



- Interact with the Help Desk to report issues and to identify and communicate agreed-upon resolutions
- Identify user education needs and coordinate with the training team to address such needs

During the implementation planning period for system modifications, we work with the Department to identify the level of change and anticipated need for on-site support. Leveraging the application adoption team's shared pool of resources, we can determine the right number and duration of on-site activities and work with the Department to prioritize resources as required.

Our PACSES SMEs work directly with Counties to improve data integrity. When Philadelphia County was preparing for the implementation of the Electronic Fund Transfer (EFT) of Foster Care/County Fees, our SMEs worked directly with their workers to help clean up the data in over 7,000 cases and handle any operational issues that were uncovered.

Assistance for Application and Technology Deployments

IV	Page IV-384	RFP Reference: 4.2 Application Adoption and System Implementation Support
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- Provide assistances for application and technology deployments

As part of our application adoption and implementation support services, we provide assistance for application and technology deployments as described earlier in this section in our response to Assistance in System Deployments.

Operational Issue Triage

IV	Page IV-384	RFP Reference: 4.2 Application Adoption and System Implementation Support
-----------	-----------------------	---

- Triage for operational issues

DPW's statewide systems are designed to standardize processes and incorporate leading practices into both the application and user workflow. The combination of a change in processes and enforcement of centralized policy frequently results in operational issues that must be addressed at a central level. These issues are frequently identified by users and may be elevated via a field support structure, on-site implementation support or user education activities, a help desk, or directly to the program office management. Under the new lot structure for systems support, Deloitte tightly coordinates with the DPW program offices to track issues, resolution status, and communications or changes back to the users.

Deloitte's approach to this coordination is customized to address the specific need of each implementation. For large statewide implementations, operational issues identified during one of the implementation phases are triaged through the Application Adoption Team. Responses are discussed, formulated, and elevated through program office or DPW management structure if appropriate. Once issues are resolved, communications



are developed by the Lots #1-5 vendor, reviewed with the Application Adoption Team, and distributed to end users as appropriate.

A different approach is employed for smaller implementations, or implementations past the immediate deployment period. Operational issues reported during ongoing operations are more challenging to track since they are raised by users in a variety of settings. The same disciplined approach is used to log and track these operational issues.

For further details on the process to triage for operational issues, refer to the required items section.

Creation of Procedures/User Documentation

IV

Page
IV-384

RFP Reference: 4.2 Application Adoption and System Implementation Support

- Lead or assist in the creation of Procedures/User documentation (as required)

Deloitte brings the right mix of experience to help the Department meet your needs and has a strong track record of collaborating with the DPW to create effective end user procedures and user documentation. These materials are created in such a manner that they can be updated and refreshed with current materials as required. An important aspect of this contract structure for the Lot #7 vendor is the handoff between program offices and the Lots #1-5 vendors. The user documentation must be clearly written and focused on the end user so these handoffs are invisible to the system users. An example of these handoffs can be found in the support that we provide for HCSIS/PROMISe.

- **HCSIS PROMISe Claim Error Resolution Tip Sheets.** For each program office that processes claims through HCSIS/PROMISe we have developed a “HCSIS PROMISe claim error resolution tip sheet” that is designed to be used both by providers and by county programs when resolving claim denials.

These tip sheets provide an overview of claim processing logic, describe the functions of HCSIS, PROMISe and CIS in claim processing and then provide a list of the common claim processing errors (ESC) encountered by the program, the system where these errors originate and steps needed to resolve the error including which helpdesk (HCSIS Help Desk, OMAP Help Desk) should be contacted if helpdesk support is needed.

As programs moved to processing of claims through the combined PROMISe HCSIS system, we worked with HP to create end user documentation that describes the overall claim process and specific functionality, while showing users how to resolve claim denials across systems.

We also developed cross system support materials as part of the implementation of the enterprise rate service functionality.



- **PROMISE Payment File Overview and Instructions.**

For program offices where county and provider payment files are generated for county paid claims we have worked with HP to develop payment file training that focuses on how to access, download, read and manipulate the PROMISE™- generated payment file.

- **Mass Rate Change Process Guide.** For the ODP-MR and OCDEL-EI programs with access to mass rate change functionality we have created Mass Rate Change Process Guides that describe the interaction of HCSIS and PROMISE through the Enterprise rate services and then outline the steps that need to be completed in both HCSIS and PROMISE to complete a Mass Rate change.

In addition to these specific examples, the following table provides an overview of typical user documentation that we create for end users. The user documentation provides detailed information for end users to understand both the business process and step by step details of procedures for a system. Under the new operating model, we anticipate coordinating with Commonwealth staff and the Lots #1-5 vendors to prioritize the creation of end user documentation as necessary.

“I wanted to acknowledge the PELICAN EI training team that supported the Westmoreland IU 7 for the training and "go Live" ... the leadership of IU 7 provided very positive feedback and the support they and their staff received. They brought this to my attention several times during the week. During the training their staff were very complementary about the way in which the training was delivered and how the staff supported them. throughout the training and go live. These efforts will confirm that the Preschool staff that are using PELICAN for the first time have a successful start. Please let them know that their efforts were very much appreciated by the Preschool staff and the Bureau.”

EITA Staff

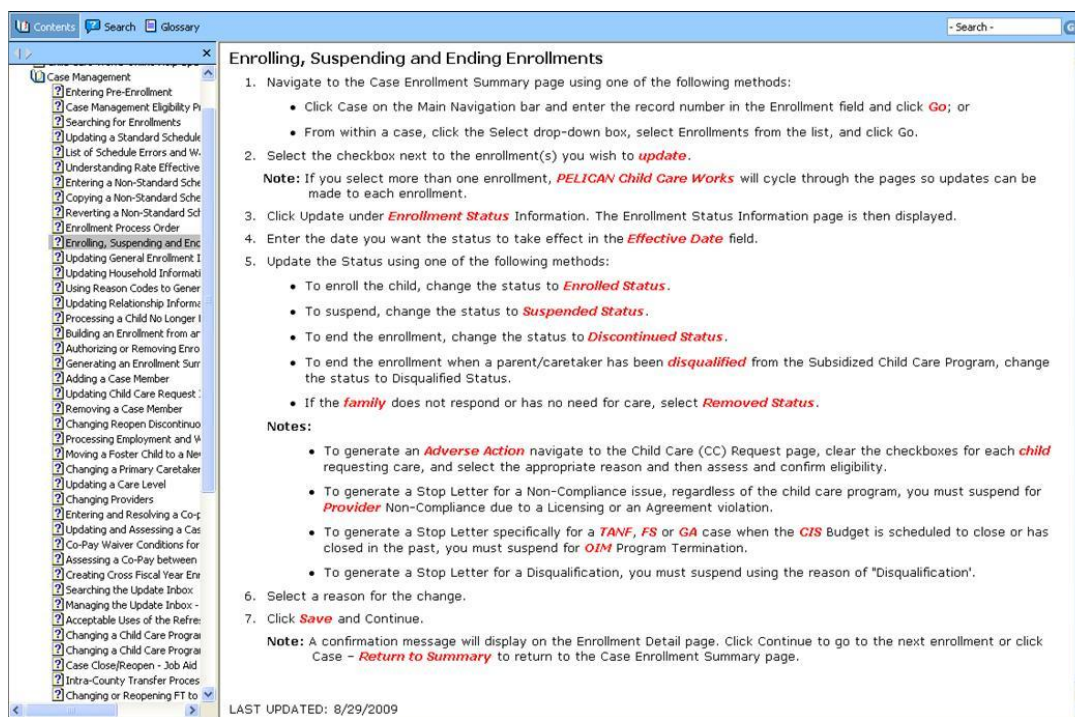
Documentation	Deloitte Attention to User Documentation Helps DPW System Implementations
User Guides/Presentations	Background material required to perform tasks including objectives, process flows, terms, concepts, related policies, roles and responsibilities, review questions, list of related transactions, and business scenarios
Business Process Workflows	Since business practices are often impacted by the technology solution, the user education materials cannot just focus on what button to click in the system. The user education materials include process based diagrams and workflows that speak directly to the topic of changing business processes and are easy to read and understand
Computer-based and/or Web-based Tutorials	Self-paced learning modules created using Captivate, ToolBook or PACSES TV, accessed through an online learning management system, Commonwealth approved Web site or CD-Rom. Includes course objectives, process flows, terms, concepts, related policies, review questions, and business scenarios
Online Help	Screen and field level documentation available online. Includes background, prerequisites/dependencies, and the step-by-step procedure, and can include field definitions and appropriate field values

Documentation | **Deloitte Attention to User Documentation Helps DPW System Implementations**

Tip Sheets/Job Aids One-page reference materials that provide end users a quick snapshot of key steps or activities to perform a process

Figure 6.7-37. User Documentation Examples.

Our long standing relationship with DPW has allowed us to further refine and enhance the procedure and user documentation that accompanies system implementations. In the last five years, we have worked with the Department to elevate the quality of user education materials, establishing DPW wide standards using Adobe Robohelp and Captivate. By bringing our vast user education experience, industry leading practices, and lessons learned from hundreds of systems implementations, we worked with DPW to evaluate the documentation tools in the market. We look forward to continuing this relationship and evolving the user documentation tools to provide the most proficient and effective user documentation that matches the innovation and forward thinking nature of the Department in relation to system development. The following graphic provides an example of the user documentation, created using Adobe Robohelp, in PELICAN Child Care Works.



PA_DPW-034

Figure 6.7-38. Example of Online Help.

We bring broad experience with user documentation tools and leverage that knowledge to support the creation of procedures and user documentation that support DPW's diverse end user groups.



Qualified Personnel

IV

Page
IV-384

RFP Reference: 4.2 Application Adoption and System Implementation Support

DPW requires that the selected Lot #7 Offeror have suitable qualified personnel resources, facilities, and supplies necessary to support the application support services (relevant services as required), shared and direct technical services outlined in this RFP. The Offeror will be required to align resource capacity to meet demands and to successfully support multiple engagements and business priorities independent of specific program, business function, and/or in-scope systems. Reference the Required Work Skills provided in Section D1 of the RFP.

As indicated through the table in 6.3.2.1, where we list detailed information about the experience of our staff, we have the ability to exclusively deliver hundreds of highly skilled individuals, with current DPW experience, to provide information technology services to DPW. In *Tab 8.0, Personnel*, we provide resumes and skill summaries of our staff.

Deloitte realizes that unplanned situations occur, where immediate action is required to fill positions. This is not an unusual situation for our firm; as our client's business needs have evolved, we have had to deal with this issue many times. Our response to these situations has been to exercise a rapid deployment strategy. This strategy effectively increases the overall population for resources by broadening the subcontractor pool. When coupled with our internal network and existing contractor base, this reduces the overall time to market of potential candidates.

For example, using this strategy, we recently helped stand up a technology solution to support Pennsylvania Fair Care by quickly pulling together a cross-functional team and deploying within three weeks of the project start. At the same time, we led an effort with the federal government to establish a technology solution for the high risk pool; that effort involved forming a 50 person team in two weeks and deploying in less than three months. We intend to leverage our rapid deployment strategy as part of the staffing strategy approach for DPW. As a result, we have the ability to scale up and scale down rapidly to address changes in DPW's information technology needs.

The ability to allocate the right resources is fundamental to the success of any business. The right resources often are those that have specific skills which are in high demand and sometimes difficult to locate. Deloitte's services are routinely categorized as those in high demand, and we are proficient at locating and allocating these specialized resources. When a skill is identified as being something that is in strong demand for our clients, we label this as a 'hot' skill and execute a campaign to focus on the attracting and hiring of those skill sets through our internal recruiting and staffing network. Alternatively, we can also turn to our supplier network to provide those skills for us. It is a credit to our firm that because of the diverse types of services and projects we perform, Deloitte attracts individuals with critical skills, even when market competition is difficult.

We understand that demands for staff needs can vary throughout the life-cycle of projects and also at times can place great demands on the ability of providers to allocate sufficient resources. Through our own qualified internal resource pool, internal



recruiting capabilities and a broad subcontractor network, Deloitte is well suited to meet the resource needs of the Commonwealth of Pennsylvania, particularly to meet peak demand periods.

Collaboration

IV

Page
IV-385

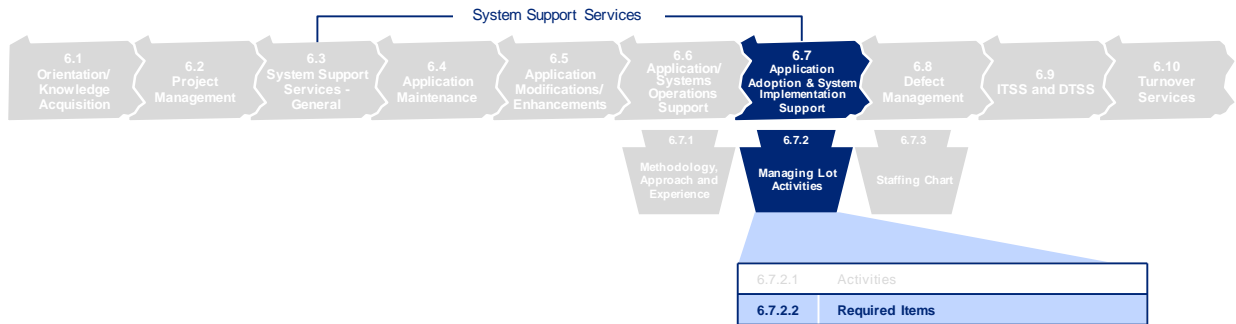
RFP Reference: 4.2 Application Adoption and System Implementation Support

NOTE: The selected Offeror must work collaboratively in the assessment and implementation of any application support services activities. The selected Offeror agrees to cooperate with any other selected Offerors, and shall not commit or permit any act that may interfere with the performance of work by any other Contractor.

Deloitte has been a trusted advisor of DPW's for over 30 years. We will work collaboratively to assess and implement application support services activities and facilitate coordination amongst other selected Offerors to form one cohesive team.



6.7.2.2 Required Items



PA_DPW-254b_4

We apply a structured approach to application adoption and system implementation using DPW’s SDM methodology, which we extend and tailor to better meet DPW stakeholder and end user needs in the new operating model. Our proposed staff understands DPW’s business and the specific needs of each program area and end user group. Our approach better supports DPW and the end user in the new multi-vendor, multi-system operating model and improves end user adoption.

Our flexible implementation approach allows us to tailor implementation support and user adoption to the specific project, while promoting a collaborative environment between the selected offerors, program offices, stakeholders, and Deloitte. Leveraging our strong program and end user knowledge, we envision building on the past successes in a coordinating role to assist the Program Offices with the disparate implementation activities that must occur across the entire project. We highlight the key features of our approach to Application Adoption and System Implementation Required Items in Figure 6.7-39.

Features	Benefits
<p>We bring the right resources that complement our technology practice and can speak to the functional side of your business to support each system implementation as required</p>	<ul style="list-style-type: none"> Improves user adoption Reduces implementation risk
<p>Aligning with the Department’s SDM methodology, our approach can be tailored to each program offices’ needs</p> <ul style="list-style-type: none"> Tailoring accounts for specific characteristics of each end user group Consistent structure promotes collaboration and enables effective coordination across vendors 	<ul style="list-style-type: none"> Better supports DPW stakeholders and users in the new operating model Reduces implementation risk



Features	Benefits
<p>Our staff's knowledge and experience means they can effectively triage issues from the field and determine the cause and impact upon issue identification</p> <ul style="list-style-type: none"> • Staff do not just pass information from the field back to the technology team • Up front analysis helps uncover system anomalies or operational issues right away and identify the right next steps for resolution 	<ul style="list-style-type: none"> • Quicker resolution of operational issues • Reduce burden on technology team to research each issue
<p>Close collaboration with DPW program offices, BIS and respective Lot 1-5 vendors during the timely reporting and resolution of anomalies discovered during implementation or adoption activities</p>	<ul style="list-style-type: none"> • Increases user adoption and decreases user frustration • Better service to stakeholders and users

Table 6.7-39. Key Features and Benefits of Our Approach to Required Items.

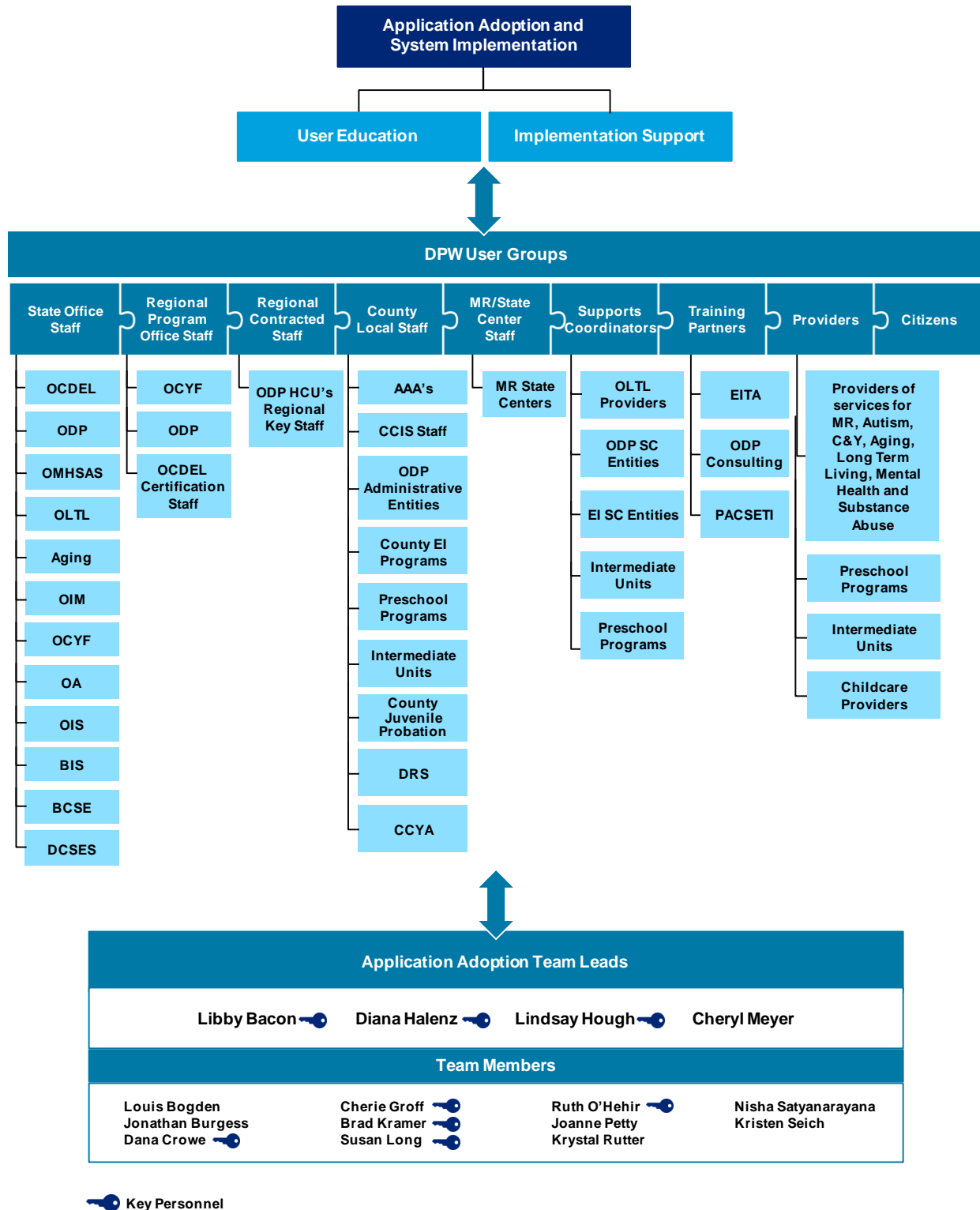
Required Resources

IV	Page IV-385	RFP Reference: Application Adoption and System Implementation Support Required Items
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The Selected **Lot #7** Offeror must describe in detail: 1) The resources required to support Application Adoption and Systems Implementation Support tasks including skills sets and experience, and 2) The associated organizational chart.

The resources required to support Application Adoption are provided in the following section: Staffing Chart. Skill sets and experience are listed by role in Section 8.4 Staffing Narrative.

The Application Adoption and Systems Implementation team is organized into a team focused on user education and a team focused on implementation support. Across those teams, knowledge is developed in staff on each of the diverse user groups supported by DPW applications. Individuals with the appropriate skills and experience are pulled into an initiative as needed to support system modifications.



PA_DPW-428_12

Figure 6.7-40. Application Adoption and Systems Implementation Organization Chart.

Team members focused on Application Adoption and Systems Implementation build knowledge of end users as well as develop experience in competencies such as communication and field support.

Coordination to Provide System Adoption and Implementation Support

IV

Page
IV-385

RFP Reference: Application Adoption and System Implementation Support Required Items

The Selected Offeror of **Lot #7** must provide a detailed description of how they will effectively coordinate and work with designated DPW stakeholders, third party vendors, and other selected Offerors (if applicable) to: 1) Provide assistance for systems adoption and implementation support,

The success of systems deployed by DPW is dependent on the degree of user adoption of those systems. DPW understands the importance of technology adoption, as demonstrated by the track record of implementation support provided to end users. We commend DPW in its choice to include application adoption and system implementation as part of Lot 7 reflecting your sense of importance for this function. Over the past ten years, the majority of DPW initiatives have been deployed using either dedicated implementation support or a level of support provided through the base implementation support services contracts for HCSIS, CIS, PELICAN and PACSES. This support has been undertaken through coordination with other vendors that include ODP Consulting (formerly OCS), EITA for training and user adoption activities for the Early Intervention and Early Learning programs, and PACSETI for training for child support.



PA_DPW-460

Figure 6.7-41. Deloitte's Support Activities for Program Office and Lots #1-5.

Deloitte understands the DPW's implementation approach and processes and is prepared to provide the support activities identified in the RFP. We have successfully performed these services for the last 10 years and can instantly support these activities under the new operating model.

Implementation activities are defined by this team starting with the planning phase, through rollout, and for a defined period of time after implementation. Our approach, and the tools that we use, are tailored for each initiative, considering the user groups impacted, their size and geographic locations, experience with the existing systems, and degree of business process change. Our assistance to stakeholders falls within the key phases of pre-implementation support through user education, cutover, and post implementation support. The following paragraphs outline details for this coordinated approach through each of the major phases.

Implementation Planning

For each implementation, we work with the appropriate vendors, stakeholders, and BIS to develop a roadmap for success, continuing the track record of successful implementations undertaken by DPW to date. Using representatives from each of the vendors, program offices, and BIS, we develop a cross-functional application adoption team to provide input to the implementation plan, communications plans, and user education plans and materials. This team meets on a regular basis (normally bi-weekly) to review initiatives, tasks, activities, implementation risks and issues, and develop corrective action plans.

One of the first tasks for the application adoption team is to define what success is and how to measure progress. The team collaborates to create a set of benchmarks which lay the groundwork for a common understanding of the effectiveness of overall implementation efforts through the duration of the project.

Another critical piece of implementation planning is the delineation of roles and responsibilities for each implementation. Our experience shows that role and responsibility definition is critical when working on implementations across vendors, program offices and stakeholders. Deloitte works within the application adoption team structure to facilitate discussions and clarifications around roles and responsibilities to execute a successful implementation. Task and activity definition and due dates for major activities and milestones are also set by the team during the implementation planning period.

We coordinate and monitor the overall implementation from the planning through post-implementation phases through the use of scorecards tailored to each initiative. When items are lagging or presenting a risk to the overall success of the project, we elevate such items through the project governance to mitigate the risk that is inherent in a multi-party implementation. The following illustration shows a sample scorecard tracking activities and responsibilities across vendors, following a model that has resulted in successful implementations that we have led with the Department over the past 10 years.

Our application adoption and system implementation support activities align with the Department's SDM methodology

- We follow the same disciplines as our business analysis and technology teams, in keeping with CMMI level 3 standards
- As part of the larger methodology, our team supports the Commonwealth and Lots #1-5 vendors to plan, coordinate, and execute successful system adoption for end users
- Our experience working in similar project environments demonstrates our ability to align our methodology and approach to meet your needs



Key		Enterprise Incident Management Implementation Support			
Not on-track to meet deadline	R	PELICAN EI is scheduled to be implemented on 00/00/0000.			
Concern that deadline may be missed	Y				
On-track to meet deadline	G				
Complete	X				

Mission	Rating	Responsible Party	Original Due Date	Revised Due Date	Comments
Train Users					
Create training materials	G	Vendor A	6/30/2011		
Schedule training and locations	Y	Vendor A	7/31/2011		Coordination with regional sites underway, not finalized
Conduct Training sessions	G	Vendor A	9/30/2011		
Establish Day Zero Data					
Coordinate data collection for provider profile setup	Y	Vendor A	6/30/2011		Responses received from 25% of providers
Perform role mapping for users by rollout wave	Y	Vendor A	7/31/2011		
Set up system access for users	Y	Vendor B	8/15/2011		Dependency on Role Mapping activity
Conduct Post-Implementation Support					
Establish first response center	Y	Vendor A	10/1/2011		Outstanding schedule coordination issues
Track and coordinate issue resolution	G	Vendor A	Ongoing		
Monitor user adoption	G	Vendor A	Ongoing		

PA_DPW-025_3

Figure 6.7-42. Example Scorecard for Cross-Vendor Implementation Tracking.

Deloitte's implementation tracking scorecard provides a snapshot of key activities and helps the DPW team manage across the moving parts of an implementation.

Finally, the application adoption team establishes a single point of contact for client implementation sites and end-users. This single point of contact reduces the possibility of conflicting information about the implementation and the resulting increase in issues during the implementation.

User Readiness

Another important function of the application adoption team is to develop the criteria used to establish operational readiness before rolling out new functionality. For multi-site implementations, the team also develops criteria and metrics to verify user readiness for sites that are part of the implementation.

These criteria are used to develop a detailed Readiness Checklist. These elements serve as both activities that must be performed and criteria for determining when onsite operations have met the readiness standards set by the application adoption team. This team incorporates a review of readiness materials in their regular meetings to determine interim and final readiness for the go-live.

To create these readiness criteria, members of the application adoption team collaborate to identify the impacts of the new system on staff and business processes. Once these impacts are identified, recommendations on how to address each impact are documented. Deloitte's experience with the user groups impacted by the DPW applications allows us to use pre-existing tools and templates for identifying and tracking these critical impacts, and compiling these recommendations into a detailed

Readiness Checklist. The following illustration shows a sample readiness checklist for a county-level implementation.

Task	Task Owner	Person	Date Completed	Notes & Questions
Implementation				
Create County PELICAN EI Implementation Team: <i>Identify Implementation Manager</i> <i>Identify Training Coordinator</i> <i>Identify County Provider Readiness Liaison</i>	EI Coordinator			See Introduction of IPT for list of responsibilities
Establish vehicle for communicating updates re: PELICAN EI Implementation with County and SC Entity Implementation Team	Implementation Manager			This should be an in-person meeting
Copy and distribute the Implementation Planning Toolkit (IPT) for the County and SC Entity Implementation Team	Implementation Manager			All materials are available to download on the LMS
Review the following chapters of the IPT with the County Implementation Team: <i>Chapter 3: System Overview</i> <i>Chapter 4: Workflow Processes</i> <i>Chapter 5: Implementation Plan & Schedules</i> <i>Chapter 6: Readiness Checklists</i> <i>Chapter 8: Training Approach & Plan</i>	Implementation Manager			Please contact your EI Coordinator, EI Advisor or BEIS directly if you would like assistance discussing these topics
Identify local BP Administrators for County and SC Entities	Implementation Manager			
Establish vehicle for communicating updates re: PELICAN EI Implementation with county and SC entity staff on a monthly basis	Implementation Manager			This should be an in-person meeting
Verify receipt of conference call meeting invitation emails (wave 1 only)	Implementation Manager			
Schedule a room to conduct pre-implementation conference calls (wave 1 only): <i>- Confirm that the room has a phone with speaker capabilities</i> <i>- Confirm that the room is internet accessible during the meetings</i> <i>- Reserve a project for meetings (if necessary)</i>	Implementation Manager			
Provider and Evaluator				
Conduct PELICAN EI Provider Kick-off Meeting: <i>- Distribute provider survey</i>	County Provider Readiness Liaison			Set expectation for survey to be returned in two weeks

PA_DPW-379

Figure 6.7-43. Example Readiness Checklist.

Deloitte approach provides a robust checklist documenting the activities that must be performed and criteria for determining when onsite operations have met the readiness targets for DPW rollouts.

Deloitte’s knowledge of the user groups’ characteristics and experience with implementation “hot spots” allow us to identify where an implementation could run into issues. Implementation planning activities build on that knowledge to target resources toward those hot spots to mitigate the implementation risks.

Pilot

Pilots are an integral part of the implementation planning and execution process when functionality is rolled out statewide or when processes require significant change to existing user procedures. Our experience shows that incorporating lessons learned from a pilot phase is an invaluable aid to the success of the statewide implementation. Pilot implementations have been used successfully across the DPW systems for OIM, OCDEL, ODP, OLTL, and most recently for the Performance Improvement Module for PACSES and Early Intervention Financial Management and Preschool implementations.

We bring our experience to the application adoption team to facilitate discussions to determine when a pilot should be conducted, designing the scope and duration of the pilot implementation, gathering and incorporating lessons learned, and modifying the statewide implementation plan. As part of the application adoption team activities, we



coordinate review and vetting of the recommendations with stakeholders, the program office(s) and BIS with an eye to economy, efficiency, and overall achievement of DPW's objectives.

The application adoption team also designates or provides staffing for a Pilot Command Center to facilitate central coordination of Pilot activities. The Command Center may be virtual or physical; in either case serves as the hub of Pilot operations to make day-to-day decisions, provide support and guidance to staff, and evaluate the success of Pilot activities. Establishing the Command Center during the Pilot also serves to test its effectiveness, answer questions that may arise in training and outline any potential changes needed.

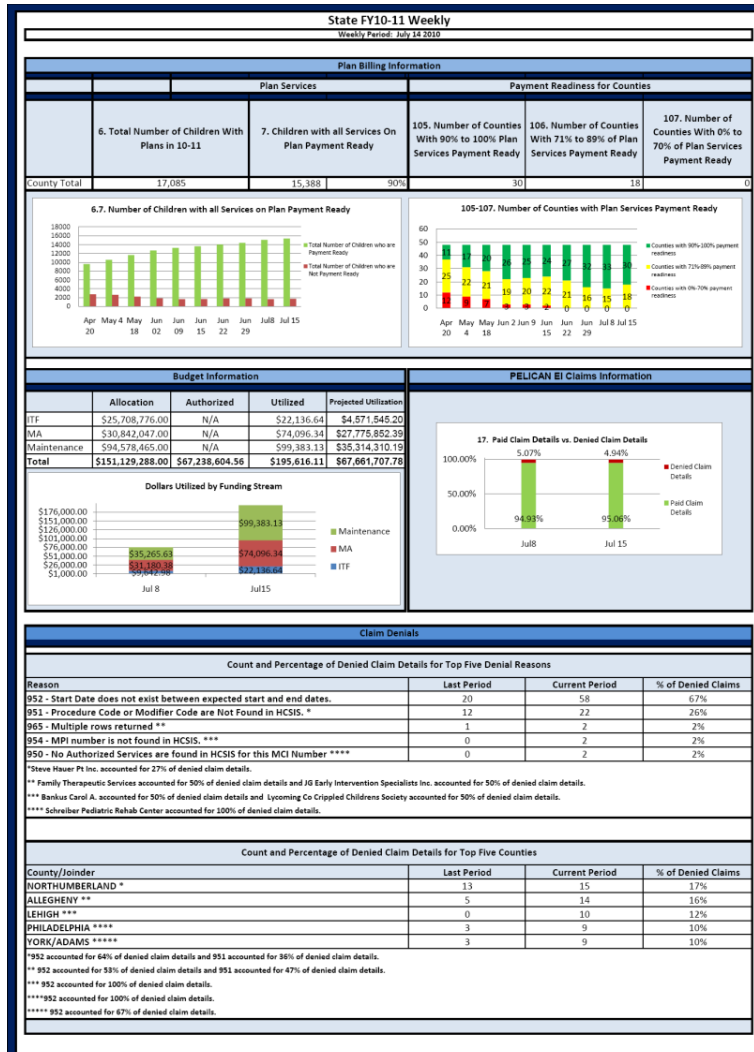
Post-Implementation Support

Systems adoption is most critical directly after deployment. The right post-implementation user support can dictate the success or failure of user adoption and by extension, the initiative. We use a data driven approach to monitor the status of implementations and user activity. We have found in past implementations that properly designed metrics can quickly identify systematic issues with users' adoption of the technology. For example, by monitoring the number of records in the system against the number of expected records, and analyzing that data against the implementation plan, trouble spots can quickly be identified and addressed to head off potentially more significant issues. We understand the importance of building relationships with users, understanding their needs and the work they do in the systems we support.

"I have been reviewing cases all day and wanted to let you know that I owe it to your PowerPoint presentation that worked like magic. I am so impressed with the simple fact that I am finally viewing the majority of cases. Thanks to you a lot of progress was made... Whew-hoo!"

Lyn Trotter
Public Health Advisor, Division of TB & STD

We have successfully bridged the gap with users through User Education activities, Help Desk support, field visits, computer labs and conferences. The following illustration shows post-implementation metrics for a recent implementation.



PA_DPW-306

Figure 6.7-44. Example Implementation Tracker.

Color coding makes at-a-glance analysis of the status easy, and aids in pinpointing "red" areas to focus resources' efforts.

Even with excellent planning and preparation, issues are bound to arise during any implementation. Through supporting many deployments for DPW, we have found that the key to resolving this challenge is to develop and deploy structured mechanisms for issue tracking and rapid resolution. Our application adoption team follows the same CMMI level 3 standards that we employ for our system development activities to manage and track system issues during post deployment.

The application adoption team plays a key role in issue identification and resolution. During this time period, application adoption team meeting frequency increases, and touch point calls may be conducted daily. ATS is used to promote transparency and allow application adoption team and stakeholders to monitor the issues being raised and steps taken to attempt to resolve them. The issue tracking tool is used to track the status of the issue (created, in analysis, closed, etc.). Deloitte analyzes these descriptions to identify trends in the types of issues users are having.



Results are communicated to the business analysis and information technology teams to identify solutions, next steps, and ownership of each issue.

Based on the issues and problems that are reported, Deloitte identifies trends that could be resolved with user education or additional documentation. At the end of the go-live implementation support period, the application adoption team summarizes the issues that have arisen, report the results of the issues and performs knowledge transfer with appropriate client counterparts.

Our own culture and style helps our clients obtain results. Deloitte takes pride in our recognition as a firm that is willing to roll up our sleeves to get the job done. Our proactive, collegial approach carries over to our business partner relationships and facilitates a continual drive to a successful implementation. Our collaborative working style and our broad experiences with implementation support and user adoption put Deloitte in the position to facilitate across vendors and continue the success that the Department has grown accustomed to with system implementations.

Triage and Resolve Operational Issues

IV

Page
IV-385

RFP Reference: Application Adoption and System Implementation Support Required Items

The Selected Offeror of **Lot #7** must provide a detailed description of how they will effectively coordinate and work with designated DPW stakeholders, third party vendors, and other selected Offerors (if applicable) to: 2) Triage to resolve operational issues,

DPW's statewide systems are designed to standardize processes and incorporate leading practices into both the application and user workflow. The combination of a change in processes and enforcement of centralized policy results in operational issues that must be addressed at a central level. These issues are frequently identified by users and may be elevated via a field support structure, on-site implementation support or user education activities, through a help desk, or may be elevated directly to the program office management. Under the new lot structure for systems support, vendors must be tightly coordinated with the DPW program offices to track issues, resolution status, and communications or changes back to the users.

Deloitte's approach to this coordination is tailored to specific implementations. For large statewide implementations, operational issues identified during one of the implementation phases are triaged through the Application Adoption Team. Responses are discussed, formulated, and elevated through program office or DPW management structure if appropriate. Issues are logged into an issue tracker for aging, and follow up,

What the Counties are saying about our SMEs:

"I just want to thank all of you for coming to Bucks this week. You did a tremendous job, aiding my staff with their questions and concerns and with listening to our suggestions and requests. I cannot tell you how helpful this was to all of us, but it was also nice to know that we have comrades at BCSE and PACSES..."

Bucks County
DRS Director



and a lead resource is assigned to the issue. If issues are purely operational, they are resolved with the appropriate stakeholders and communications are developed by the Lots #1-5 vendor, reviewed with the Application Adoption Team, and distributed to end users as appropriate.

A different approach is employed for smaller implementations, or implementations past the immediate deployment period. Operational issues reported during ongoing operations are more challenging to track since they are raised by users in a variety of settings. The same disciplined approach is used to log and track these operational issues in ATS. However, since there may not be a dedicated Application Adoption team for these issues, they are logged for inclusion in the ongoing team meetings for discussion and resolution. A similar process for issue resolution, communication and closure is followed for these issues as is followed for issues identified promptly after implementation and resolved through the Application Adoption Team structure.

Report and Resolve Anomalies Discovered during Implementation or Adoption Activities

IV	Page IV-385	RFP Reference: Application Adoption and System Implementation Support Required Items
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The Selected Offeror of **Lot #7** must provide a detailed description of how they will effectively coordinate and work with designated DPW stakeholders, third party vendors, and other selected Offerors (if applicable) to: 3) Report and resolve anomalies discovered during implementation or adoption activities

Our experience managing multiple threads involved in complex implementations undertaken by DPW is key to continuing the successes the Department has achieved in the past. Our approach to supporting the Lots #1-5 vendors preserves the leading management structure that has been used successfully in the past and builds on our collaborative culture to include different considerations for the coordination that will be required going forward. We bring demonstrated tools to the table to facilitate communication, coordination, and to minimize the risk to DPW.

As users adopt the system and begin to use it for their daily activities, issues arise that result from system errors or user actions that were unanticipated. Deloitte facilitates identification, triage and resolution of technical and system anomalies through a centralized monitoring and control process that involves the selected vendors for the lots, representatives from the program offices and BIS.

System issues are reported to this cross-functional team through the help desks, program offices, trainers and implementation team. Issues that are identified are logged in an issue tracker and are entered in ATS, if warranted. New issues are discussed in

Our PACSES team provides level 2 and 3 supports to successfully manage high volumes of support requests

- The PACSES Help Desk records over 9,200 PSRs annually – an average of over 750 per month
- Most of these PSRs are resolved within 48 hours – giving your users the answers they need, when they need them



the Application Adoption management meetings and ranked in order of importance. Ownership is assigned to each issue and milestone dates are set for research and/or next steps.

IV

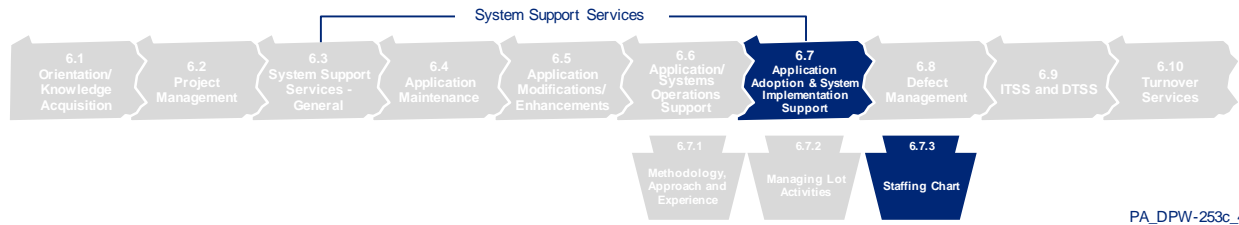
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IV-385

RFP Reference: Application Adoption and System Implementation Support Required Items

NOTE: *The selected Offeror will assist in assessing the impact on other applications for any modifications to the in-scope systems. Should there be multiple vendors involved in the support of other applications; the selected Offeror must work collaboratively in the assessment and implementation of any application changes that impact other applications. The selected Offeror agrees to cooperate with any other selected Offerors, and shall not commit or permit any act that may interfere with the performance of work by any other Contractor.*

Deloitte has been a trusted advisor of DPW's for over 30 years. We will work collaboratively to assess the impact on other applications for any modifications to the in-scope systems and facilitate coordination amongst other selected Offerors to form one cohesive team.

6.7.3 Staffing Chart



PA_DPW-253c_4

II	Page II-4	RFP Reference: II-3. Work Plan
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Provide staffing charts for the ongoing operational Activities and Tasks that show the proposed staff by labor category and job function.

Provide similar information for any subcontractors that are proposed.

Provide a role/description table for the Offeror’s proposed staffing roles for all Activities and Tasks to support the requirements of the RFP. A description of the duties and functions to be performed by the staffing role must be indicated.

The resources identified for Application Adoption and Implementation Support Services are listed in the following figure. More information about each one of these individuals, including resumes and description of responsibilities, can be found in Tab 8.0.

Proposed Staff	Labor Category/Job Function
Bacon, Elizabeth Jeannette	Application Adoption Lead
Halenz, Diana Marie	Application Adoption Lead
Hough, Lindsay	Application Adoption Lead
Meyer, Cheryl Ann	Application Adoption Lead
Groff, Cherie	Sr. Implementation Specialist
Crow, Dana	Sr. Implementation Specialist
Long, Susan	Sr. Implementation Specialist
Bogden, Louis	Implementation Specialist
Burgess, Jonathan N	Implementation Specialist
Kramer, Brad	Implementation Specialist
O'Hehir, Ruth Ann	Implementation Specialist
Rutter, Krystal	Implementation Specialist
Satyanarayana, Nisha	Implementation Specialist
Seich, Kristen Leigh	Implementation Specialist

Figure 6.7-45. Application Adoption and Implementation Support Resources.

6.8 Defect Management



PA_DPW-200h

II	Page II-2	RFP Reference: II-3. Work Plan
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Describe in narrative form your technical plan for accomplishing the work. Use the task descriptions in **Part IV** of this RFP as your reference point.

IV	Page IV-299	RFP Reference: Systems Architecture Lot #6 and Technical Support Services Lot #7
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Defect Management: effectively managing defects throughout the software development life cycle (SDLC) and live production environments to deliver quality end products and address emergency situations that must be resolved immediately.

Additional RFP Reference: Systems Architecture Lot #6 and Technical Support Services Lot #7, Page IV-319

Successful defect management is a key goal for the maintenance and operation of the DPW enterprise systems. As the Lot 7 vendor, Deloitte brings a unique combination of business and technology expertise that will allow us to track and manage defects through the Software Development Life Cycle (SDLC) and in Production. We will implement a rigorous process to manage defects when they occur and take steps to prevent defects from happening in the future.

Introduction

Deloitte, a premier Health and Human Services systems integrator, brings you the level of expertise needed to maintain, operate and modify the DPW IT systems. We understand that the people of the Commonwealth must have a system that supports reliable business operations and is available 24/7. The department systems provide services to over four million citizens who need the specific services of child care, public assistance, home and community health services, and child support. A persons well being depends on whether the systems that administer these services work as designed, are timely, and defects are addressed in an organized fashion.

Unique and Distinguishing Factors

- Tailors Defect Prevention approach including recent implementation of tools to support code quality and security, and procedural improvements. Improvements based on analysis of DPW data and trends.
- Continuous improvement initiative includes defect analysis and reporting.
- Provides visibility to defects in a DPW user friendly format including impact, trends and analysis to improve transparency and quality of end product.



For example there are people that depend on receiving heating assistance in the cold winter months, people that are waiting for their benefit check so they can provide for their families, and custodial parents that rely on the income to support their children.

Defect management is essential to making sure the critical services and benefits that the department provides are not delayed in any way as a result of an error in the systems. Defect management is also the process for identifying, categorizing, resolving, and managing defects or failure to conform to the specifications or a failure to function/operate properly.

Features	Benefits
Process centric approach to defect management provides accurate, detailed analysis, and reporting of defect information	<ul style="list-style-type: none"> • Reduces defect density over time • Improves transparency and accountability of defects
Utilizes a centralized repository and system to define and report on defects	<ul style="list-style-type: none"> • Improves transparency and accountability of defects to the appropriate stakeholders in DPW and for other lot vendors responsible for resolution
Prevention based software development procedures	<ul style="list-style-type: none"> • Reduces the overall defects that are identified and improves the overall software quality thus reducing the cost of defects
Proactive identification, monitoring, and resolution by providing DPW with a repository of defects. Allows DPW to monitor software quality as new application code is introduced into the system	<ul style="list-style-type: none"> • Improves transparency and accountability of defects • Improves quality of end product

Figure 6.8-1. Deloitte Defect Management Features and Benefits.

Deloitte’s approach to defect management is grounded in a well defined process centric approach which provides the department with transparency and accountability for managing and resolving defects at each phase of the software development life cycle. Our methodology and approach includes defining, classification, resolution, and monitoring of defects as they are identified. As the Lot #7 vendor we are overall responsible for an enterprise defect management system and tracking of defects throughout each phase of the software development life cycle and latent production defects across Lots 1-7. Our guiding principles of defect management include the following:

- **The primary goal is to prevent defects.** Where this is not possible or practical, the goals are to both find the defect as quickly as possible and minimize the impact of the defect.

Defects if not managed can be very costly and impact critical benefits from being received by citizens:

- Finding and fixing a defects after delivery is 100 times more expensive than finding and fixing it during the requirements and design phase
- About 80% of avoidable rework comes from 20% of the defects
- About 80% of the defects come from about 20% of the modules of code
- About 90% of production downtime comes from about 10% of the defects



- The defect management process **should be risk avoidance driven** -- i.e., strategies, priorities, and resources should be based on the extent to which risk can be reduced.
- Defect measurement should be **integrated into the software development process** and be used by the project team to improve the process. In other words, the project staff should capture information on defects at the source. It should not be done after-the-fact by people unrelated to the project or system.
- As much as possible, the capture and analysis of the **information should be automated.**
- The process for Defect management will be information **driven to improve the process.**

Deloitte’s understanding of DPW systems and where the challenges and risks are for defects within the application will reduce the overall cost in resolving defects in the system. Since we have been maintaining and enhancing these systems we have a unique understanding of trends of defects and where the trouble spots are within the applications.

Below is a table outlining some of the defect management considerations and impacts to the business systems if defects are not managed aggressively.

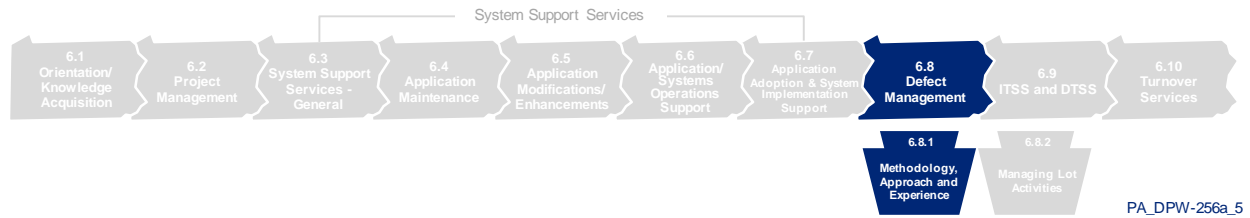
DPW Application	Defect Management Characteristics
eCIS	The eCIS system is a .NET, Web-based system with functions such as application entry, case management, document imaging, call center ticket tracking, case narratives, data exchange, financial management and case worker dashboard functions. Defects within these areas can have a range of adverse affects on worker efficiency with the most severe ultimately resulting in impacts to case creation and case maintenance activities.
CIS	CIS is DPW’s eligibility mainframe system which supports several functions such as eligibility determination and benefit calculation, case creation and maintenance, reporting, and overnight batch processing. Defects in any of the CIS screens, real-time interface calls to eCIS, or critical nightly batch processes have the chance to impact case worker process flows and ultimately result in the inability to issue benefits in a timely fashion.
COMPASS	COMPASS is a self service, Web-based application which allows clients to screen for potential eligibility and apply for DPW benefits by dynamically scheduling questions based upon the selected programs. Defects within the COMPASS system include items such as scheduling incorrect questions for specific programs, not routing applications to the correct departments, or any system errors that would impact a client’s ability to successfully complete an application.



DPW Application	Defect Management Characteristics
<p>PELICAN</p>	<p>Pennsylvania’s Enterprise to Link Information for Children Across Networks (PELICAN) is the Department of Public Welfare’s initiative to integrate the Department’s child care programs under a single management information system. PELICAN is composed of the following Web-based systems: Child Care Works (CCW) – processes subsidized child care cases; PA Pre-K Counts (PKC) – facilitates local Pre-Kindergarten partnerships; Keys to Quality (K2Q) – brings together organizations and programs and helps address quality improvement and professional development; Provider Certification (PPCS) – manages new facilities, renewals and inspections; and, Early Learning Network (ELN) – gathers information on early childhood programs and the development of children to help build and maintain high quality early childhood programs.</p> <p>Defects may impact ability to maintain client information, assess eligibility to receive subsidized child care benefits, enroll children, properly calculate and make provider payments, inspect and certify providers, reporting accuracy and maintain fiscal information. PELICAN has interfaces with other DPW systems such as CIS, COMPASS, HCSIS, MCI (Master Client Index), and MPI (Master Provider Index), as well as external systems such as Pearson and PDE (Pennsylvania Department of Education). Deloitte’s experience in how these systems and complex interfaces work together help us identify defects, assess functional and performance risks and select test scenarios to execute when performing modifications and enhancements.</p>
<p>HCSIS</p>	<p>HCSIS is a Web-enabled system that enables the creation, monitoring, and management of services provided through state administered home and community based services. Supporting system functionality promotes provider involvement through provider registration, claims creation and processing, and incident creating and tracking. Defects within HCSIS have the ability to not only impact the timeliness of provider payments, but also the quality of the services provided to consumers.</p> <p>High risk HCSIS defects impact claims processing, financial management, and service quality tracking (incident management). The system also interfaces with other core eligibility and financial management systems such as, but not limited to, CIS and PROMISE™ giving high risk defects the ability to cause further downstream negative impacts. Deloitte’s unique understanding of the HCSIS functionality position it well to potentially identify and resolve specific system defects before they impact key internal and external stakeholders and systems.</p>
<p>PACSES</p>	<p>PACSES consists of one mainframe system which conducts the intake, paternity and order establishment, collections, and enforcement of child support. The other ancillary systems provide customer services, paternity tracking, information management, and performance management. The defects in the PACSES business systems may impact whether a custodial parent receives their child support payment when they are scheduled to receive it.</p> <p>Defects that are high risk include areas such as case processing, financial distribution, key interfaces to the statewide disbursement unit and financial institutions, and areas where PACSES integrates with the statewide Eligibility system through the IVA and IVD interface. Deloitte’s unique understanding of these subsystems will aid in our ability to prevent, quickly pinpoint and resolve specific defects that may occur.</p>

Figure 6.8-2. DPW Application Defect Understanding.

6.8.1 Methodology, Approach and Experience



II	Page II-3	RFP Reference: II-3. Work Plan
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Where possible, the Offeror should provide specific examples of methodologies or approaches that will be used to fulfill the various requirements, how these methodologies will be adapted for this contract and implemented, and examples of the Offeror's similar experience and approach on comparable projects.

Methodology

The Deloitte methodology for defect management is included in our overall Software Development Methodology (SDM) as a part of software quality and software testing for application maintenance and modifications. Our methodology for defect management is founded on our software quality principles using the CMMI, ITIL process framework and our SDM methodology. Deloitte will follow its standard methodology through maintenance and modification of the DPW applications for software quality. Defect management is a sub component of overall software quality and we will use the methodology for defect management which includes definition, classification, resolution, and monitoring of overall defects.

Deloitte's Global Software Testing practice:

- Proven and detailed toolkit which improves software quality
- Over 500 software quality professionals
- We have strategic alliances with HP and IBM for their testing products

The Systems Development Life Cycle and the Defects Life Cycle

Defects can be discovered at any point within the SDLC; typically defects uncovered during the requirements phase are handled by the team performing the gathering of the information for requirements and General Systems Design (GSD). For Lot 7, our defect management methodology focuses on Detailed Systems Design through Implementation. In general, the majority of defects are uncovered during the coding, testing, migration to production, and implementation of the applications.

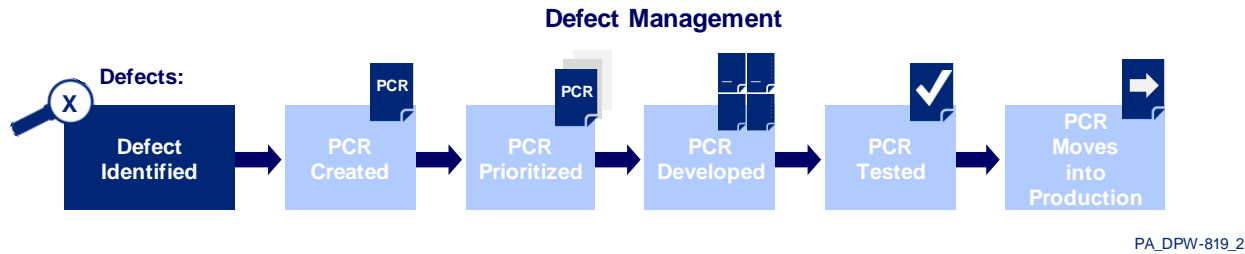


Figure 6.8-3. Defect Management Life Cycle.

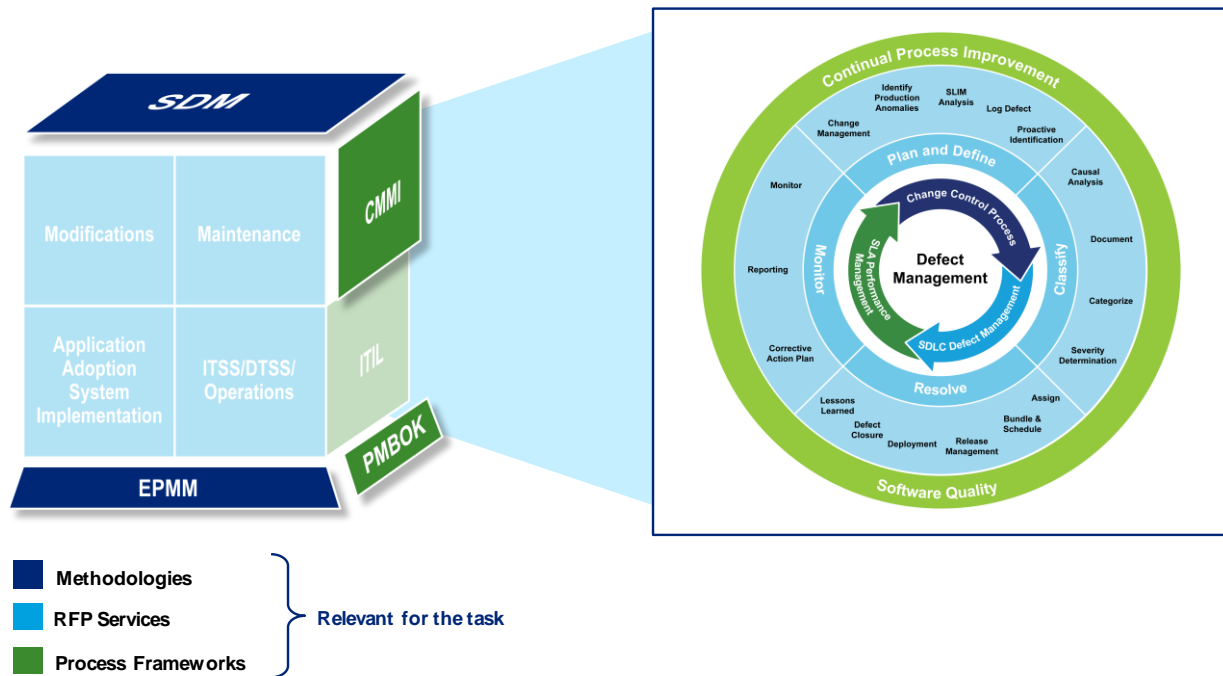
All defects will be identified, prioritized, scheduled, and implemented in production based upon mutually agreed upon schedules and priorities.

Defects themselves follow a life cycle within the SDLC. Once a defect is identified, it is reported on through the creation of a PCR, and the PCR is classified and prioritized in light of existing workload and the severity of the error. It will then be assigned to an individual or a team for development work to resolve the issue. The support team will perform a number of tasks including recreating the issue, reviewing requirements/design documentation, development of a resolution and unit testing.

When the developer/team is confident that the problem has resolved, the PCR is migrated to the testing environments to fully test the fix and determine if the problem has fully been resolved. The PCR is then positioned for migration to the production environment and, once completed, the cycle is completed and the PCR is closed.

Our Framework Driven Methodology

Our methodology has been developed using this Defects Life Cycle as a foundation for its activities. We have utilized the process frameworks of CMMI and PMBOK in combination with our knowledge of the SDM and EPMM methodologies to develop strong method for the efficient identification, classification, resolution and reporting on defects during the course of support activities.



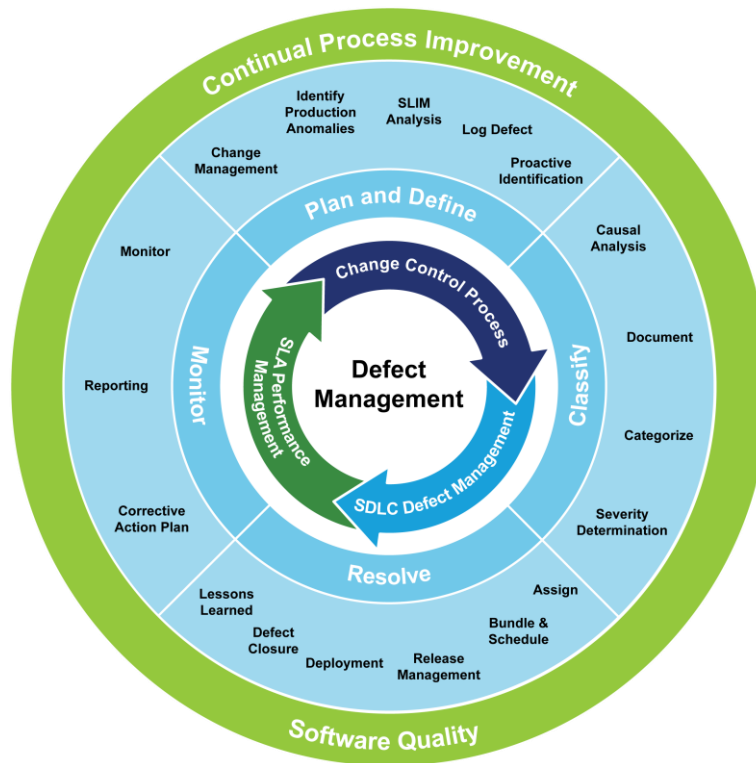
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Figure 6.8-4. Deloitte’s Methodology for Defect Management.

Deloitte’s Defect Management method blends the best of CMMI and PMBOK, while it is also tailored to the needs of SDM and EPMM

One of the most important functions of any development is to properly manage and control system defects that arise as part of system maintenance and modifications. This is just not about updating code structures, but it involves an all-encompassing and structured methodology which spans defect/minor change prioritization to the implementation of that defect in the production environment. Without effective processes and people to manage such processes, defects may not be implemented on time thereby disrupting business continuity. In this section, Deloitte demonstrates how it meets the defect management needs of the Commonwealth while maintaining code stability and quality.

Approach



PA_DPW-781_3

Figure 6.8-5. Deloitte's Defect Management Approach.

Our approach to defect management integrates the phases with a bias toward continual improvement with a focus on overall software quality.

Our approach to defect management focuses on the rapid and efficient resolution of issues so that the impacted systems can be returned to their normal operational state. It follows the above diagram in performing the following main phases: **Plan and Define**, **Classify**, **Resolve**, and **Monitor**. These phases are iterative in nature and are continually performed as defects are reported to the team.

Plan and Define

Although defect management is a cyclical process occurring at all points of the SDLC, it is key that proper planning and defining of the function occurs. Foundational to this is the understanding of how to effectively predict the number and complexity of potential defects, and establish a team structure that is able to address these issues. This is a repetitive process: as the applications continue to grow in terms of lines of code, the number and complexity of defects has the potential to increase, so we will perform this process on a periodic basis, based upon the amount of change introduced into the applications.

In order to be able to forecast the impacts of defect management on the staff allocation and required skills, we use a number of models that allow us to generate consistent estimates of time and resource requirements. The algorithmic Constructive Cost Model



(COCOMO) provides the capability, with additional extension beyond the base model, to estimate the amount and severity of defects that the maintenance team can expect over a period of time. Furthermore, in order to drive to a deeper level of accuracy, we use our experiential knowledge from our present support of the DPW suite of applications. Our team has been performing defect management on these applications for 10+years and can leverage this knowledge to refine the estimates.

After a defect density model is developed with a high-level of confidence, we use the SLIM (Software Life cycle Management) parametric estimation technique for determining the actual person-hours we can expect to expend on resolving the defects. Again, we augment this with our past experience: we have gathered a significant amount of empirical data on our software development effectiveness through the CMMI Level 3 certification that all of our DPW projects went through. The result of these activities is an understanding of the overall staff load required to support the expected amount of defects.

The expected amount of defects is also a primary driver in planning and defining maintenance releases. For emergency defects, we will migrate to a production environment once the fix has been identified, coded and tested. However, for other severity levels (and minor maintenance-related PCRs), we work with the Department and the Program Offices to schedule releases on a regular basis, based upon the expected defect density, migration windows, and expected major releases. It is our goal to maximize software stability through the judicious use of maintenance releases; typically we will plan on one maintenance release a quarter. We do understand, however, that there could be times that additional maintenance releases are required and will develop our schedule in a way that allows for the occasional adjustment of targeted release dates.

Classify

Upon receipt of a defect notification, the first major process to execute is the classification of the problem. Our team performs an initial triage of the issue and collaborates with the individual who initiated the request to determine the severity, based upon the tier system described in the RFP (1 – Fatal, 2 – Major, 3 – Minor, 4 – Cosmetic). This is an important step; an incorrect severity can result in the inefficient allocation of resources to problems and delay resolution of critical issues.

Full documentation of the problem is required in order to provide guidance to the developer who will eventually work on the issue. Since the developer will most likely attempt to replicate the issue, providing information on actions taken, data used, time of day, inputs, outputs, etc. will help in clarifying the problem and allow for replication to occur. Finally, the initial triage of the problem occurs, and a determination is made if the issue should be routed to another team/Lot vendor. If the problem is one that is to be addressed by the maintenance team, an analysis of the problem will be performed to attempt to determine the cause of the issue. Any causes identified are notated in the PCR in order to provide the developer with insight into the reason for the failure.



Resolve

Once the problem has been classified and documented, the team will resolve the issue. The initial activity is to assign the problem to a developer, and it is the responsibility of the maintenance team's management to determine which developer to allocate the PCR to. When assigning a developer, it is important to get a match of skills and capabilities to the issue, thus the team will take into consideration:

- Complexity of the problem
- The application having the problem
- Technical skill set required (e.g. .NET, Oracle, etc.)
- Resource Availability
- Other in flight work impacted by the issue

The developer attempts to recreate the problem and then utilizes problem solving techniques to find the code that is causing the issue and resolve. During this period, the developer will be in contact with the Department, the other Lot Vendors, program offices, and users as required for the gathering of additional information and providing of status.

Once the development is completed, the maintenance team member performs testing as per the established SDM, and, if necessary, coordinates with the requestor to test the fix and approve the resolution. Depending upon the situation and timing, the migration to production will occur through the lower environments resulting in the fix being implemented either as an emergency (as soon as possible) or as part of a planned maintenance release.

In emergency situations, the need could arise for a "work around" to be implemented in order to allow the application user(s) to perform their duties. This usually occurs when the fix for an issue is not readily apparent, and the issue is causing a severity 1 (fatal) problem. In this case, the developer, maintenance project management, program offices, and other stakeholders as required will hold a meeting/conference call to discuss potential workarounds and the impacts of the work around on the business. The team will jointly determine if a work around is warranted and if in agreement, a developer will be assigned to developing the work around while the issue is being analyzed and resolved.

The defect is not closed until the original problem is resolved or it cannot be recreated then the developer is responsible for documentation of "Lessons Learned" so that if similar issues arise, the developers can reference the fix that was implemented.



Monitor

The developer continues to monitor the behavior of the fix in production after implementation to validate the efficacy of the changes. The amount of time for this monitoring will be agreed upon when the PCR is closed and is dependent upon the type of modification (for example, a batch fix might require multiple batch cycles to determine

that it has corrected the problem, while an online resolution might only need to be viewed by the user). If a Corrective Action Plan (CAP) is required (as per the RFP and described in the sections below), the maintenance team project manager will work with the developer to create the CAP and deliver to the Department within the agreed upon timeframes.

Experience and Examples

Our experience in defect management is based on hundreds of Public Sector and private section technology projects. Deloitte has an enterprise software testing center of excellence that establishes consistent procedures and leading practices in software quality and defect management. We have utilized our software testing center of excellence and our system integration experience in the below example projects where we have managed thousands of defects to successful resolution.

Deloitte Experience Footprint	Example	Deloitte Role in Providing Services Similar to DPW Requirements
	<p>Pennsylvania – Department of Public Welfare</p>	<ul style="list-style-type: none"> • Deloitte provides maintenance, operations, and enhancements for 6 business applications; over 27 business systems, with over 200+ subsystems. • Deloitte manages the overall defects that are identified using an automated defect management system. • Our teams have closed over 11,000 PCRs over the last six years and we have reduced the defects by over 30% over during that time frame. • We have developed reports for managing defects which include defect list by business application, closed defects, open defects, assigned defects, outstanding defect lists. • Our teams have implemented software quality assurance Eligibility, Provider, Case Management, Child Support Enforcement, Child Welfare, and Enterprise Systems for DPW. • Deloitte has helped DPW develop and enhance the overall software quality assurance and defect management processes for the Commonwealth.
	<p>New Hampshire – New Heights</p>	<ul style="list-style-type: none"> • Deloitte has been providing services to New Hampshire since 1996 and is still the maintenance and operations vendor for the Eligibility System New Heights. • New HEIGHTS is the backbone system that enables DHHS to administer the various programs it provides for the needy citizens of New Hampshire. The New HEIGHTS system is responsible for determining eligibility for approximately \$800 million in benefits. • The implementation of New HEIGHTS revolutionized the District Office business operations for administering TANF and Food Stamp benefits by introducing an interactive client clearance and a real-time eligibility determination and benefit computation.





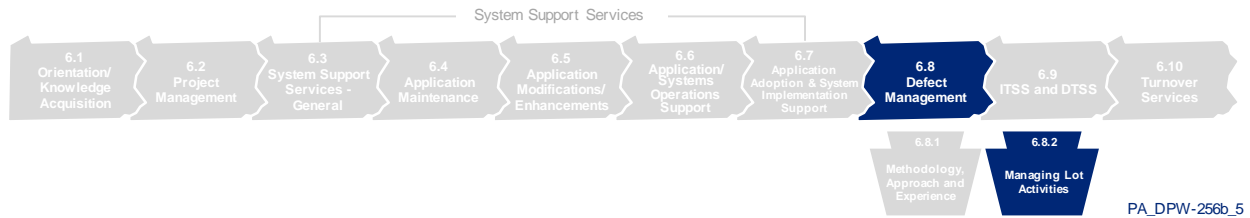
Deloitte Experience Footprint	Example	Deloitte Role in Providing Services Similar to DPW Requirements
		<ul style="list-style-type: none"> Facilitates compliance with federal and state noticing requirements, avoiding millions of dollars in fines. Supports the State's 60,000 cases and processes 300,000 transactions per day. Reduction in error rate from an average of 9.75 to 5.11. The system supports over 1500 users, has 7 million lines of code, and conducts approximately 250,000 transactions per day.
	<p>West Virginia RAPIDS</p>	<ul style="list-style-type: none"> Deloitte has worked as the maintenance and operations vendor for the West Virginia Eligibility and Self Service systems since 2001. Our team supports project management, software development, testing, implementation, and post production support. The system has over 5.5 Million lines of code, support 2500 users, has approximately 300,000 cases, and contains 1,700 programs, over 600 screens, and executes approximately 925,000 transactions per day. Deloitte has reduced the overall defects in the system by 75% since taking over the contract in 2001.
	<p>Wisconsin CARES</p>	<ul style="list-style-type: none"> Deloitte has been an active team with the State of Wisconsin's DHFS and DWD since 1992. The State contracted with Deloitte to provide project management, initial design, development, conversion planning, and application testing of the CARES system. Deloitte also provided implementation and change leadership support, including field support, training, and post implementation review. In addition to the design, development, and implementation phases, Deloitte is currently contracted to provide maintenance and enhancements for the CARES application. The CARES system, CARES Worker Web, ACCESS, ECF, and other supporting applications developed and maintained by Deloitte allow Wisconsin to continually to improve citizen service and reduce administration costs. The Wisconsin CARES suite of systems consists of 4.1 million lines of code, conducts over 1.7 million transactions per day, and support over 5,300 users.

Figure 6.8-6. Experience and Examples.

Deloitte is the premier Health and Human Services System Integrator with the experience to manage defects across multiple systems and environments.

6.8.2 Managing Lot Activities



II

Page II-3

RFP Reference: II-3. Work Plan

Provide a description of the Offeror's plan and approach for managing the Lot's Required Activities and Tasks

Issues, Risks and Proposed Solutions

II

Page II-3

RFP Reference: II-3. Work Plan

During this discussion, the Offeror should identify potential issues/risks and proposed solutions.

A rigorous and thorough defect management process is critical to effectively resolving defects as quick as possible. Deloitte's experience has concluded that a key "time" factor to resolving defects as quick as possible relates to defect rejection and duplication. The Lot 7 vendor selected by the Commonwealth should provide leadership and direction based on experience, lessons learned and best practices when working with Lots 1-5 and Lot 6 vendors to mitigate and reduce the time spent managing defects. Deloitte has worked collaboratively with the Commonwealth and understands the common reasons for defect rejection and duplication and will work with Lots 1-5 and Lot 6 vendors to avoid these. Deloitte has incorporated this information into the approach and methodology to managing defects.

Based on this understanding, as well as the lessons learned from our national HHS client and project base that includes those of similar size, scope and complexity to DPW, we provide a list of the most critical issues and risks regarding defect management on this new contract. More importantly, we propose solutions that reduce or avoid these issues and risks and have incorporated them into our project management approach. We provide a full list of issues, risks and proposed solutions in our *Tab 4, Section 4.3, Issues and Risks* narrative response.

Key Staff Spotlight

Brian Holwig

Application Team Lead



Software Quality – Defect Management

“Managing defects starts with using industry tools and best practices to estimate the number of defects expected so adequate resource planning can be performed.”



Issue/Risk	Deloitte's Mitigation Strategies
<p>Ability to Quickly Address PCRs</p> <ul style="list-style-type: none"> Deloitte can continue to work through the PCRs in a timely manner and can help increase system acceptance and improve the applications' effectiveness. Time is of the essence when resolving production defects in batch and online systems, End users/clients may be severely inconveniences if system defects are not resolved timeline 	<ul style="list-style-type: none"> Having a National HHS/Pa DPW experienced vendor like Deloitte, is the safest and most reliable approach to helping confirm that PCRs are addressed timely and correctly.
<p>Accurate Defect Identification and Reporting</p> <ul style="list-style-type: none"> Multiple vendors entering duplicate defects and pointing to different root causes (requirements, design, implementation) 	<ul style="list-style-type: none"> Increased participation in DPW in the defect documentation and analysis process in order to streamline ownership and reduce duplication
<p>Ability to Assess the Impact of a PCR</p> <ul style="list-style-type: none"> Each problem that affects a system in an adverse way or precludes a user from completing their job functions can impact overall program performance. If the full breath of an impact of a PCR is not understood, situations can degrade from bad to worse. 	<ul style="list-style-type: none"> Having a vendor like Deloitte, is the safest and most reliable approach to helping confirm that PCRs are fully understood and that the impact to the system is clear. This also includes the ability to understand downstream affects or cross program impacts that may not otherwise be obvious.

Figure 6.8-7. Issues and Risks for Defect Management

We will work with Lots 1-5 and Lot 6 vendors to execute the proposed best practices and provide them access to the Defect Tracking System which will be enhanced to included better reports which will facilitate communications and aid in quicker defect remediation. The defect management process clearly defines roles and responsibilities and includes end to end processes. The end to end processes not only include data from reports but interpretation of that data, including impacts to the solution and schedule, integration with other lot vendors and impact on ongoing quality assurance.

Processes, Tools and Reports

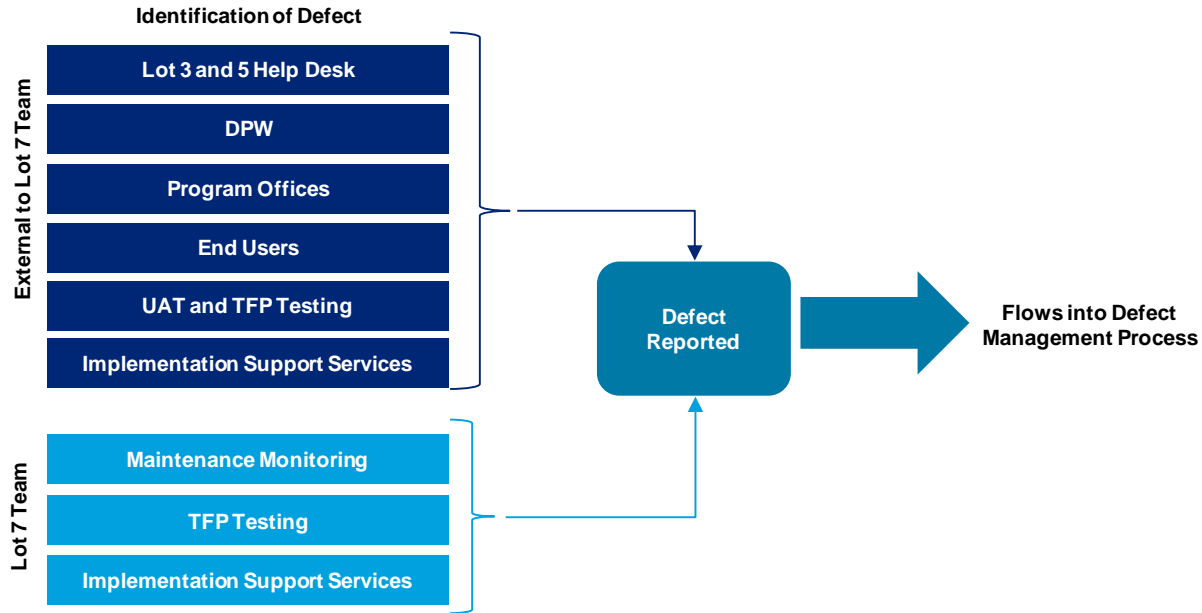
II	Page II-3	RFP Reference: II-3. Work Plan
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For each of the Lot's Required Activities and Tasks, describe the processes that will be followed and tools that will be used; describe the reports that will be used to track, monitor work, and measure performance.

Deloitte will be using the proposed Defect Management process and will use the enhanced Automated Tracking System as its primary tool for tracking, reporting and interpreting impacts and results. The following activities will be used to track, monitor the work and measure performance.

Activity 1: Defect Definition

It is important to clarify how the maintenance team is notified of defects. We understand, from the RFP, that defects can be identified by the help desk supporting case management (Lot 3) and PACSES (Lot 5), and that the Lot 6 vendor will provide support when the Deloitte team from Lot 7 requires additional assistance. Our experience with DPW has show that the Department, Program Offices, and end users can also initiate the defect management process when they encounter a problem.



PA_DPW-1331

Figure 6.8-8. Identification of Defects.

Deloitte's maintenance team will receive defect notification from a number of sources, including our proactive monitoring of the applications.

Defects will be reported in a number of ways. External to our team supporting Lot 7, the Lot 3 (Case Management) and Lot 5 (PACSES) help desks will be responsible for reporting of defects that are routed through their respective service desks. As per the RFP, they will generate an ATS PCR that our team will receive and process according to our defect management procedure. The remaining Lots (1,2 and 4) will report their issues through the DPW help desk, who will enter the ATS PCR on their behalf for handling by the maintenance team.

Our experience has also shown that the Department, the individual Program Offices and individual end users that we work with also uncover defects during the normal course of business. They are able to enter an ATS PCR directly, or work with our maintenance team to enter the requisite information into the ticket for downstream processing. During UAT defects are sometimes uncovered that require action on the part of the maintenance team, although the majority of these defects will be entered into ATS by the Lot 3 and 5 vendors. Furthermore, prior to production certification out of the TFP testing, defects need to be indentified and corrected. This is an activity that is performed



by collaboration between the other lot vendors, our modifications team, the program offices, and the ITSS team. In addition, post-testing, the Implementation Support Services teams will occasionally uncover defects during the course of their required activities; therefore they have a role to play in the overall identification of system issues.

Our maintenance team will also proactively monitor the applications, and when an issue is encountered, generate a PCR to resolve the problem. Since our team also supports testing, including TFP, they will also report defects and open PCRs when encountered during the various testing phases.

To standardize the defect reporting, guidelines are established that determine the amount of information necessary to report a defect; e.g. what information is needed on descriptions, products, and screenshots. Defect tracking must be simple enough so that users and stakeholders will use it, but cannot be oversimplified because it must capture vital information about the problem. This includes the identification of the defect, logging the defect, conducting proactive identification, and estimating future defects in the software development life cycle.

We will follow established escalation procedures for emergency defects to notify the effected parties. The defects will be logged into the defect tracking system and the periodic (typically daily) system defect triage meetings will be used to perform the following:

- Provide status on open PCRs being actively worked
- Review new PCRs, and make the following determinations:
 - The level of information provided and if more is required
 - If the reported incident a defect or a change request
 - Establishment/changes to the priority level
- Provide testing updates for PCRs nearing production readiness
- Provide timeline/project plan updates on PCRs
- Reprioritize PCRs as required

These meetings are meant to be concise, accurate readouts on the overall status of the PCRs. Due to the number of applications in the DPW suite, we hold separate PCR review meetings for each production application; furthermore, for larger modifications and releases that are in the testing phase, a PCR defect meeting will be held on an agreed upon frequency to review defects that have occurred as a result of UAT and TFP testing.

The following are the activities we perform as part of Activity 1 – Defect Definition.

Process

Defect Identification. Log defects into the defect management tool as soon as they are discovered either by users opening a ticket with the Help Desk or through testing of the applications.

Proactive Review of Data Fixes. Identify and log defects into the defect management tool based on reoccurring data fixes that are being done to the applications or through data integrity checks.

Figure 6.8-9. Activity 1 – Defect Definition.

Activity 2: Defect Classification

After defects have been discovered and defined, the defects will be triaged and classified in order to determine defect category, prioritization, and severity and to support root cause determination. This activity will involve input from the Commonwealth as well as the vendors for Lots 1-7. The following are the activities we perform as part of Activity 2 – Defect Classification.

Process

Defect Categorization. Categorization of defects involves denoting into one of the following:

- Software Engineering Process (SEP) Defect
- Configuration Defect
- Hardware Defect
- Code Defect
- Product Defect
- Operations Defect
- Undetermined Defect

Defect Prioritization. Once the change has been initiated and assigned to an appropriate functional subsystem, the change is tagged for prioritization as part of the change prioritization meetings. Prioritization of the change provides direction to the DPW program office and Deloitte functional lead(s) that initial impact analysis needs to be completed to determine feasibility and realistic implementation timeframes. Priorities assigned include:

- Mission Critical
- Mission Essential (Ok with workaround)
- Cosmetic

Impact Assessment. Once the root cause has been established, Deloitte will work together with the Lots 1-5 and Lot 6 vendor as needed to determine the severity of the defect by analyzing other areas within the application that may be affected by the defect. Additionally, we will conduct an analysis to determine if any other areas of the application may be adversely affected by adding, deleting, or modifying the code that contains the defect. Defect Severity will be assigned as follows:

- Level 1: Fatal Defects
- Level 2: Major Defects
- Level 3: Minor Defects
- Level 4: Cosmetic Defects

Process

Defect Reproduction and Documentation. The next step for Production defects is to attempt to reproduce the defect in a development environment that mimics the build and the data that exists in production. For modifications defects will also be replicated in the development environment. Once the defect has been successfully reproduced, Deloitte will begin reviewing log files, application code, system requirements and documentation in order to attempt to establish the root cause of the system problem. The root cause of the problem may be:

- Missed Requirements
- Design Flaws
- Lack of detailed and updated design documentation
- Poor Requirement Traceability
- Lack of Testable Requirements
- Faulty Application code
- Configuration
- Hardware

Figure 6.8-10. Activity 2 – Defect Classification.

Activity 3: Defect Resolution

Once the defect has been identified, entered in ATS and classified, the responsible track lead assigns a developer from the maintenance team to resolve the issue. A key activity during this period is the identification of those defects that are similar in nature and have cross-impacts upon the applications. If the situation and urgency allows for it, these defects will be combined and bundled together with the intention of developing them as part of a larger release. This allows for more efficient use of staff and the ability to better leverage testing and migration resources.

The assigned developer will perform an initial analysis of the data available, and if it is determined that the problem can be traced to an incorrect technical system design, requirements issue, or incorrect UAT scripting, the incident will be forwarded to the Lot 6 vendor for review and resolution.

Should this not be the case, the developer will attempt to recreate the issue in the development environment, using the information provided in the PCR. This requires access to test data that mimics the present production environment; through our years of working with DPW we have a comprehensive understanding of the differences in data among the various systems and use this knowledge to allow us to quickly establish an environment for re-creation of the problem.

The developer will use typical troubleshooting techniques to identify the lines of code, logic and/or data that is causing the software to fail or not operate in the correct fashion. Our team has been structured in such a way that our developers have the ability to access a broad base of staff with knowledge in both the application and technology domains that make up the overall systems footprint at DPW for further consultation on a defect.

Once the problem code, logic, or data has been identified, the developer will follow DPW standards for the code fix to resolve the issue. This includes unit testing by the developer prior to preparing the fix for migration into the testing environments. Upon satisfaction that the fix is working properly, the developer coordinates with the track lead and the test team to schedule the resolution for the testing process.

Upon successful completion of the testing, the track lead will review the resolution with the requesting party to gain acceptance of the fix. In some cases, this could require an additional round of User Acceptance Testing prior to full acceptance and position for migration into the production environment. However, if testing is not successful, the defect is routed back to the developer for additional analysis and coding.

Migrations to production will either be achieved by adding the PCR to a planned release bundle, or, for emergency fixes, be scheduled for the next available window for migration. Upon migration to production, the track lead will mark the PCR as complete and begin monitoring of the resolution in the production environment.

The following is a summary of the activities we perform as part of Activity 3 – Defect Resolution.

Process

Bundling and Scheduling. After defects are classified they are combined into a bundle of similar defects to be fixed as part of a bigger release. Combining defects into bundles will be done through the Automated Tracking System. These bundles are made up of logical grouping of defects that will be deployed to Production at the same time.

Fix Defects. After the bundling and scheduling activities have been completed the defects are assigned to the appropriate development team to fix the code that caused the defect. Tracking of assignment for who is to fix the defect will be done through the defect management tool. Developers will know which defects they have assigned as well as the schedule, severity and priority for the defect.

Test Defects. After the defects have been fixed by the Application Team the defect is transferred to the testing environments to verify that the defect has been corrected. The defect will be assigned to the appropriate testing resource to determine if the defect fix is approved.

Release Management and Deployment. After the fix has been approved by the testing team the defects that make up the approved bundle will be deployed to Production as a release. We will conduct Go-No calls for deployment to Production. DPW will be the final authority in making any “Go/No Go” decisions. The Deloitte team will perform deployment to Production upon DPW approval.

Defect Closure. After the fix has been deployed to Production the defect will be closed in the defect management tracking system.

Figure 6.8-11. Activity 3 – Defect Resolution.

Activity 4: Defect Monitoring

Ongoing reporting and tracking of defects is crucial for the successful and timely resolution of defects, thus we monitor defects in a production environment for an agreed upon time to determine if the fix is successful. This period varies by the type of fix: for some batch programs this could require multiple batches to be executed to full execute the change; alternatively, some real-time transactions can be validated immediately.

This activity will be completed by Deloitte as the Lot 7 vendor. The following are the activities we perform as part of Activity 4 – Defect Monitoring.

Process

Defect Reporting. We will provide to the Commonwealth, Lots 1-5 and Lot 6 vendors periodic reports containing statistics on open defects.

Resolution Effectiveness. We will provide to the Commonwealth, Lots 1-5 and Lot 6 vendors periodic reports containing statistics on system defects across SDLC phases that will help determine improvement areas on the project.

Figure 6.8-12. Activity 4 – Defect Monitoring.

Tools to Support Defect Management

Deloitte utilizes ATS as its' foundational defect management tool. Our team built, deployed and customized ATS for the present DPW support contract and will continue to use and enhance the product as required to meet the needs of the defect management function.

II

Page
II-3

RFP Reference: II-3. Work Plan

For each of the Lot's Required Activities and Tasks, ...describe the reports that will be used to track, monitor work, and measure performance.

As the Lot 7 vendor Deloitte provides to the Commonwealth and the other lot vendors, reports and metrics produced from the defect management tool to manage system defects. Below are representative reports we use throughout the SDLC phases (System Requirements, Design, Build, Integration, SAT, Production, and post Implementation). These reports have been enhanced from the current versions to incorporate experience, lessons learned and updated technology.

- **Production Defect Report.** Prior to deployment to Production environment Deloitte will produce the Production Defect Report. This will certify that the code moving to the Production environment has been tested successfully in the lower environments.
- **Defect Management Log.** Real-time report of defect data in the defect management tool produced on an ad hoc basis.
- **Daily Defect Log.** Tactical report of open production defects, anticipated resolution path and expected resolution date/time produced daily.

Have you heard?

The Commonwealth received the following Technology Innovation Awards related to Deloitte-assisted implementations

- 2009 Federal Office of Child Support Enforcement (OCSE) Commissioner's Award for Innovative Technology for Performance Improvement Module (PIM)
- 2008 Federal Office of Child Support Enforcement (OCSE) Outstanding Program Performance Award



- **Weekly Defect Log.** Summary of weekly defect activity, including new defects and closed defects produced weekly.
- **Trends Report.** Defect trends over time by Priority, Type, Repair Time and Severity produced monthly.
- **Defect Density/Lines of Code/Software Quality Index.** Report of defects per Thousand Lines of Code (KLOC) produced monthly.
- **Defect Aging Report.** This report tracks the total time a defect has been open. This is from date of entry until it is closed. This report is produced weekly.

Management Controls, Communication, and Evaluation

II	Page II-3	RFP Reference: II-3. Work Plan
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Describe the management controls that will be used to identify and manage risk, maintain project schedules, ensure the quality of the work, and meet all of the performance expectations. Based on its experience, the Offeror should include a discussion of its formal and informal communication processes within a project of this nature. The Offeror should also address its approach to internally monitoring and evaluating its effectiveness in meeting the RFP requirements for the Lot throughout the course of the contract.

Management controls, formal and informal communications processes, and monitoring and evaluating of effectiveness are managerial functions that we use to identify and monitor potential errors from which we perform the necessary corrective actions. These functions on a project of this nature include planning, organization, staffing and directing of work to minimize deviation from standards and to achieve the stated goals of the organization. We establish controls by setting standards and based on these internal controls, measure and evaluate actual performance to these against these goals. Communication processes, internal and external to the project organization, are the means for facilitating these control mechanisms and the resulting corrective actions.

Defect Management Process	Deloitte Approach
Plan	<ul style="list-style-type: none"> • Identify and log defects • Proactively review ongoing maintenance activities for potential system defects • Identify resource needs
Organize	<ul style="list-style-type: none"> • Categorize defects • Conduct impact analysis to determine defect priority and severity • Document and determine root cause of defects
Staff	<ul style="list-style-type: none"> • Determine resource requirements for resolving defects • Identify release team • Coordinate level of effort for implementation defect resolution

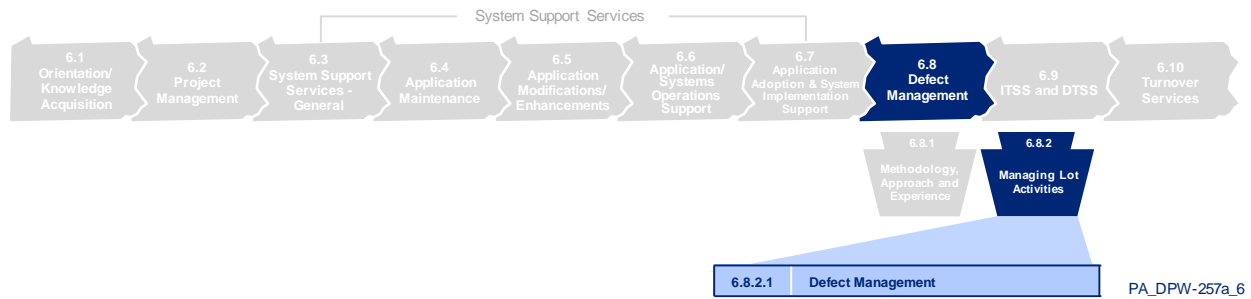


Defect Management Process	Deloitte Approach
Direct	<ul style="list-style-type: none">• Define logical bundles of defects• Identify maintenance or modification release to correct defects• Assign defects to development team to fix• Test defects to make sure defects have been resolved• Deploy Release to Production
Communicate	<ul style="list-style-type: none">• Produce defect tracking reports• Identify areas of improvement through evaluation of defects
Evaluate	<ul style="list-style-type: none">• Identify areas of improvement through evaluation of defects• Evaluate resolution of defect• Close defect

Figure 6.8-13. Management Control, Communication, and Evaluation Process.

Deloitte utilizes a disciplined approach to effectively provide management control, enable communication and facilitate evaluation.

6.8.2.1 Defect Management



IV	Page IV-319	RFP Reference: 1. Systems Support Services General, Defect Management
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It is imperative that DPW have an effective defect management with accurate, detailed analysis, and reporting of defect information per software release to assist management with risk management, process improvement, project management, and Go or No-Go operational readiness decisions. DPW does not want multiple and disparate defect management systems and disjointed processes.

The availability and reliability of the DPW systems is necessary to support the business functions of eligibility determination, benefit delivery, childcare services, early learning initiatives, home and community services, child welfare and child support enforcement within the Commonwealth. Troubleshooting, resolving issues and managing changes related to the business functions can be complex and involve multiple programs, interfaces, components, batch jobs and stakeholders. Deloitte understands the critical nature of these functions and the role of Defect Management in minimizing application “down time” so there is no impact on agency services to the Commonwealth constituents.

West Virginia – Integrated Eligibility system RAPIDS:

- Deloitte since taking over the maintenance and operations of the Integrated Eligibility System has reduced defects by over 75 percent
- 2500 users, 5.5 Million lines of code
- 1,700 programs
- And at DPW Implemented over 200 releases over the last 3 years

We understand why defect management is important to the Department as a means to minimize risk and impact of defects identified in the production applications. Implementing the necessary processes and procedures is crucial in order to minimize the chance of flaws being found in the applications that serve the Commonwealth. The following sections provide our detailed response to the Lot 7 offeror’s responsibilities for defect management.



Enterprise Defect Management

IV	Page IV-319	RFP Reference: 1. Systems Support Services General, Defect Management
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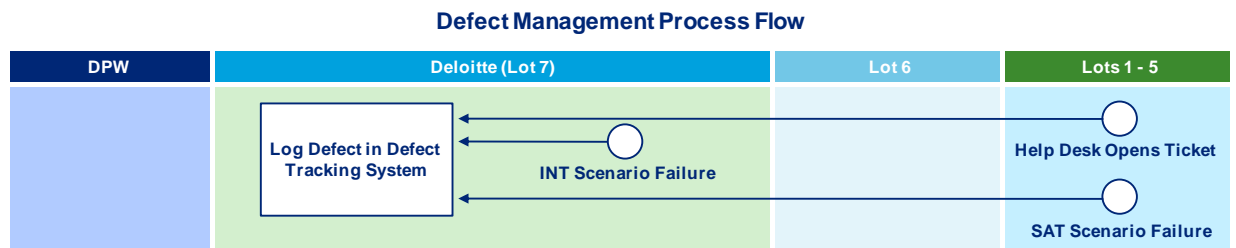
To achieve this objective, the Offeror of **Lot #7** will have overall responsibility for an enterprise defect management system and tracking of defects throughout all the SDLC phases as well as latent production defects. Selected Offeror[™]s for Lots # 1-5, and Lot #6 will be expected to coordinate with and provide input to the Lot #7 Offeror and DPW regarding defect prevention, discovery, tracking, categorizing (i.e., type and severity), resolution, reporting, and after action activities to improve end product quality and solution development and delivery processes.

Defect management is a component within the DPW Systems Development Methodology. Defect management is primarily a subset of Software Unit, Integration Test, Acceptance, and Implementation. The Deloitte Defect Management Process is comprised of four steps which supports the tracking of defects throughout the SDLC phases.

- Defect Definition
- Defect Classification
- Defect Resolution
- Defect Monitoring

Defect Definition

The first step in the defect management process is to identify the error and enter the required information into the defect management tool.



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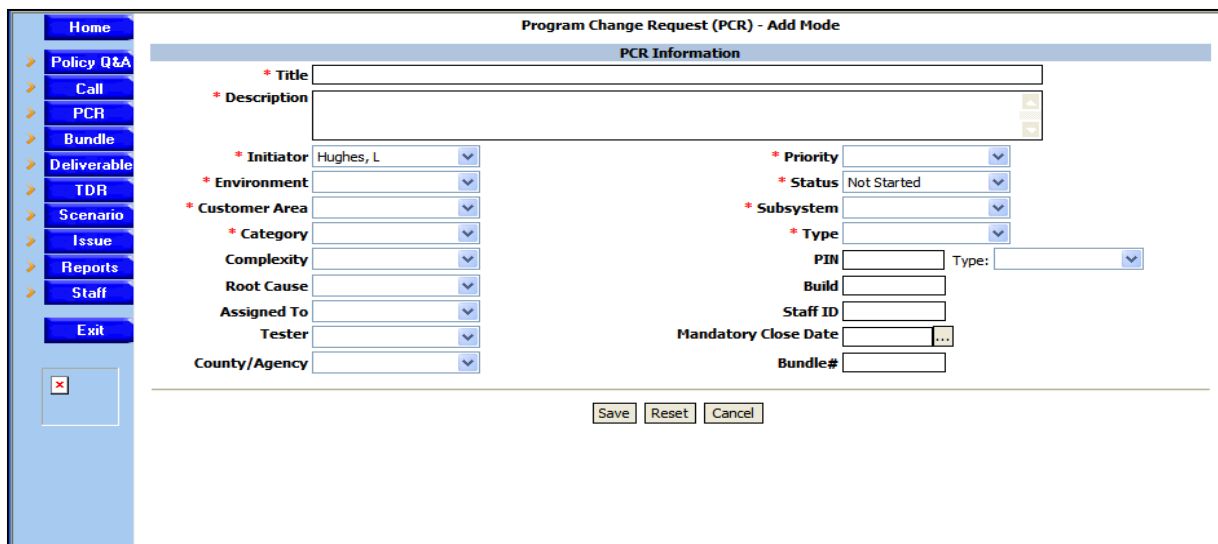
Figure 6.8-14. Defect Management – Definition Phase.

Issues identified either in Production or in testing are logged into the Defect Tracking System. The defects are then assigned for classification.

Defect Identification. As the Lot 7 vendor, Deloitte proposes to use the Automated Tracking System (ATS) as its primary tool for defect management. Deloitte has leveraged its experiences over the past 10 years supporting DPW and has enhanced the tool to provide updated reporting. A great benefit to the Commonwealth staff is that they are already familiar with this tool which will minimize knowledge transfer and transition activities given the other changes in Lots 1-5 and 6. Figure 6.8-15 is a capture of the ATS data entry screen; the simplicity and ease of data entry can be easily seen from this diagram.

Our defect management system is a very effective and proven defect management tool that allows for tracking defects from discovery, throughout the SDLC phases until resolution. DPW has been effectively using this tool to manage the existing projects for 10 years. Deloitte will work with the Commonwealth to identify any other industry standard defect management systems like Rational ClearQuest, Remedy, JIRA, etc. by performing a cost-benefit analysis and submitting to the Commonwealth a level-of-effort to convert defect information.

A defect provides for the documentation and tracking of an identified discrepancy discovered in production or as part of development of a system modification. A defect will be created for each incident after a bundle has been created. The system creates a unique defect number for tracking the defect through the SDLC phases. Figure 6.8-15 is the screen in the defect management system that allows for defects to be created.



The screenshot shows a web-based form titled "Program Change Request (PCR) - Add Mode". On the left is a navigation menu with buttons for Home, Policy Q&A, Call, PCR, Bundle, Deliverable, TDR, Scenario, Issue, Reports, Staff, and Exit. The main form area is titled "PCR Information" and contains the following fields:

- * Title: Text input field
- * Description: Text input field with a scroll bar
- * Initiator: Dropdown menu (selected: Hughes, L)
- * Priority: Dropdown menu
- * Environment: Dropdown menu
- * Status: Dropdown menu (selected: Not Started)
- * Customer Area: Dropdown menu
- * Subsystem: Dropdown menu
- * Category: Dropdown menu
- * Type: Dropdown menu
- Complexity: Text input field
- Root Cause: Text input field
- Assigned To: Text input field
- Tester: Text input field
- County/Agency: Dropdown menu
- PIN: Text input field
- Type: Text input field
- Build: Text input field
- Staff ID: Text input field
- Mandatory Close Date: Text input field with a calendar icon
- Bundle#: Text input field

At the bottom of the form are three buttons: Save, Reset, and Cancel.

PA_DPW-576

Figure 6.8-15. Program Change Request Add Mode.

Defects can be created and accessed from the Defect Tracking System as Program Change Requests (PCR). This is the current standard defect management tool used by the Department.

The Status of the defect is first entered by the initiator of the defect using the drop down menu option "Not Started". The Status is then updated as needed by the Track Lead or Designer of the system modification or maintenance initiative. The status dropdown values help track the defect through the SDLC phases until it is resolved.

Program Change Request (PCR) - Edit Mode

PCR Information

PCR# 228 **Last Updated By** Saini, S
Created On 11/17/2008 6:25:23 PM **Last Updated On** 11/21/2008 09:44:16

*** Title** WO-161 (UAT) (Issue # 16)

*** Description** WO-161 (Performance Improvement Module)

*** Initiator** Saini, S

*** Environment** System Acceptance Tr

*** Customer Area** OIS

*** Category** Not Assigned

Complexity

Root Cause

Assigned To Shaner, N

Tester Saini, S

County/Agency

*** Priority** Medium

*** Status** Not Started

*** Subsystem**

*** Type**

Build

Staff ID

Mandatory Close Date

Bundle#

PA_DPW-578

Figure 6.8-16. Program Change Request Edit Mode.

After defects have been created in the Defect Tracking System they are able to be edited so that status and other defect properties can be tracked throughout the SDLC process.

Proactive Review of Data Fixes. In addition to identifying and logging the defects into the Defect Tracking System, we also will do a review of current Production data fixes that are being performed as well as releases to identify potential system defects. This on-going task will minimize risk and reduce the number of existing defects that may be in the system but not yet identified.

Defect Classification

The next step in the defect management process after the defect has been identified is to classify the defect to determine a number of characteristics including type, priority, severity and potential risk impact. Classification of the defect will assist in the determination of priority, corrective action and level of effort needed to correct the defect in the applications. Figure 6.8-17 provides the activities and responsible parties for taking action in the classification phase of defect management.

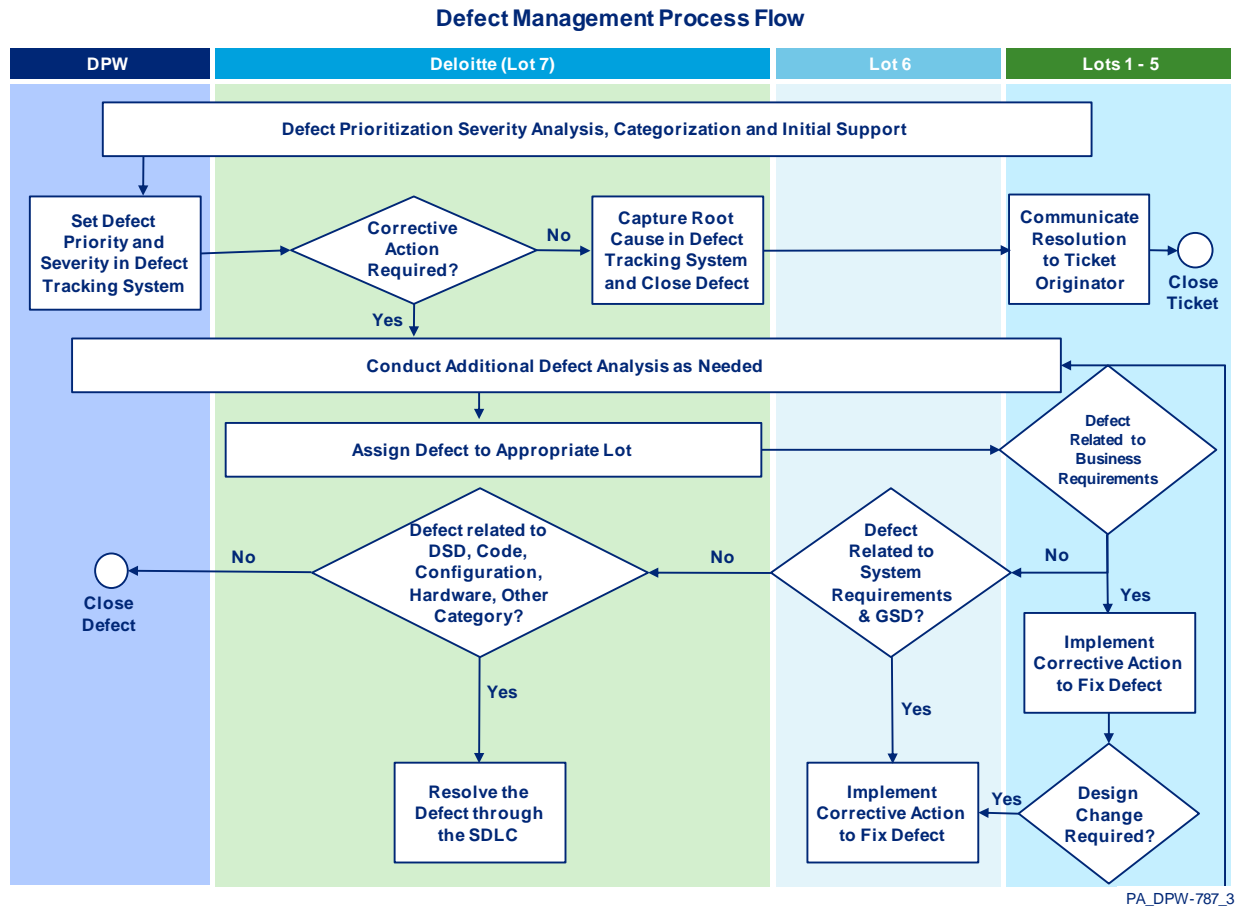


Figure 6.8-17. Defect Management Process Flow – Classification Phase.

Once issues are created in Defect Tracking System they are assigned for classification which includes categorizing, prioritizing, conducting an impact analysis and determining whether or not corrective action is necessary. If defects are determined necessary to be corrected they are assigned to the Application Team for resolution.

Defect Categorization. Defect categorization involves the segmenting of defects into one of the following one of the following groups:

- Software Engineering Process (SEP) Defect
- Configuration Defect
- Hardware Defect
- Code Defect
- Product Defect
- Operations Defect
- Undetermined Defect

Categorizing a defect allows for identifying what type of defect it is which allows for better routing and assignment of defects to make sure it gets to the appropriate group for resolution. In general, the maintenance team has responsibility for the resolution of defects; however, if the defect is related to a major modification/release that is in integration or UAT testing, or warranty-related, the defect will be assigned to the modifications team for resolution.

Once a defect is entered and categorized the next step is to perform a root cause analysis of the defect. The Root Cause Field is filled in by the Application Track Lead or Designer using a value from the drop down in the Defect Tracking System. When the defect is being closed, the Root Cause field becomes Mandatory and must be added in order to “Save” any changes made. Figure 6.8-18 displays how the defect category and root cause can be logged into defect management system as part of the defect management process.

PA_DPW-577

Figure 6.8-18. Program Change Request Root Cause Property.

The Defect Tracking System allows for adding and maintaining the root cause of the defect which is useful in defect reporting to be able to identify where the majority of the defects originate.

Impact Assessment/Defect Prioritization. Once the root cause has been established, Deloitte will work together with the Lots 1-5 and Lot 6 vendor if required to determine the severity of the defect by analyzing other areas within the application that may be affected by the defect. Additionally, we will conduct an analysis to determine if any other areas of the application may be adversely affected by adding, deleting, or modifying the code that contains the defect. Defect Severity will be assigned as follows within the Defect Tracking System:

- Level 1: Fatal Defects
- Level 2: Major Defects
- Level 3: Minor Defects
- Level 4: Cosmetic Defects

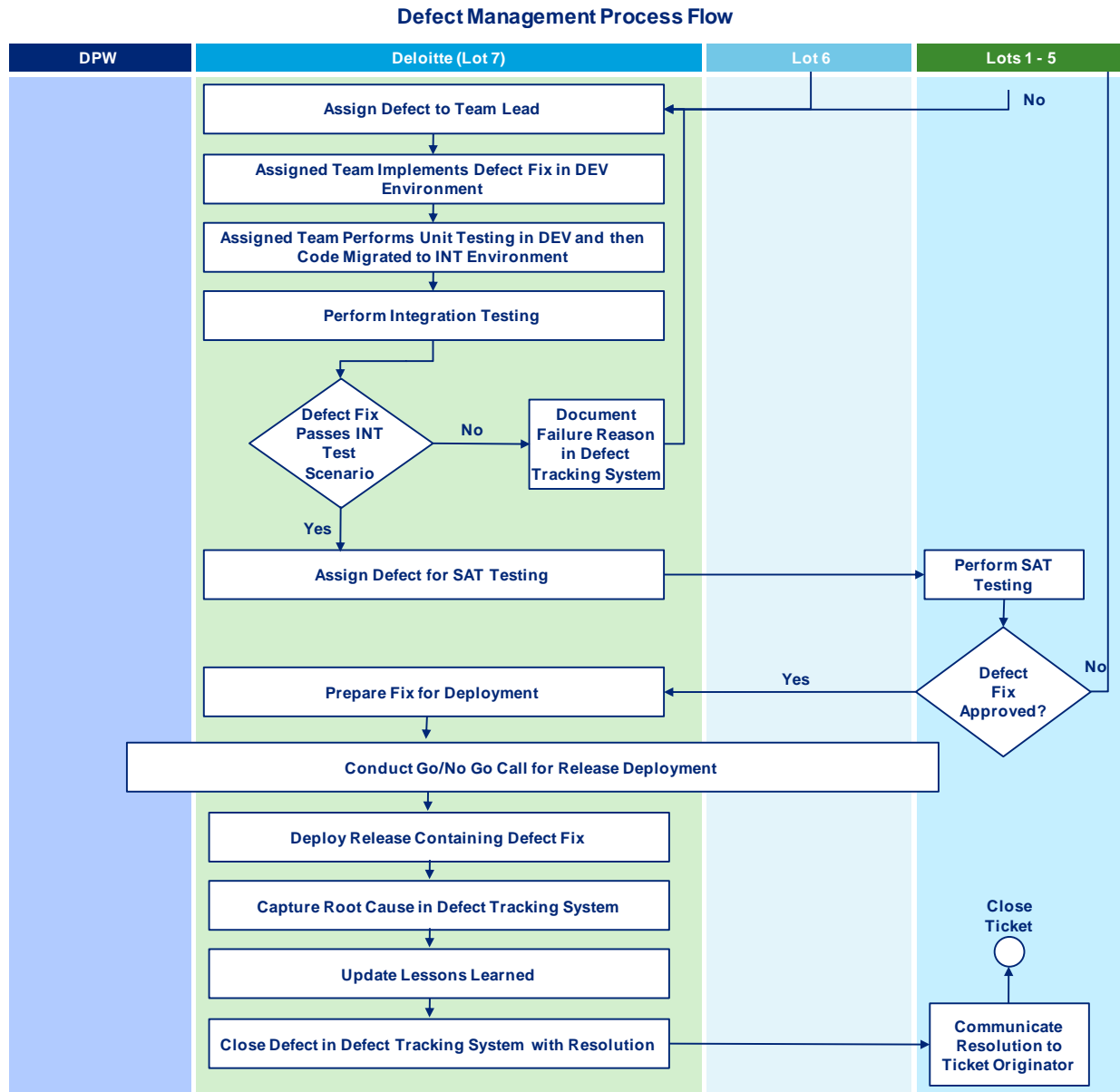


Defect Reproduction and Documentation. The next step for Production defects is to attempt to reproduce the defect in a development environment that mimics the build and the data that exists in production. For modifications defects will also be replicated in the development environment. Once the defect has been successfully reproduced, Deloitte will begin reviewing log files, application code, system requirements and documentation in order to attempt to establish the root cause of the system problem to assist in defect resolution.

As with other maintenance requests, service failure reports will be entered into the Defect Tracking System along with supporting information describing the incident. Other details concerning the resolution of the problem, work-arounds, and/or other considered responses (including those that may not have worked) will also be documented. Following the successful resolution of the service failure the team will provide an after-action incident report that documents the service failure (including the determined cause of the failure) and the final resolution.

Defect Resolution

After logging the defect into the Defect Tracking System and categorizing and determining the impact and severity the next step in the defect management process is to resolve the defect through the DPW SDM process. Similar defects or defects affecting similar subsystems of the applications will be grouped together in logical bundles and scheduled for development, testing and implementation as part of a major or minor release. Figure 6.8-19 provides the activities and who is responsible for taking action in the resolution phase of defect management.



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Figure 6.8-19. Defect Management – Resolution Phase.

After defects have been defined and classified they are assigned to the Application Team to correct and include in a planned release that will be tested and it will be determined whether or not the defect has been corrected and is ready to be deployed to Production.

Bundling and Scheduling. After defects are classified they are combined into a bundle of similar defects to be fixed as part of a bigger release. Combining defects into bundles will be done through the Automated Tracking System. These bundles are made up of logical grouping of defects that will be deployed to Production at the same time.

Figure 6.8-20 displays the Bundle – Add feature within the Defect Tracking System that will allow for the creation of a tracking mechanism for logical groupings of defects that will be developed, testing and deployed together.

PA_DPW-563

Figure 6.8-20. Defect Bundles.

Bundles provide the ability to assemble logical groupings of defects to provide a means to track defects through the SDM process.

Fix Defects. After the bundling and scheduling activities have been completed the defects are assigned to the appropriate development team to fix the code that caused the defect. Tracking of assignment for who is to fix the defect will be done through the Defect Tracking System. Developers will know which defects they have assigned as well as the schedule, severity and priority for the defect.

Test Defects. After the defects have been fixed by the Application Team the defect is transferred to the testing environments to verify that the defect has been corrected. The defect will be assigned to the appropriate testing resource to determine if the defect fix is approved.

Release Management and Deployment. After the fix has been approved by the testing team the defects that make up the approved bundle will be deployed to Production as a release. We will conduct Go-No calls for deployment to Production. DPW will be the final authority in making any “Go/No Go” decisions. The Deloitte team will perform deployment to Production upon DPW approval.

Defect Closure. After the fix has been deployed to Production the defect will be closed in the defect management tracking system.

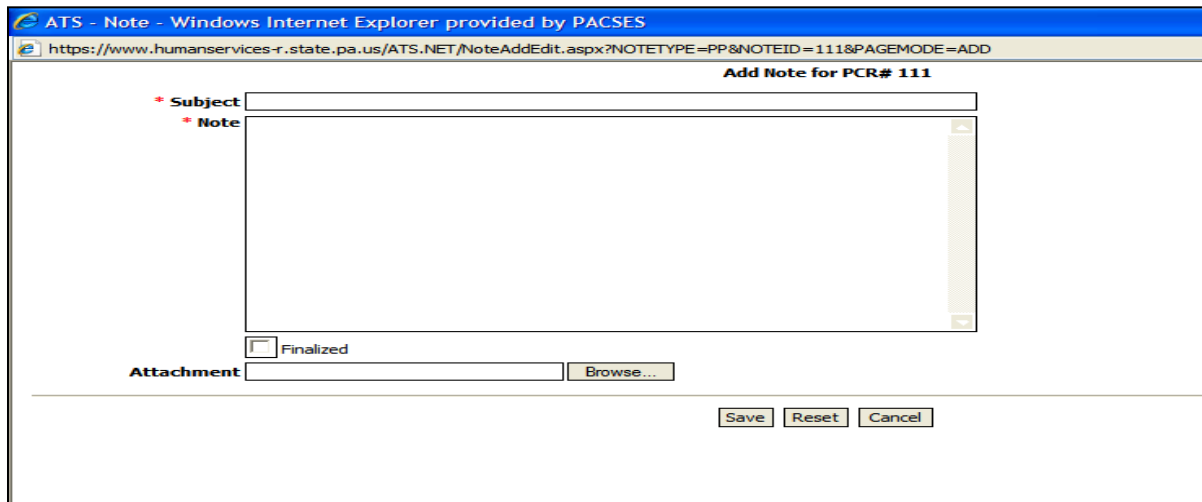
Defect Monitoring

Monitoring for defects is an on-going task that will be done as long as systems are maintained. This activity will include regular communication to the Commonwealth on the status of open defects as well as input for analysis for the assessment of operations and identify potential areas for continual process improvement.

Defect Reporting. We will provide to the Commonwealth, Lots 1-5 and Lot 6 vendors periodic reports containing statistics on open defects. For additional information on defect reporting see *Defect Management Reports*.

Resolution Effectiveness. We will provide to the Commonwealth, Lots 1-5 and Lot 6 vendors periodic reports containing statistics on system defects across SDLC phases that will help determine improvement areas on the project.

The Defect Tracking System also allows for documentation of defect tracking activities as the defect moves through the SDLC phases through the addition of notes. Figure 6.8-21 shows the Add Note screen that is available in the Defect Tracking System for documentation and tracking activities.



PA_DPW-579

Figure 6.8-21. Add Note Functionality.

The existing Add Note functionality within the Defect Tracking System allows for documentation to be added to existing defects in order to track and monitor them on a regular basis.

Standard as well as custom reports may be generated from the Defect Tracking System for defect reporting purposes. As the Lot 7 vendor, Deloitte will continually monitor the quality of development, Integration test and deployment activities through internal review sessions as part of our Quality Assurance process. We will also work with a QA vendor if the Commonwealth obtains one for the engagement.

Defect Management Reports

IV

Page
IV-319

RFP Reference: 1. Systems Support Services General, Defect Management

Offeror for **Lot #7** will be responsible for providing defect management reports as a contract deliverable throughout specific SDLC phases (i.e., Requirements, Design, Build, Integration, SAT, Production, and post Implementation) for each software release.

As the Lot 7 vendor Deloitte will provide to the Commonwealth and the other lot vendors, reports and metrics produced from the defect management tool to manage system defects. These reports will be produced on a regular basis and provide the following information from data within the Defect Tracking System:

- Total number of open defects per category per defect severity
- Total number of defects resolved, outstanding, and re-opened per category per severity
- Total Number of Defects per SDLC Phase per Defect Severity
- Total number of defects per software release by category
- Defect fix rate per software release by category
- Average fix cycle time per category per severity

Figure 6.8-22 displays the Program Change Request Reports Criteria screen where reports can be generated on demand using a number of defect properties as input parameters.

The screenshot shows the 'Program Change Request (PCR) Reports Criteria' interface. It features a grid of search filters. On the left, there are text input fields for 'Report', 'PCR#', 'Bundle#', and 'Call#'. Below these are dropdown menus for 'Initiator', 'Assigned To', 'Tester', and 'County/Agency' (with 'ADAMS' selected). The middle section contains checkboxes for 'Page Breaks' and 'Open Status', followed by dropdown menus for 'Status' (with 'None--' selected), 'Type' (with 'None--' selected), 'Priority' (with 'None--' selected), 'Complexity' (with 'None--' selected), 'Customer Area' (with 'None--' selected), and 'CCP Status' (with 'None--' selected). On the right side, there are dropdown menus for 'PIN Type', 'Environment' (with 'None--' selected), 'Subsystem' (with 'None--' selected), and 'Category' (with 'None--' selected). At the bottom right, there are checkboxes for 'Non Bundled', 'Sort Owner-Status', 'Sort Status-Owner', and 'BVA Date Returned NULL'.

PA_DPW-580

Figure 6.8-22. Defect Reports.

Automated Tracking System provides the ability to run reports on demand using a number of defect properties as input parameters.



Figure 6.8-23 displays the Program Change Request Report which can be generated on demand and displays all open defects.

 PCR Report																
PCR #	Bundle	Release Category	Status	Priority	PCR Type	Subsystem	Creation date	Initiator	Tester	Assigned To	Last updated	Environment	PIN	Mandatory Close Date	Build	Complexity
315		Not Assigned	In Production	High	New Development	System Enhancement	4/9/2009	Warren, Bryan	.	Warren, Bryan	4/21/2009	Production		4/14/2009		Medium
316		Maintenance	Approved	Medium	Documentation	Maintenance	4/9/2009	Warren, Bryan	.	Warren, Bryan	4/22/2009	Production		4/24/2009		Low
327		Maintenance	Approved	High	Defect	ChildLine	4/15/2009	Harclerode, Kenton	.	.	7/9/2009	Production		1/1/0001		Unknown
318		Maintenance	Approved	Expedited	Query/Adhoc Report	ChildLine	4/14/2009	Harclerode, Kenton	Harclerode, Kenton	Patel, Trusher	4/14/2009	Production		4/14/2009		Medium
328		Maintenance	Approved	High	Data Fix	ChildLine	4/17/2009	Harclerode, Kenton	Ellsperman, Rose	Patel, Trusher	2/11/2010	Production		1/1/0001		Medium
341		Maintenance	Approved	Critical	Defect	ChildLine	4/29/2009	Harclerode, Kenton	.	Patel, Trusher	2/11/2010	Production		5/1/2009		Medium
378	6	Release 2.0	Approved	Medium	System Enhancement	TANF FTR2	6/8/2009	McCutcheon, Katie	.	Juthani-Patel, Nayna	8/3/2009	Production		1/1/0001		Low
381		Maintenance	Approved	High	Defect	AIIRS	6/9/2009	Smith, Christine	.	Smith, Christine	7/1/2009	Production		1/1/0001		Low
389	6	Not Assigned	Approved	High	Defect	TANF FTR2	6/18/2009	McCutcheon, Katie	.	Juthani-Patel, Nayna	8/11/2009	Production		1/1/0001		Medium
387		Maintenance	In Production	Medium	Defect	AIIRS	6/18/2009	Smith, Christine	.	Smith, Christine	8/4/2009	Production		1/1/0001		Low
422		Not Assigned	Approved	High	Documentation	ChildLine	7/15/2009	Ellsperman, Rose	.	Ellsperman, Rose	1/27/2010	Production		1/1/0001		Medium
443	18	Not Assigned	Approved	High	System Enhancement	BHA MAPPER	7/23/2009	Foy, Alicia	.	Martin, Robert	1/15/2010	Production		9/30/2009		High
429		Maintenance	Approved	High	Data Fix	ChildLine	7/20/2009	Patel, Trusher	.	Patel, Trusher	2/11/2010	Production		1/1/0001		Low
488	18	Not Assigned	Approved	Medium	System Enhancement	BHA MAPPER	8/18/2009	yang, Qiuyan	Martin, Robert	Martin, Robert	1/15/2010	Production		8/27/2009		Medium
505		Not Assigned	In Production	High	Defect	ChildLine	8/21/2009	Ellsperman, Rose	.	Ellsperman, Rose	9/10/2009	Production		1/1/0001		Medium
520		Maintenance	Not Started	Medium	New Development	Administration	8/28/2009	Herrold, Steve	.	Herrold, Steve	8/31/2009	Production		1/1/0001		Medium

Report generated on 4/13/2010 12:14:23 AM Page 1 of 5

PA_DPW-846

Figure 6.8-23. Defect Report.

The defect report provides a listing of all active defects and their specific status so that DPW has transparency into the defect management process.



Figure 6.8-24 displays a sample report that shows aging of defects by release.

HCSIS		Total PCR and Test Scenarios Implemented as part of this Release	Total Number of Warranty PCRs Identified as part of this Release			Number of Open Warranty PCRs Identified as part of this Release			Number of Closed Warranty PCRs Identified as part of this Release			Number of Open Warranty PCRs not assigned to a Release		
Release	Release Date		< 30 Days	30 - 60 Days	> 60 Days	< 30 Days	30 - 60 Days	> 60 Days	< 30 Days	30 - 60 Days	> 60 Days	< 30 Days	30 - 60 Days	> 60 Days
Release 6.3.2	6/11/2009	5	0	0	1	0	0	0	0	0	1	0	0	0
DW Release 7.4	8/18/2009	11	0	0	12	0	0	8	0	0	4	0	0	11
DW Release 7.5	10/20/2009	2	0	0	2	0	0	1	0	0	1	0	0	1
Release 6.5.1	10/22/2009	6	0	0	1	0	0	0	0	0	1	0	0	0
Release 6.5.2	12/10/2009	11	0	0	1	0	0	1	0	0	0	0	0	0
01/07/2010 - D/F	1/7/2010	10	0	0	1	0	0	0	0	0	1	0	0	0
Release 6.6.0	1/30/2010	893	0	21	31	0	21	16	0	0	15	0	1	7
Release 6.6.1	2/11/2010	18	0	2	0	0	1	0	0	1	0	0	0	0
Release 6.5.0	3/25/2010	196	0	0	30	0	0	2	0	0	28	0	0	1
Release 6.7.0	4/10/2010	442	0	0	1	0	0	1	0	0	0	0	0	0
Release 6.3.0	10/7/2010	222	0	0	2	0	0	1	0	0	1	0	0	0
Release 6.4.0	10/7/2010	174	0	0	27	0	0	0	0	0	27	0	0	0
Release 6.0.0	11/12/2010	1177	0	0	1	0	0	1	0	0	0	0	0	0

Report generated on 4/13/2010 12:10:39 AM Page 1 of 2

PA_DPW-847

Figure 6.8-24. Warranty Aging Defect Analysis.

The report for aging defects provides DPW with the visibility into how quickly defects are being reduced over time.



Figure 6.8-25 provides a sample of a defect management report that displays the total number of defects yielded by SDLC phase and release.

Deloitte PMO Metrics Data Submission

Project Defect Data

Last Updated By: PELICAN Team
Last Updated Date: 12/28/09

Scope of Data: For the purposes of this measurement, only defects detected in an application environment, or in an SDLC deliverable or work product (e.g., RDD) are counted. Defects detected in non-SDLC work products such as plan documents and project support artifacts are not reported under this measurement.

Operational Definitions: Populate Deliverable Review Defects using data from the project's deliverable review logs for all engineering deliverables and work products (RDD, GSD, DSD, Program Specs, PMNs, etc.). Do NOT count enhancements as defects.

Work Order Number	Work Order Title	Status	Deliverable Review Defects				SIT & Pre-UAT Defects				UAT Defects				Warranty Defects				Root Causes of Variation		
			Total Suggestions	Total Non-Critical Severity	Total Critical Severity	Total Review Defects	Total Low Severity	Total Medium Severity	Total High Severity	Total Critical Severity	Total SIT Defects	Total Low Severity	Total Medium Severity	Total High Severity	Total Critical Severity	Total UAT Defects	Total Low Severity	Total Medium Severity		Total High Severity	Total Critical Severity
WO 021	Provider Search Expansion	Completed	4	15	0	15	10	15	14	5	44	25	15	20	10	70	0	0	0	0	No warranty PCRs captured in ATS for this initiative
WO 026	OTL and Audem SSD	In Progress	0	8	13	21	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	SIT, Pre-SAT, UAT and Warranty defects not populated since the initiative is still in development phase
WO 036	Pre-K Courts Enhancements Phase 4	In Progress	0	13	8	21	5	9	6	2	22	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	UAT and Warranty defects not populated since the initiative is still in Pre-SAT test phase
WO 028	NET Bank Enrollment	Completed	7	6	0	6	0	0	1	6	1										
WO 003	Early Learning Network System Expansion	Completed	0	53	1	54	3	18	42	33	55	3	17	28	2	50	0	11	3	0	14
WO 017	Early Learning Network Data Warehouse Release 1	Completed	0	31	0	31	1	4	14	1	20	4	18	16	0	38	0	0	0	0	No warranty PCRs captured in ATS for this initiative
WO 029	PA Pre-K Courts Phase 3	Completed	24	92	30	131	37	193	195	15	430	14	94	113	15	236	5	10	10	0	25

PA_DPW-848

Figure 6.8-25. Defect Analysis and Phase Yield Report.
The defect analysis and phase yield reports will identify the defects and how they are being reduced through all phases of the SDLC.

These defect management reports will provide input into defect analysis that can be used to improve current processes within the SDLC, assess releases and inform Go or No-Go decisions made by the Commonwealth.

Production Defect Report

IV Page IV-319 RFP Reference: 1. Systems Support Services General, Defect Management

Lot # 7 vendor will provide a production defect report and certify that the end product is operational and ready to migrate into live production environments from a systems perspective. **Lot #s 1-5** will certify that the end product is operational and ready to migrate into live production environments from a business perspective. The production defect report, SAT Completion Test Results, and both certifications are contract deliverables and required for DPW to assess the end product operational readiness profile and make an informed Go or No-Go decision. DPW makes the final determination of assigning a defect categorization and criticality.

We will use the ATS defect management tool to bundle defects into releases. The software code tied to a release will migrate from development to the Software Integration and Testing environment after unit testing has been completed by Deloitte. We will submit a Unit testing report and migrate code after approval by the Commonwealth.

Deloitte will follow the existing DPW Software Development Methodology for promoting defects across environments and finally deploying to Production. We understand there are seven different environments (development, integration test, systems acceptance test, test for production, integrated load test, production, and training) that the defect resolutions will need to migrate through.

Deloitte will conduct testing in the Integration and Test environments and provide a test results document to the Commonwealth upon completion. After approval the code will be deployed to the Acceptance environment where the Lots 1-5 vendors will lead the System Acceptance Testing (SAT) activities. Deloitte will provide defect reports and work closely with the Commonwealth and the Lots 1-5 vendor to facilitate a successful

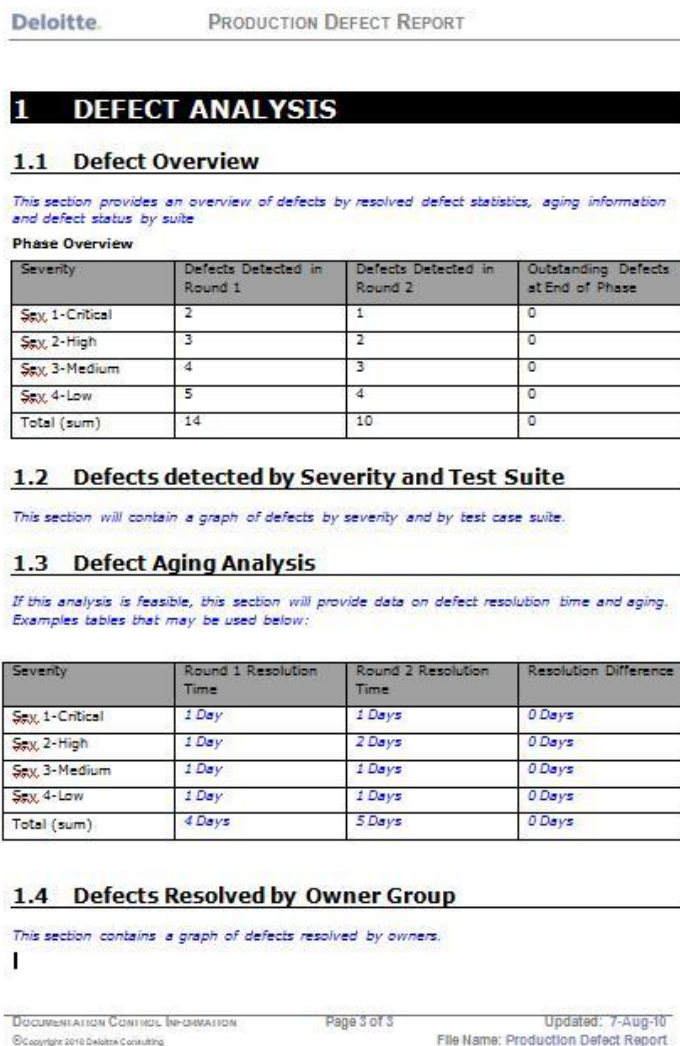


Acceptance testing phase. The Lots 1-5 vendor will produce the SAT Completion Report for approval by the Commonwealth that will certify that the code base is operational and ready for Production deployment. Prior to deployment to Production environment Deloitte will produce the Production Defect Report. This will certify that the code moving to the Production environment has been tested successfully in the lower environments.

The Production Defect Report will consist of the following information:

- A list of defects contained in the release
- Dates of migration across environments and approval dates

Figure 6.8-26 displays a sample Production Defect Report.



PA_DPW-871

Figure 6.8-26. Sample Production Defect Report.
Provides overview of defects and certification that end product is operational.



Deloitte will submit the Production Defect Report prior to the proposed Production deployment date allowing for sufficient time for approval by the Commonwealth.

We will conduct Go-No calls for deployment to Production. DPW will be the final authority in making any “Go/No Go” decisions. The Deloitte team will perform deployment to Production upon DPW approval.

Providing Defect Input

IV	Page IV-320	RFP Reference: 1. Systems Support Services General, Defect Management
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Offerors must provide input and specific data and/or information upon request by the Department with regards to defect prevention, discovery, resolution, management, tracking, reporting, SDLC processes and test reports.

As the Lot 7 vendor Deloitte will upon request provide the Commonwealth with the information regarding system defects from discovery until resolution. This information will be tracked in the Defect Tracking System which provides the ability to query the data and provide information on an as needed basis.

Deletion and Modification of Defects

IV	Page IV-320	RFP Reference: 1. Systems Support Services General, Defect Management
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Offerors are not authorized to make deletions or modifications to defects outside of status indicators without approval from the Department. Changes to a particular defect’s categorization or criticality is not authorized and requires formal written authorization from DPW-BIS director, designated BIS SQA manager, or DPW Contract Administrator.

Deloitte will manage defects within the Automated Tracking System (ATS) tool. We will review defects in the daily System Defect Triage Meetings. Subsequent steps involve performing an impact analysis, determining the priority, severity and category of the defect. The Commonwealth will be the final authority on deciding these attributes and the defect will be modified to reflect the values approved by the Commonwealth.

Once a defect category, severity and priority have been assigned the defect tracking system contains an audit tracking feature and any modifications will be logged along with the username and the date timestamp. The defect tracking system does not allow deletion of a defect. It only allows status changes. Any status changes made will be with the approval of the Commonwealth alone.



Figure 6.8-27 displays the status history within the defect tracking system.

Program Change Request (PCR) Status History						
PCR#	16954					
Title	IVB-CP-Rejected case MAWD screen not available in CIS/see8446					
Seq#	Status	Last Updated By	Last Updated On	Category	Build	CCP Status
1	Not Started	Jain, Siddharth	7/27/2010 10:04:59 AM			
2	Withdrawn Approved	Karl, Mary	7/27/2010 4:17:11 PM			

PA_DPW-872

Figure 6.8-27. Defect Status History.

Updates to the defect status is tracked and will provide required audit trail for updates made to defects.

Process and Procedures

IV

Page
IV-345

RFP Reference: 2.3.1 Defects Management

The Offeror for **Lot #7** must propose the tools, processes, and methodology that demonstrates how they will coordinate and work with designated DPW stakeholders, third party vendors, and other selected Offerors (if applicable) to effectively manage application maintenance defects and address emergency situations that must be resolved immediately. Defects will be deemed to be an emergency when normal business operations and processing is interrupted or stopped, (i.e., Level 1: Fatal or Level 2: Major) or there are other significant errors in processing. The Offeror must describe its problem escalation procedure if a system defect cannot be readily resolved. The Offeror shall immediately notify the DPW Contract Administrator of any emergency defects identified by the Offeror; and advise the Department of the corrective action to be taken by the Offeror. Reference the defect management paragraph in Application Support Services General; Section D 1; and Defect Management & Reporting Guide (**Appendix BBB**).

Implementing processes and procedures to resolve Production issues in a timely manner is critical to maximizing application availability and minimizing downtime. We understand that the Commonwealth has identified different severity levels and have proposed key response mechanisms. Figure 6.8-28 provides our understanding of your requirements for resolving and responding to Production defects with different levels of severity.

		24 Hours	48 Hours	3 Working Days	5 Working Days	30 Working Days	60 Working Days
Notification of Defect	Level 1: Fatal	<ul style="list-style-type: none"> • Corrective Action Plan • Defect Resolution 			<ul style="list-style-type: none"> • Root Cause Analysis • Plan for Defect Reconciliation 	<ul style="list-style-type: none"> • Execute Defect Reconciliation Plan 	
	Level 2: Major	<ul style="list-style-type: none"> • Corrective Action Plan • Defect Resolution 			<ul style="list-style-type: none"> • Root Cause Analysis • Plan for Defect Reconciliation 	<ul style="list-style-type: none"> • Execute Defect Reconciliation Plan 	
	Level 3: Minor		<ul style="list-style-type: none"> • Defect Resolution 	<ul style="list-style-type: none"> • Corrective Action Plan 	<ul style="list-style-type: none"> • Root Cause Analysis • Plan for Defect Reconciliation 	<ul style="list-style-type: none"> • Execute Defect Reconciliation Plan 	
	Level 4: Cosmetic				<ul style="list-style-type: none"> • Corrective Action Plan • Defect Resolution** • Plan for Defect Resolution** 	<ul style="list-style-type: none"> • Execute Defect Reconciliation Plan 	
	Other				<ul style="list-style-type: none"> • Corrective Action Plan* • Plan for Defect Reconciliation* 	<ul style="list-style-type: none"> • Defect Resolution** 	<ul style="list-style-type: none"> • Execute Defect Reconciliation Plan

* Submission determined by DPW
** Based on when CAP is reviewed and returned from DPW Staff

PA_DPW-291

Figure 6.8-28. Defect Management Response Requirements.

We understand your requirements for identification and classification of defects.

Each severity requires a different speed of response as the impact to DPW stakeholders is different based on the severity level criteria that DPW has set forth. As the figure below indicates, we understand that Severity 1 and 2 production defects are high impact issues that require immediate attention. In order to give these issues the prompt attention that they require, we will use an emergency system problem triage procedure to accelerate the triage and response process. By addressing these issues promptly and thoroughly, DPW will increase the level of user satisfaction with their applications.



Severity Level	Severity Level Criteria	Key Response Mechanisms
1-Fatal	<p>As per the RFP Appendix BBB, Fatal Defects are the defects, which results in the failure of the software system, of a subsystem, or of a software unit so that no work or testing can be carried out after the occurrence of the defect. Fatal defects could result in critical loss of data, critical loss of system availability, critical loss of security, critical loss of safety, or cause very serious consequences to citizens and/or agency mission. Multiple functions are severely broken, cannot be used, and there is no workaround. This defect <u>must</u> be resolved prior to approval of work product.</p>	<p>Severity 1 system problems will be addressed promptly as an emergency. Deloitte will participate in the emergency triage meetings to help analyze, prioritize and categorize the defect. We will work closely and expeditiously with the Lots 1-6 vendors and complete system development activities to address in production based on environment availability and release schedule.</p>
2-Major	<p>As per the RFP Appendix BBB, Major Defects are one, which also causes failure of entire or part of system, but there are some processing alternatives, which would allow further operation of the system. Major defects could cause significant consequences for the system and disruptions in business operations. One or more functions are badly broken, needs to be fixed but there is a workaround. This defect <u>must</u> be resolved prior to approval of work product.</p>	<p>Severity 2 system problems will need to be evaluated by business owners/project management on an individual basis to determine if the work-around process is too difficult or time-consuming to allow business to be conducted effectively. Deloitte staff will participate in this process and will work on resolution accordingly. We will work closely and expeditiously with the Lots 1-6 vendors and complete system development activities to address in production based on environment availability and release schedule.</p>
3-Minor	<p>As per the RFP Appendix BBB, Minor Defects does not result in failure but causes the system to produce incorrect, incomplete, or inconsistent results, or the defect impairs the system usability. Minor defects may cause small or negligible consequences for the system, minor disruptions in business operations and would be relatively easy to recover. Minor defects can be released into production provided there is a work around or a waiver has been granted by DPW. This defect <u>should</u> be resolved prior to approval of work product.</p>	<p>Severity 3 system problems will be triaged during the daily defect triage meeting. Deloitte staff will participate in this meeting and will work on resolution accordingly. We will work closely and expeditiously with the Lots 1-6 vendors and complete system development activities to address in production based on environment availability and release schedule.</p>



Severity Level	Severity Level Criteria	Key Response Mechanisms
4-Cosmetic	As per the RFP Appendix BBB, Cosmetic Defects are small errors that do not prevent or hinder functionality. Cosmetic defects are trivial defects that can cause no negative consequences for the system or business operations. Resolution of this defect needs to be <u>negotiated</u> with impacted personnel.	Severity 4 system problems will be triaged during the daily defect triage meeting. Deloitte staff will participate in this meeting and will work on resolution accordingly. We will work closely and expeditiously with the Lots 1-6 vendors and complete system development activities to address in production based on environment availability and release schedule.

Figure 6.8-29. Defect Severity Classification.

When a Severity 1 or 2 level defects are logged into the Defect Tracking System, notification will be promptly sent to an on-call production staff. We will review the defect, and if necessary, gather additional information from the initiator. The appropriate maintenance team resources will be contacted, and they will attempt to reproduce the issue and establish the root cause. As required in the RFP, within twenty four hours, Deloitte will provide a Corrective Action Plan that articulates its understanding of the problem, either a diagnosis of the problem or a description of the activities being undertaken to diagnose the problem, and an estimated time to resolve the issue.

We will provide this status report to the BIS Executive Leadership and the Implementation Team and provide regular updates. The resolution may consist of both a short-term solution to facilitate a temporary fix in production and long-term solution in order to fully address the problem. The following sections provide additional details on the activities related to how we will respond with an appropriate corrective action plan and response based on the defect level.

Level 1 and Level 2 Defect Response

IV	Page IV-345	RFP Reference: 2.3.1 Defects Management
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The Offeror of **Lot #7** shall respond within twenty-four (24) hours with a Corrective Action Plan (CAP) for any Level 1 (Fatal) and Level 2 (Major) emergency defects reported by the Department. Emergency Level 1 (Fatal) and Level 2 (Major) defects must be resolved within twenty-four (24) hours of identification unless otherwise agreed to by the DPW Contract Administrator and a root cause analysis must be submitted within five (5) days, including a plan for the reconciliation of any issues that are a result of the defect. The actual reconciliation must occur within thirty (30) working days, unless otherwise directed by the Department or unless the DPW Contract Administrator or delegate has granted an extension of the period of time necessary to cure the deficiency.

We understand the need for a swift response to Level 1 Fatal and Level 2 Major defects as these defects may result in either complete system failure or failure of major subsystems. We will assign and put together a corrective action plan for defect remediation within five working days and resolution within thirty working days unless otherwise mutually agreed to by the DPW Contract Administrator and Deloitte. Deloitte will engage DPW for prioritization for deployment to Production.



We will work with DPW stakeholders to address and resolve the defect in production based on environment availability, release schedules, program module coding contention, and DPW migration timeframes.

Level 3 Defect Response

IV	Page IV-345	RFP Reference: 2.3.1 Defects Management
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The Offeror of **Lot #7** shall respond within three (3) working days with a Corrective Action Plan (CAP) for any Level 3 (Minor) defects reported by the Department. Emergency Level 3 (Minor) defects must be resolved within forty-eight (48) hours of identification unless otherwise agreed to by the DPW Contract Administrator and a root cause analysis must be submitted within five (5) days, including a plan for the reconciliation of any issues that are a result of the defect. The actual reconciliation must occur within thirty (30) working days, unless otherwise directed by the Department or unless the DPW Contract Administrator or delegate has granted an extension of the period of time necessary to cure the deficiency.

We understand the need for a quick response to Level 3 – Minor defects as these defects may result in usability issues and incorrect data being entered into the applications. We will assign and put together a corrective action plan for defect remediation within five working days and resolution within thirty working days unless otherwise mutually agreed to by the DPW Contract Administrator and Deloitte.

Deloitte will engage DPW for prioritization for deployment to Production. We will work with DPW stakeholders to address and resolve the defect in production based on environment availability, release schedules, program module coding contention, and DPW migration timeframes.

Level 4 Defect Response

IV	Page IV-345	RFP Reference: 2.3.1 Defects Management
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For defects related to isolated problems but not interrupting production operations (Level 4: Cosmetic), the Offeror's maintenance staff shall submit a Corrective Action Plan (CAP) within five (5) working days of discovery or receipt of a defect notification to the DPW Contract Administrator for review and approval indicating how and when the deficiency will be corrected. The correction will apply to both systemic and processing/operational issues as well as any recoveries or reruns that are required.

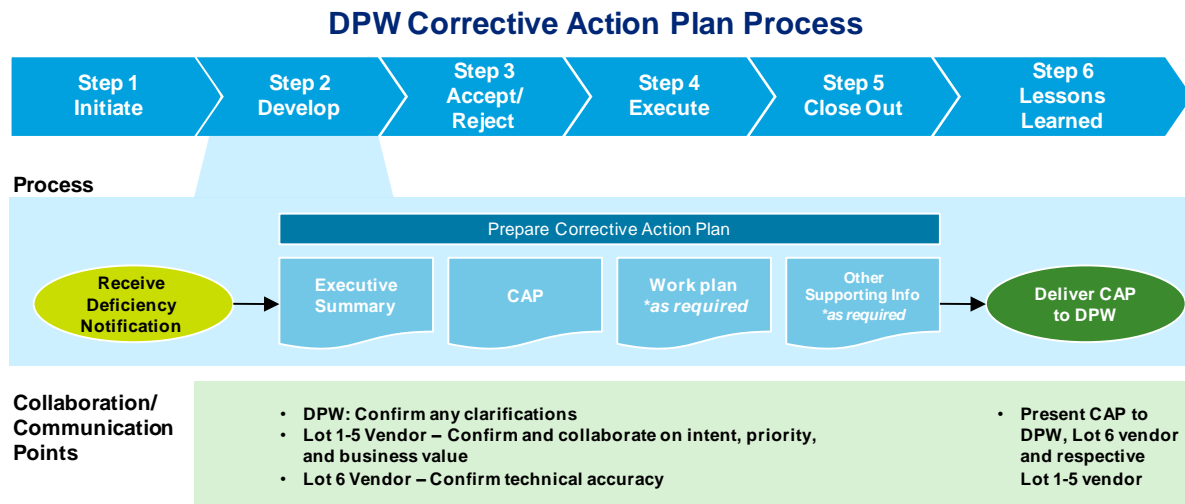
We understand the need to correct Level 4 defects on an ongoing basis as these defects are cosmetic in nature. We will assign and put together a corrective action plan for defect remediation within five working days and resolution within thirty working days unless otherwise mutually agreed to by the DPW Contract Administrator and Deloitte. Typically, level 4 defects will be bundled with a level 1 or 2 defect when that object is being corrected. Deloitte will engage DPW for prioritization for deployment to Production. We will work with DPW stakeholders to address and resolve the defect in production based on environment availability, release schedules, program module coding contention, and DPW migration timeframes.

Corrective Action Plans

IV	Page IV-346	RFP Reference: 2.3.1 Defects Management
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The Department's staff will review and approve or return the CAP to the selected Offeror for modification within two (2) working days. The CAP will include information that will define any system and/or operational problem, the problem solution, and the level of effort required to code, test, implement, address operational issues and update documentation related to the deficiency. Once approved by the DPW Contract Administrator, the Offeror shall correct the deficiency within five (5) working days, including a plan for the reconciliation of and issues that are a result of the defect. The actual reconciliation must occur within thirty (30) working days, unless otherwise directed by the Department or unless the DPW Contract Administrator or delegate has granted an extension of the period of time necessary to cure the deficiency.

We understand the need for corrective action plans to be put into place after defects have been identified in order to provide a means for tracking and correcting the defect with the systems. Figure 6.8-30 depicts the Corrective Action Plan process from when a deficiency notification is received until it is complete.



PA_DPW-782

Figure 6.8-30. Corrective Action Plan Process.

Our approach to the corrective action plan includes a well defined process which allows for stakeholder involvement, resource environment considerations, release schedules, and communication to other stakeholders.

The Corrective Action Plan provides a tracking mechanism for critical information on the defect and also the solution for fixing it. The major features of the Corrective Action Plans that we will submit to the Commonwealth include:

- Definition of system or operational problem
- Corrective/preventative actions required to resolve the defects
- Estimation of the level of effort required to code, test, implement and document fix



Figure 6.8-31 depicts a sample Corrective Action Plan which will provide the course on how we plan to resolve system and operational problems.

Root Cause Analysis Report							
Problem Description	Finding Root Cause and taking corrective action for defects for the Screening Release.						
Processes Impacted							
Name of Phase/Iteration/Release for which Causal Analysis was conducted	Screening Release						
Causal Analysis meeting date:	6/14/2010	Participants: Rakesh Patel, Neeraj Ghatge, Hiral Nisar, Saurabh Ganju, Joshua					
Action Plan							
Problem Area	Primary Cause	Specific root Cause	Corrective/preventive action	Responsible	Targeted Date of completion	Actual date of Completion	Status
High Functionality or Logic related defects	Incorrect Programming Logoc	Relatively new resources on project, Developer did not consider all scenario's considered 'common knowledge'	Storyboard needs to be reviewed by the manager and QA lead for completeness after capturing requirements in multiple iterations.	Offshore/On-Site Manager and QA Lead	For the future release	N/A	OPEN
High Functionality or Logic related defects	Incorrect Programming Logoc	Different developers working on similar data representation on different pages.	Improve inter-developer communication so that developers are aware of common changes.		For the future release	N/A	OPEN
High Analysis / Validation Coverage related defects	Insufficient Unit Testing	Decision Tree Review not done for completeness and correctness - it was a new way of representing requirements	Walk-through of the decision trees will be done between on-site manager and off-shore team for completeness and correctness.	On-site Manager/Off-shore team	Any occurrences of decision trees from now onwards.	N/A	OPEN
Project Standard Related Defects	Non-compliance to standards or guidelines	Screening UI changed, the changed UI prototype was not checked for ADA compliance before implementation	For any UI change, we should do a comprehensive check for ADA compliance before implementation across pages	Offshore Lead	For the future release	N/A	OPEN
Effort Variance	Incorrect estimates for Screening Results Page, the Positive variance in Screening Results Page caused the Negative variance in Next Steps page	Functionality not considered when estimating effort, some pages might not fall under 'standard page estimates'	When estimating effort, consider the functionality to determine effort for different components (Coding / Unit Testing)	Offshore Lead	For the future release	N/A	OPEN

PA_DPWW-584

Figure 6.8-31. Sample Corrective Action Plan.

Corrective Action Plans provide the steps that need to be followed to correct defects from identification to closure.

Other Defect Response

IV	Page IV-346	RFP Reference: 2.3.1 Defects Management
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For other defects, the Offeror of **Lot #7** may be required, as determined by the Department, to submit a Corrective Action Plan (CAP), including a plan for the reconciliation of data that are a result of the defect within five (5) working days, of discovery or receipt of a deficiency notification from the Department. The Department's staff will review and approve or return the CAP to the Offeror for modification within five (5) working days. The Offeror shall correct the deficiency within thirty (30) working days unless the DPW Contract Administrator or delegate has granted an extension of the period of time necessary to cure the deficiency. The actual reconciliation must occur within sixty (60) working days, unless otherwise directed by the Department.

We understand the need to correct other defects as these defects may cause negative or unintended consequences for the systems or business operations. Although Deloitte agrees in principle to the RFP statement on Corrective Action Plans and the timelines associated with them, there are a number of considerations that need to be understood in order to fully define the situations where a CAP is required.



Key to being able to perform this analysis is a determination when the defect is first noted what the severity actually is. This is accomplished through alignment with the severity definition and an understanding of the broader impacts of the defect. Our maintenance team understands this, and prior to commencing work on a defect will contact the requestor to determine if the initial severity is correct, or if changes (both higher and lower) are required. Furthermore, there are situations where a specific defect might not fit into the severity 1-4 categories and will need to be considered under the modifications activities or queued for future work.

In addition, when determining if the defect “fits” the requirement of CAP generation, there are a number of additional attributes that must be considered:

- Did the maintenance team have complete control over the defect?
- Were there third-parties involved (e.g. outside vendors, other Lot providers, program offices, etc.) that had an impact upon the defect?
- Were the handoffs from groups outside of the maintenance team performed correctly and in a timely fashion?
- Was the defect the result of a base software problem that required intervention/fixes/patches from a software vendor?
- Were there delays in testing/promotion through the environments that the maintenance team did not control?

Deloitte understands the importance of rapid and effective resolution of production issues and is fully aware of the importance of corrective action planning as a tool to prevent the recurrence of issues.

The resources identified for Defect Management are organic to our Maintenance Team and are part of the Staffing Chart included in *Section 6.4*.



6.9 ITSS and DTSS



PA_DPW-200i

II	Page II-2	RFP Reference: II-3. Work Plan
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Describe in narrative form your technical plan for accomplishing the work. Use the task descriptions in **Part IV** of this RFP as your reference point

IV	Page IV-300	RFP Reference: Systems Architecture Lot #6 and Technical Support Services Lot #7
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IT Shared Services/Direct Technical Support Services: The selected Offeror's will be responsible for the Direct Technical Support Service activities necessary to support the DPW Application and Technical Engineering staff relative to strategic, tactical, and operational activities.

Additional RFP Reference: Systems Architecture Lot #6 and Technical Support Services Lot #7, Page IV-385

Addendum #4, Q&A: Page IV-299/IV-300 of the RFP lists Direct Technical Support Services as a task that a vendor should respond to. However within Section E, the detailed requirements address both Direct Technical Support services and IT shared services. Could you please confirm that the reference to Direct Technical Support Services on Page IV-300 should state 'IT Shared Services/Direct Technical Support Services?' "YES

Our proposed ITSS/DTSS approach supports and expands DPW's award-winning shared services model, and advances the Department's enterprise, service-oriented strategy. Our team provides strategic, tactical, and operational support that enables migration to next generation programs and technologies without risking mission critical DPW application operations and technical support. The team includes a unique blend of staff with in-depth DPW application and IT experience together with other experts from across the firm that bring expertise in ITIL, CMMI, enterprise architecture, SOA, security, cloud computing and other forward-thinking IT frameworks and technology trends.

In working with DPW over the years, Deloitte understands the strategic importance and the challenges of migrating DPW applications to EA-SOA frameworks that are supported by an efficient IT shared service model. Our ITSS/DTSS team is experienced in the operational details of supporting the DPW systems environment, and has worked with DPW as a leader to implement new models for delivering IT service to the Commonwealth. We worked shoulder-to-shoulder with DPW

Unique and Distinguishing Factors

- Delivery team with over 2000 years of collective DPW experience
- On-demand access to advanced technology and HHS experts from across the firm and through Project Advisory and Innovation Panel
- Strategy and implementation support for DPW's award-winning shared services model



in defining and successfully deploying an initial IT shared services model and an initial set of EA-SOA initiatives. At the same time, the team balances these new forward-thinking initiatives with day-to-day operations and uninterrupted production support to users.

No other vendor can bring this unique blend of expertise in new strategic technologies, shared services, and DPW business and technical operations. Our approach enables successful application migration to the new technologies and operating models at low risk to DPW. We propose building on our current ITSS/DTSS approach and prior successes in two key ways that are critical to advancing DPW’s IT strategy, including:

- **Evolve DPW’s enterprise and service-oriented vision to the next maturity level** that builds on existing DPW EA-SOA frameworks, defines a strategic EA-SOA platform vision and Roadmap, and institutionalizes specific SOA-based approaches into maintenance and modification activities and processes,
- **Expand ITSS/DTSS approach** to a comprehensive, scalable shared services IT model that includes business application, technical and operational shared services as well as ‘on-demand’ access from specialists in latest technology trends and HHS best practices.

Our proposed ITSS/DTSS approach translates into a series of strategic, tactical and operational efforts that align with DPW objectives described in RFP Part IV Work Statement, page IV-315, and as outlined in Figure 6.9-1.

DPW Objectives	Feature	Benefits to DPW
Refine and expand the DPW Enterprise Architecture reference models	<ul style="list-style-type: none"> • Progress reference models and collaboratively develop overarching EA-SOA Roadmap of initiatives • Use layered architecture reference models that address specific concerns with each layer and facilitate incremental implementation of the Roadmap 	<ul style="list-style-type: none"> • Provides high availability solution with business services to support consistent information and increased efficiency • Continues and expands DPW’s leadership position as EA-SOA innovator in state government
Build and evolve business solutions with EA frameworks	<ul style="list-style-type: none"> • Mature and broaden use of newer technologies such as business rules engines and configuration-driven services at the enterprise level • Provide consistency with Federal Enterprise Architecture (FEA) framework • Strategize and enable solutions that: <ul style="list-style-type: none"> - Increase automation and enhance user adoption of web self-service solutions - Decrease amount of manual intervention required in DPW processing 	<ul style="list-style-type: none"> • Quicker realization of benefits with enhanced return on DPW assets • Helps the program offices achieve the desired level of productivity from their staffs and systems



DPW Objectives	Feature	Benefits to DPW
Achieve greater flexibility and facilitate agile transformations	<ul style="list-style-type: none"> • Support configurable solution approaches, e.g. modular development that decouples business rules from software SDM; expand use of Corticon, services and event-driven methods • Continue to reduce reliance on proprietary frameworks and technologies • Use service-based integration approaches 	<ul style="list-style-type: none"> • Decreases maintenance efforts • Enables easier upgrades • Increases flexibility to quickly respond to business change, new legislation
Create software services for end-to-end business processes	<ul style="list-style-type: none"> • Use business process-centric approach, leveraging team's in-depth HHS business process and technical expertise as well as best practices from our national HHS Practice • Expand use of business process models and tools, business rules engine to compose modular, reusable common shared services • Leverage data warehouse and reporting approaches with evolution to a common DPW knowledge management platform 	<ul style="list-style-type: none"> • Reduces development and deployment time through reusable process management components • Quicker value delivery and integration • Reduces delivery risk based on past successful services development and deployment • Enhances on-demand data access and efficient queries and analysis by authorized internal/external agencies and citizen users
Transform and/or design technology solutions that are maintainable, extensible, scalable, reusable, and secure	<ul style="list-style-type: none"> • Reduce overlapping solution components and evolve to single common platform • Leverage standards- and service-based development and integration approaches • Promote strict adherence to standards • Use COTS components as and where they make business and technical sense 	<ul style="list-style-type: none"> • Reduces architectural complexity and support efforts • Provides more cost-effective integration of new functions
Use Service Oriented Architecture frameworks	<ul style="list-style-type: none"> • Mature a robust event-driven SOA architecture foundation, including common platform with loosely coupled web, application, and data tiers; standards-based, service enabled components and integrations • Support Federal Enterprise Architecture (FEA) and MITA frameworks • Mature middleware approach for inter- and intra-Agency communications • Leverage SOA methods to enhance batch and online processing 	<ul style="list-style-type: none"> • Supports effective resource management, including hardware, software, staff • Increases processing efficiency and service to end users



DPW Objectives	Feature	Benefits to DPW
Achieve greater economies of scale and scope at lower total cost of ownership	<ul style="list-style-type: none"> • Enable unified shared services organizational model managed by DPW IT leadership • Expand shared services model to include application support services as well as technology and operations • Expand access and integration of Deloitte’s firm wide technology and HHS best practice expertise using an ‘on-demand’ model • Mature ITIL framework and advance to CMMI-Level 4 	<ul style="list-style-type: none"> • Provides better, more flexible support to business stakeholders • Improves management of shared processes, standards, and technical assets • Enables efficient on-demand access to additional technology and HHS specialists • Improves efficiency and quality in application enhancement, maintenance, and delivery • Enables easier and economical scalability

Figure 6.9-1. ITSS/DTSS Approach Features and Benefits.

We have organized this section into tabs for the larger domains for ease of review across shared services support provided to DTE, DEA, and DIMO.

Throughout the remainder of this section, we describe our capabilities to meet the activities and requirements of DPW. We expect that the provision of these services will be based on final DPW priorities and resources allocated to support these services. In addition, we describe our Lot 7 services, activities, and capabilities based on the RFP’s explicit breakout of Lot 6 and 7 efforts, where available. And we provide our best judgment where the breakout is not explicit and the Lot 6 and 7 activities potentially entail a shared collaborative effort in support of DPW project objectives.

		Lot 6	Lot 7
Technical and Infrastructure Support		<ul style="list-style-type: none"> • Database Support • Configuration Management • Security • Architecture • Middleware • Groupware / Network • Knowledge Management • Operations • Production Support 	<ul style="list-style-type: none"> • Database Support • Configuration Management • Security • Architecture • Middleware • Groupware / Network • Knowledge Management • Operations • Production Support
Direct Technical Support	Application Direct Technical Support	<i>Not Applicable</i>	<ul style="list-style-type: none"> • Middleware Support
	Technical Engineering Direct Technical Support	<p><i>Not Applicable</i></p> <ul style="list-style-type: none"> • Enterprise Knowledge Management • Technology Strategy Assistance and Alternative Solutions Support • DPW CMMi and ITIL Strategy Assistance and Solutions Support 	<ul style="list-style-type: none"> • Security • Configuration Management • Database Administration • Middleware Architecture Support • Enterprise Knowledge Management • Technology Strategy Assistance and Alternative Solutions Support • DPW CMMi and ITIL Strategy Assistance and Solutions Support

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Figure 6.9-2. Our Understanding of Lot 6 and Lot 7 Activities.

Deloitte Helps to Evolve DPW's Enterprise and SOA Vision to the Next Maturity Level

Deloitte embraces DPW's vision for an EA-Service-oriented architecture (SOA) as the means to deliver efficient, reliable, and scalable support to DPW stakeholders and citizens. We also understand DPW's position as an IT leader in the Commonwealth, and the benefits of a unifying platform to establish standards-based, service-oriented frameworks that can be used within the Department and to connect to other Commonwealth departments. A common open system platform facilitates better management of shared processes, standards, reusable services, modular components or other technical assets.

We propose building on the initial EA-SOA foundation and evolving it to the next level of maturity. For the next stage, it is critical to define and refine a 'to be' Future State EA-SOA vision and Roadmap for implementing the vision. The EA-SOA Roadmap defines an executable strategy that aligns to and supports the 2009-2011 DPW Information Technology Strategic Plan. Our ITSS/DTSS team applies its deep DPW, HHS, EA-SOA, and technology know-how to collaboratively work with DPW and the other lot vendors to develop the EA-SOA vision and Roadmap. We provide a high level DPW EA-SOA Future State conceptual model in Figure 6.9-3 for illustration purposes only.

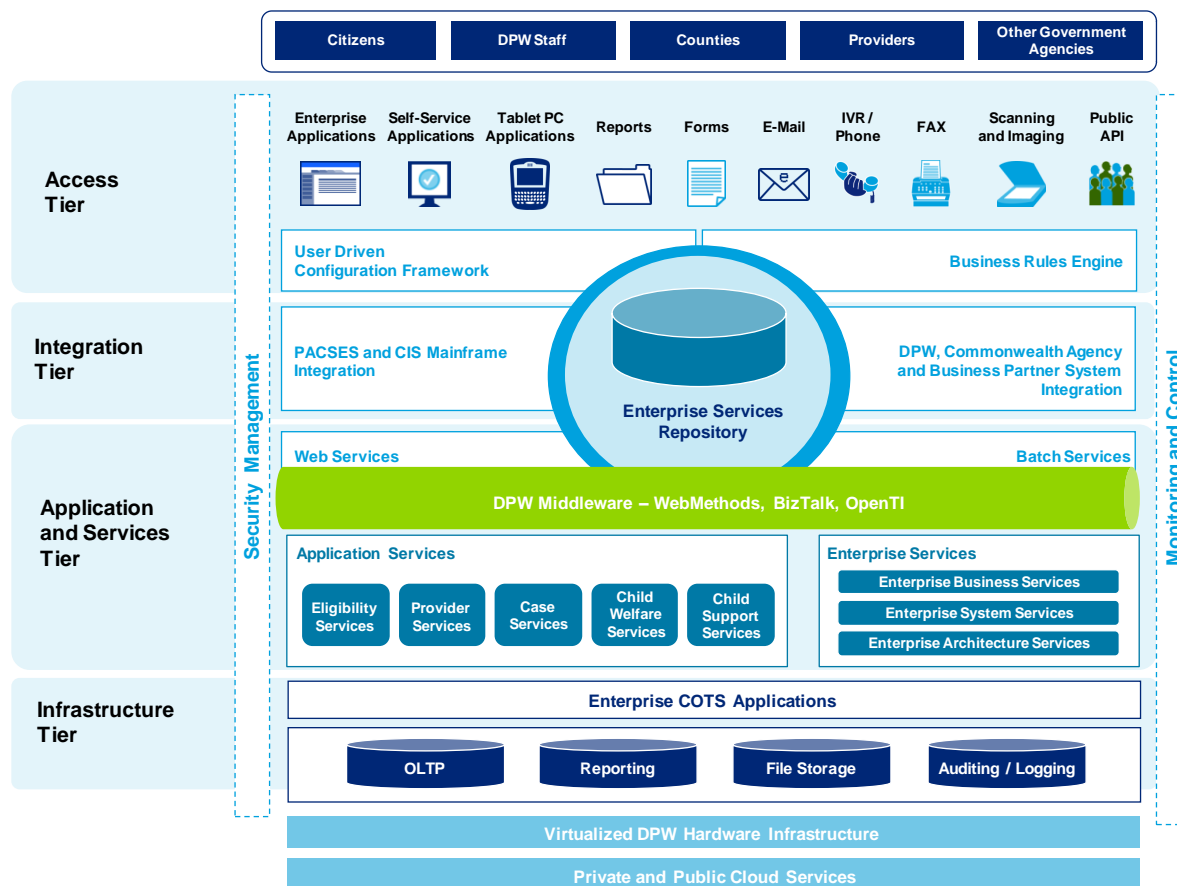
Key Staff Spotlight

Joe Berkstreser

ITSS and DTSS Team Lead



"I'm most looking forward to helping DPW continue to lead the way in IT service delivery for the Commonwealth. As a team, we're anxious to assist DPW remain the gold standard in Government IT services across the world."



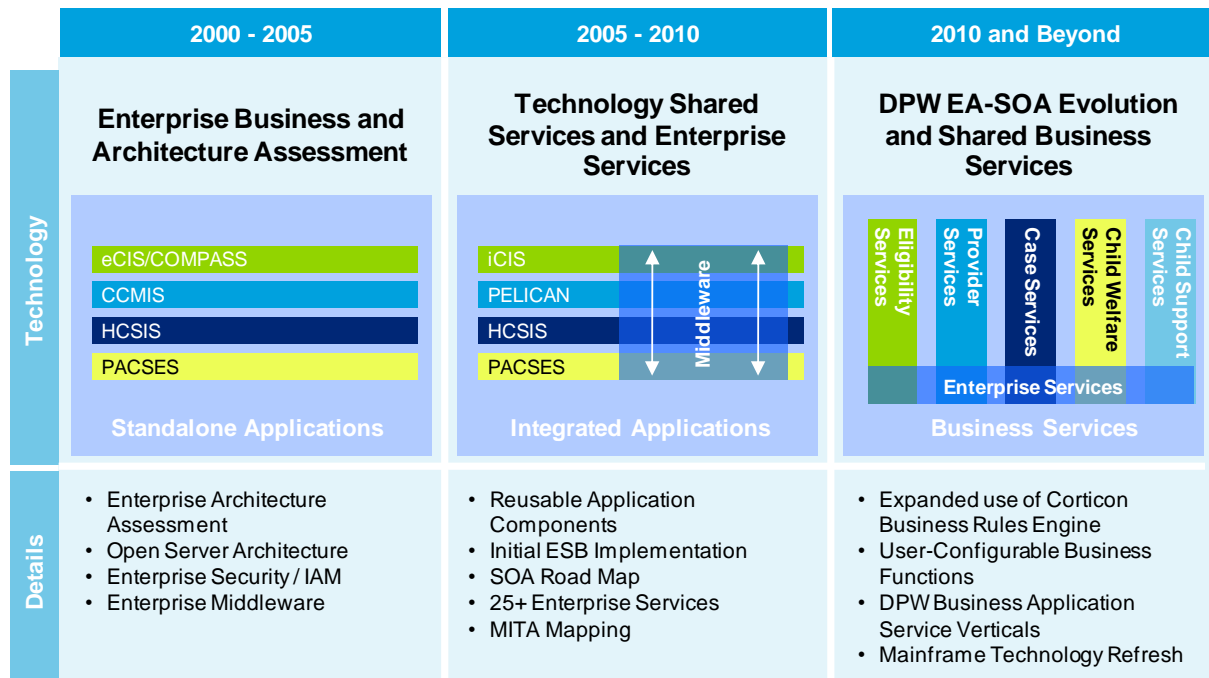
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Figure 6.9-3. Example EA-SOE Future State Vision.

For the next stage of the evolution, it is critical for DPW to define and refine a 'to be' EA-SOA vision and Roadmap for implementing the vision.

It becomes increasingly important to have a Future State vision and Roadmap as DPW matures its EA-SOA frameworks and includes enterprise business shared services in the strategy. The Future State vision and Roadmap become useful tools for communicating and refining the approach with business stakeholders, addressing key questions about EA-SOA roll-out, and benefits to the business.

The Future State vision and Roadmap are living artifacts. The ITSS/DTSS team works with BIS, business stakeholders, and the other lot vendors to evolve the EA-SOA Future State model, frameworks, and implementation Roadmap. In support of the DPW IT Methodology and Commonwealth OIT guidelines, we use best in class processes and tools to migrate DPW applications over time to EA-SOA frameworks. The evolutionary approach is low risk and supports the Department's enterprise vision for a secure, scalable, and extensible application and open system platform, as shown in Figure 6.9-4.



PA_DPW-884_3

Figure 6.9-4. DPW Incremental Evolution to Enterprise SOA.

Deloitte's approach brings next generation services thinking to evolve DPW's SOA model.

Our team jointly reviews, adapts and refines the vision and Roadmap with DPW at least annually or necessitated by business changes or new legislation. In this way, the ITSS/DTSS team assists DPW in maturing the enterprise service-oriented architecture, business process priorities, governance approach, infrastructure, tools, and resources while continuing to support on-going operations.

As part of the Department's EA-SOA evolution, we work with DPW to plan and integrate new technologies that enable business innovation, efficiency, and IT transformation. As a thought leader in public and private sectors, Deloitte identifies key technology trends and has a broad base of experts that are specialists in the new technologies. Our proposed ITSS/DTSS team has deep understanding of these trends as well.

The team has identified those technologies that will enable improvement at DPW, as outlined in Figure 6.9-5.



PA_DPW-885_3

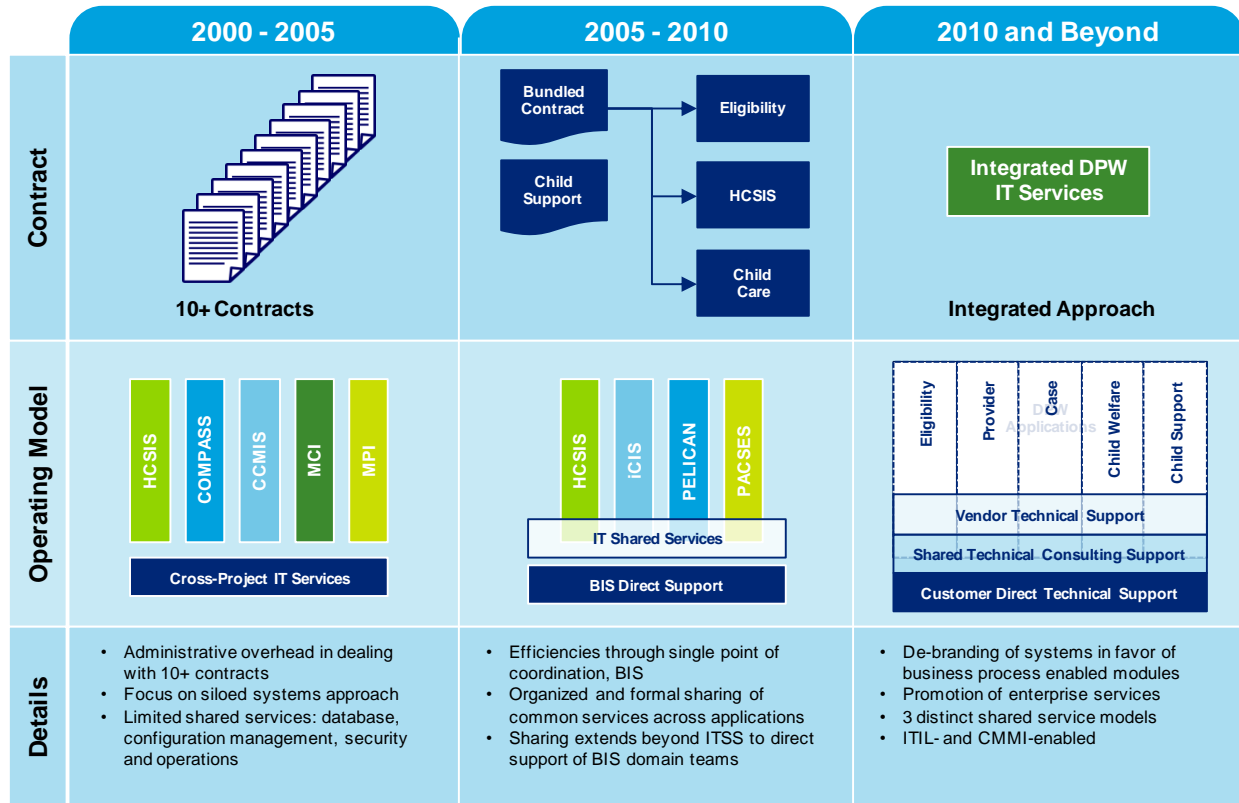
Figure 6.9-5. Key Technologies with Potential Benefits to DPW.

Our ITSS/DTSS team has responsibility for working with DPW to plan and implement key technologies that offer significant opportunity for business benefit, as we move into the future.

Deloitte Helps to Expand DPW’s Shared Services Approach

We fully support DPW’s ITSS/DTSS shared services model and propose expanding, enhancing, and unifying the model in a variety of ways. We are proud of our role in the collaborative development and successful rollout of DPW’s initial shared services model. We are also proud of the subsequent recognition of DPW by the Commonwealth and National Association of State Chief Information Officers (NASCIO) in 2009 as well as by ComputerWorld in 2010. The scalable model is a best industry practice in public and private sectors, and enables high levels of flexible resource sharing and efficient use of specialist resources across applications, systems, domains, and organizations.

We bring a committed and experienced ITSS/DTSS team. The team includes specialists with extensive DPW shared services expertise, new technology specialization with on-demand access to additional technology and HHS best practice experts from across Deloitte. We propose to build on our past joint successes with DPW and take the shared services IT model to the next level, as depicted in Figure 6.9-6.



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Figure 6.9-6. Evolution of the Shared Services Model at DPW.

Our ITSS/DTSS approach builds on our past successes with DPW, expands the support to business application shared services for a consistent, unified model.

When NASCIO gave the award to DPW in 2009, Commonwealth CIO Brenda Orth commended the Department for “finding innovative ways to share IT services across multiple business concerns,” as described in the insert on the following page. Together, DPW and Deloitte have delivered and continue to deliver greater efficiencies and economies of scale through the ITSS/DTSS model.

However, we believe the next evolution of the ITSS/DTSS model is critical not only for efficient and economical resource pooling but also for the successful evolution of DPW’s EA-SOA strategy, as discussed above. Under our expanded model, we provide business shared services in addition to system and architecture shared services for a unified approach. We provide on-demand access to additional core technology experts who have significant experience rolling out the methodologies, infrastructure and products necessary to support DPW’s EA-SOA architecture.

CONTACT:
JAMES WEAVER
Director
Division of Technology
Engineering
Department of Public Welfare
(717) 772-7120
jamweaver@state.pa.us

CORPORATE PARTNERS:
Deloitte Consulting



In light of the turbulent economic climate and dramatically declining resources, there may be no goal as paramount as ensuring that every dollar spent and every personnel hour invested in state government technology achieves the greatest possible outcome. I applaud the Department of Public Welfare for finding innovative ways to share IT services across multiple business concerns. Vulnerable citizens are better served because of DPW's creativity and flexibility."

...Brenda Orth, Chief Information Officer, Commonwealth of Pennsylvania

7 ENTERPRISE IT MANAGEMENT INITIATIVES

PENNSYLVANIA: IT Shared Services

Pennsylvania's Governor's Office of Administration (OA) provides policy direction, management services and technology infrastructure to all agencies under the jurisdiction of Pennsylvania Governor Edward G. Rendell. With the support and commitment of key agencies, the OA's Office of IT (OIT) embarked on Shared Services and related Consolidation Initiatives in 1998 to help better support growing citizen needs and refocus Pennsylvania's IT culture from technology alone to business. These leading initiatives have improved efficiencies resulting in \$317 million in savings with an additional savings of \$240 million expected over the next five years.

The Department of Public Welfare (DPW) is Pennsylvania's largest agency and is responsible for meeting the needs of over two million clients with the assistance of 15,000 support workers, 500,000 providers, and 300,000 employers. DPW has fully embraced shared services and has partnered with OA to develop and execute best practices in policy, processes, governance, workforce development and enterprise change management to drive a successful shared services enterprise-wide initiative for Pennsylvania as a whole.

The enterprise IT applications used to manage the administration of DPW's core programs are large and complex. The goal of its IT Shared Services model is to augment functional expertise with technical experts who can move across functions as demand for their services fluctuates. This alleviates DPW from handling technical IT resources as "fixed costs," which are bound to a particular functional initiative whether or not there is an immediate demand for their services. It also allows DPW to better manage agency requirements and improve service to citizens through the implementation of newer technology.

Furthermore, DPW's approach to shared services – such as its current move to an SOA environment – has helped Commonwealth agencies significantly improve IT agility, service levels and performance and reduced operations and security risks.

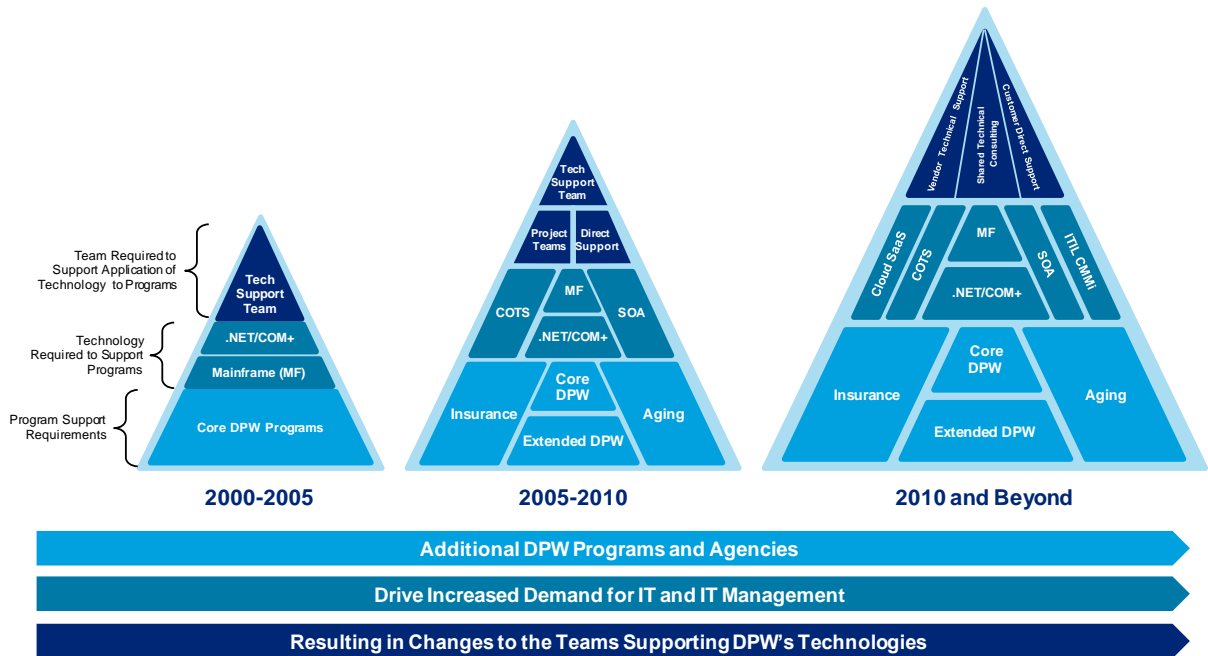
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Figure 6.9-7. DPW's Shared Service Model Receives National Recognition in 2009 NASCIO Award.

We are proud of our contribution and collaboration with DPW in the implementation of a premier nationally recognized shared services IT model.

Source: [http://www.nascio.org/awards/2009 awards.](http://www.nascio.org/awards/2009%20awards)

The expanded IT shared services model is a key ingredient to facilitate EA-SOA governance, overall architecture implementation, management of shared business processes, consistent application of standards, SOA-based SDM methods, reuse of services and technical assets. In Figure 6.9-8, we depict the evolution of DPW’s shared services model and ITSS/DTSS’ evolution in executing a successful EA-SOA strategy, including support for new technologies.



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Figure 6.9-8. Evolution of Shared Services Model to Support DPW EA-SOA Strategy.

A robust ITSS/DTSS shared service model is a necessity in delivering on EA-SOA strategy with new applications and business processes.

Evolutionary Stage	Deloitte Assists in Evolving the DPW IT Delivery Model
2000 – 2005	<ul style="list-style-type: none"> • Program. IT system support for DPW programs was concentrated on federally mandated programs such as welfare and child support as well as early web adopters such as client self-service and home and community-based waiver programs. • Technology. The base of technology supported was limited to legacy mainframe technologies and technologies needed to support an n-tier Microsoft/Oracle based architecture. • Organization. Technical support could be managed by a single organization with a limited use of shared services across the enterprise.



Evolutionary Stage	Deloitte Assists in Evolving the DPW IT Delivery Model
2005 – 2010	<ul style="list-style-type: none"> • Program. IT system support was expanded to support a variety of additional DPW welfare programs, waivers, and child care and child support initiatives. At the same time, the Insurance and Aging department consolidations were set in motion, resulting in additional IT system support requirements for DPW. • Technology. Technologies were expanded beyond core mainframe and Microsoft/Oracle n-tier architectures to include a variety of COTS products and enterprise services. • Organization. To accommodate this growing complement of technologies, various teams were engaged, including DPW domain teams, IT shared services, the application teams and BIS direct support teams.
2010 and Beyond	<ul style="list-style-type: none"> • Program. DPW program support requirements continue to expand as programs accommodate the new Health Care Reform legislation, and IT systems from the Insurance and Aging Departments are increasingly integrated into DPW's architecture. • Technology. The technology and skill base to support the programs continues to expand as new COTS technologies are introduced, the CMMI and ITIL initiatives are embraced, and practices for employing technologies such as virtualization and cloud computing continue to mature within DPW's enterprise. • Organization. Shared service economies of scale are realized with the creation and management of a single shared services organization split across the Vendor Technical, Shared Technical Consulting, and Customer Direct Technical Support models.

Figure 6.9-9. Drivers of the DPW Shared Services Evolution.

As DPW's EA-SOA, program, and technology requirements continue to grow, so too will the demands placed on the shared services organization. Deloitte's ITSS/DTSS teams possess capabilities that support the dynamic nature of the DPW's business. These capabilities allow DPW to support evolving program needs, adopt new innovative technologies, support on-going production and to continue to mature the EA-SOA and shared services model over the coming contract period. Our approach includes:

- **DPW Business and Technical Knowledge and Experience.** Over 2000 combined years of experience in DPW's technologies, programs, COTS products, operating models, practices and procedures that enable continuity of existing support levels.
- **Resource Surge Capacity.** Demonstrated ability to leverage our global network to deliver the quantity and quality of technical specialists DPW needs to meet surges in demand. Surges occur as a result of unforeseen changes in programs, policies, or legislation that drive short term needs for additional or different types of shared services support.
- **Access to a Deep Pool of Specialists.** Whether DPW's demands require technical specialists with conventional skill sets or a unique HHS business or technical specialty, Deloitte leverages its benchstrength of internal and business partner network specialists and delivers them on-demand to the Department.
- **Access to the Latest Thinking in IT Practices and Methodologies.** DPW's business and technology needs will not remain static. Deloitte provides DPW access



to the latest thinking in IT practices and methodologies that will impact DPW's organization including advanced technologies, HHS best practices, and next generation of ITIL guidance and lessons learned being used by other state HHS organizations.

- **Industry Standard ITIL/CMMI Approach.** Deloitte delivers an ITSS and DTSS team certified with the latest version of ITIL and backed by ITIL and CMMI subject matter experts with experience implementing high quality repeatable processes for some of the largest IT enterprises in the world.

The remainder of this section provides details about Deloitte's ITSS and DTSS proposed methodology and approach, and specifies how Deloitte delivers world-class shared services across the Vendor Technical, Shared Technical Consulting, and Customer Direct Technical Support models.

Our past and current successes provide DPW with a firm that demonstrates repeatable positive results for our clients. We feel this evidence is paramount when considering a HHS solutions integrator for a project of this size and complexity. To demonstrate our direct and relevant project experience, we feel there is no better voice than DPW hearing from our clients. On the following page, we are pleased to present DPW with a letter of reference from one of the Department's peers, demonstrating our capabilities and character in delivering successful and tangible results in Health and Human Services programs and IT.



State of Florida
Department of Children and Families

Charlie Crist
Governor

George H. Sheldon
Secretary

August 10, 2010

To Whom It May Concern:

Deloitte Consulting has been working in close partnership with the State of Florida Department of Children and Families for the past 4 years. As a trusted advisor, Deloitte has been working closely with the State to administer the Temporary Assistance to Needy Families (TANF), Medicaid, Food Stamp and Refugee Assistance (RAP) programs thru the FLORIDA (Florida Online Recipient Integrated Data Access) system. The FLORIDA system is an integrated Public Assistance (IV-A) and Child Support Enforcement (IV-D) system which serves approximately 600K child support cases, handles more than \$1.3B in annual collections, serves 2.5M clients for food stamps and 2.2M clients for Medicaid.

Deloitte Consulting was involved in the original design and implementation of the FLORIDA system in 1992 and in March 2006, the State awarded the contract to Deloitte for ongoing FLORIDA system maintenance and support. During this 4 year period, Deloitte has developed numerous web based J2EE systems to help the department's strategic initiatives and to support the modernization efforts.

Within 6 months after the contract was awarded, the State of Florida and Deloitte deployed a comprehensive Disaster Food Stamp system –"Food for Florida (FFF)". This system helped the State of Florida to create Buddy State (cross-state) FFL disaster recovery services with the State of Louisiana. This initiative won the "ISM 2009 Recognition Award" for Excellence in Human Services Technology and also won that year's "EBT project of the Year Award" from the EFT Association.

In the last few years, the State of Florida and Deloitte developed and deployed a portfolio of Client facing systems such as ACCESS WEBAPP, Pre-Screening and My Account to support the state's initiative of enhancing the Self Service delivery model. Also, Deloitte provides valuable consultation for the strategy of transforming the mainframe legacy (FLORIDA) system to web based system. Deloitte is instrumental in bringing best practices and lessons learned from other states.

Deloitte Consulting has worked with the State of Florida for the past four years providing project management, maintenance, enhancement, testing, and implementation support services for the FLORIDA and numerous web based J2EE systems. Deloitte has been a valuable partner over the past 4 years. The State of Florida and Deloitte have jointly worked continually to improve the Florida citizens experience with the services provided by the State and to enhance worker productivity. Deloitte brings the right knowledge and attitude to help us implement the economical and innovative solutions.

If you have any questions regarding FLORIDA system or ACCESS programs, or the role of Deloitte, please feel free to reach me at 850-922-6356 or email me at LaQuetta_Anderson@dcf.state.fl.us

Sincerely,



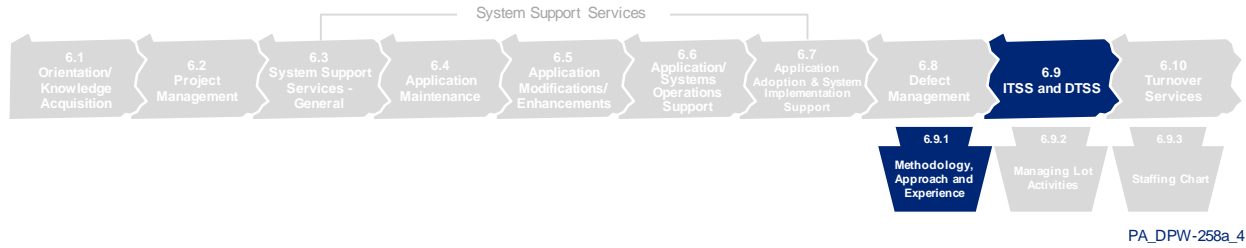
LaQuetta Anderson, Data Processing Manager
State of Florida, Dept. of Children and Families
1940 North Monroe Street, Suite -80,
Tallahassee, FL 32399

1317 Winewood Boulevard, Tallahassee, Florida 32399-0700

Mission: Protect the Vulnerable, Promote Strong and Economically Self-Sufficient Families, and

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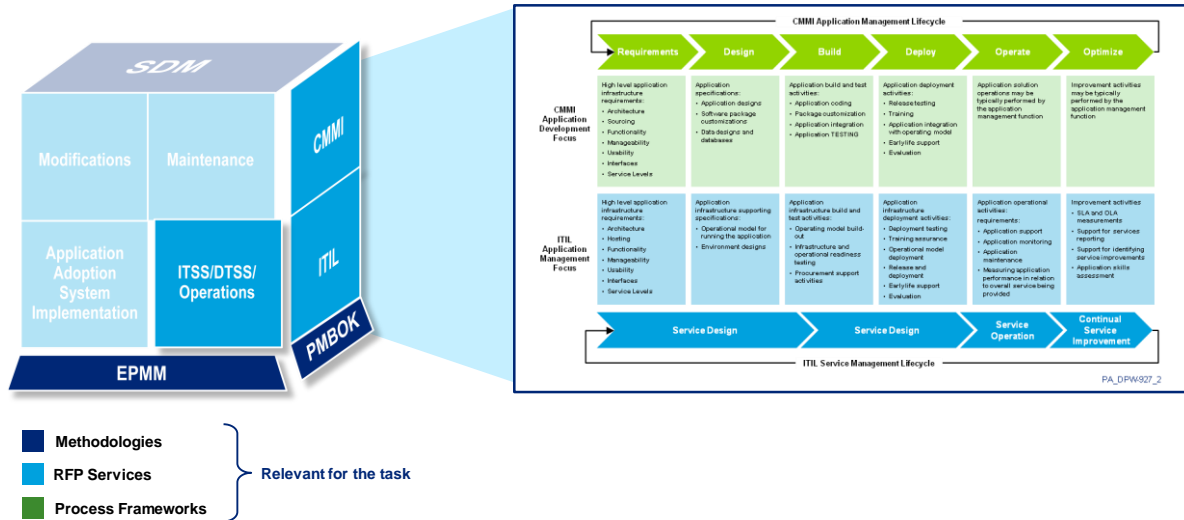
6.9.1 Methodology, Approach and Experience



II-3	Page II-3	RFP Reference: II-3.Work Plan
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Where possible, the Offeror should provide specific examples of methodologies or approaches that will be used to fulfill the various requirements, how these methodologies will be adapted for this contract and implemented, and examples of the Offeror's similar experience and approach on comparable projects.

Methodology



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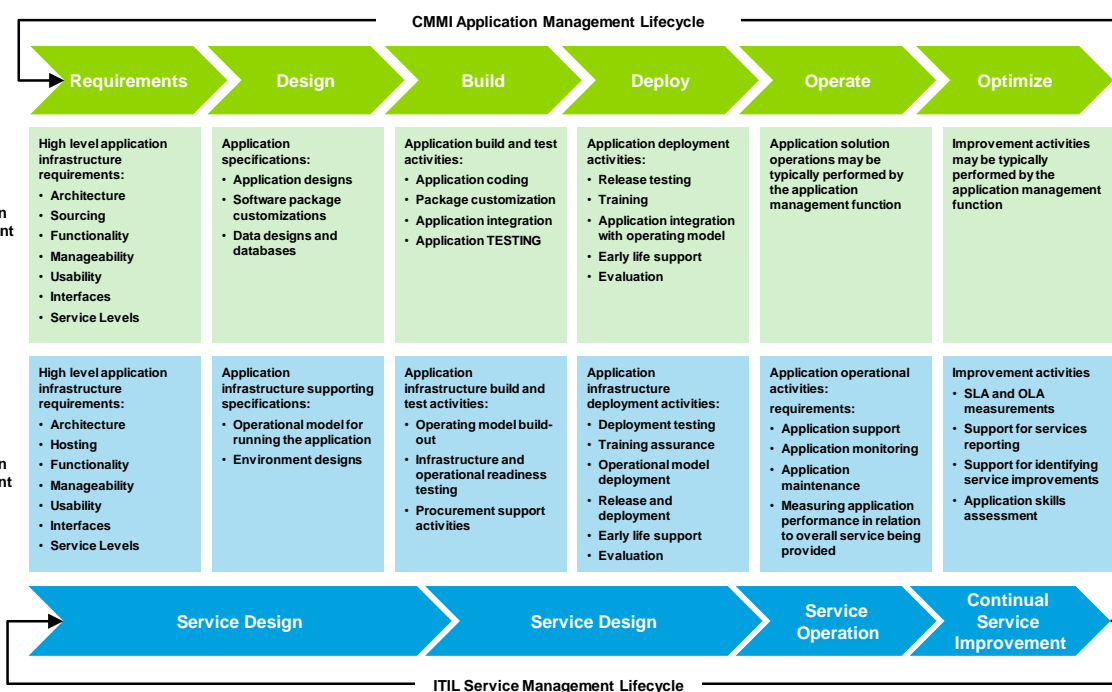
Figure 6.9-10. DPW IT Methodology is based on ITIL and CMMI Frameworks.
ITSS/DTSS use a CMMI- and ITIL-driven methodology for providing services and to meet the needs of the teams supporting DPW.

We use the DPW IT Methodology and its major components as the foundation for our ITSS and DTSS services. In particular, we leverage the CMMI and ITIL components of the methodology to drive consistent, detailed processes in support of in-scope application maintenance and modification efforts.

ITSS and DTSS operate on a model that provides support services common to the needs of the teams conducting maintenance and modifications. ITSS and DTSS use a CMMI- and ITIL-driven methodology that tightly couples the application management life cycle with the application development life cycle.

Deloitte uses the ITIL version 3 application management life cycle for our ITSS and DTSS services. Our approach aligns the ITIL process framework with the SDM. Activities that occur within each stage of the application development life cycle are paired with application management support activities to help determine that application solutions are operable and integrated within the DPW IT infrastructure.

Figure 6.9-11 illustrates the alignment of the application development life cycle and application management life cycle within ITIL version 3. In support of DPW, our ITSS, DTSS, and operations teams employ a detailed methodology that uses both the CMMI and ITIL process frameworks.



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Figure 6.9-11. ITSS/DTSS Services Based on Alignment of CMMI, ITIL, and the SDM.

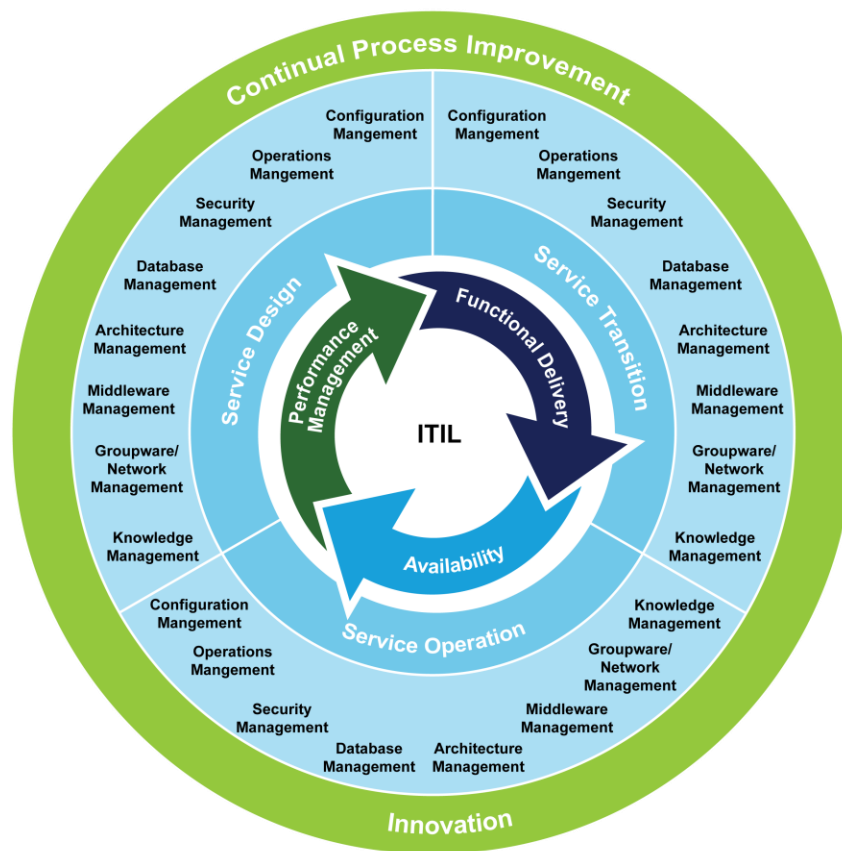
Our ITSS/DTSS methodology aligns application development, application management with the ITIL service life cycle.

- ITIL.** We use the IT Infrastructure Library (ITIL) version 3 application management framework to guide the implementation of standard IT services for the modification and maintenance teams. Our IT support services consist of both the application development and infrastructure solutions required to support those maintenance and modification teams. We use the framework to guide ITSS, DTSS, and operations activities throughout the complete service life cycle, including service strategy, design, transition, operation and continual service improvement.
- CMMI.** The Capability Maturity Model Integrated (CMMI) framework, from Carnegie Mellon’s Software Engineering Institute, provides application development focus. We use CMMI to guide the development of new software as well as the ongoing maintenance of existing software. The maintenance and modification teams are the

primary users of the framework. The DTSS, ITSS, and operations organizations align with the CMMI processes used by the maintenance and modifications teams, including the process standards and quantitative measures used by these organizations.

Applying DPW Methodology

As part of our prior support effort over the past 10 years, we supported DPW in the development of the Department’s IT methodology to meet the ever-growing demands placed on DPW IT and the enterprise. We used the ITIL framework and high level processes as the foundation for structuring our DPW services and to define repeatable detailed processes that can be measured and continuously improved. Figure 6.9-12 provides the ITSS and DTSS “view” of the methodology framework applicable to DPW, as defined by Deloitte.



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Figure 6.9-12. ITSS/DTSS Detailed Methodology Uses the ITIL Service Life cycle as the Framework.

We extended the DPW IT Methodology and used ITIL as the framework for organizing ITSS and DTSS services.

We further extended the methodology into a set of IT activities or “services,” detailed processes, artifacts, outputs and overall body of knowledge that guide our team’s efforts on a day-to-day basis. ITIL promotes the philosophy of managing IT by value-driven services versus by technology capabilities and technology platforms. The framework



simplifies the management of complex IT infrastructures with thousands of assets and moving parts by bundling these into services tightly aligned with DPW business objectives. Within our ITSS/DTSS team, 23 members are trained and ITILv.3 Foundation-certified.

ITSS and DTSS Services Delivered Using an ITIL-based Life cycle

Based on ITIL, we deliver and manage each ITSS and DTSS service through a set of service life cycle stages. The service life cycle contains five stages, including

- Service Strategy
- Service Design
- Service Transition
- Service Operation
- Continual Service Improvement

Each service relies on processes, functions, activities, organizational models and measurements. Together, they allow IT services to integrate with DPW business processes, provide measurable value and provide the basis for continuous improvement at DPW. Each service uses a hub and spoke design. It begins with service strategy at the hub, service design, transition and operation as the revolving life cycle phases, and anchored by continual service improvement. Each part of the life cycle exerts influence on the other, and relies on the other for inputs and feedback. In this way, a constant set of checks and balances throughout the ITSS and DTSS service life cycle allow DPW to adapt quickly to changes in demand, policy, regulations, budget or other business change.

At the core of our approach is **Service Strategy**. Deloitte uses this as the basis to create value for DPW based on our strong understanding of DPW objectives. Support activities are bundled into value-driven services and operated through a service portfolio to manage cost and demand. In addition, we work with DPW to establish a common operating approach and foundation for governing and maturing CMMI- and ITIL-based approaches. We use strategies as guides to the overall development of ITIL-based service management capabilities and to improve the alignment between those capabilities and DPW business strategies.

Our **Service Design** approach transforms DPW service strategy into the blueprint for delivering DPW objectives. Our unique design approach considers not only the technologies, but also the people, processes and governance aspects needed to fully operate each service – in this case, ITSS/DTSS services. It includes the changes and improvements necessary to increase or maintain value to DPW stakeholders over the life cycle of services, the continuity of services, achievement of service levels, and conformance to DPW standards and regulations.



Our **Service Transition** approach provides capabilities for introducing new and changed services into live service operation while controlling risk for DPW. This includes leading practices to support change, configuration, asset, release and deployment, at the highest levels of efficiency while managing issues and risks.

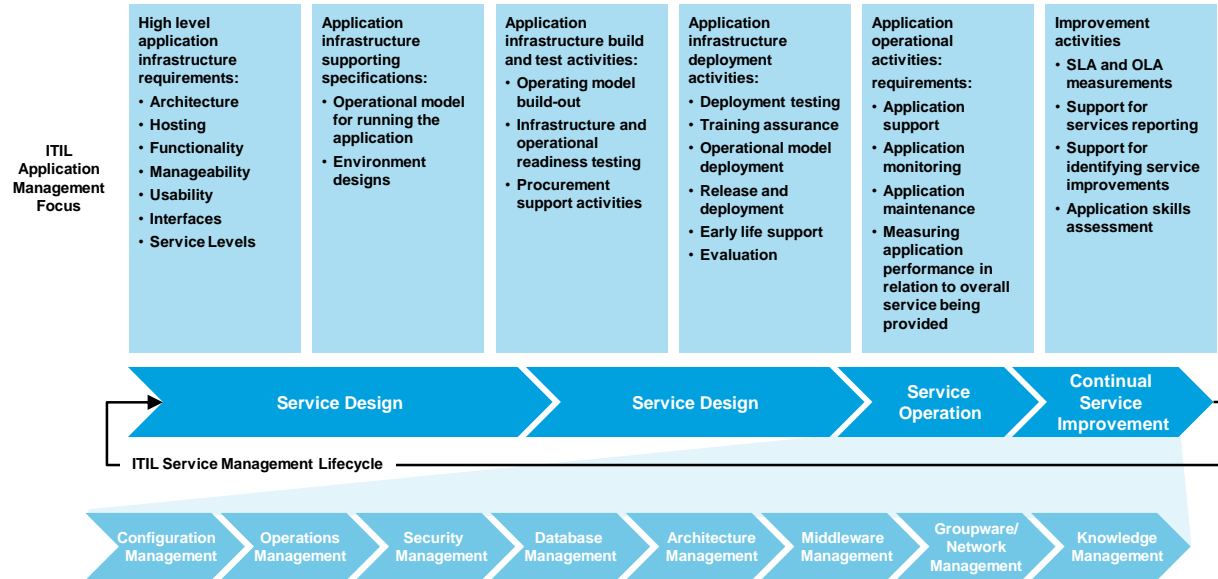
Our **Service Operation** approach embodies the leading practices in the management of critical day-to-day operation of services. Deloitte recognizes that DPW strategic objectives are ultimately realized when services are actually delivered. Our approach includes assisting DPW in the implementation of leading practices in areas such as configuration, security, and middleware management.

Our **Continual Service Improvement** approach is the cornerstone for creating and maintaining value for DPW stakeholders through better strategy, design, transition and operation of services. As demonstrated by the work of our team, we rely on the use of performance baselines and maturity assessments to continually improve the quality of services, operational efficiency and business continuity. We use a closed loop feedback system, based on the Plan–Do–Check–Act (PDCA) Deming Total Quality Management improvement model. Our approach introduces improvements on an ongoing basis for increased efficiency and quality in application enhancement, maintenance, and delivery.

Within the ITIL service groups of Service Design, Service Transition, and Performance Management, we define eight major categories of ITSS/DTSS services. We manage the quality or service level of each of the eight categories based on **Functional Delivery**, **Availability**, or **Performance Management**, as applicable. We discuss each of the eight major ITSS/DTSS Service categories in detail in the following section.

Approach

As explained in the previous section, ITIL is a set of concepts and practices for IT services management and delivery. Ultimately, ITIL is based upon the establishment of a service catalog and the processes for defining, providing, improving, and potentially expanding the services in the catalog. In our approach for ITSS and DTSS, we have defined eight major service categories and aligned them to the Service Operation and Continual Service Improvement elements of the ITIL life cycle, as depicted in Figure 6.9-13.



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Figure 6.9-13. Our ITSS and DTSS Service Categories.

We have defined eight major service categories that align to the ITIL life cycle and use an application management focus.

The service operation and service improvement elements of the ITIL model include the ITSS/DTSS service categories that align with the activities requested in the RFP (RFP Sub-section E, page IV-385). These services and their corresponding activities are explained in more detail below while the detailed processes related to each of these services and activities can be found in *Section 6.9.2*, of this proposal under the section entitled *Processes, Tools, and Reports*.

Configuration Management



PA_DPW-929a

Our approach to Configuration Management support encompasses a set of activities that ultimately deliver improved functionality and latest technologies to end-users as well as meeting performance expectations. Our team uses a structured process to plan, test, and support configuration of new releases and upgrades to DPW software, COTS components, technology platforms, and infrastructure with strict version control.

Based on our extensive experience with DPW’s IT environment and our best practices, we extended DPW’s methodology and established detailed, ITIL-based processes and DPW-specific playbooks to manage release, migration, and environment coordination activities, as described in Figure 6.9-14. We also provide capacity planning, monitoring and performance management to support day-to-day operations and scalability for future initiatives.



Configuration Management Activities	Deloitte Delivers Configuration Management Processes
Release Support	<ul style="list-style-type: none"> • Provide deployment planning, execution and support • Provide BIS with test cases and scenarios for business intelligence application functionality testing
Environment Coordination Support	<ul style="list-style-type: none"> • Perform middleware installation, configuration, testing, and analysis • Support upgrade planning, DR migration, virtualization, and configuration management solutions that support DPW's EA-SOA vision • Evaluate new technologies and incorporate new solutions for configuration management, virtualization and effective hardware utilization • Support upgrades to SiteMinder and IdentityMinder software, operating systems, databases, and business intelligence software • Create and maintain infrastructure documentation
Capacity Planning Support	<ul style="list-style-type: none"> • Support quarterly capacity planning
Performance Support	<ul style="list-style-type: none"> • Facilitate load and break testing of the applications • Proactively monitor the application and database for tuning opportunities

Figure 6.9-14. Key Configuration Management Activities.

Operations Management



Our Operations Management approach facilitates systems availability and performance in accordance with service level agreements (SLAs). We use automated monitoring tools and a metrics-based approach to proactively identify and resolve production incidents and problems.

Our team provides critical batch schedule management and batch performance analysis, as described in Figure 6.9-15. We leverage our experience with DPW batches to assist in monitoring for any abnormalities in the thousands of jobs that run each evening for mainframes, open systems, and PACSES platforms. In addition, we establish effective frameworks for enabling the successful integration of new batches and resolving issues with existing jobs.

Operations Management Activities	Deloitte Delivers Operations Management Processes
Operational Support	<ul style="list-style-type: none"> • Automate and distribute operational project reports, such as the Daily Business Metrics, to the project team.
Problem Support	<ul style="list-style-type: none"> • Support DPW's Security Incident Event Management System (SIEM) • Investigate, analyze and recommend solutions to production issues impacting in-scope applications.

Operations Management Activities	Deloitte Delivers Operations Management Processes
Batch Schedule Support	<ul style="list-style-type: none"> Support creation of batch run books, escalation protocols and restart instructions for project batch jobs.
Performance Support	<ul style="list-style-type: none"> Identify opportunities and assist in improving open system performance Assist with Cognos query performance tuning and in the creation of Cognos performance tuning procedures.
Request Support	<ul style="list-style-type: none"> Serve as the single point of contact for the project teams to each of the BIS domain teams. Review application team requests for completeness, accuracy and adherence to the strategic vision of DPW/BIS. Communicate upcoming requests from the application teams to each of the BIS domain teams. Provide a summary of the system requirements and high-level scope to assist in resource planning.

Figure 6.9-15. Key Operations Management Activities.

Security Management



Deloitte’s approach and processes for Security Management enable our team to integrate application, data, infrastructure, and network security controls throughout the SDM life cycle for enhanced privacy and security of DPW and citizen information. The Deloitte security team leverages the DPW Risk Framework to work with the project teams to identify potential security and privacy risks for new initiatives and design controls to mitigate them, as described in Figure 6.9-16. Before going live, applications are subjected to a battery of security vulnerability assessment tools through different attack vectors. Post go-live, we monitor real-time authorization and authentication activity, and capture data for forensic analysis by DPW personnel.

Security Management Activities	Deloitte Delivers Security Management Processes
Access Control Support	<ul style="list-style-type: none"> Provide ongoing identity access management (IAM) infrastructure support and enhancement services.
Security Support	<ul style="list-style-type: none"> Support BIS in the planning and design of new security solutions using the standard DPW architecture and tools. Enhance the RSA enVision implementation by defining processes and procedures to monitor Key Performance Indicators (KPI). Define backup and recovery improvement opportunities within the security infrastructure to support more effective and efficient DR processes.



Security Management Activities	Deloitte Delivers Security Management Processes
Security Risk Management Support	<ul style="list-style-type: none"> • Develop a framework for information security risk assessments within DPW. • Define and implement role management processes and enterprise level role-based model for the applicable program office. • Improve the security team's request tracking system to support the USEC change request process.
User Management Support	<ul style="list-style-type: none"> • Assess existing integrated identity management and provisioning solutions and their potential to automate the creation, modification, and deletion of user identities as well as their access and entitlements. • Support the generic self-registration service and password services.
Vulnerability Control Support	<ul style="list-style-type: none"> • Create and maintain the CA(2) document. • Perform vulnerability tests of the code developed by the project teams in non-production environments. • Conduct network vulnerability assessments and penetration testing assessments. • Create detailed reports for each vulnerability identified with mitigation steps.

Figure 6.9-16. Key Security Management Activities.

Database Management



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Our Database Management activities include design support to development as well as database administration and production support processes to optimize application and database server performance and availability. In addition to database design and operation activities, our team plays an active role in performance tuning and the proactive identification of database tuning opportunities. We work with DPW to define and implement an information life cycle management (ILM) strategy that addresses the governance, management, system availability, recovery and related SLA requirements of the in-scope applications. We describe key database management activities in Figure 6.9-17.

Database Management Activities	Deloitte Delivers Database Management Processes
Database Design Support	<ul style="list-style-type: none"> • Support database design and the management of the data dictionary • Review logical and physical database designs • Assist in developing database related standards and best practices

Database Management Activities	Deloitte Delivers Database Management Processes
Database Operations Support	<ul style="list-style-type: none"> • Manage test data population and refresh in the various test environments • Support BIS in planning and executing database upgrades • Assist in the database backup and disaster recovery processes • Develop database related processes or maintenance utilities
Performance Support	<ul style="list-style-type: none"> • Execute query performance tuning and proactive database monitoring • Perform PL/SQL code reviews and open system batch process execution reviews • Monitor database performance; identify and implement tuning opportunities
ILM Support	<ul style="list-style-type: none"> • Assist in researching, defining, and implementing an Information Life Cycle Management (ILM) strategy

Figure 6.9-17. Key Database Management Activities.

Architecture Management



Deloitte’s approach for Architecture Management encompasses both tactical initiative and application related architectural activities as well as larger enterprise-wide strategic architectural activities and process improvement initiatives. On the tactical application architecture side, we leverage our experience with and knowledge of DPW architecture standards and conventions to assist application teams with efficient and effective designs that adhere to standards, support the EA-SOA strategy, and reduce architectural complexity. In addition, we assist in the preparation and presentations to the DPW Architecture Review Board (ARB) as well as to our internal Deloitte Architecture Review Board in reviews of business solutions. We use the DPW Application Life cycle Management (ALM) baseline throughout this process to guide architectural and technology decisions and to align with DPW’s approved technologies and approaches.

On the strategic side, we provide specialized architectural assistance throughout the year. The team supports annual IT planning efforts and updates, assesses and analyzes new or upgraded technologies, develops recommended technology support approaches and alternatives for major new business initiatives as well as works with DPW, Lot 6 and the other lot vendors to plan and refine next steps in the EA-SOA strategy and Roadmap. As part of our broader shared services model, the team leverages additional deep technical or HHS business expertise from specialists across Deloitte, as needed, on topics such as Cloud Computing, Transfer Technology, SOA, ITIL, CMMI, Health Care Reform, MITA or other national HHS business issues and best practices. We describe the broad range of Architecture Management activities in Figure 6.9-18.

Architecture Management Activities	Deloitte Delivers Architecture Management Processes
Architecture Design Support	<ul style="list-style-type: none"> • Work with teams to create strategic application designs that align with DPW’s EA-SOA vision for increased business flexibility, reduced architectural complexity, and lower development and maintenance cost. • Review initiative designs for efficiency and effectiveness and adherence to standards, and facilitate initiative presentations to the ARB. • Manage the Application Life cycle Management (ALM) dashboard and overall application baseline to facilitate timeliness, transparency, and enhanced reporting.
Technology Strategy Support	<ul style="list-style-type: none"> • Provide specialist assistance for DPW technology strategy support for annual planning efforts and technology assessments, such as COTS, Cloud Computing, and Transfer Technology product support. • Provide DTE-Enterprise Knowledge Management Services (EKMS) assistance. • Help refine and refresh the EA-SOA Roadmap and shared services support model, including the planning of next phases and translation into an executable strategy and next steps. • Refine and enhance the DPW ITIL and CMMI models; providing strategic support to developing maturity levels and execution of activities as well as mapping to DPW goals on an annual basis. • Provide technology strategy support to establish an integrated software quality assurance approach throughout the SDM phases.

Figure 6.9-18. Key Architecture Management Activities.

Middleware Management



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Our middleware management approach supports the DPW EA-SOA vision and enterprise service bus (ESB) strategy, design, and development efforts. We work closely with DPW and the application teams to design middleware integration solutions that support services-based development approaches for enhanced business process and data integration. The team’s activities include support for the breadth of middleware products used within the DPW enterprise, including webMethods, BizTalk, and OpenTI. The team’s efforts include the integration of new middleware technologies into the DPW enterprise middleware environment, development of standards and processes for BizTalk, and mentoring Commonwealth middleware staff on new technologies such as BizTalk and Windows Communication Foundation (WCF). Figure 6.9-19 highlights the team’s efforts.



Middleware Management Activities	Deloitte Delivers Middleware Management Processes
Middleware Strategy and Design Support	<ul style="list-style-type: none"> • Provide support to configure, analyze and prototype solutions to support the EA-SOA and ESB strategy for improved business process and data integration. • Work with BIS Middleware Team to design middleware solutions and development approaches in support of project initiatives, including integration approach, architecture direction, and ongoing maintenance and operations functions. • Support the creation of application integration standards, processes, and related documentation that help integrate middleware/ESB platform with the DPW enterprise. • Provide middleware knowledge sharing and mentoring to Commonwealth staff as directed by DPW management.
Middleware Development and Implementation Support	<ul style="list-style-type: none"> • Provide webMethods, BizTalk, and OpenTI development support and integration into the DPW environment.

Figure 6.9-19. Key Middleware Management Activities.

Groupware/Network Management



Deloitte’s approach to groupware/network management supports DPW’s network, security and server teams in the use of DPW IT assets by Deloitte staff relating to in-scope systems, as described in Figure 6.9-20. We support the DPW network team with network maintenance tasks related to application team connectivity to the business partner network and for issues impacting in-scope application-related network connectivity.

Groupware/Network Management Activities	Deloitte Delivers Group/Network Management Processes
Asset Management Support	<ul style="list-style-type: none"> • Work with BIS to assist in managing CWOPA desktop computer compliance with DPW standards and protocols • Work with BIS to manage Safeboot accounts and access to Commonwealth equipment being used by Deloitte staff
Network Support	<ul style="list-style-type: none"> • Support the network team with tasks or maintenance activities as required

Figure 6.9-20. Key Groupware/Network Management Activities.

Knowledge Management



PA_DPW-929h

Our knowledge management efforts support the DTE Enterprise Knowledge Management Support (EKMS) team, and the overall provision of efficient, business-oriented intelligence solutions to the DPW program offices and other stakeholders. Our efforts include processes for capturing and recording appropriate metadata as well as checking for compliance with DPW EDW standards, as highlighted in Figure 6.9-21. In addition, we assist in the review and update of standards, as necessary, and work with DPW during Cognos reviews to validate that the infrastructure adheres to industry best practices and supports the program office performance reporting requirements.

Knowledge Management Activities	Deloitte Delivers Knowledge Management Processes
EDW Design Support	<ul style="list-style-type: none"> • Work with BIS EKMS to design knowledge management solutions that support project initiatives, and the need for improved reporting and analytics using Cognos BI and the data warehouse. • Capture, validate, and post metadata to the EDW Metadata Application. • Assist in Cognos configuration reviews to validate that infrastructure is efficient and adheres to best practices.

Figure 6.9-21. Key Knowledge Management Activities.

Experience and Examples

As the premier systems integrator in HHS, and a leader in information technology strategy and implementations, Deloitte offers a full set of service capabilities, extensive experience, and supports HHS solutions across a number of states that are similar in scope to the DPW Strategic Business Systems Project.

We find the nature of the public sector environment, including the unique requirements and operating rhythms of each state, requires a strategic, long-term perspective with reliable delivery on a day-to-day basis. Unlike other firms that may pursue engagements in the Commonwealth or in the public sector opportunistically, Deloitte has focused on the needs of DPW and our other state HHS clients over the past 35 years. We understand that, while the requirements and legislative mandates that drive these systems may appear similar, each state has unique business needs, different implementation requirements,

Have you heard?

Deloitte has:


- Implemented HHS solutions in over 25 states
- Typically, has more than 1000 business and IT transformation projects underway at any point
- Deploys deep bench of strategy, EA-SOA, advanced technology, ITIL, CMMI, and HHS business experts
- Over 700 Deloitte practitioners with extensive experience in designing, building, and implementing SOA architectures and SOA-enabled solutions
- Application Service Center models that supports flexible and on demand resourcing



and different strategies for responding efficiently to evolving citizen and stakeholder needs and expectations.

Similar to our efforts with DPW, Deloitte develops a deep understanding of our clients' business and operating environments over time. We provide the necessary continuity of support for multi-year strategies, multi-phased projects and large-scale transformation initiatives that must yield results while providing uninterrupted service to stakeholders and citizens.

In Figure 6.9-22, we highlight three examples of our experience, including the DPW effort, that demonstrate Deloitte's ability to bring the unique combination of strategic, tactical, and operational capabilities together with in-depth understanding of the client environment to provide ITSS and DTSS services similar to those required by DPW.

Deloitte Experience	Example	Deloitte's Role in Providing ITSS/DTSS Services Similar to DPW Requirements
<p>Commonwealth of Pennsylvania</p> 	<p>DPW Strategic Business Systems</p>	<ul style="list-style-type: none"> • Support DPW strategic business systems for 10 years, including five business applications, 27 systems, heterogenous mix of custom and COTS, older and new technology, batch and online mission critical systems • Provide range of services including EA-SOA IT and business transformation strategy and phased implementation as well as full development life cycle, maintenance and operations of current systems in complex, high availability environment • Support innovative IT service delivery using shared service model • Provide broad domain support including architecture, security, database, configuration management, knowledge management, middleware, production operations support • Established project frameworks and expert team with DPW-specific system knowledge and ITIL-based processes with CMMI Level 3 certification.



Deloitte Experience	Example	Deloitte's Role in Providing ITSS/DTSS Services Similar to DPW Requirements
<p>Commonwealth of Massachusetts</p> 	<p>Strategic Enterprise-level HHS IT Programs</p>	<ul style="list-style-type: none"> • Support Enterprise Office of Health and Human Services (EOHHS) for over five years providing prime system integration support, HHS solution strategy, planning, and full development life cycle support for SOA-based initiatives using an enterprise-level architectural approach • Provide range of services including open platform architectural design and full development life cycle, implementation and maintenance services for: <ul style="list-style-type: none"> - Virtual HHS Gateway. Services-based application as front-end to 30 mission critical applications - Intake Eligibility & Referral. Services-based application using rules-based approach for streamlined intake and referral processes - Shared Security Identity & Access Management Infrastructure. Designed and implemented modular, scalable approach that supports single sign-on and extensible to meet rising demands of stakeholders and clients • Designed and developed innovative application service delivery approach that uses a cost model to distribute maintenance and enhancement costs to consuming agencies. • Provide application-oriented domain support including architecture, security, database, configuration management, middleware, and technical support • Establish and use CMMI-based frameworks and SDLC approaches
<p>State of Texas</p> 	<p>TIERS Eligibility and Child Support Systems</p>	<ul style="list-style-type: none"> • Support Office of Attorney General (OAG) in multi-year program to modernize Child Support Enforcement processes and applications using SOA architecture and approaches • Providing prime system integration support, including planning, and full development life cycle support using COTS and custom application approaches for Security Identity and Access Management, Role Management process, Rules engine, Document Management, Content Management and Portal-based user interface. • Support a range of HHS SOA services including: Client Search, Case Search, Benefit and Program, Application Inquiry, Client Referral Service, Individual/File Clearance Search Service, and a Master Client Index • Provide application-oriented domain support including architecture, security, database, configuration management, middleware, and technical support • Establish and use CMMI-based frameworks and SDLC approaches. The TIERS eligibility system is currently assessed at CMMI Level 3 and will receive a CMMI Level 4 assessment during the life of the contract.

Figure 6.9-22. Relevant Experience Demonstrating Success with Complex, Multi-Phased Strategic and Tactical Programs.



In Figure 6.9-23, we provide a comparison of the core IT domain services provided by Deloitte with each of the referenced state project examples. The comparison demonstrates that there is near parity in the IT domain services that Deloitte provides for each of the projects. Deloitte performs the services within large, complex HHS environments that are similar to the Commonwealth’s environment. In addition, the comparison indicates that DPW is one of the first large-scale state HHS agencies to apply ITIL at the enterprise level and require ITIL capabilities within its RFPs. Similarly, as a technology leader, DPW is one of the first states to address cloud computing in their public requests. It is in these areas that our pool of technical resources, strategic technology and multi-industry experience become very important. Deloitte has a deep pool of resources that allows us to deliver one of the foremost industry experts in ITIL, Randy Steinberg, as well as best practices and strategic thinking about moving to the cloud from our Center for the Edge in Silicon Valley.

IT Services	DPW	Massachusetts	Texas
Database	✓	✓	✓
Configuration Management	✓	✓	✓
Security	✓	✓	✓
Architecture	✓	✓	✓
Middleware	✓	✓	✓
Knowledge Management	✓	✓	✓
Operations	✓	✓	✓
Production Support	✓	✓	✓
Mainframe Integration	✓	✓	✓
CMMI	✓	✓	✓
Enterprise Services	✓	✓	✓
SOA	✓	✓	✓
ITIL	✓		
Cloud Computing	✓		

Figure 6.9-23. Comparable IT Domain Support Experience in Large-scale State HHS Systems.

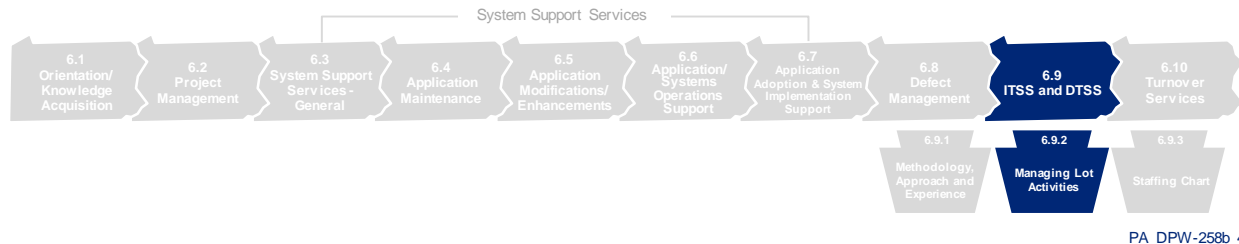
Deloitte has implemented HHS solutions and supported other large-scale business transformation projects in more than 25 States, seven Federal agencies and more than 100 public sector organizations. Deloitte typically has more than 1000 public and private sector projects underway at any given point. These multi-phased business and IT transformation projects involve enterprise-level and service-oriented strategies, COTS integration and full development life cycle management, implementations, maintenance and operations as well as architecture and technical services within highly diverse technical environments.



The Pennsylvania, Massachusetts and Texas examples demonstrate the breadth of our experience supporting large-scale, multi-system HHS solutions, and uniquely qualify Deloitte to provide ITSS and DTSS support to DPW.



6.9.2 Managing Lot Activities



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II	Page II-3	RFP Reference: II-3.Work Plan
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Provide a description of the Offeror's plan and approach for managing the Lot's Required Activities and Tasks.

Through our demonstrated experience, Deloitte collaborates with DPW to deliver dependable, low risk technical support solutions in an expanded shared services model that meets the Department's operational needs and service level agreements (SLAs). For over 10 years, Deloitte's DPW shared services team has worked side by side with DPW to deliver reliable support that facilitates the efficient delivery of IT services required to manage the business as well as advance EA-SOA strategies.

DPW's business offerings have grown tremendously over the years, including multiple LIHEAP supplemental payments, ELN, COMPASS enhancements and, most recently, Fair Care application collection. DPW and Deloitte operate as a single, efficient high performance team that flexibly adjusts and meets the growth and changes in the business. In addition, our joint team supports the strategic goal of embracing EA-SOA design patterns and solutions as part of a multi-phased EA-SOA Roadmap. In these beginning phases, we have together defined web service standards, deployed an initial SOA run-time environment with a preliminary middleware/ESB approach, and developed and deployed over 25 common, reusable technical and operational services.

Our combined technical team has extended the DPW IT Methodology and developed a support approach that includes detailed processes based on ITIL and CMMI principles. Our approach is based on DPW and Deloitte-developed methodologies, tools and technologies that we integrate with specific procedures, monitoring techniques and controls. Our management approach also includes methods for problem identification and resolution, issues and risk mitigation, management controls, reporting and communication, quality controls and performance measurement against SLAs.



Issues, Risks and Proposed Solutions

II

Page
II-3

RFP Reference: II-3. Work Plan

During this discussion, the Offeror should identify potential issues/risks and proposed solutions.

The DPW business supports millions of clients, thousands of providers, hundreds of services and numerous distinct applications consuming various architectures, COTS tools and custom-built solutions. This alone presents substantial risk that must be effectively managed to help verify the needs of the business are met.

Our tracking tool, ATS, and management tool, PMC, application provide centralized risk and issue management, complete with an automated daily distribution of the risk/issue listing to management for review.

Our team will work closely with DPW to manage these risks through the upcoming change of administration that will surely introduce new directions, strategies and expectations of the Department. We propose to work closely with the Department and proactively define risks and mitigation strategies before they become true issues.

Figure 6.9-24 presents an example of some of the issues, risks, and proposed solutions from a shared service perspective.

Issue/Risk	Deloitte's Mitigation Strategies
<p>Availability of Mission Critical Infrastructure.</p> <ul style="list-style-type: none"> The Department must continue to support the mission critical systems regardless of the vendor selected for Lots 6 and 7. 	<ul style="list-style-type: none"> The proven team at Deloitte provides a knowledgeable and diverse set of technology skills and expertise supported by a solid understanding of the business of DPW that is critical for continued DPW mission success.
<p>Delays in Advancing the Shared Services Model to Other IT Functions.</p> <ul style="list-style-type: none"> DPW has significant momentum; and with a transition requiring six months at a minimum, there is a high probability that advancing the shared services model will take several years to show additional progress. 	<ul style="list-style-type: none"> At the onset, Deloitte has the established background and business knowledge in the DPW shared services model to not only maintain the current level of quality for the current services but to continue the growth trend towards improved efficiencies. With the new contract, Deloitte is ready to perform annual planning to advance DPW's shared service and technology vision vs. planning for orientation and knowledge transfer activities.
<p>Striking the Balance Between Enterprise Architecture/ SOA with Fulfilling the Responsibilities of the Business Customer.</p> <ul style="list-style-type: none"> Having support personnel that understand the program and end user needs and priorities as well as the critical importance of overall technology modernization helps to strike that balance. 	<ul style="list-style-type: none"> We have worked side-by-side with DPW as the Department has led the way in the sector in appropriate application of SOA strategy and deployment of consumable business services. This history establishes the trust between DPW and Deloitte to provide an appropriate balance in supporting EA-SOA strategy and supporting day-to-day end user needs.



Issue/Risk	Deloitte's Mitigation Strategies
<p>Challenges of Integrating COTS into Existing Applications.</p> <ul style="list-style-type: none"> DPW is increasingly using COTS products in support of current HHS IT best practices. As a result, the interdependencies between the COTS products and the custom built solutions are important to understand and manage, 	<ul style="list-style-type: none"> Deloitte has a large pool of resources to draw from that has a breadth of experience working with COTS products as well as use of service-based integration methods and other approaches to optimize the use of COTS for DPW. Our detailed knowledge of the custom built applications positions Deloitte to more effectively integrate COTS with custom solutions.
<p>Ability to Continually Upgrade to New Technologies in a Highly Integrated and Multi-Program Set of Business Solutions.</p> <ul style="list-style-type: none"> As part of DPW's incremental renewal strategy, new and upgraded technologies will be introduced into a complex and highly integrated business systems environment. 	<ul style="list-style-type: none"> With our relationships with the leading product companies across the industry, Deloitte helps DPW implement their COTS solutions based on our in-depth knowledge and technology-agnostic position. By providing a broad view of the program areas and application initiatives, ITSS helps to progress upgrades and introduce new technologies.

Figure 6.9-24. Direct technical Support and ITSS Services Issue/Risks and Mitigation Strategies.

Processes, Tools and Reports

II	Page II-3	RFP Reference: II-3. Work Plan
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For each of the Lot's Required Activities and Tasks, describe the processes that will be followed and tools that will be used; describe the reports that will be used to track, monitor work, and measure performance.

For the eight ITSS/DTSS service categories and activities defined in the Approach Section above, each activity involves processes, tools and reports that are used to track, monitor work, and measure performance. We use reports to collect, manage and distribute data to stakeholders. Deloitte works with DPW to define, document and manage repeatable processes that streamline the technical support for the Department.

The following section describes the processes, tools and reports we use to provide ITSS/DTSS support across the in-scope projects.

Configuration Management



- Capacity Planning Support
- Environment Coordination Support
- Performance Support
- Release Support

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Activity: Capacity Planning Support

Process	Tools
<p>Capacity Planning. Support the collection, assimilation and presentation of application capacity plans</p>	<ul style="list-style-type: none"> • SightLine Expert Advisor. DPW's enterprise wide tool supporting infrastructure resource utilization metrics collection. • Perfmon. A complementary tool to Siteline that collects more detailed infrastructure resource utilization metrics. • Daily Business Metrics Report History. A Deloitte created repository that collects and distributes daily business metrics. The history of these metrics is used to trend consumption over time to support capacity planning. • Daily Enterprise Service Report History. A Deloitte created repository that collects and distributes daily Enterprise Service utilization metrics. The history of these metrics is used to trend consumption over time to support capacity planning. • Torch. Provides mainframe system usage information for overall capacity planning. It can be used to review SIP, MFD, and tape management data to help with projections. • Log Analyzer.LA is a mainframe centric tool used to review logon failures, file access rejections, unexpected changes in SIMAN, repeated use of privileged IDs. It is essentially a tool that can be used for security purposes and access attempts to a Unisys mainframe system. • Batch Analyzer. A custom developed .NET application that processes the data from Torch to provide graphical and historical depictions of batch and online performance over time. • Database Capacity Measurement Scripts. Custom solutions created by Deloitte DBA's to, in an automated fashion, collect database centric metrics that are used to trend storage consumption expectations within the database.

Figure 6.9-25. Configuration Management Capacity Planning Support Processes and Tools.



Reports

- **Capacity Plans.** We provide capacity plans on a quarterly basis that take into account growth in application usage as a result of increased DPW users, clients, providers or other business partners. The capacity plans include anticipated increases in consumption to support new functionality for additional services, new client populations, or new user groups. The plans are proactive and provide estimated increases in infrastructure, file server, and database storage to support potential procurement of additional capacity.

Activity: Environment Coordination Support

Process	Tools
<p>Upgrade Support. Support BIS in planning and execution of system upgrades, including Operating Systems, Security Software, Database Servers and other Infrastructure Components.</p> <hr/> <p>Infrastructure Management. Support BIS in the planning and testing of infrastructure upgrades such as software patches, hardware replacement, etc.</p> <p>Support migration of test environments to Selinsgrove to support alternative DR solutions.</p>	<ul style="list-style-type: none"> • CIO Runway. A summary list of initiative timelines through the SDLC. • DPW Implementation Calendar. A detailed calendar view of scheduled application/infrastructure changes. • System Center Configuration Manager (SCCM). The Department's standard tool for automated, distributed software deployment across the network. The tool is used to update desktops with the latest versions of software, security patches and configuration files. • Vendor Supplied Installation Objects. COTS products include automated executables to facilitate their installation on a server or desktop. • ATS Regression Testing Scenarios. A defined and documented set of regression testing scenarios that are used to verify the integrity of the application after maintenance activities are performed. • Environment Health Check Scripts. Automated and manual scripts that are executed on a daily bases to verify application availability. These scripts are also executed after infrastructure maintenance activity to verify availability. • nANT/MSBuild. Tools that facilitate automated bundling of executable code to be deployed. • Deployment Playbook – A detailed listing of the steps necessary to support a deployment.
<p>Provide Enterprise Knowledge Management/ Business Intelligence support</p>	<p>EKMS Tools. Cognos and Informatica</p>
<p>Assess and Incorporate virtual server technology within the Security infrastructure to facilitate improved management of hardware cost and resources.</p>	<ul style="list-style-type: none"> • VMWare ESX. Enterprise virtualization solution, allowing for image-based servers, provisioning and fault tolerance.



Process	Tools
<p>Create and maintain infrastructure documentation (system blueprints, etc.).</p>	<ul style="list-style-type: none"> • Microsoft Visio. Microsoft tool used to show the relationships between infrastructure components, communication protocols and relevant capacity. • Sparx Enterprise Architect. Enterprise tool used to document details surrounding component design, interface protocols and signatures, configuration details as well as consumption documentation.
<p>Evaluate new technology, tools and best practices to mature our configuration management processes – including configuration file encryption, improved automated deployments methodologies, etc.</p>	<ul style="list-style-type: none"> • nANT/MSBuild. Tools that facilitate automated bundling of executable code to be deployed. • Concord. DPW's enterprise solution for end user response time metrics collection. Concord leverages agents installed on end user machines to report response time metrics back to a centralized DPW server for reporting.
<p>Provide configuration management solutions to best support DPW's vision of SOA and service management.</p>	<ul style="list-style-type: none"> • SightLine Expert Advisor. DPW's enterprise wide tool supporting infrastructure resource utilization metrics collection.
<p>WebMethods upgrade support including installation, configuration, testing and analysis.</p>	<ul style="list-style-type: none"> • Perfmon. A complementary tool to Siteline that collects more detailed infrastructure resource utilization metrics.
<p>Biztalk support installation, configuration and prototyping of solutions to introduce this platform into the DPW architecture.</p>	<ul style="list-style-type: none"> • AppSight. DPW's standard tool to support application instrumentation. The tool is used to collect substantial metrics for components exhibiting problematic behavior to hasten the identification of the issue root cause. • MyWebMethods Server. Provides for real time analysis and monitoring of the webMethods infrastructure. • SOA Security Manager. A centralized web service security management solution.

Figure 6.9-26. Configuration Management Environment Support Processes and Tools.



Reports

- **CTO Dashboard.** We provide daily CTO Dashboard reporting that provides a critical ‘health check’ of application and infrastructure availability in the production environment. In addition, the dashboard communicates any open system issues by highlighting the health of an application as ‘red’, ‘yellow’ or ‘green.’

Activity: Performance Support

Process	Tools
<p>Load and Break Testing – Facilitate the scheduling, execution and analysis of load and break tests. Work with the project team to assimilate results and present to BIS management with each major release</p>	<ul style="list-style-type: none"> • QuickTest Pro. Performs automated regression testing of application functionality, once scripts and scenarios have been defined and recorded. • HP Performance Center. A software suite that supports the automated testing of Web-based applications under simulated load. • SOAP UI. Provides a mechanism to load test web services singularly outside an application. • ATS Regression Testing Scenarios. A defined and documented set of regression testing scenarios that are used to verify the integrity of the application after maintenance activities are performed. • Environment Health Check Scripts. Automated and manual scripts that are executed on a daily bases to verify application availability. These scripts are also executed after infrastructure maintenance activity.
<p>Performance – Proactively monitor application behavior for tuning opportunities. Work with BIS to identify system tuning solutions</p>	

Figure 6.9-27. Configuration Management Performance Support Processes and Tools.



Reports

- **CTO Dashboard.** We provide daily CTO Dashboard reporting that provides a critical ‘health check’ of application and infrastructure availability in the production environment. In addition, the dashboard communicates any open system issues by highlighting the health of an application as ‘red’, ‘yellow’ or ‘green.’

Activity: Release Support

Process	Tools
<p>Deployment Execution. Receive, plan, execute and verify application deployments through the test environments. Assist DPW with production deployments, including playbook management, stakeholder communication and application team testing coordination</p> <hr/> <p>Deployment Planning. Create playbooks, coordinate technical details with BIS, and coordinate deployment logistics</p>	<ul style="list-style-type: none"> • CIO Runway. A summary list of initiative timelines through the SDLC. • DPW Implementation Calendar. A detailed calendar view of scheduled application/infrastructure changes . • ITSS Request Tracker. A Web-based application used by Deloitte teams to request all services, including migration support, of ITSS. • ATS. A Web-based tool that tracks, from a software release standpoint, PCR, bundle and build information that comprise a release. • Deployment Playbook. A detailed listing of the steps necessary to support a deployment. • nANT/MSBuild. Tools that facilitate automated bundling of executable code to be deployed. • Cruise Control .NET. The deployment engine that consumes output from MSBuild/n ANT to physically deploy the code. • TFS/VSS. Version control software to house the application source code checked in/out by developer staff. • PACSES CONFIG Database. A consolidated repository used to track, manage and report on changes across the PACSES mainframe.
<p>Application Testing. For BI application functionality and load testing, provide BIS with test cases and scenarios prior to testing and provide test results prior to TFP.</p>	<ul style="list-style-type: none"> • QuickTest Pro. Performs automated regression testing of application functionality, once scripts and scenarios have been defined and recorded. • HP Performance Center. A software suite that supports the automated testing of Web-based applications under simulated load. • SOAP UI. Provides a mechanism to load test web services singularly outside an application. • ATS Regression Testing Scenarios. A defined and documented set of regression testing scenarios that are used to verify the integrity of the application after maintenance activities are performed. • Environment Health Check Scripts. Automated and manual scripts that are executed on a daily bases to verify application availability. These scripts are also executed after infrastructure maintenance activity.

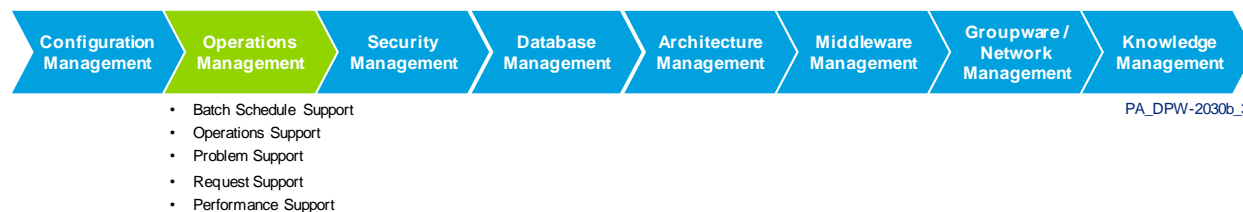
Figure 6.9-28. Configuration Management Release Support Processes and Tools.



Reports

- **CTO Dashboard.** We provide daily CTO Dashboard reporting that provides a critical 'health check' of application and infrastructure availability in the production environment. In addition, the dashboard communicates any open system issues by highlighting the health of an application as 'red', 'yellow' or 'green.'
- **Quality Assurance Difference Report.** The report compares new application build and the current production build to verify that the proper code and components are being changed. We use the report as a critical step in our quality management process to determine that we have deployed the correct version of the application code to production.
- **Deployment Playbook.** Deployment Playbooks provide a script of detailed steps used during a TFP or production deployment and the approximate timing for each step. The playbooks provide a common understanding to DPW and Deloitte of the tasks necessary to execute a production deployment. We provide playbooks to DPW for review several weeks before an actual deployment to allow time for refinements and to address any questions or concerns.
- **Deployment Instructions.** We provide Deployment Instructions that are based on the Deployment Playbooks and provide additional detailed instructions to DPW web and server teams on the exact tasks required to execute a production deployment. We distribute the instructions several days before an actual deployment to give DPW an opportunity to review the detailed tasks required to support deployment and address any questions or concerns.
- **PACSES Migration Control Management (MCM) Report.** The MCM Report identifies the current status of a PACSES deployment package during its release migration process. The report provides a current status of deployment package to stakeholders, including 'System Acceptance Test,' 'Ready for Production Signoff,' and 'Production Approved.'

Operations Management



Activity: Batch Schedule Support

Process	Tools
<p>Batch Management. Support creation of batch run books, escalation protocols and restart instructions for all project batch jobs. Assist BIS to set up the OPCON scheduler to support project batch schedules. Provide first-line of support to BIS for batch issues/questions</p>	<ul style="list-style-type: none"> • Deloitte Batch Runtime Analysis Framework 1.5. Our rules-based batch runtime analysis framework identifies batch jobs that have possible performance degradation issues by analyzing historic batch runtimes and calculating the variance based on analysis of standard deviation. • SMA OpCon/xps. Automated batch scheduler used to execute batch jobs.

Figure 6.9-29. Operations Batch Schedule Support Processes and Tools.

Reports

The following provides a representative sample of Operational Reports:

- **Batch Run Books.** Created as part of each initiative, the Batch Run Books provide the details of each application’s batch requirements. The documentation includes a detailed description of each batch job, scheduling information, timing, frequency and expected runtime as well as escalation procedures for technical resources to follow in the event exceptions occur during processing.

Activity: Operations Support

Process	Tools
<p>Reporting. Automate and distribute operational project reports – such as the Daily Business Metrics - to project team, program office and BIS staff.</p>	<ul style="list-style-type: none"> • SMA OpCon/xps. Automated batch scheduler used to execute batch jobs. • SQL Server Reporting Services. This tool allows for the automated execution and generation of pre-developed reporting templates, • Deloitte Batch Status Reporting Framework 3.5. This tool leverages automated scripts and SSRS subscriptions to inform key stakeholders of any batches that did not finish successfully the previous evening. • Deloitte Batch Runtime Analysis Framework 1.5. Our batch runtime analysis framework intelligently identifies batch jobs that have possible performance degradation issues by analyzing historic batch runtimes and calculating the variance based on analysis of standard deviation.

Figure 6.9-30. Operations Support Processes and Tools.



Reports

- **Production Batch Exceptions Detail Report.** Deloitte generates a daily exception report prior to the start of the online processing to inform support teams of any batches that did not finish successfully during the previous 24 hours. The report initiates a prompt root cause and business impact analysis which we summarize and distribute via the Production Batch Exception Summary Report.
- **Production Batch Exception Summary Report.** This report provides key DPW stakeholders with a management summary of the root cause and business impacts of the batch failures or anomalies that occurred the previous evening.

Activity: Problem Support

Process	Tools
SIEM Work with BIS to provide support on DPW's Security Incident Event Management System.	<ul style="list-style-type: none"> • Environment Health Check Scripts. Automated and manual scripts that are executed on a daily bases to verify application availability. These scripts are also executed after infrastructure maintenance activity to verify availability. • Infrastructure Alerts. DPW leverages automated monitoring tools that alert technical staff when defined negative thresholds are met (i.e. Excessive CPU utilization, limited available disk space, etc.). • SightLine Expert Advisor. DPW's enterprise wide tool supporting infrastructure resource utilization metrics collection. • Perfmon. A complementary tool to Siteline that collects more detailed infrastructure resource utilization metrics. • UDSMON. Provides real time mainframe centric database monitoring that shows active reads/writes to the database areas/records/sets. • OSAM. Provides both real time and historical system monitoring of mainframe information on TIP transaction activity, UDS thread usage, mass storage and disc utilization, communications performance statistics, batch usage, etc.
Issue Management – Work with BIS to investigate, analyze and recommend solutions to production issues impacting all in-scope applications	
Research and resolve issues related to the Database and/or application interaction with the Database.	
Assist with Cognos troubleshooting related to application issues and ETL Informatica issues related to application issues.	
Research and resolve issues related to the Cognos and/or Informatica installations and application interaction with EKMS.	

Figure 6.9-31. Operations Problem Support Processes and Tools.

Reports

- **Production Batch Exceptions Detail Report.** Deloitte generates a daily exception report prior to the start of the online processing to inform support teams of any batches that did not finish successfully during the previous 24 hours. The report initiates a prompt root cause and business impact analysis which we summarize and distribute via the Production Batch Exception Summary Report.
- **Production Batch Exception Summary Report.** This report provides key DPW stakeholders with a management summary of the root cause and business impacts of the batch failures or anomalies that occurred the previous evening.

Activity: Request Support

Process	Tools
<p>Quality Assurance. Serve as the single point of contact from the project teams to each BIS team. Review each request for completeness, accuracy and adherence to the strategic vision of DPW before submission to the DPW team for review and approval</p>	<ul style="list-style-type: none"> • Project Management Center (PMC). A Web-based management tool that provides centralized risk/issue management and reporting. Risks/Issues can be characterized as DTE, DEA or CIO level escalation. • ITSS Request Tracker. A Web-based application used by Deloitte teams to request all services, including migration support, of ITSS. This tool provides change tracking and logs each person that initiates or modifies a request.
<p>Communication/Coordination. Communicate upcoming requests from the application teams to each BIS team. Provide a summary of the requirements and high level scope to assist in resource planning</p>	

Figure 6.9-32. Operations Request Support Processes and Tools.

Reports

- **ITSS Reporting.** ITSS submits weekly and monthly status in the form of project/steering team meeting minutes as well as a monthly summary of work completed for the past month and work to be completed in the coming month. This reporting provides important technical and project information with BIS, project teams, Program Offices and Executive Staff.

Activity: Performance Support

Process	Tools
<p>Leverage our understanding of the Enterprise Applications (HCSIS, PELICAN, iCIS, etc.) architecture, design, and operations to identify opportunities and to assist in improving Open System server performance. This includes enhance caching solutions, use of Microsoft solutions such as Web Gardening or, Monitor Server performance using tools.</p>	<ul style="list-style-type: none"> • Concord. DPW's enterprise solution for end user response time metrics collection. Concord leverages agents installed on end user machines to report response time metrics back to a centralized DPW server for reporting. • SightLine Expert Advisor. DPW's enterprise wide tool supporting infrastructure resource utilization metrics collection • Perfmon. A complementary tool to Sitaline that collects more detailed infrastructure resource utilization metrics • AppSight. DPW's standard tool to support application instrumentation. The tool is used to collect substantial metrics for components exhibiting problematic behavior to hasten the identification of the issue root cause. • Cognos 8 Business Intelligence. Tool used for the configuration settings of the Cognos server environment.
<p>Assist with Cognos Query Performance tuning for optimal results.</p>	
<p>Assist in developing Cognos and DW related performance monitoring procedures, standards, and best practices.</p>	

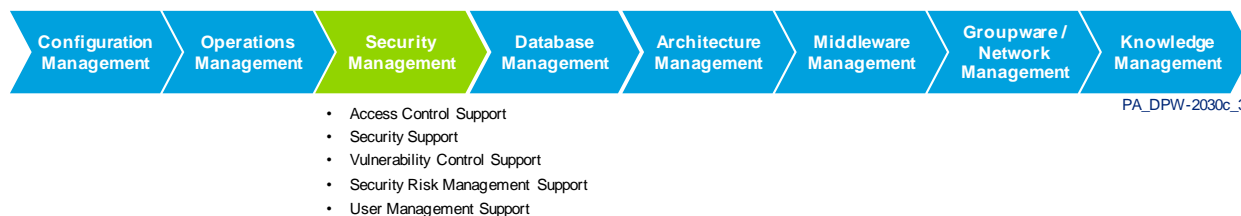
Figure 6.9-33. Operations Performance Support Processes and Tools.



Reports

- **Load Test Analysis Report.** Deloitte generates analysis reports after each load testing session, including performance metrics, such as CPU, Memory and Disk utilization; detailed business metrics analysis; and average system response times of each page and transaction tested.

Security Management



Activity: Access Control Support

Process	Tools
<p>IAM (Identity and Access Management Support) Work with BIS staff to help support DPW's IAM infrastructure, to also include Provisioning and Role Based access control assessments as needed</p> <hr/> <p>Provide ongoing IAM infrastructure (IBM Tivoli Identity Manager, CA Identity Manager, CA SiteMinder, Radiant Logic VDS and CA SOA Security Manager) support and enhancement services i.e. defining the security approach, architecture direction, application integration standards and ongoing maintenance activities. Implement identity-based web services security solution to secure access the DPW web services by inspecting the security information contained in the XML documents submitted by web service consumers.</p>	<ul style="list-style-type: none"> • CA SiteMinder. A centralized web access management tool which provides authentication and policy (or role) based authorization services. It enables single sign-on between protected applications and has ability for federated access management between enterprise directories. • CA Identity Manager. A centralized user account life cycle management tool. It is used by delegated administrator to manage user's identity and access. It can be configured to provide self-service password and self-registration features to end users. • CA SOA Security Manager. A centralized web service security management solution. • RADIANTONE VDS. RadiantOne VDS aggregates and correlates user identity and access existing in multiple user repositories into one enterprise directory for efficient identity and access management. • IBM Tivoli Identity Manager. A policy based user life cycle management solution with workflow capabilities that manages user access across DPW applications\ from on-boarding through termination • Password Reset Utility. Password Reset utility is a custom developed tool to help reset user passwords due to password expiration or user account lockouts. • User Migration Utility. A custom tool to automate user migrations from one domain controller (Active Directory) to another domain controller. • Password Management Utility. A custom develop tool to help end-users to retrieve/reset their credentials such as "Forgot Password" functionality based on "Hint Questions."

Figure 6.9-34. Access Control Support Processes and Tools.



Reports

- **SOA Security Service Catalog.** This report catalogs DPW services protected with CA SOA security manager. The catalog contains information of each service including the user accounts, user roles, service business owners, service data, service endpoints and service description. This catalog includes the SOA services security design, CA SOA Security Manager build configuration and implementation steps.
- **Security and Privacy Monthly Steering Team Report.** The monthly report provides status on security and privacy based initiatives as well as the measured key performance indicators for the security infrastructure.

Activity: Security Support

Process	Tools
<p>Security Design – Work with BIS to design and implement security solutions using the standard DPW architecture and security tools</p>	<ul style="list-style-type: none"> • Personally Identifiable Information (PII) Catalog. A repository of sensitive PII data present in the application generated notices, correspondences and reports. • PII Data Flow Maps. Graphically represents the flow of data in DPW applications through the five phases of data life cycle – Collect, Use, Store, Share and Destroy. • DPW Role Life cycle Management. DPW’s guidelines for application user role creation and maintenance process. • Deloitte’s Secure Development Life cycle. Provides a framework for developing secure applications by implementing and measuring security controls throughout systems development life cycle. • Deloitte’s Privacy and Data Protection Framework. provides guidelines for providing robust data protection and privacy using leading privacy tools and techniques. • EMC/RSA enVision. A system incidents and events management tool. It aggregates access logs from other enterprise tools, correlates, analyzes and provides a holistic view of users’ access in the system.
<p>Support BIS in the planning and design of new security solutions using the standard DPW architecture and tools</p>	<ul style="list-style-type: none"> • EMC/RSA enVision. A system incidents and events management tool. It aggregates access logs from other enterprise tools, correlates, analyzes and provides a holistic view of users’ access in the system.
<p>Enhance the RSA enVision implementation by defining processes and procedures to monitor Key Performance Indicators (KPI). Provide support to existing envision implementation. Integrate devices with enVision. Assist with keeping enVision infrastructure up to date with patches, hot fixes, etc.</p>	<ul style="list-style-type: none"> • Deloitte’s Business Continuity Management Framework. Provides a demonstrated approach to analyze current state, identify requirements, define and implement data backup and recovery process.

Figure 6.9-35. Security Support Processes and Tools.



Reports

- **Security Design.** This report provides the security controls that are designed to mitigate potential security threats and vulnerabilities. This report includes the following security design considerations:
 - User role definition
 - Data protection controls
 - PII catalog
 - PII data flow map
 - Fine Grained Access Control
 - SIEM integration with Application Security Audit Logs.
- **Security and Privacy Monthly Steering Team Report.** The monthly report provides status on security and privacy based initiatives as well as the measured key performance indicators for the security infrastructure. Security KPIs are provided as part of this report.
- **Data Backup and Recovery Assessment Report.** This report provides the improvement opportunities and prioritized disaster recovery (DR) requirements after performing a current state assessment of data recovery and backup processes.

Activity: Vulnerability Control Support

Process	Tools
<p>Vulnerability Testing. Support DPW's IT projects by performing vulnerability tests of the code developed by the project teams in non-production environments. We perform the testing using DPW standard tool sets.</p>	<ul style="list-style-type: none"> • HP WebInspect. A web application and web services security testing tool for automated vulnerability scanning. • HP SwfScan. HP SWFScan is an open source security tool to decompile and identify security vulnerabilities in applications developed with the Adobe Flash platform. • Paros Proxy. An open source proxy used to evaluate security of the web applications by intercepting HTTP and HTTPS data, including cookies and form fields, between web server and a client.

Process	Tools
<p>CA(2). Create and maintain the CA(2) document. This document is required for each major release of an application. This process also includes secure code review, and web application vulnerability scanning.</p>	<ul style="list-style-type: none"> • HP WebInspect. A web application and web services security testing tool for automated vulnerability scanning. • HP SwfScan. HP SWFScan is an open source security tool to decompile and identify security vulnerabilities in applications developed with the Adobe Flash platform. • Paros Proxy. An open source proxy used to evaluate security of the web applications by intercepting HTTP and HTTPS data, including cookies and form fields, between web server and a client. • HP DevInspect. An automated source code analyzer that helps to consistently identify vulnerabilities in the source code through static and dynamic code analysis.
<p>Conduct network vulnerability assessment and penetration testing assessment using automated tools like Nmap, Nikto, Nessus, GFILanguard, Ethereal, Snort, Kismet, Airshark, MIBWalk. Conduct a manual analysis of the network devices and architecture. Perform configuration review of the network devices. Compare against security leading practices for network security and architecture and identify gaps.</p>	<ul style="list-style-type: none"> • Nessus. A commercial vulnerability scanner that allows customization of the ports and services to be scanned. • Nmap. A stealth port scanner that identifies network devices, operating systems and potential vulnerabilities. • Nikto. An automated vulnerability scanner that identifies potentially web server vulnerabilities. • GFILanguard. A network, security and port scanner with over 15,000 vulnerability assessment signatures. • Ethereal. A sniffer that allows you to examine data from either a live network or from a capture file on disk. • Snort. Snort's open source network-based intrusion detection system (NIDS) has the ability to perform real-time traffic analysis and packet logging on Internet Protocol (IP) networks. • Kismet. Kismet is an 802.11 layer2 wireless network detector, sniffer, and intrusion detection system. • MIBWalk. SolarWinds MIB Walk analyzes the SNMP tree of the target network device and pulls the value of each Object Identifier in the supported MIBs (Management Information Base).

Process	Tools
<p>Create detailed reports for each vulnerability identified with mitigation steps. Assist business owners to determine business impact and business risks of each identified vulnerability. Assist DPW to formalize remediation plan for mitigation of the vulnerabilities identified.</p>	<ul style="list-style-type: none"> • Deloitte’s Vulnerability Management Life cycle. Provides a framework to assist an organization with the design, development, implementation, and sustainment of an enterprise-wide, long-term, VM solution. • Deloitte’s Secure Development Life cycle. Provides a framework for developing secure applications by implementing and measuring security controls throughout systems development life cycle. • DPW Security Risk Framework. Provides a list of rationalized security requirements based on DPW standards, Commonwealth ITBs, Federal and State regulations such as HIPAA, FERPA, SSA and IRS 1075 and industry leading practices such as NIST. • ATS. A Web-based tool that tracks, from a software release standpoint, PCR, bundle and build information that comprise a release.
<p>The security testing consultant assists BIS to identify security vulnerabilities within the web applications and environment for prioritized testing by BIS. This assessment includes manual testing and tests conducted with the help of automated web application/ web service vulnerability assessment tools that DPW has, such as HP Web Inspect.</p>	<ul style="list-style-type: none"> • HP WebInspect. A web application and web services security testing tool for automated vulnerability scanning. • HP SwfScan. HP SWFScan is an open source security tool to decompile and identify security vulnerabilities in applications developed with the Adobe Flash platform. • Paros Proxy. An open source proxy used to evaluate security of the web applications by intercepting HTTP and HTTPS data, including cookies and form fields, between web server and a client. • SOAP UI. Provides a mechanism to load test web services singularly outside an application.

Figure 6.9-36. Security Management Processes and Tools.

Reports

- **CA(2) Policy Validation Assessment Report.** This report documents the results of the CA(2) policy validation assessment that identifies and measures the following key aspects of each major DPW application release:
 - Compliance with OA/OIT policies, procedures and standards
 - Data security level
 - Security measures to address potential security risks
- **Application Security Vulnerability Assessment Report.** A documented list of potential vulnerabilities or security improvement opportunities found during application vulnerability testing. The results are reviewed by the application team and managed by the PCR process. This report includes the vulnerabilities identified as part of Secure Code Review.



- **Network Security Vulnerability Assessment Report.** A documented list of potential vulnerabilities or security improvement opportunities found during network vulnerability testing. The results are reviewed by the application team and managed by the PCR process.
- **Security and Privacy Monthly Steering Team Report.** A monthly report providing status on security and privacy based initiatives as well as the measured key performance indicators for the security infrastructure.

Activity: Security Risk Management Support

Process	Tools
Develop a framework for information security risk assessments within DPW. The framework assists the Chief Security Officer in making security related decisions for the applications	<ul style="list-style-type: none"> • DPW Security Risk Framework. Provides a list of rationalized security requirements based on DPW standards, Commonwealth ITBs, Federal and State regulations such as HIPAA, FERPA, SSA and IRS 1075 and industry leading practices such as NIST. • DPW Security Risk Prioritization Tool. Evaluates the security risks from each security domain for each application/systems and provides the prioritized risks that DPW has to consider. • Deloitte's IT Risk Management Framework.
Enhance RBAC (Role Based Access Control)	<ul style="list-style-type: none"> • DPW Role Life cycle Management. DPW's guidelines for application user role creation and maintenance process • Deloitte's Role Management for Enterprise Framework (RM4E). Framework to provide a streamlined access control management for improved security and compliance.
<p>Define and implement role management processes and enterprise level role-based model for the applicable Program offices. Define process refine, optimize, and adapt role definitions business changes. Define process set quality targets and processes fix privileges exceptions and flawed role definitions. Define process recertify privileges changes and role updates with business managers. Define process for automated testing of privileges and roles against business process rules and policies such as segregation of duty.</p> <p>Improve the security team's request tracking system to support the USEC Change Request process.</p>	<ul style="list-style-type: none"> • DPW Role Life cycle Management. DPW's guidelines for application user role creation and maintenance process. • Deloitte's Role Management for Enterprise Framework (RM4E). Framework to provide a streamlined access control management for improved security and compliance. • ATS. A Web-based tool that tracks, from a software release standpoint, PCR, bundle and build information that comprise a release.

Figure 6.9-37. Security Management Processes and Tools.

Reports

- **Security Risk Assessment Report.** This report provides the results of the security risk assessment performed on DPW applications using the DPW's Security Risk Framework.

- **Security and Privacy Monthly Steering Team Report.** A monthly report providing status on security and privacy based initiatives as well as the measured key performance indicators for the security infrastructure.

Activity: User Management Support

Process	Tools
<p>Assess existing integrated identity management and provisioning solution tenable the potential automate the creation, modification, and deletion of user identities and their access and entitlements range of DPW's enterprise systems, from mainframe web applications. Design and implement standard processes for On-boarding, Transfer, Periodic Access Review, and Off-boarding of DPW employees. Design and implement discretionary or request- driven access process flow for Functional Roles (for DPW employees). Define a process for periodically audit of provisioning policies. Identify technical resources (provisioning targets) that leverage the IBM TIM Provisioning solution. Define use cases and policies to be enforced by the TIM Provisioning solution. Define procedures for periodic user access reviews. Enhance self-service password services using GINA technology. Design and implement eSignature based MD205.34 user agreement collection process. Provide ongoing support for the TIM Infrastructure.</p>	<ul style="list-style-type: none"> • CA SiteMinder. A centralized web access management tool which provides authentication and policy (or role) based authorization services. It enables single sign-on between protected applications and has ability for federated access management between enterprise directories. • CA Identity Manager. A centralized user account life cycle management tool. It is used by delegated administrator to manage user's identity and access. It can be configured to provide self-service password and self-registration features to end users. • CA SOA Security Manager. A centralized web service security management solution. • RADIANTONE VDS. RadiantOne VDS aggregates and correlates user identity and access existing in multiple user repository into one enterprise directory for efficient identity and access management. • IBM Tivoli Identity Manager. A policy based user life cycle management solution with workflow capabilities that manages user access across DPW applications\ from on-boarding through termination • Password Reset Utility. Password Reset utility is a custom developed tool to help reset user passwords due to password expiration or user account lockouts • User Migration Utility. A custom tool to automate user migrations from one domain controller (Active Directory) to another domain controller • Password Management Utility. A custom develop tool to help end-users to retrieve/reset their credentials such as "Forgot Password" functionality based on "Hint Questions" • DPW Role Life cycle Management. DPW's guidelines for application user role creation and maintenance process • Deloitte's Role Management for Enterprise Framework (RM4E). Framework to provide a streamlined access control management for improved security and compliance
<p>Support the Generic Self -registration service and password Services (Implementation and Rollout).</p>	
<p>Implement the generic self-registration service to provide user account registration features for use by applications across the DPW.</p>	

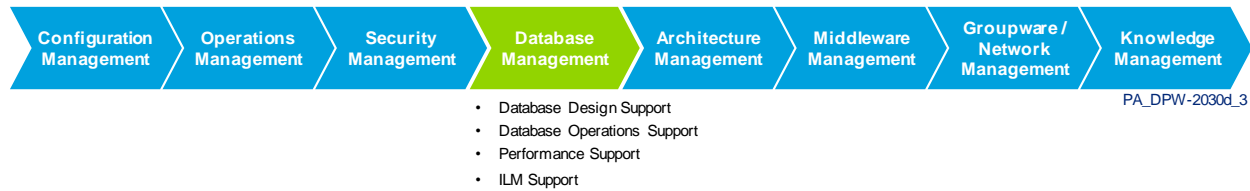
Figure 6.9-38. Security Management Processes and Tools.



Reports

- **Automated User Provisioning Design and Build Report.** This report contains the scope, objectives, design, configuration parameters and solution build considerations for User Provisioning Solution using IBM Tivoli Identity Manager.
- **User Self-Registration and Advanced Password Service Design and Build Deliverable.** This report provides the scope, objectives, service design, configuration parameters and solution build considerations for user self-registration service and advanced password service.
- **Security and Privacy Monthly Steering Team Report.** The monthly report provides status on security and privacy based initiatives as well as the measured key performance indicators for the security infrastructure.

Database Management



Activity: Database Design Support

Process	Tools
Database Design – physical and logical model creation	<ul style="list-style-type: none"> • ERwin 7.3.4. Client desktop tool that is used to create and maintain logical and physical data models. • SQL * Plus. Oracle utility that provides a conduit to execute native SQL against an Oracle database. • Golden. COTS tool that allows provides a slightly enhanced conduit to execute native SQL against an Oracle database. • TOAD. COTS tool that provides a substantially enhanced c conduit to execute native SQL against an Oracle database as well as DBA centric monitoring, tuning and configuration tasks. • Oracle Enterprise Manager. Oracle supplied tool used to manage objects, structures and configurations within the database. • UDS. DMS/RDMS tool used to manage database objects, structures and configurations within the Unisys database platform.
Data Dictionary Management – adherence to naming standards; review with BIS Data team	
Review logical and physical database designs.	
Assist in developing database related standards and best practices.	

Figure 6.9-39. Database Design Support Processes and Tools.

Reports

- **Logical Data Model.** The logical data model provides an overview of the business relationships between defined entities and attributes.
- **Physical Data Model.** The physical data model provides a detailed schematic of the physical manifestation of the database actually deployed. This includes normalization of database entities as well as the definition of physical partitions, schemas and primary key relationships. Additionally, details about new interfaces, expected capacity growth, archive/purge criteria, and migration and conversion strategies are included to support the project initiative.
- **Data Dictionary.** The Data Dictionary provides a description of each column, along with the business purpose of the data within the columns, any data constraints and sample values for each column.

Activity: Database Operations Support

Process	Tools
<p>Data Management. Managing test data through the various environments to support project initiatives</p>	<ul style="list-style-type: none"> • SQL* Plus. Oracle utility that provides a conduit to execute native SQL against an Oracle database.
<p>Upgrade Support. Support BIS in planning and execution of database upgrades</p>	<ul style="list-style-type: none"> • Golden. COTS tool that allows provides a slightly enhanced conduit to execute native SQL against an Oracle database.
<p>Assist in the Open Systems Database Backup/Recovery and Disaster Recovery processes.</p>	<ul style="list-style-type: none"> • Oracle Enterprise Manager. Oracle supplied tool used to manage objects, structures and configurations within the database.
<p>Develop database related maintenance processes and/or utilities.</p>	<ul style="list-style-type: none"> • TOAD. COTS tool that provides a substantially enhanced c conduit to execute native SQL against an Oracle database as well as DBA centric monitoring, tuning and configuration tasks. • ISQL. Unisys 'Interactive SQL', similar to Oracle's SQL*Plus, is a utility that allows for database command execution used to create/alter structures or to deploy code. • Louis II. A COTS tool that provides high speed retrieval of data housed in the Unisys RDMS database. The tool can be leveraged from ECL streams to perform database maintenance in a timely, efficient manner.
	<ul style="list-style-type: none"> • IQU Plus. A COTS tool used to access data from the DMS tables. Primarily used by the DBAs for minor data extract tasks or data fix tasks. • IRU. Integrated Recovery Utility – software used by DBAs to perform database recoveries/reorganizations. • RDMS FastLoader. Similar to Oracle's SQL Loader, this tool provides the capability to quickly bulk load RDMS tables. • Export/Import Data Pump. Oracle utility that allows for bulk data and/or structure copy from one environment to another.

Figure 6.9-40. Database Operations Support Processes and Tools.

Reports

- **Database Quality Assurance Difference Report.** This report is an on-demand report used by Deloitte database administrators (DBA) to compare and report differences in database schemas, objects, indices, columns, etc. between environments. This is critical to verify that only the desired constructs are moving to higher environments and, eventually, production. The results are shared with DPW for final review and verification before promoting the change to production.
- **Database Refresh Summary.** This report highlights the status of the scheduled, automated refresh of data from production to lower environments. For example, refreshing data into TFP is critical for accurately rehearsing production deployments, subsequent testing, and for proactively rehearsing data fix scripts before going to

production. This report allows for rapid assessment of the success of the process or if additional analysis is required.

Activity: Performance Support

Process	Tools
<p>Performance. Query performance tuning/proactive monitoring</p> <hr/> <p>Perform OLTP Query Performance tuning.</p> <hr/> <p>Perform PL/SQL Code reviews to determine code is efficient and adheres to best practices.</p> <hr/> <p>Review and optimize Open Systems Batch queries and processes.</p> <hr/> <p>Monitor database performance; identify and implement tuning opportunities.</p>	<ul style="list-style-type: none"> • SQL* Plus. Oracle utility that provides a conduit to execute native SQL against an Oracle database. • Golden. COTS tool that allows provides a slightly enhanced conduit to execute native SQL against an Oracle database. • TOAD. COTS tool that provides a substantially enhanced c conduit to execute native SQL against an Oracle database as well as DBA centric monitoring, tuning and configuration tasks. • ISQL. Unisys 'Interactive SQL', similar to Oracle's SQL*Plus, is a utility that allows for database command execution used to create/alter structures or to deploy code. • Louis II. A COTS tool that provides high speed retrieval of data housed in the Unisys RDMS database. The tool can be leveraged from ECL streams to perform database maintenance in a timely, efficient manner. • IQU Plus. A COTS tool used to access data from the DMS tables. Primarily used by the DBAs for minor data extract tasks or data fix tasks. • IRU. Integrated Recovery Utility – software used by DBAs to perform database recoveries/reorganizations. • RDMS FastLoader. Similar to Oracle's SQL Loader, this tool provides the capability to quickly bulk load RDMS tables. • Export/Import Data Pump. Oracle utility that allows for bulk data and/or structure copy from one environment to another.

Figure 6.9-41. Database Performance Support Processes and Tools.

Reports

- **AWR Report.** An Oracle-supplied report that summarizes the statistics found during a scheduled scan of the database. This includes technical metrics such as logical/physical reads, buffer gets, query response time, etc. The report feeds subsequent tuning processes to quickly identify and resolve performance tuning opportunities.
- **Top Queries for Performance Improvement Report.** This report provides the DPW database management team with an overview of queries that have been identified as top candidates for performance tuning. We work with DPW to analyze the functionality of these queries and prioritize them through the standard PCR process.



- **PACSES Performance Database.** Deloitte collects performance metrics that identify online and batch processes that generate high I/O levels and/or significant runtimes. The executions of the identified run units are then monitored on the mainframe using standard tools such as UDSMON, OSAM and SUDS.

Activity: Database ILM Support

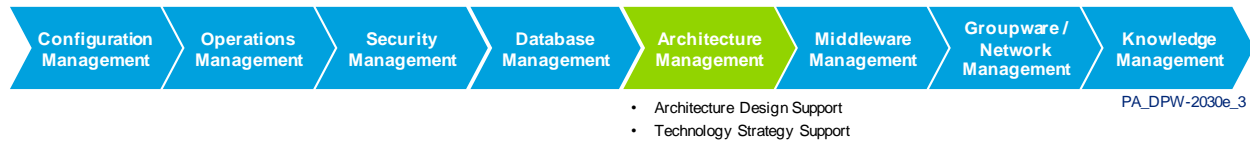
Process	Tools
Assist in researching, defining, and implementing an Information Life Cycle Strategy.	<ul style="list-style-type: none"> • Optim. DPW's enterprise tool to support the transition of structured and unstructured data from primary, high speed access storage to secondary storage devices and structures. The tool supports both the archiving and temporary retrieval of aged data in support of business activities. • Batch Purge Processes. Scheduled batch jobs that physically purge databased on business requirements.

Figure 6.9-42. Database Management Processes and Tools.

Reports

- **Optim Archive/Purge History Report.** This report displays information on historic archive and purge runs, and consists of details pertaining to number of archive files, data movement through the tiered storage infrastructure and storage disk management statistics.
- **Archive Run Discrepancy Report.** This report provides information on the number of records archived for a particular run as well as the number of records expected to be archived. The report enables analysis of archiving discrepancies that serve as the basis of further analysis.

Architecture Management



Activity: Architecture Design Support

Process	Tools
<p>Design. Work with the application teams to create a strategic application design that aligns with the broader enterprise vision of DPW/BIS.</p> <hr/> <p>Standards Alignment. Facilitate initiative presentations to the Architecture Review Board (ARB) to verify adherence to standards. Perform ARB presentation rehearsals with the application team for efficient execution. Manage the Deloitte’s internal Architecture Review Board team to verify consistent solutions and practices are being leveraged across all applications. Manage and maintain the Application Life cycle Management Dashboard and overall application baseline to facilitate timeliness and improved accuracy.</p> <hr/> <p>Application Life cycle Management Dashboard. Provide overall application baseline to facilitate transparency, timely and enhanced reporting.</p>	<ul style="list-style-type: none"> • ALM Baseline. Comprehensive listing of approved tools, technologies and product versions that are approved for use within the DPW applications. • ATS. Tool used to record non-functional change requests for the application teams to reflect the need to align with new DPW. technologies or get off of technologies where support is expiring. • Sparx Enterprise Architect. Enterprise tool used to document details surrounding component design, interface protocols and signatures, configuration details as well as consumption documentation. • DPW Service Catalog. Enterprise listing of reusable business components, applications that consume the services, and change history.

Figure 6.9-43. Architecture Design Support Processes and Tools.

Reports

- **ARB Presentations and Checklists.** Created for each application initiative, the ARB presentation is used to review new business or technical concepts, application capacity changes, and architectural modifications to systems with DPW stakeholders. During each initiative’s life cycle, three of these are created, beginning with a business requirements overview, and gradually progressing into more technical concepts as the initiative progresses.
- **ALM Dashboards.** Each in-scope system maintains an ALM dashboard, which represents that system’s compliance with the technologies (including versions) that are published in the current version of the ALM baseline.
- **Non-Functional PCR Reports.** Reports created from the ATS tracking system that specify outstanding non-functional PCRs by application and by DPW IT domain.

Activity: Technology Strategy Support

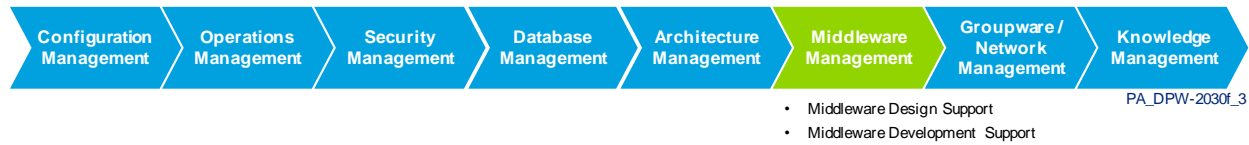
Process	Tools
<p>Provide specialist assistance for DPW technology strategy support for annual planning efforts and new technology initiatives, such as new COTS products, Cloud Computing,, Transfer Technology product support.</p>	<ul style="list-style-type: none"> • Annual Scoping Deck. Tool used to facilitate annual planning discussions with program offices, DPW IT organization, application teams, ITSS/DTSS, and other critical DPW stakeholders.
<p>Provide technology strategy support to establish a baseline for annual planning and scoping.</p>	<ul style="list-style-type: none"> • CIO Runway. Tool used to manage the critical SDLC milestones of all the approved work orders for a given fiscal year across all is-scope applications.
<p>Provide DTE-Enterprise Knowledge Management Services Assistance .</p>	<ul style="list-style-type: none"> • CMMI Assessment Tool. Used during the CMMI appraisal to determine the CMMI maturity of an organization.
<p>Establish the ITIL (IT Infrastructure Library) Adoption Approach.</p>	<ul style="list-style-type: none"> • CMMI Process Guides. Used as a reference to provide a starter set of process descriptions, inputs, outputs, process flows that can be tailored to DPW projects needs.
<p>Refine and expand CMMI and ITIL maturity models and governance frameworks.</p>	<ul style="list-style-type: none"> • CMMI Process Measurement Dashboard. Used to analyze the project metrics collected and to reporting these metrics to project leadership.
<p>Provide strategy support to assess CMMI and ITIL model maturity level baselines and map annual strategies for annual targets.</p>	<ul style="list-style-type: none"> • DPW Standard COTS Assessment Tool. DPW standard tool for collecting data on comparable technologies, assigning weightings for the evaluation, and recording and tabulating technology evaluation scores.
<p>Provide technology strategy support to establish an integrated software quality assurance approach throughout the SDM phases.</p>	<ul style="list-style-type: none"> • ITIL Assessment Tool. Used to assess As-Is processes and determine ongoing maturity levels, gaps, and issues. • ITIL Process Framework. Used as a reference for identifying and organizing ITIL process implementation tasks for process design, deployment, and assessment. • ITIL Process Management Dashboard. Pre-built dashboard used as a reference for identifying a starter set of process measurements.

Figure 6.9-44. Technology Strategy Support Processes and Tools.

Reports

- **Annual CMMI Assessment Report.** An annual report that details DPW's progress towards achieving CMMI level capabilities and identifies opportunities for continued focus and improvement.
- **Annual ITIL Assessment Report.** An annual report that details DPW's progress in the past year towards achieving ITIL goals and identifies opportunities for continued focus and improvement.
- **COTS Product Evaluation Report.** The output of the COTS product or transfer technology comparison and analysis.

Middleware Management



Activity: Middleware Design Support

Process	Tools
<p>Design. Work with BIS middleware team to design webMethods/ OpenTI solutions to support project initiatives.</p>	<ul style="list-style-type: none"> • Microsoft Visio. Microsoft tool used to show the relationships between infrastructure components, communication protocols and relevant capacity. • Sparx Enterprise Architect. Enterprise tool used to document details surrounding component design, interface protocols and signatures, configuration details as well as consumption documentation. • SOAP UI. Provides a mechanism to load test web services singularly outside an application. • XML Spy. Facilitates XML schema design support and validation.
<p>Creation of BizTalk standards, processes, and related documentation to help integrate this platform with the Enterprise.</p>	<ul style="list-style-type: none"> • Deloitte Services Thinking Framework v2.1. Deloitte brings the collective experience of more than 15,000 service-oriented architecture implementations working in collaboration with state, federal and private sector organizations to design, build and implement SOA services and strategies. • Visual Studio. Integrated development environment for developing, debugging and maintaining code on Microsoft's .NET platform. • BizTalk 2009 Administrator. Configures the BizTalk 2009 runtime services, including deployment, logging, and connectivity to database and web service resources.
<p>Provide knowledge sharing and mentoring to the Commonwealth staff as directed by DPW management. This includes guidance and assistance required during initiatives.</p>	<ul style="list-style-type: none"> • webMethods Developer. Integrated development environment to code and debug webMethods packages. • webMethods Integration Server. Java-based server which hosts webMethods services and packages. • MyWebMethods Server. Provides for real time analysis and monitoring of the webMethods infrastructure.
<p>Enterprise Architecture support to configure, analyze and prototype solutions to support the Enterprise Service Business concept.</p>	<ul style="list-style-type: none"> • Visual Studio. Integrated development environment for developing, debugging and maintaining code on Microsoft's .NET platform. • OpenTI Builder. UNISYS tool used to generate components hosted in the OpenTI runtime to connect mainframe and open systems software. • BizTalk 2009 Administrator. Configures the BizTalk 2009 runtime services, including deployment, logging, and connectivity to database and web service resources. • nANT/MSBuild. Tools that facilitate automated bundling of executable code to be deployed.

Figure 6.9-45. Middleware Design Support Processes and Tools.



Reports

- **Middleware Initiatives Tracker.** This weekly report highlights initiatives that involve active middleware or service development components, and target dates for completion. The report is used to lead weekly status reviews of each initiative, and to proactively plan for resource demand.

Activity: Middleware Development Support

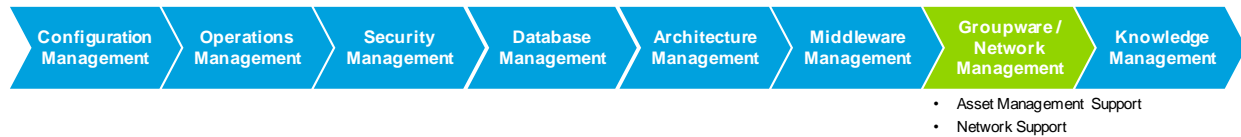
Process	Tools
Support the webMethods platform upgrades.	<ul style="list-style-type: none"> • MyWebMethods Server. Provides for real time analysis and monitoring of the webMethods infrastructure. • Vendor Supplied Installation Objects. COTS products include automated executables to facilitate their installation on a server or desktop. • webMethods Developer. Integrated development environment to code and debug webMethods packages. • webMethods Integration Server. Java-based server which hosts webMethods services and packages. • TFS/VSS. Version control software to house the application source code checked in/out by developer staff. • Visual Studio. Integrated development environment for developing, debugging and maintaining code on Microsoft's .NET platform. • OpenTI Builder. UNISYS tool used to generate components hosted in the OpenTI runtime to connect mainframe and open systems software. • BizTalk 2009 Administrator. Configures the BizTalk 2009 runtime services, including deployment, logging, and connectivity to database and web service resources.
Provide Open TI support of existing and prioritized initiatives.	
Develop middleware packages for prioritized initiatives.	

Figure 6.9-46. Middleware Development Support Processes and Tools.

Reports

- **webMethods Package List.** This report lists each webMethods package, its assigned developer and architecture owner, and a change log of any maintenance activities performed.
- **OpenTI Services List.** This listing tracks each OpenTI service, as well as the consuming applications and the business description of the functionality.
- **DPW Services Catalog.** The DPW Services Catalog is a listing of enterprise services and reusable objects which can be incorporated into applications to serve a specific business or technical function. The service catalog includes items such as the Master Client and Provider Indexes (MCI/MPI), Enterprise Correspondence, and FSWS. This document tracks the consumers of services and the release date version history of each service deployed within DPW.

Groupware/Network Management



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Activity: Network Support

Process	Tools
<p>Network Support. Support the network team with tasks or maintenance activities as required to support Deloitte’s CWOPA network services.</p>	<ul style="list-style-type: none"> • Concord. DPW’s enterprise solution for end user response time metrics collection. Concord monitors network infrastructure and reports on bandwidth utilization and throughput. • System Center Configuration Manager (SCCM). The Department’s standard tool for automated, distributed software deployment across the network. The tool is used to update desktops with the latest versions of software, security patches and configuration files. • Vendor Supplied Installation Objects. COTS products include automated executables for installation.

Figure 6.9-47. Network Support Processes and Tools.

Reports

- **Concord Busy Segment Report.** This report, which can be produced daily, weekly, or on-demand, is filtered to show selected pieces of network infrastructure and displays the average traffic, and the percentage of network resources available.
- **SCCM Desktop Report.** This report, produced on-demand from BIS’s SCCM system, lists all of the CWOPA workstations attached to our connection, or to the business partner network, and also lists all of the software packages installed. This report is used to manage licensing for products, and to verify compliance to antivirus and other security policies.

Knowledge Management



• EDW Design Support

PA_DPW-2030h_3

Activity: Electronic Data Warehouse (EDW) Design Support

Process	Tools
Assist in Cognos configuration reviews to determine that infrastructure is efficient and adheres to best practices.	<ul style="list-style-type: none"> • Cognos 8 Business Intelligence. Tool used for the configuration settings of the Cognos server environment.

Figure 6.9-48. EDW Design Support Processes and Tools.

Reports

- **Configuration Recommendations Report.** This report helps identify optimal configuration settings for the Cognos server environment, and assist in the development of techniques to enhance throughput and manage bottlenecks in dispatcher settings, and report queues.

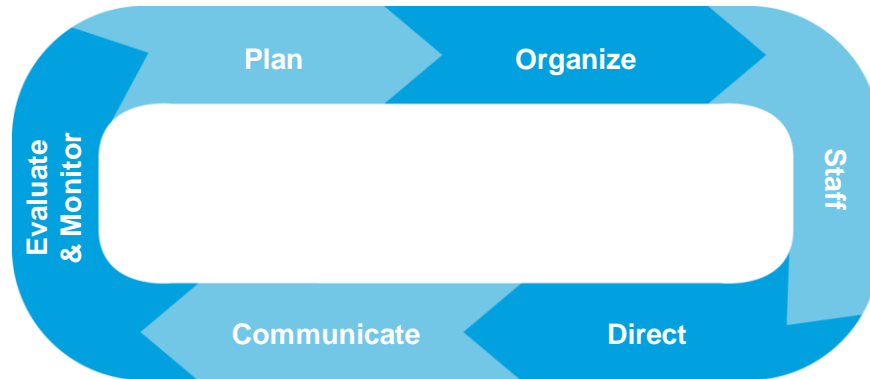
Management Controls, Communication and Evaluation

II	Page II-3	RFP Reference: II-3. Work Plan
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Describe the management controls that will be used to identify and manage risk, maintain project schedules, ensure the quality of the work, and meet all of the performance expectations. Based on its experience, the Offeror should include a discussion of its formal and informal communication processes within a project of this nature. The Offeror should also address its approach to internally monitoring and evaluating its effectiveness in meeting the RFP requirements for the Lot throughout the course of the contract.

Based on ITIL and CMMI-based continual service improvement principles, the team uses a set of management controls, formal and informal communications processes, and monitoring and evaluation techniques. We align the controls and techniques to specific activities to proactively anticipate needs or identify potential errors and deviations from standards. The overall approach forms a closed loop feedback system of functions based on the Plan-Do-Check-Act (PDCA) Deming Total Quality Improvement model.

The closed loop feedback system is comprised of Plan, Organize, Staff, Direct, Communicate, Evaluate and Monitor functions, as described in Figures 6.9-49.



PA_DPW-696

Figure 6.9-49. Management Control, Communication, and Evaluation Process.

Deloitte utilizes a disciplined approach to effectively provide management control, enable communication and facilitate evaluation.

We use standards to establish internal controls for processes and activities. The team monitors, measures and evaluates actual performance against standards, and reviews opportunities for continuous improvement, as shown in Figure 6.9-49. We use internal and external communication methods to report performance, and discuss corrective actions when issues arise or when standards are not met.

Management Control Process	Deloitte Approach to Providing Management Control, Communication and Evaluation Support
Plan	<ul style="list-style-type: none"> Participate and contribute to the DPW Strategic and Annual planning efforts to help develop or refine methods and controls relating to ongoing operations. Work with BIS to review, confirm and document release plans that require support throughout the fiscal year. Participate and contribute to the review of High Level Estimates and Work Orders with BIS prior to the start of initiatives to proactively anticipate and incorporate operational needs in estimates. Work with BIS to review impacts, risks and issues associated with operational maintenance activities and incorporate in overall plan.
Organize	<ul style="list-style-type: none"> Consistently use CMMI-complaint tools to organize, track and manage Risks, Assumptions, Action Items, Issues and Decisions Reached. Use work plans to organize and manage anticipated work items relating to operational support. Define roles and responsibilities to clearly delineate expectations across the team for operational tasks.
Staff	<ul style="list-style-type: none"> Deploy high skilled resources intimately familiar with the technology of DPW from our shared pool of resources. Mentor staff by defining fiscal year goals, individual achievement metrics and training opportunities, and identifying ongoing training needs to maintain proficiency in the latest technologies supporting operational activities. Educate staff on the business processes, technical direction and strategic goals of the Department on an ongoing basis.

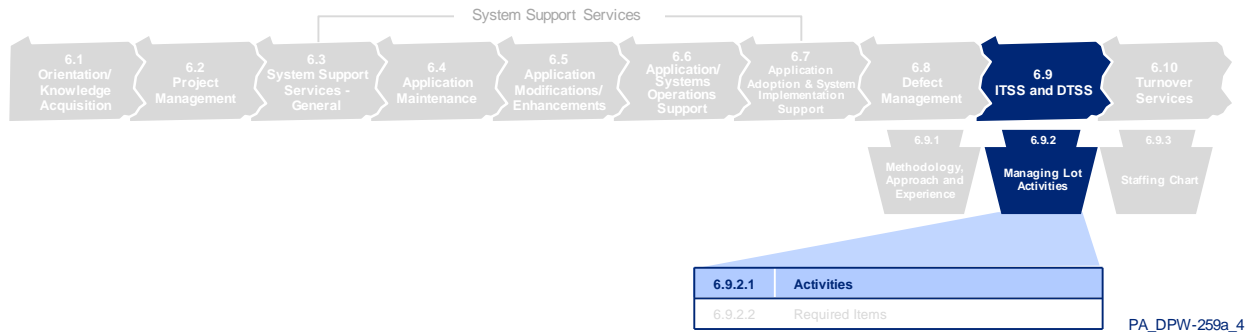


Management Control Process	Deloitte Approach to Providing Management Control, Communication and Evaluation Support
Direct	<ul style="list-style-type: none"> • Manage and maintain the Web-based request tracker tool that provides Internet-based submission of work requests to the shared services team. Use this tool to assign, manage and track work activities. • Review status of tasks and activities on a weekly basis to verify project and Department needs are being met. • Prioritize tasks to support effective business system processing, including efficient management of problem or incidents that impact system availability, performance, or usability.
Communicate	<ul style="list-style-type: none"> • Facilitate and coordinate project and steering team meetings, including meeting agendas, meeting minutes, and action item tracking. • Use defined processes and protocols to notify DPW stakeholders of critical issues that require attention, including a summary of the issue, business impact, and mitigation options. • Include internal project and DPW staff in automated business communications such as the daily system 'health check' metrics report, daily batch exception report, etc. • Participate in key project team and BIS facilitated meetings that discuss project initiatives and impacts on overall operational support.
Evaluate and Monitor	<ul style="list-style-type: none"> • Review open work requests to shared services to verify and monitor timely and accurate response. • Follow up with project team and BIS leads to discuss performance, review and improve overall service delivery related to operational support. • Perform post-deployment QA verifications on release deployments, and mature the 'release scorecard' concept to grade release efficiency. Support mid-year and end-of-year performance evaluations of staff.

Figure 6.9-50. Management Controls, Communication, and Evaluation.



6.9.2.1 Activities



IV	Page IV-386	RFP Reference: E. Information Technology (IT) Shared Services Model & Direct Technical Support Services for Lot#6 Offeror or Lot#7 Offeror
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The shared services model was established to create a stable, productive, and reliable environment for the applications that the Department develops and its stakeholders. One objective is to effectively perform as a bridge between these agencies and be successful in implementing the releases on an established schedule. Further there is a great deal of efficiency in the use of resources that perform common technology activities for applications, in the common shared services model.

Under the shared services model technical resources fall under one of three categories:

- 1) Customer Direct Technical Support: The Offerors technical resource is integrated into the states technical teams (DEA or DTE), is physically located at the Willow Oak facility, and dedicated full time under the direction of the DPW-BIS manager assigned.
- 2) Shared Technical Consulting Support: The Offerors technical resource provides SME consulting services to DPW-BIS on a needs be basis but is also shared across the Offeror's technical teams advising and providing technical oversight. Resource is physically located at the Offeror's facilities and under the direction of the Offeror's management team.
- 3) Vendor Technical Support: The Offeror's technical resource is shared across the Offeror's technical teams based on project priorities.

Deloitte fully supports DPW's Information Technology Shared Services (ITSS) and Direct Technical Support Services (DTSS) shared services vision. We are proud of our role in the collaborative development and successful rollout of DPW's initial, award-winning shared services model. We propose to expand and enhance the approach to support the Lot 7 activities specified in the RFP, and assist DPW in evolving the model to the next level of maturity.

Our shared services approach builds on our past joint successes with DPW. The next evolution of the ITSS/DTSS model is critical not only for efficient resource pooling in a multi-lot operating model but also for the successful evolution of DPW's EA-SOA strategy and use of advanced technologies.

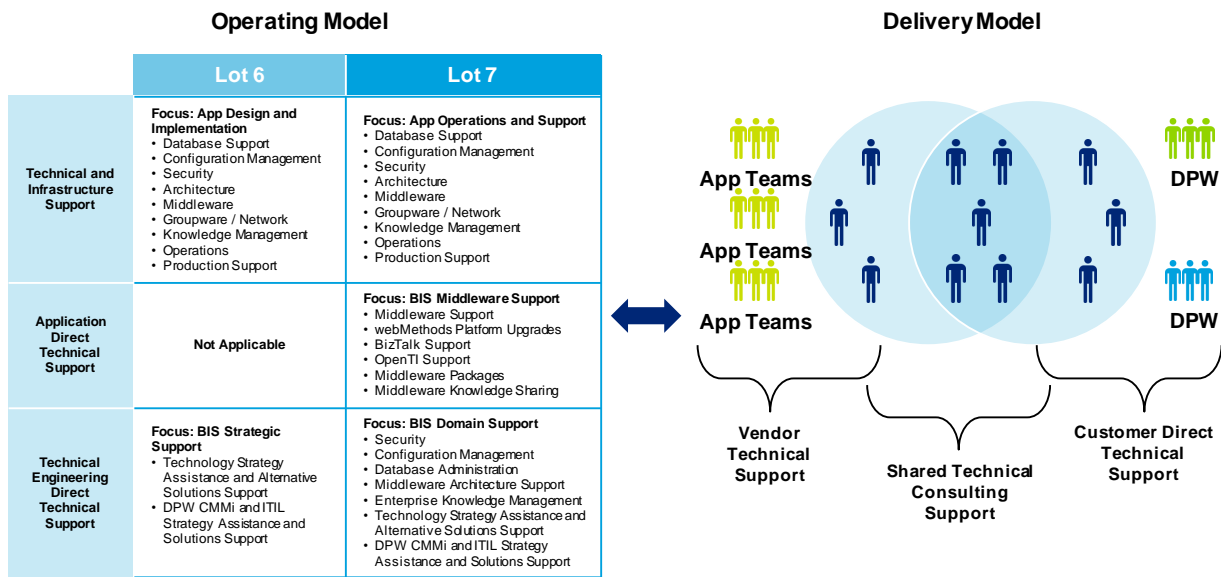
In support of Lot 7 activities, we expand the model and bring a committed and experienced ITDD/DTSS team. The expanded model includes Application and Technical Engineering shared services in addition to Technical and Infrastructure shared services for a unified and economical approach. The model includes on-demand access to additional core technology experts and strategists that have significant experience rolling out advanced technologies, phased adoption of EA-SOA methodology and supporting infrastructure as well as ITIL and CMMI framework maturity strategies.

The expanded IT shared services model is a critical ingredient to facilitate EA-SOA governance, enterprise architecture evolution, deployment of new technologies and COTS products, consistent application of standards, SOA-based SDM methods, management and reuse of common business services, and efficient overall management of DPW technical assets.

We structured the Activities Section of our response to align with the order of the requirements in the RFP. In addition, our shared services approach organizes and supports the Lot 7 activities in two interdependent models that include an Operating Model and Delivery Model as described below.

Our Approach to an Expanded Shared Services Model

Our approach builds upon and expands the existing shared service model in an efficient and economical manner. The approach integrates an Operating Model and a Delivery model to provide ITSS and DTSS services. The Operating Model defines the “what” (what services are being provided) and the Delivery Model defines the “how” (how the teams and staff are organized and deployed to provide these services). These models are illustrated in Figure 6.9-51 and described below.



PA_DPW-486

Figure 6.9-51. DPW ITSS and DTSS Integrated Operating and Delivery Models.

We build upon the existing interdependent models to deliver the required shared services in an efficient and economical manner.

The two models are distinct but interdependent in order to align with and support the RFP requirements, as follows:

- **Operating Model.** Our approach segments the operating mode into Lot 6 and Lot 7 activities as summarized above. Based on the RFP requirements, we organize the activities into the following groups:
 - Technical and Infrastructure Support Services,



- Direct Technical Support Services, which is divided into the Application Direct Technical Support and Technical Engineering Direct Technical Support Services.
- **Delivery Model.** We organize the services delivery and staff deployment model based on the shared service resource categories described in the RFP, as follows:
 - Customer Direct Technical Support (CDTS),
 - Shared Technical Consulting Support (STCS),
 - Vendor Technical Support (VTC).

We share the resources across the Vendor Technical and Customer Direct Technical Support categories with a small, key contingent of these resources playing a dual role to form the shared Technical Consulting Support team of resources. We commend DPW's vision in taking the shared services model to the next level of maturity and organizational collaboration through this staff deployment approach. To execute on DPW's strategy, we propose to deploy our key resources in the STCS staff deployment model to promote cross-team knowledge transfer, collaboration and staff development. Our proposed shared services staff deployment model helps DPW accelerate the adoption and institutionalization of new technologies, EA-SOA methods, ITIL and CMMI process frameworks, and realize additional shared services efficiencies.

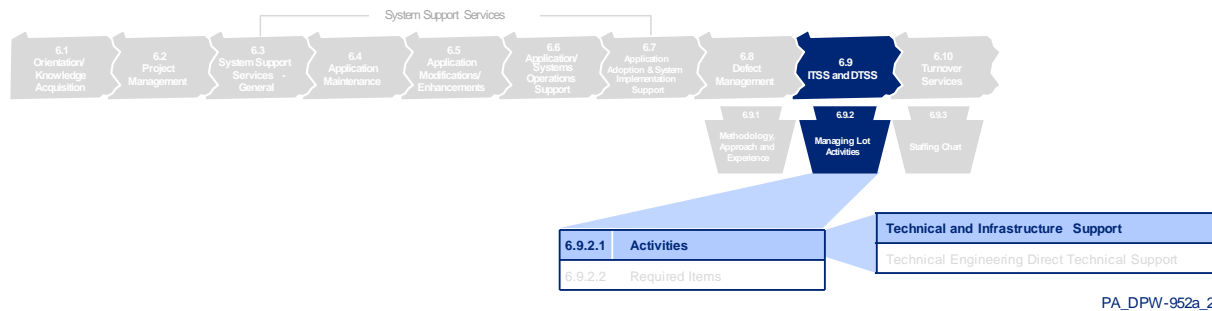
The proposed ITSS and DTSS delivery model is described in more detail in *Section 6.9.4, Staffing Chart and Roles*.

This section will continue with details around our proposed delivery of Technical and Infrastructure Support Services and then continue on to our Direct Technical Support Services delivery approach.





Technical and Infrastructure Support



PA_DPW-952a_2

IV	Page IV-386	RFP Reference: E. Information Technology (IT) Shared Services Model & Direct Technical Support Services for Lot#6 Offeror or Lot#7 Offeror
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Shared Services operates in two venues: 1) Technical and Infrastructure operational support and....

Lot 7 Technical and Infrastructure Support Services are the activities related to the support of application delivery, including management and execution of the application development life cycle, implementation, and support. The service efforts incorporate work and support processes across the DPW IT domains.

Approach

Deloitte has developed a comprehensive IT Shared Services Process Framework to organize and support technical and infrastructure support services. The framework serves as an accelerator and is based on our experience of delivering IT shared service activities and coordinating across DPW stakeholders and application development teams. This framework is a comprehensive set of processes, tasks and coordination activities tailored to meet the requirements of DPW stakeholders in each of the Department's technical and business domains. We staff and deploy experts from the shared services pool of resources based on the needs of each domain. Our approach has been carefully developed based upon the standards and timelines set forth by the DPW Software Development Methodology (SDM), the standards of each technical domain, and our knowledge of the processes that the Department uses to complete each software release. We provide a visual representation of Deloitte's framework in Figure 6.9-52.



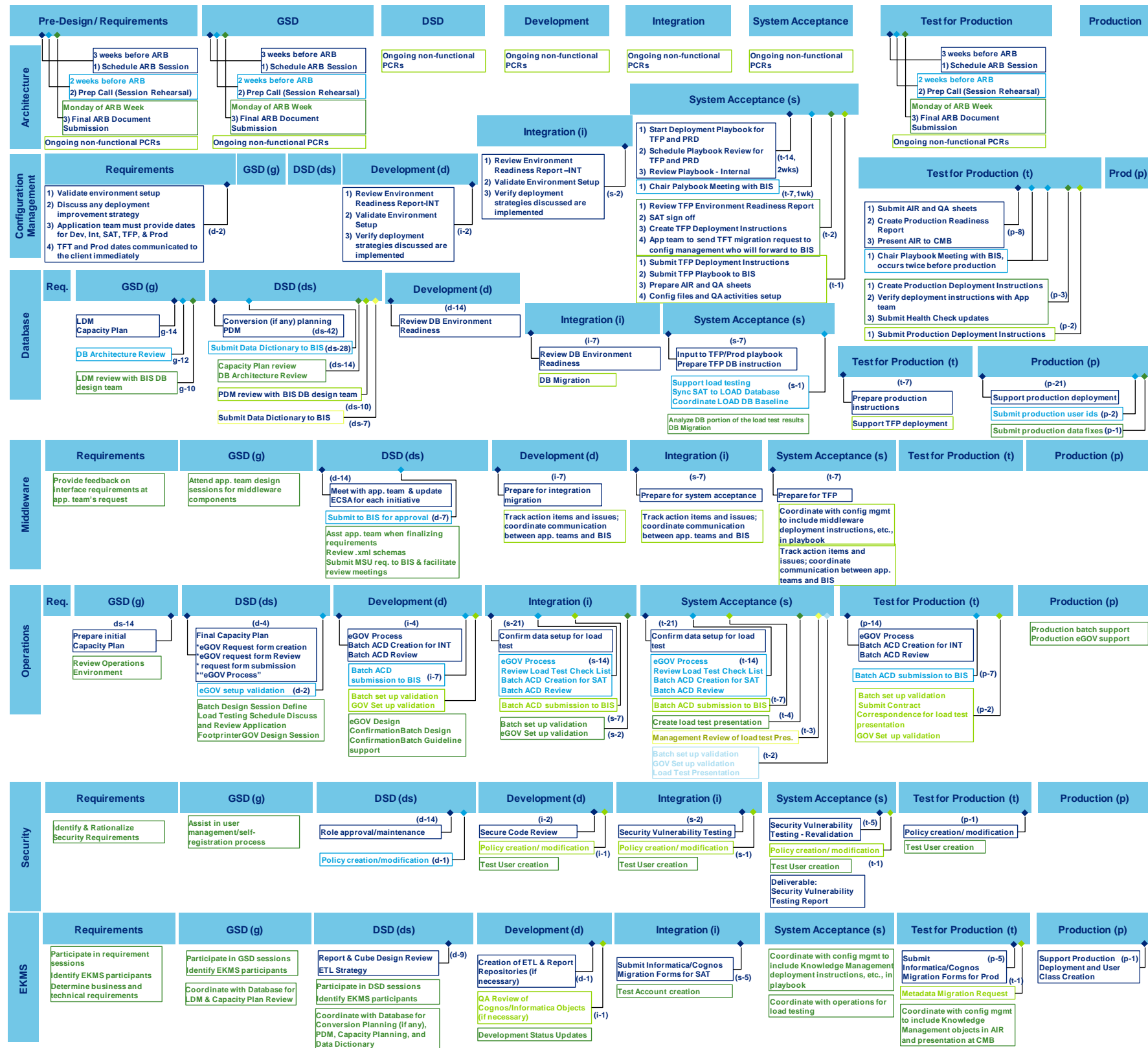


Figure 6.9-52. IT Shared Services Process Framework.

Deloitte delivers an IT Shared Services Process Framework that manages activities and processes across technical domains.

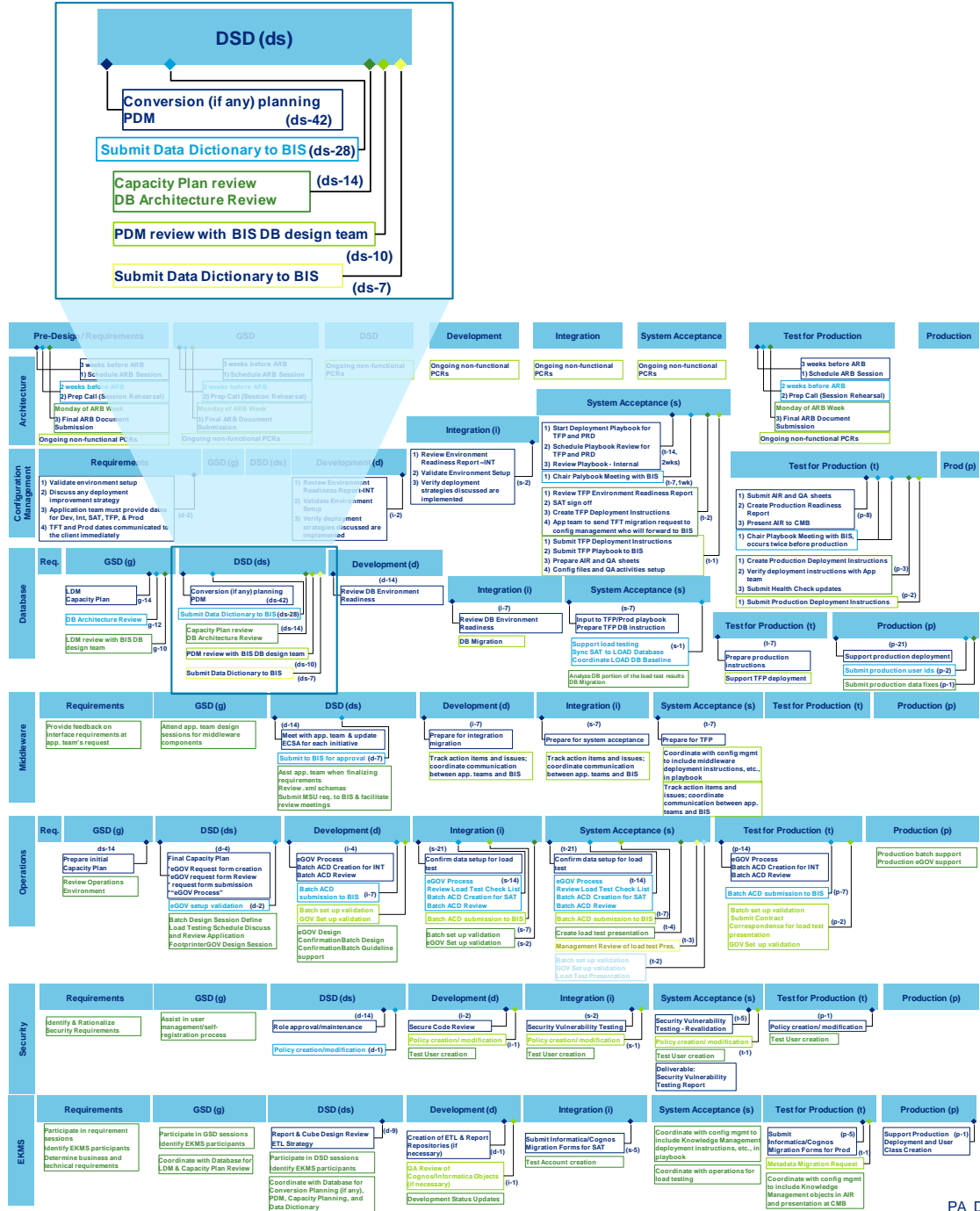
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The framework provides a detailed mapping of support activities each of the technical domains, including Architecture, Configuration Management, Database, Middleware, Operations, Security, and Enterprise Knowledge Management Services (EKMS). In addition, the framework maps the support activities to each phase of the software development life cycle. Each activity is a key step in a carefully choreographed process to promote a high quality release. The activities begin in the DSD design phase and complete with the successful implementation of the release into the production environment. Our framework also targets timelines for the completion of each task within the overall software development life cycle.

As an example, Figure 6.9-53 illustrates the detailed level that we define and manage release support activities – in this case the Detailed Systems Design (DSD).



PA_DPW-1139_2

Figure 6.9-53. The Framework Provides Detailed Definition of Support Activities During the SDLC. This framework provides detailed definition of services that support each release, for example, the DSD Phase.

In addition, the framework and supporting documentation identifies key activities which are performed during each release cycle by each of the domain team members. We organize the activities into common domain-centric groups that characterize the majority of tasks within that domain, including Planning, Quality Assurance, Release Management/Coordination, and Delivery.



Figure 6.9-54 lists the ITSS services that we perform within each technology domain.

Domain	Activity Group	Deloitte Activity Meets RFP Requirement
Database	Planning	<ul style="list-style-type: none"> • Schedule logical data mode, (LDM), physical data model (PDM), and data dictionary reviews. • Perform capacity planning and review with DPW. • Determine application business metrics to collect and monitor.
	Quality Assurance	<ul style="list-style-type: none"> • Perform detailed review of database objects and code. • Review performance testing results and perform tuning. • Confirm that naming and coding standards are followed.
	Release Management/Coordination	<ul style="list-style-type: none"> • Coordinate release changes with database team. • Participate in playbook and release planning. • Chair coordination meetings with database stakeholders.
	Delivery	<ul style="list-style-type: none"> • Perform LDM, PDM and data dictionary reviews. • Perform capacity planning and review with DPW. • Determine application business metrics to collect and monitor. • Review reports, cube, ad hoc package mockups. • Discuss extract, transform, and load (ETL) architecture and strategy.
Configuration Management	Planning	<ul style="list-style-type: none"> • Complete and submit Unit Test Checklists and Summary for adherence to development standards. • Participate in Cognos model/package review sessions. • Review performance testing results and perform tuning. • Confirm that naming and coding standards are followed.
	Quality Assurance	<ul style="list-style-type: none"> • Coordinate release changes with EKMS team. • Complete and submit Cognos and Informatica migration forms. • Participate in playbook and release planning.
	Release Management/Coordination	<ul style="list-style-type: none"> • Coordinate deployment activities and post deployment support.
	Delivery	<ul style="list-style-type: none"> • Perform LDM, PDM and data dictionary reviews. • Perform capacity planning and review with DPW. • Determine application business metrics to collect and monitor. • Review report, cube, ad hoc package mockups. • Discuss ETL architecture and strategy.



Domain	Activity Group	Deloitte Activity Meets RFP Requirement
Architecture	Planning	<ul style="list-style-type: none"> • Schedule ARB sessions.
	Quality Assurance/Improvement	<ul style="list-style-type: none"> • Review services, design documents and code. • Review new technology items with DPW.
	Release Management/Coordination	<ul style="list-style-type: none"> • Participate in playbook and release planning sessions. • Participate in weekly project team meetings. • Chair coordination meetings with architecture stakeholders.
	Delivery	<ul style="list-style-type: none"> • Produce updated standards and technical guidelines.
Middleware	Planning	<ul style="list-style-type: none"> • Complete and submit Unit Test Checklists and Summary for adherence to development standards. • Participate in Cognos model/package review sessions. • Review performance testing results and perform tuning. • Confirm that naming and coding standards are followed.
	Quality Assurance	<ul style="list-style-type: none"> • Coordinate release changes with EKMS team. • Complete and submit Cognos and Informatica migration forms. • Participate in playbook and release planning.
	Release Management/Coordination	<ul style="list-style-type: none"> • Coordinate deployment activities and post deployment support.
	Delivery	<ul style="list-style-type: none"> • Perform LDM, PDM and data dictionary reviews. • Perform capacity planning and review with DPW. • Determine application business metrics to collect and monitor. • Review report, cube, ad hoc package mockups. • Discuss ETL architecture and strategy.
Groupware/Network	Planning	<ul style="list-style-type: none"> • Perform planning for network capacity and desktop availability to support staffing requirements. • Communicate needs for hardware by submitting work orders for any desktop hardware or software required to complete initiatives.



Domain	Activity Group	Deloitte Activity Meets RFP Requirement
	Quality Assurance	<ul style="list-style-type: none"> • Work with BIS to review installed software on CWOPA workstations to monitor licensing and adherence to the ALM baseline. • Maintain current patches, antivirus definitions and Windows Updates on CWOPA workstations used by Deloitte.
	Release Management/Coordination	<ul style="list-style-type: none"> • Coordinate scheduled network maintenance activities and activities required to mitigate impact to the in-scope systems. • Work with BIS to manage changes to the firewalls to maintain needed access to complete development.
	Delivery	<ul style="list-style-type: none"> • Work with BIS to review Deloitte business partner network segment utilization and performance. • Perform application capacity planning for network utilization.
Knowledge Management	Planning	<ul style="list-style-type: none"> • Complete and submit Unit Test Checklists and Summary for adherence to development standards. • Participate in Cognos model/package review sessions. • Review performance testing results and perform tuning. • Confirm that naming and coding standards are followed.
	Quality Assurance	<ul style="list-style-type: none"> • Coordinate release changes with EKMS team. • Complete and Submit Cognos and Informatica migration forms. • Participate in playbook and release planning.
	Release Management/Coordination	<ul style="list-style-type: none"> • Coordinate deployment activities and post deployment support.
	Delivery	<ul style="list-style-type: none"> • Schedule LDM, PDM and data dictionary reviews. • Perform capacity planning and review with DPW. • Determine application business metrics to collect and monitor. • Review reports, cube, ad hoc package mockups. • Discuss ETL architecture and strategy.



Domain	Activity Group	Deloitte Activity Meets RFP Requirement
Operations	Planning	<ul style="list-style-type: none"> • Complete and submit Unit Test Checklists and Summary for adherence to development standards. • Participate in Cognos model/package review sessions. • Review performance testing results and perform tuning. • Confirm that naming and coding standards are followed.
	Quality Assurance	<ul style="list-style-type: none"> • Coordinate release changes with EKMS team. • Complete and Submit Cognos and Informatica migration forms. • Participate in playbook and release planning.
	Release Management/Coordination	<ul style="list-style-type: none"> • Coordinate deployment activities and post deployment support.
	Delivery	<ul style="list-style-type: none"> • Schedule LDM, PDM and data dictionary reviews. • Perform capacity planning and review with DPW. • Determine application business metrics to collect and monitor. • Review reports, cube, ad hoc package mockups. • Discuss ETL architecture and strategy.
Security	Planning	<ul style="list-style-type: none"> • Review applicable DPW security standards, regulatory requirements and security objectives • Determine changes to Security Design,(CA)², Security Vulnerability Testing and IAM. • Identify the log files for integration with DPW SIEM system. • Determine security Key Performance Indicators (KPIs) to collect and monitor • Identify key application stakeholders.
	Quality Assurance	<ul style="list-style-type: none"> • Perform detailed review of security requests submitted through ATS • Perform RBAC assessment, threat modeling, PII data flows, security vulnerability tests and secure code review • Review test results and mitigate vulnerabilities/threats identified. • Determine that the application meets the security requirements.
	Release Management/Coordination	<ul style="list-style-type: none"> • Review vulnerability remediation applied to identify if the vulnerabilities have been mitigated before production migration • Coordinate IAM changes with security team. • Participate in playbook and release planning.

Domain	Activity Group	Deloitte Activity Meets RFP Requirement
	Delivery	<ul style="list-style-type: none"> • Perform IAM changes based and coordinate deployment validation activities with DTE Security team. • Configure DPW SIEM system to collect and correlate the identified application audit logs • Perform security infrastructure capacity planning and review with DPW. • Monitor security KPIs using DPW SIEM system.

Figure 6.9-54. ITSS Process Framework Activities by DPW Domain.

We also developed a complete set of tools and methods to not only support the services requirements but also support our critical role of integrating the Department’s business users with the BIS technology teams. For example, we use a Work Plan tool that generates a comprehensive plan that is consistent with DPW’s SDM and coordinates milestones, artifact submission dates, and meetings for each initiative. The planning tool helps to enable standard repeatable processes across releases as well as timely completion of coordination activities with appropriate DPW stakeholders.

Figure 6.9-55 provides an example of a work plan that we generated for a software release.

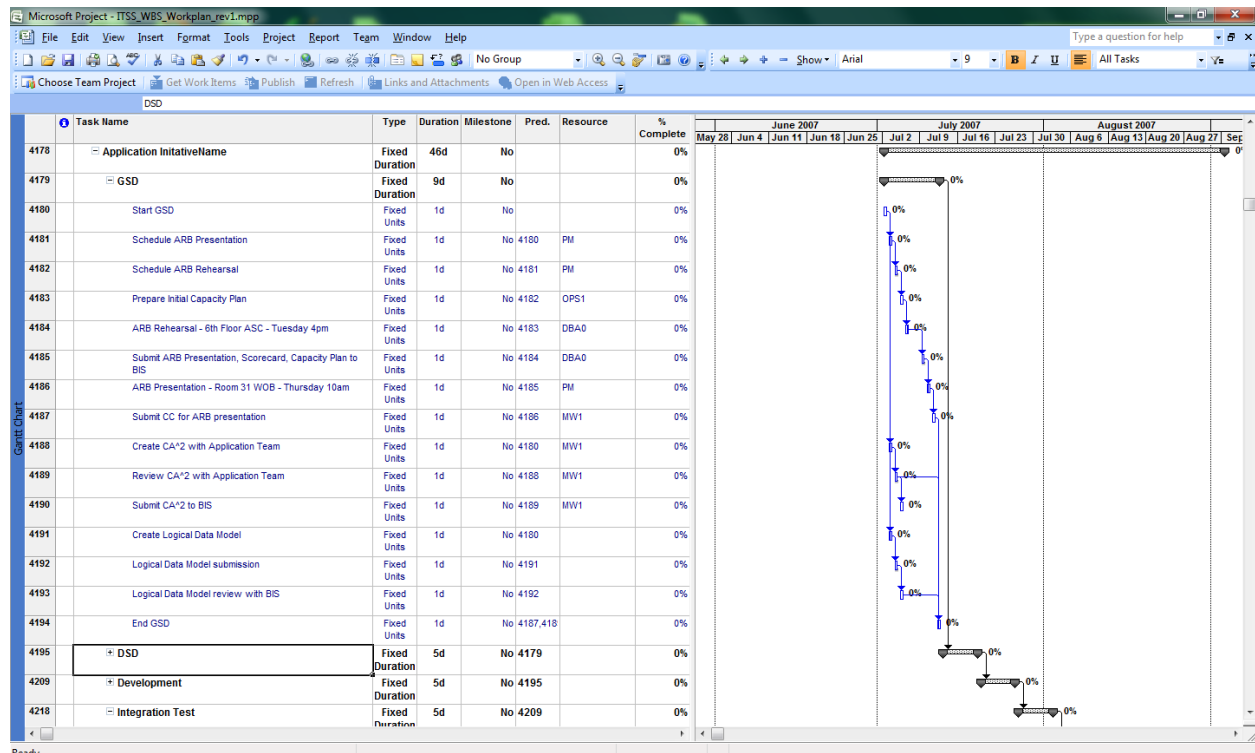


Figure 6.9-55. Example Standard Work Plan - We Provide Tools and Techniques to Support the Framework. Our Work Plan tool generates plans that are consistent with DPW’s SDM and enables standard repeatable processes in release management.

The following sections provide details around our proposed approach to delivering services in support of each domain.





Database Support

IV	Page IV-387	RFP Reference: E. Information Technology (IT) Shared Services Model & Direct Technical Support Services for Lot#6 Offeror and Lot#7 Offeror
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The Selected Offerors of Lots # 6 and Lot #7 will be performing the work associated with Systems Support Services initiatives and Direct IT Support Services using an IT Shared Services Model.

Figure 7 below, is a table that highlights specific application operational support services by domains. This includes service offerings in the following domains.

Database Support

- **Database Design** – physical and logical model creation
- **Data Dictionary Management** – adherence to naming standards; review with BIS Data team
- **Performance** – Query performance tuning/proactive monitoring
- **Data Management** – Managing test data through the various environments to support project initiatives
- **Capacity Planning** – Support quarterly capacity planning
- **Upgrade Support** – Support BIS in planning and execution of database upgrades
- **Quality Assurance** – Serve as the single point of contact from the project teams to BIS database team. Review each request for completeness, accuracy and adherence to the strategic vision of DPW before submission to the DPW team for review and approval
- **Communication/Coordination** – communicate upcoming requests from the application teams to the BIS database team. Provide a summary of the requirements and high level scope to assist in resource planning

We provide a comprehensive set of Lot 7 database support services that is based on 10 years of experience with the DPW applications and IT standards. Our database administrators support DPW’s diverse mix of database platforms and technologies, providing support to applications teams during the SDM life cycle, database upgrades, capacity utilization planning and monitoring, and performance management. In addition, our team serves in a critical coordination role. They analyze requests from multiple application teams, validate compliance to standards as well as integrate database-centric activities across initiatives for efficient schedule and resource management. Figure 6.9-56 summarizes our understanding of the breakout of Lot 6 and Lot 7 database support activities.

Lot 6	Lot 7
<ul style="list-style-type: none"> • Database design - through logical data model creation 	<ul style="list-style-type: none"> • Database design - through physical data model creation
<ul style="list-style-type: none"> • Database quality assurance - serve as the single point of contact from the project teams to BIS database team 	<ul style="list-style-type: none"> • Database quality assurance - serve as the single point of contact from the project teams to BIS database team
<ul style="list-style-type: none"> • Database communications/coordination - communicate upcoming requests from the application teams to the BIS database team 	<ul style="list-style-type: none"> • Database communications/coordination - communicate upcoming requests from the application teams to the BIS database team
N/A	<ul style="list-style-type: none"> • Perform query performance tuning and proactive database monitoring • Manage test data through the various environments to support project initiatives • Support BIS in planning and execution of database upgrades • Validate data dictionary and review with BIS data team • Support quarterly capacity planning

Figure 6.9-56. Breakout of Lot 6 and Lot 7 Database Support Activities.



In Figure 6.9-57, we highlight the types of application-specific database support provided by our team.

Application	Deloitte’s Understanding of Application –Specific Characteristics for Database Support
iCIS	<ul style="list-style-type: none"> • CIS, TPL and IEVS database support activities require detail knowledge of process and data integration with iCIS. • Innovative use of solutions such as Oracle Advanced Queue and Oracle User-defined types support complex data integration with the mainframe. • COMPASS database activities require implementation of efficient data integration techniques such as use of XML to improve flexibility and implement changes more rapidly.
PACSES	<ul style="list-style-type: none"> • Mainframe PACSES support entails detailed knowledge of the system’s database design and collaboration with DPW in developing native SQL data access without the use of COBOL programs. • Web PACSES database design for daily bulk ETL of mainframe extracts into Open Systems provides DPW with improved data delivery, business intelligence, and reporting.
HCSIS	<ul style="list-style-type: none"> • Database design uses Oracle’s Fine Grained Access capability and enables DPW to implement complex data access requirements with restrictions implemented at a user level.
PELICAN	<ul style="list-style-type: none"> • Database support entails detailed knowledge of users local SQL Server express database instances and integration with the server based Oracle enterprise database.
Child Welfare	<ul style="list-style-type: none"> • Database support activities will focus on modernizing and reengineering Child Welfare systems from MS SQL Server, MS ACCESS databases to maximize their use of the Oracle database platform and align with DPW standards. • Backup/restore opportunities and improvements for MS Access-based systems. • Potential data quality and interface issues with inefficiencies in collecting data from 67 counties.
Enterprise Services	<ul style="list-style-type: none"> • Database support requires knowledge and experience with mitigation of two-phase commit’ scenarios, and transaction type selections (Oracle RAC vs. Singleton for distributed transactions).

Figure 6.9-57. Key Application-Specific Characteristics of Our ITSS Database Support.

The DPW IT infrastructure includes a heterogeneous set of Oracle, Microsoft SQL Server, and Unisys DMS/RDMS database platforms. As part of each initiative, Deloitte works with DPW to manage the various aspects of database support and coordinate activities that are unique to each platform type, including:

- **Database Design.** Develop physical data models that are consistent with DPW database standards, and work with BIS to review, validate and gain approval for the design.
- **Data Dictionary Management.** Create database objects using DPW database naming conventions and work with DPW to review and validate them.
- **Performance.** Work with DPW to monitor performance, identify improvement opportunities, and implement architecturally sound solutions.
- **Data Management.** Work with DPW to perform redacted data refreshes in lower environments to support testing efforts while protecting personally identifiable information in accordance with DPW information security policies and guidelines.
- **Capacity Planning.** Work with DPW to provide support quarterly operational capacity planning efforts as well as capacity planning for specific initiatives.
- **Upgrade Support.** Work with DPW to manage upgrades to database systems and monitoring tools.
- **Quality Assurance.** Drive continuous improvement by effectively managing requests between application development staff and DPW, and validating compliance to standards.
- **Communication and Coordination.** Manage the communication plan to keep stakeholders informed and engaged in decision-making, and provide appropriate communication throughout the SDM.

The following sections outline our approach to database support.

Database Design

The team provides database design and Physical Data Model (PDM) support primarily during the Detailed System Design (DSD) and Development phases of the

Benefits to DPW

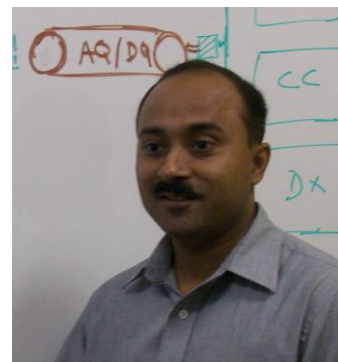
Deloitte brings:

- Knowledgeable Database Team with DPW system-specific experience developed over 10 years.
- Demonstrated methods and techniques for modernizing, reengineering, and extending useful life of DPW's mainframe applications and older technologies for improved responsiveness to business change, alignment with DPW standards, and enhanced return on DPW IT assets.
- Best practice database design approaches and models from similar HHS systems in other states for enhanced design efficiency and quality.

Key Staff Spotlight

Mac Doraiswamy

Chief Database Architect



"I look forward to continuing our support for DPW's wide range of applications, databases and technologies as well as the challenges and opportunities that such a complex environment provides".



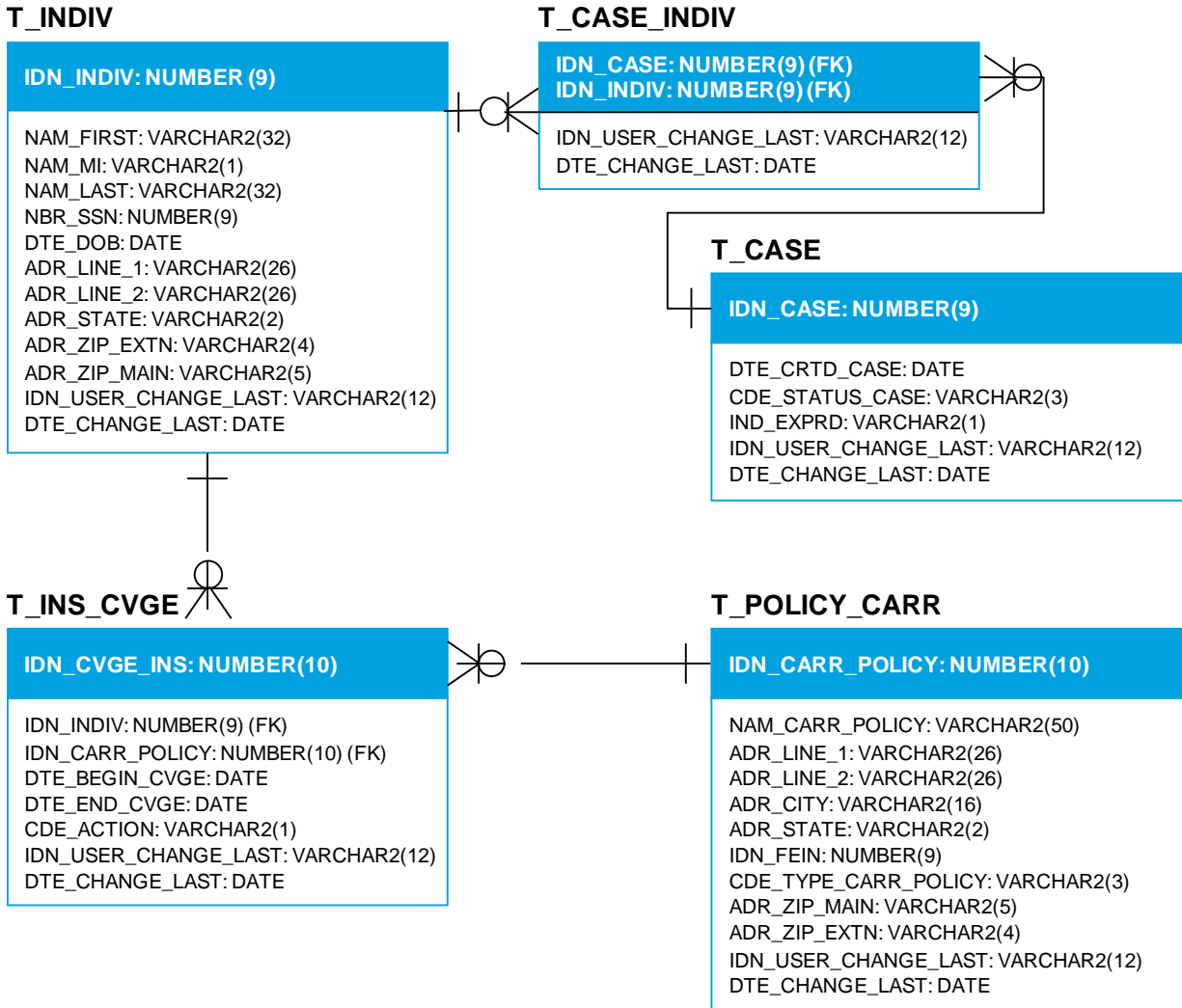
SDM. The physical data model represents database details from an implementation standpoint.

The data models integrate design requirements from a range of sources, such as changes in business processes, business rules and workflow, user interface needs, transactions, and Information Life cycle Management (ILM) considerations. The team develops database designs that adhere to DPW standards, such as naming conventions, data keys, indexes, constraints and permissions. Our team works collaboratively with DPW resources throughout the design and data modeling phase. We develop and review our design approaches with DPW, and also leverage data models and design approaches from similar systems in other states. The team present database designs in formal design reviews and obtains DPW approvals prior to implementation.

Physical Data Model Creation

Our team performs physical database design and modeling as part of the DSD process. We review and validate the Logical Data Model (LDM) developed by the Lot 6 vendor, and use the LDM as a reference to create the PDM. The team creates the PDM to provide the implementation level database specifications to the application teams.

Unlike logical designs that are generic across database platforms, physical designs vary depending on the database architecture. The Lot 7 database team has detailed knowledge and experience with DPW's various database platforms, including Oracle and SQL Server for open system applications and the Unisys DMS/RDMS architecture for the CIS and PACSES mainframes. For DPW's older mainframe applications, the team uses its detailed knowledge of the application and its underlying use of the database platform. For newer open platforms, the team uses open systems database design approaches that follow industry best practices, as depicted in Figure 6.9-58.



PA_DPW-2004_2

Figure 6.9-58. Sample Relational Database PDM for Open Systems.
Deloitte’s approach for open systems database design follows industry best practices.

In contrast, the team uses its experience and specific techniques in DMS network database design to optimize flexibility, scalability and extensibility within the constraints of the older mainframe technology environment, as illustrated in Figure 6.9-59.

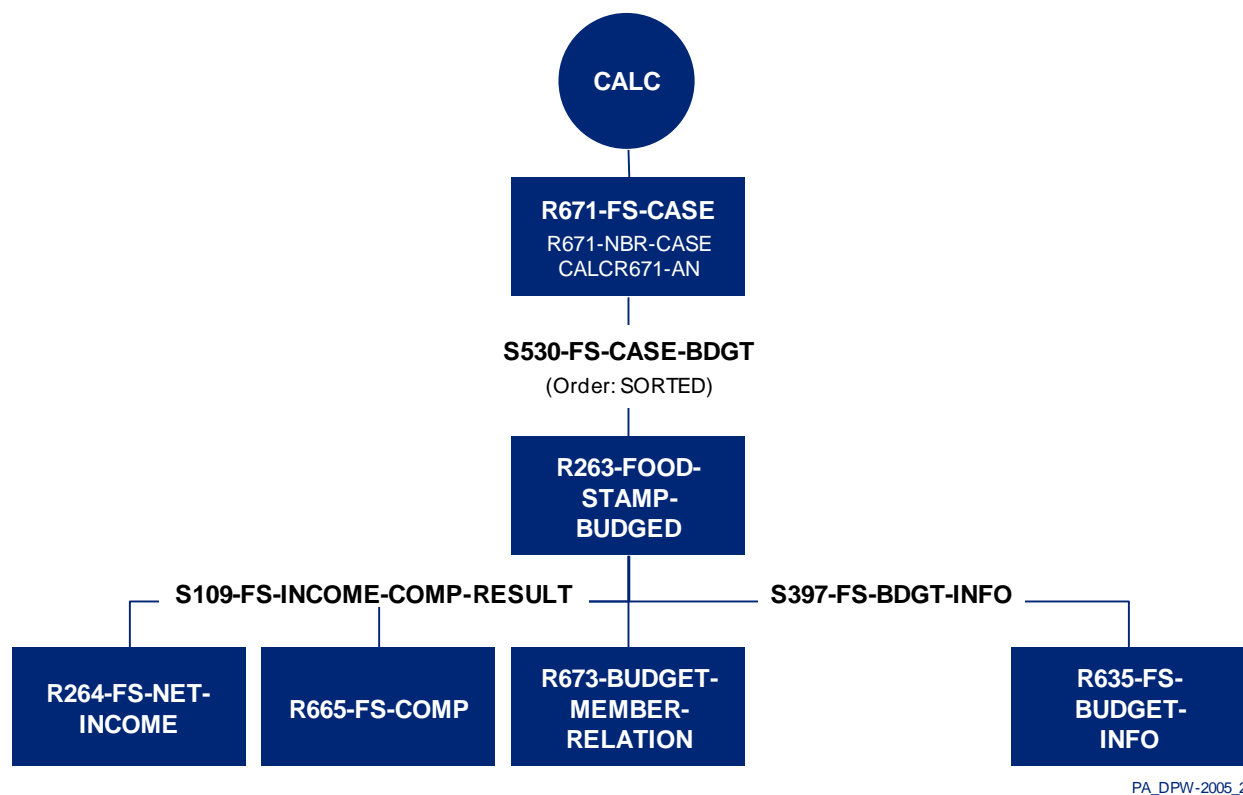


Figure 6.9-59. Sample Network DMS Database PDM.

Our team leverages specific knowledge and experience with the older mainframe environments when developing DMS network database designs.

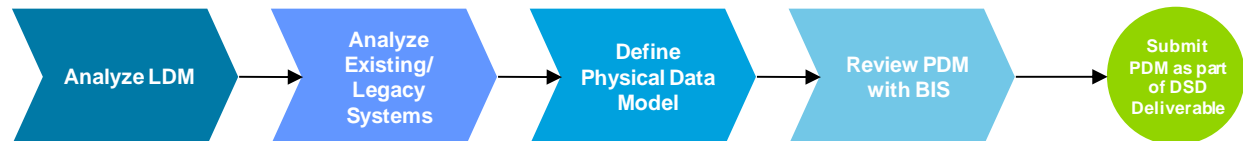
The team's high-level objectives and activities for creating and maintaining a PDM are the same across DPW's mix of database platforms, and include:

- **Standards Compliance for Normalization.** We translate logical entities into physical objects and normalize.
- **Security Standards and Best Practices.** We review sensitive columns that house personally identifiable information and identify them as candidates for encryption or masking.
- **Performance.** We use physical database design techniques that support high performance processing with constructs such as indexes, partitions, and de-normalized structures.
- **Scalable Design.** We configure appropriate sets of database platform capabilities to support scalability, such as database clustering, transaction support configurations, failover management.
- **Maintainability.** We employ the data dictionary as part of the physical design, and use techniques to improve maintainability that involve the tables and columns, business rules, physical characteristics (e.g. data type, length), data validation values.
- **Support of DPW SOA Vision.** We use design patterns that align with DPW's strategic SOA vision and promote the reuse of enterprise services, thus eliminating the need for redundant database objects and processes and improving maintainability.

- **Auditability.** We include audit capabilities in the design to assist in application analysis, audit reporting and productivity management.

PDM Creation Process for Open Systems

We work closely with the application teams, DPW and BIS staff to create a physical data model that supports initiative requirements. Figure 6.9-60 depicts the process we use to support the creation of a PDM for Open Systems relational databases as part of DSD.



PA_DPW-2001_2

Figure 6.9-60. Open Systems Database PDM Process Executed as Part of the DSD Phase.

Deloitte's approach for creating an Open Systems PDM incorporates industry best practices for large enterprise databases.

Analyze LDM. We use the LDM created by the Lot 6 vendor as the basis for defining the PDM during the DSD phase. The team assesses the PDM data analysis efforts based on the following:

- **New System Initiative.** Data analysis focuses on translating all logical entities and attributes to tables and columns using DPW naming conventions.
- **System Replacement Initiative.** Data analysis requires additional inputs from legacy system data analysis with implementation level details.
- **Existing System Enhancement Initiative.** Data analysis involves performing impact analysis on existing data tables, columns and database programs.

Analyze Existing/Legacy Systems. Except in the case of new system initiatives, the team conducts critical analysis of existing/legacy system data to model data dependencies and behavior. Key areas of analysis include existing/legacy database tables and columns, data validation programs, etc.

Define Physical Data Model. We create the PDM using the Erwin Data Modeler, and include the results of our technical data analysis and information gathered at JAD sessions with DPW. As part of DSD and the JAD sessions, our team gathers non-functional implementation considerations. Typical non-functional considerations for physical database design include normalization and partitioning strategies, data retention and growth, data volume and index design as well as data consistency approaches.

Review PDM with BIS. The team works with DPW throughout the DSD phase to collaboratively build the PDM model. We jointly decide on the optimal set of design decisions based on technical constraints and implementation considerations. Our team conducts formal reviews to finalize the PDM. In subsequent development phases after DSD, we may identify minor changes to the PDM such as changes to improve

performance or update a naming standard. We review changes with BIS and incorporate them into the PDM prior to final implementation of the release into production.

Submit PDM as part of DSD. After incorporating all feedback from the formal PDM review, we submit the PDM as part of the DSD deliverable. Additionally, the team implements the database structures in the development environment as part of development readiness. Upon formal approval of the DSD, our DBAs implement the database up through the System Acceptance & Test (SAT) environment. BIS DBAs implement the database in the TFP and Production environments using scripts prepared by Deloitte.

PDM Creation Process for Legacy Infrastructure

The CIS, TPL and IEVS Database Change Control PDM process is very similar to that of the Open Systems process with some key exceptions. The team executes CIS, TPL and IEVS DMS/RDMS network database changes using a modified process to accommodate the maintenance-specific processes as indicated in Figure 6.9-61.



PA_DPW-2002_2

Figure 6.9-61. CIS, TPL and IEVS Database Change Control PDM Process Executed as Part of DSD.

Deloitte's approach for CIS, TPL and IEVS database change control incorporates best practices for Unisys DMS and RDMS database platforms to support efficient data retrieval and optimize legacy infrastructure.

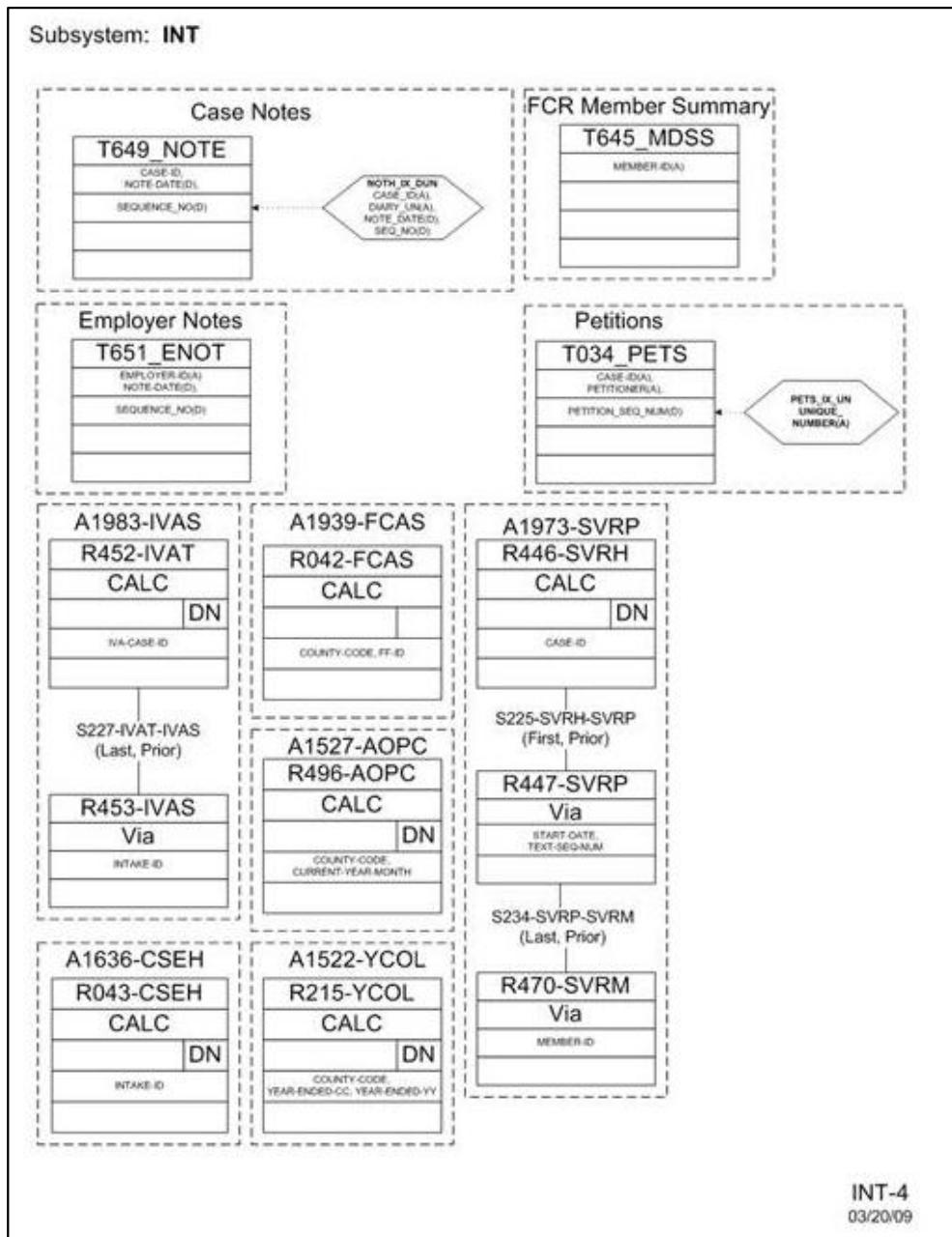
The key exceptions involve differences in terminology and documentation, including:

- Unisys DMS has record sets instead of tables and columns.
- Unisys RDMS uses tables and columns, however, the relationship definitions and PDM reflect similar details as used for DMS.
- Relationships are modeled using pointers and identifiers.
- The Change Control Request document is equivalent to a data dictionary on the Open Systems side with record definitions and pointer information instead of tables and columns.

Using the record definition inputs from the Change Control request, the BIS mainframe DBAs create the PDM for DMS and RDMS for CIS, TPL and IEVS. This model is integrated with the existing master PDM and published on the BIS internal site. Additionally, the BIS DBAs implement the database structures in the development environment as part of development readiness. Upon formal approval from BIS, BIS DBAs implement the database changes in all environments up through production.

PACSES Physical Data Model

The Deloitte PACSES Mainframe database staff develops the PACSES PDM using a process that is similar to the PDM process for open systems. We maintain the PACSES PDM as a Bachman Chart, which is created, managed and housed using Microsoft Visio. The Deloitte DBAs that support the PACSES legacy system maintain the accompanying design documentation. All structural changes are documented and reflected in the Bachman Chart shown in Figure 6.9-62.



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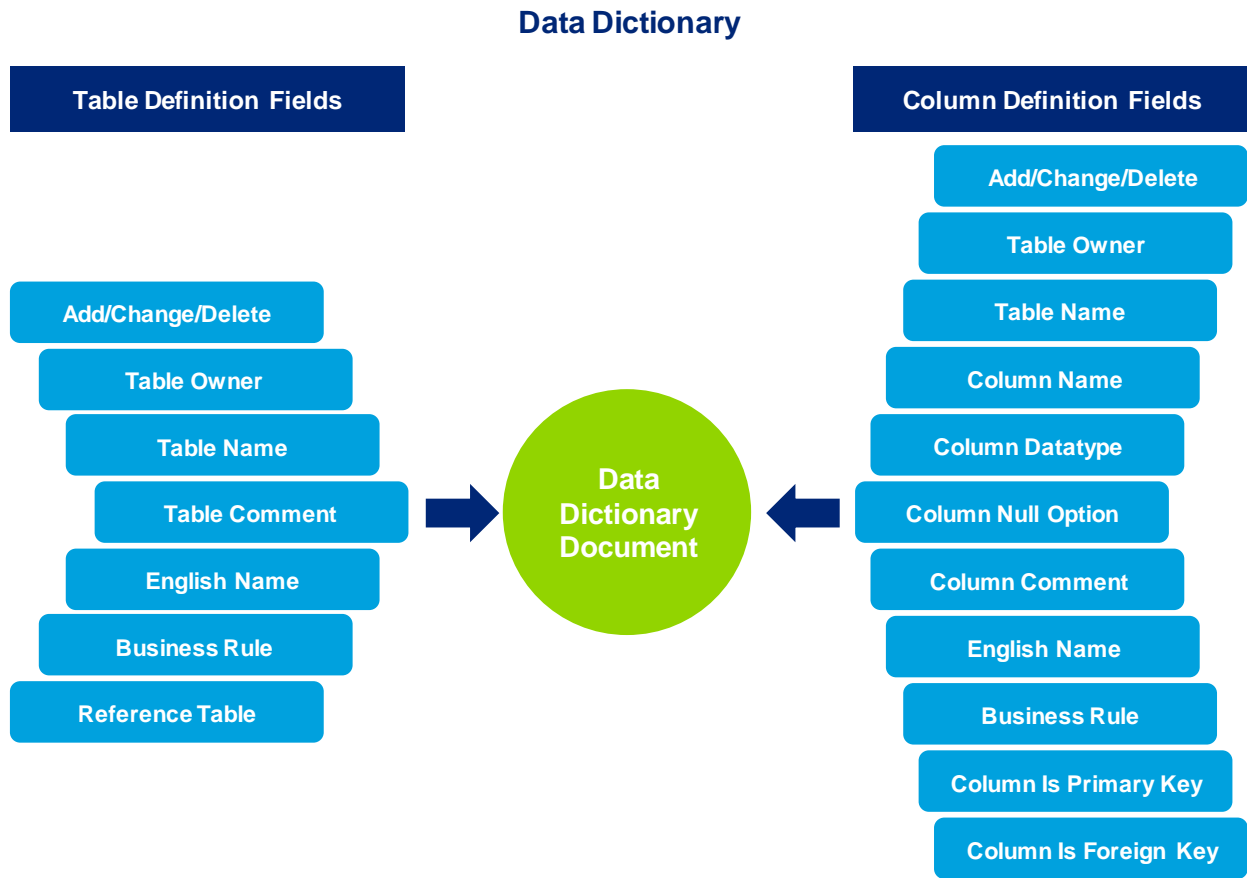
Figure 6.9-62. Sample PACSES Physical Data Model Diagram.

Deloitte PACSES DBAs use Bachman diagrams to document network database structures for the PACSES mainframe.

The PACSES Bachman Chart depicts both DMS and RDMS structures. The DMS structures depicted in the diagram include area, record and set representations, along with key data items and set orders. The cardinality of each set is also depicted. We document the RDMS structures with their table names, primary key definitions, and when present, their secondary key definitions. All key definitions include the key order for both DMS and RDMS structures.

Data Dictionary Management

Our team develops and manages the data dictionary as part of modification and new initiatives. We use DPW’s enterprise standard modeling tools to define data dictionary elements. Our experienced staff adheres to naming standards and creates information about data pertaining to relevance, relationships to other data, source, usage, and format, as depicted in Figure 6.9-63.



PA_DPW-2006_2

Figure 6.9-63. Deloitte Staff Support Development and Maintenance of Data Dictionaries.
The Deloitte team use DPW’s enterprise standard modeling tools to define data dictionary elements.

We review data dictionaries with the BIS Data Team.

Our process and activities for creating data dictionaries for Open Systems and mainframe DMS databases are largely the same. In addition, the fields we document are similar except the mainframe DMS database has the following differences:

- Table Names are replaced by 'Record Names.'
- Primary keys are replaced by record identifiers.
- 'Column names' are replaced by 'Record Fields.'
- Relationships are implemented using record pointers hence, instead of foreign keys, the pointer definitions have to be included.

Our support teams also use the data dictionary process as a key step in capturing metadata as part of Business Intelligence and Knowledge Management initiatives.

Data Dictionary Process

Figure 6.9-64 depicts our process for creating the data dictionary as part of DSD:



PA_DPW-2007_2

Figure 6.9-64. We Execute Our Data Dictionary Process and Activities as part of the DSD Phase.

Deloitte's approach to data dictionary creation follows a strict adherence to naming standards coupled with tight BIS collaboration for improving the Enterprise Data Definitions.

Create an Entity and Attribute List from the LDM. A list of English names for entities and attributes are derived as part of the LDM process by the Lot 6 vendor and stored in the ErWin repository. Our team reviews the list in the context of the proposed normalized tables along with physical relationships. We add additional columns and tables solely to support physical implementation.

Derive Physical Names. Our team derives the physical names, data types, column size and other fields required for the data dictionary and the columns and tables. Our team uses the BIS Enterprise Data Dictionary (EDD) tool to support adherence to naming standards.

We continue to work with BIS to identify strategies for merging data dictionary repositories and the data warehouse metadata repository as part of DPW's vision for an overall Enterprise Information Management.

Create Data Dictionary. Our team creates data dictionaries. For Open Systems, we capture and manage the information using the Erwin Model for Open Systems database. For the CIS, TPL and IEVS mainframe database, we submit changes to the data dictionary fields which are reconciled and managed by DPW.



After a PDM is fully created, we generate the data dictionary for Open Systems from the Erwin tool for review by technical and application teams. We incorporate any ongoing DSD changes prior to formal BIS review.

Review Data Dictionary with BIS. Our support team conducts a formal review meeting of the data dictionary with the BIS Data Team.

Submit Data Dictionary as part of DSD. Upon incorporation of feedback from the review meeting with BIS, the Deloitte team submits the data dictionary as part of the DSD deliverable.

The PACSES Mainframe Data Dictionary Process

The PACSES Team has developed a data dictionary using MS Access. This data dictionary is supported and maintained by the DBA. It is the repository for tables, records, files and data elements utilized by the PACSES application. The data dictionary generates logical file and table layouts used by the application, the physical record layouts used in the DMS schema and definitions for creating RDMS tables. It also generates a file of specialized database references that are used by the Louis II product to name elementary data items which comprise DMS concatenated keys. The Data Dictionary provides sample “record” layouts from the PACSES mainframe database showing the individual data elements and key values associated with that record. This provides an excellent reference tool for both the DBA and the application developers.

The PACSES Data Dictionary. The data dictionary is accessible by the application team, but they are limited to read-only mode, and writing can only be performed by members of the technical team. Application developers are allowed to generate record layouts. The generated products are also stored on the PACSES LAN. They are uploaded to the PACSES Mainframe using a custom developed migration tool called the Programmer’s Workbench.

The Database Add/Change/Delete Process. Requests for new database objects, or changes and deletions to database objects are submitted to the DBA on a Record Layout Change Form (RLCF). The DBA is the central point of contact for database changes because database-related entities have special attributes in the data dictionary that control the generation of the database objects.

Following DPW Naming Standards. The DPW standards and policies have been put in place to confirm singularity, consistency, and flexibility within DPW-supported systems. The same standards are also being adhered to by the PACSES DBA. The data dictionary is being used to verify that pre-existing data elements are being used to keep consistency within the PACSES application. New data elements are being named using DPW standards to keep the system consistent into the future.

Database Performance

Our team uses a proactive approach to database performance by incorporating performance considerations at the beginning of the design process and conducting on-going monitoring and tuning of query performance during the SDM and after release into the production environment.

We incorporate database performance considerations during the General System Design (GSD) phase of an initiative. We continue to refine design elements and considerations that can impact performance throughout the rest of the SDM. To identify poor performing queries during development, developers follow a set of code review procedures with respect to performance. After each development iteration, we use an “explain plan” for each modified query that checks for potential performance bottlenecks. Our DBAs work with the developers to assist them in tuning the code.

After release of the system into production, we proactively monitor database and query performance using a variety of tools and metrics-based techniques. The team analyzes and prioritizes opportunities for performance tuning, and coordinates tuning activities with BIS.

Our approach to database query performance management on the open systems consists of the following:

- Continued database performance query optimization
- Proactive production database monitoring and tuning

Database Performance Query Optimization

The Deloitte team documents and maintains performance improvement related queries and shares them with DPW. We also work with DPW to prioritize queries and mitigate ongoing performance issues.

On the mainframe, our approach consists of the following:

- Monitoring mainframe performance and throughput.
- Monitoring Open TI and Tipper transactions to make sure they do not queue up and cause performance issues.

As part of our ongoing process improvements, we will continue to work with DPW to setup a process that can capture all the bad performing queries and store them in a repository. These queries will be periodically analyzed and reviewed with DPW as part of prioritization meetings.

During load testing, we actively focus on identifying bottlenecks in the application as well as any performance tuning opportunities. As part of a successful load test, the following activities are performed by the Deloitte team around reporting and resolving problematic procedures or queries:



- Query and procedures are executed against a production volume database environment like LOAD Test or TFP (Test for Production).
- Execution Plans and resource consumption information is collected.

As part of executing the load test and results monitoring, we use the following Oracle utilities to gather query statistics:

- SQL Trace with TKPROF (Transient Kernel Profiler)
- OEM (Oracle Enterprise Manager)
- AWR (Automatic Workload Repository)
- ADDM (Automatic Database Diagnostic Monitor).
- UDSMON for the mainframe (CIS, TPL, IEVS and PACSES)

The team reviews the TKPROF Report for pre and post tuned versions of the database code and prepares a report that is shared with the BIS database group. The focus is to compare between the “Before” and “After” pictures of the database code for the fix that is being proposed.

Deloitte’s approach to reporting performance activities is a positive enabler of improving ongoing user and business operations support. Figure 6.9-65 represents a sample format for a performance tuning report.

DB	Application	Sub-System	SQL ID	BEFORE Tuning			AFTER Tuning		
				Buffer Gets	Disk Reads	Elapsed Time/Sec per Exec	Buffer Gets	Disk Reads	Elapsed Time/Sec per Exec
xxx	xxx	xxx	xxx	1,889	1,866	1.62	4	4	0.04

Figure 6.9-65. Sample Format for a Performance Tuning Report.

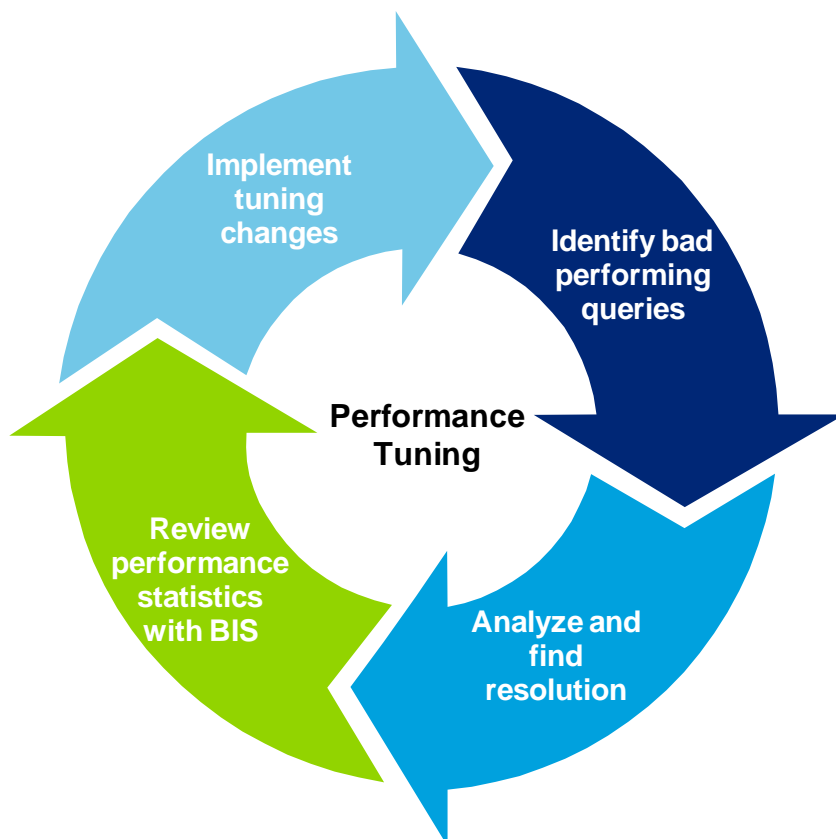
The purpose of this report is to show the before and after view of the database code to help demonstrate the performance improvements.

We address performance related issues based on criticality/severity levels and use the following guidelines:

- If the performance tuning requires new indices, then they are deployed either early morning of weekdays or bundled with upcoming releases.
- If the performance fix requires a code change, then it gets bundled with an upcoming release.

Proactive Production Database Monitoring and Tuning

Figure 6.9-66 highlights our iterative approach for non-production as well as production performance monitoring and tuning.



PA_DPW-2009_2

Figure 6.9-66. Performance Tuning Process.

Deloitte's process for performance tuning involves proactive monitoring coupled with an iterative approach to achieve continuous improvement.

Identify Query Performance that Requires Tuning. Our DBAs monitor the production database to identify any queries that require tuning. After a new release deployment, the Deloitte team works closely with the BIS database team to monitor the production database for any abnormal behavior. If any of the queries identified during business hours or off hours (batch window) demonstrate abnormal behavior, BIS is notified. The Deloitte DBAs work with the developers to find a resolution for the issue.

Analyze and Find Resolution. The Deloitte team generates the following reports as part of identifying the resolution:

- AWR (Advanced Workload Repository) for Top Wait Events, SQL Statistics
- ADDM (Automated Database Diagnostic Monitor) reports for Memory statistics, IO Statistics, Buffer Pool and Advisory Statistics and Instance Activity Statistics

The Deloitte team analyzes these reports and identifies high resource consuming queries. Further analysis is performed on the logs to identify any dead lock issues.

Since the CIS, TPL, and IEVS mainframe performance monitoring cannot be done in real time, they rely on similar types of metrics coming from the mainframe based UDSMON tool.



Review Performance Statistics with BIS. We notify BIS if we observe any performance degradation of queries in production. The Deloitte team takes the next step to discover the root cause and develop a resolution. The Deloitte team has proactively developed a set of utility scripts to capture the “Top 10” queries by time and by resource consumption, and prioritized the fix of those queries to improve their performance.

The Deloitte team maintains a list of production performance- related queries. During weekly database administration meetings, these “Top 10” queries are prioritized for review and/or corrective action. The Deloitte team can also receive requests from the BIS DBAs on a specific query’s resource contention within the production database instances. The team performs an initial analysis of those queries and identifies opportunities for improving their performance. The problematic queries are documented as PCRs and are prioritized based on their criticality.

Implement Tuning Changes. The performance tuning fix that gets prioritized as part of the change control board is coded and tested in the development through load testing environments. In each successive environment, we test the fix with an increased data volume. We gather and review metrics with DPW for approval prior to implementation in TFP and production.

Mainframe Database Performance Monitoring and Tuning

Deloitte DBAs monitor the production mainframe database using tools including the Online System Activity Monitor (OSAM), Sightline, and Universal Data Systems Monitor (UDSMON). The primary use of OSAM is to monitor the average I/O rate of the Production online transactions which have the highest frequency of use.

Sightline is used to monitor I/O rates to the disk drives which support the Production database and audit trails. UDSMON is used to measure overall transaction hit rates and to identify and resolve transaction locking issues.

Batch system performance is also monitored using some of the same tools used to check the online system. UDSMON provides a view of all run units accessing the database simultaneously and reveals queuing in real time. Sightline gathers performance data in a MS Access database to use for daily, weekly and monthly reporting purposes. An additional product, SUDS, is used to create a daily report of all batch run units accessing the database, and reveals queuing issues that need to be addressed.

Deloitte also uses OSAM to monitor the database I/O usage of the Production online transactions. Through experience, Deloitte analysts have determined the average I/O rates of the highest used transactions and can quickly recognize when those transactions are running abnormally. The transactions are generally monitored after a Production application migration, database reorganization, or when system performance has noticeably degraded.



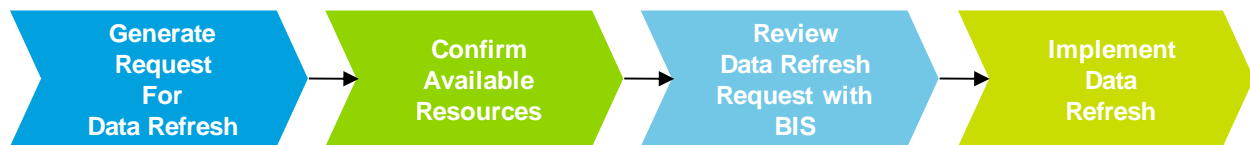
Database Data Management

Our team manages test data through the various environments to support project initiatives. We facilitate production refreshes to authorized lower environments, as described in Figure 6.9-67. These activities are planned and communicated with BIS and the application team. The environments refreshed are Integration, SAT, Load and TFP. The Deloitte DBAs perform redaction on the data to mask all Personally Identifiable Information (PII). The team communicates and coordinates all the refreshes with BIS database group in addition to notifying them in advance for any space requirements.

Scripts and utilities for lower environment refresh	Deloitte Activities Meet RFP Requirements
Lower environment refresh details document	<ul style="list-style-type: none"> • Overall approach and process for refreshing TFP is same across applications. • Minute differences between applications due to inter dependencies. • Application/Sub system being refreshed. • Batch schedule name and schedule timing. • Production Source and target file locations. • Details regarding utility script location, like disable constraint, truncate, import parameter files. • Notification procedures for successful completion or failure conditions.
TFP Refresh Batch	<ul style="list-style-type: none"> • Scripts and batch utilities are used to automatically refresh TFP • Periodic TFP refresh is orchestrated using production exports generated by batch from production. • TFP refresh is supported using a two days of backup data from production. • Daily archive/purge job runs in production to periodically clean older backup data.
Other Environments Data Refresh	<ul style="list-style-type: none"> • Automated scripts exist for lower environments, • On-demand basis for execution is used for lower environments data refresh • Deloitte teams uses the service request process to coordinate these activities with DPW • Data is refreshed and redacted by the Deloitte team in lower environments.

Figure 6.9-67. Deloitte Approach to Developing Data Refresh Scripts and/or Utilities in Support of SDM.

Figure 6.9-68 depicts the process for data management in lower environments.



PA_DPW-2010_2

Figure 6.9-68. Data Management Process.

Deloitte's process for data management involves using automated scripts to perform data exports, refresh, and required redaction.

Generate the Request for a data refresh. Application teams require data in various lower environments for testing. Based on phase begin dates around Integration, and SAT and LOAD testing, our team works quickly to communicate their testing needs as part of the ARB process during an initiative. In addition to this communication to BIS, we create a formal data refresh request that is reviewed by the Deloitte DBAs.

Confirm Available Resources. The team confirms available space in the database environment. If more resources are necessary, the team updates the refresh request with the additional space requirements prior to review with BIS database group.

Review the Data Refresh Request with BIS. During the weekly coordination meetings with BIS, our team shares the data refresh request along with any additional resources in terms of space, instance configuration and other database resource parameters. Upon review and approval from BIS, the refresh is scheduled for execution based upon an agreed upon timeline.

Implement the Data Refresh The team utilizes existing automated scripts to perform the necessary data refresh and redaction in the lower environments as per the BIS approval.

Database Capacity Planning

Deloitte performs database-related capacity planning across the suite of enterprise applications. Our team supports quarterly operational capacity planning as well as initiative-based capacity plans. Deloitte's proficiency in assisting DPW capacity planning comes from years of experience monitoring the production infrastructure of both the mainframe and open system environments while concurrently supporting the design and implementation readiness planning of various initiatives.

The rest of this section focuses on how capacity planning is managed operationally and throughout the SDLC.

- **Initiative-Based Capacity Planning for Modifications.** Database capacity plans for initiatives continue to be presented during the Application are aligned with GSD and SAT phases respectively. The Deloitte team provides an in-depth analysis of project database increases and behavioral changes during the Physical Data Model review that potentially impact database capacity, topology or configuration.



- **Quarterly Capacity Planning.** On a quarterly basis, the team leverages tools created and maintained to collect, collate and present the relevant data, thus allowing us to present capacity planning metrics. This includes Review Board sessions II and IV which increases in disk consumption, connection volumes, CPU, and memory utilization. BIS consolidates this data and creates the overall enterprise server capacity solution.

Initiative Based Capacity Planning for Modifications

Prior to each application going live, Deloitte presents the initial capacity plan to the DPW stakeholders during the ARB II and ARB IV for database-related capacity planning. Before any capacity plan is submitted, the Deloitte team analyzes the initiative to obtain a thorough understanding of new business processes in order to plan for any anticipated growth in data volume.

The **ARB II** meeting is conducted during the General System Design phase. The capacity plan Deloitte presents during this meeting contains initial estimates of database size increase. The group analyzes new or altered functionality, business processes, and key business metrics introduced with the initiative. The information presented at this meeting helps DPW to gain an understanding of expected data volume growth areas.

The **ARB IV** meeting occurs towards the end of Systems Acceptance Testing phase and before the initiative's go-live date. The Deloitte team uses this meeting to present a revised capacity plan from the ARB II meeting. These revisions take into account the results of Systems Acceptance Testing and Load Testing.

Quarterly Capacity Planning

In addition to the ARB II and ARB IV capacity plans, Deloitte provides DPW management with an enterprise-wide capacity plan at the beginning of each quarter for each application using data from the various environments, as depicted in Figure 6.9-69. The capacity plan summarizes database growth from both day-to-day usage and growth due to all new initiatives from the upcoming quarter. This allows for proactive discussion and planning for any major anticipated increases on an on-going basis.



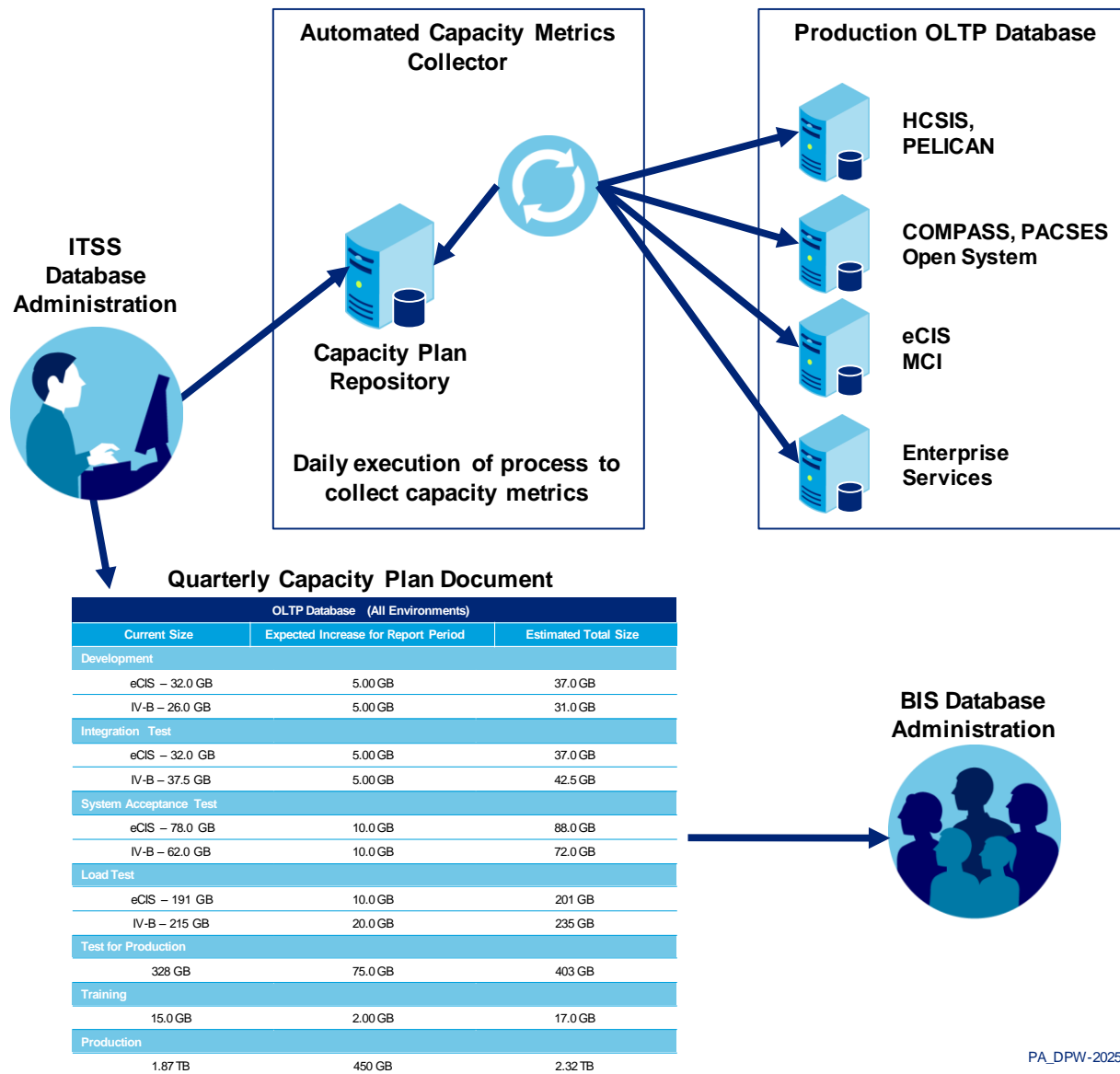
OLTP Database (All Environments)		
Current Size	Expected Increase for Report Period	Estimated Total Size
Development		
eCIS – 32.0 GB	5.00 GB	37.0 GB
IV-B – 26.0 GB	5.00 GB	31.0 GB
Integration Test		
eCIS – 32.0 GB	5.00 GB	37.0 GB
IV-B – 37.5 GB	5.00 GB	42.5 GB
System Acceptance Test		
eCIS – 78.0 GB	10.0 GB	88.0 GB
IV-B – 62.0 GB	10.0 GB	72.0 GB
Load Test		
eCIS – 191 GB	10.0 GB	201 GB
IV-B – 215 GB	20.0 GB	235 GB
Test for Production		
328 GB	75.0 GB	403 GB
Training		
15.0 GB	2.00 GB	17.0 GB
Production		
1.87 TB	450 GB	2.32 TB

PA_DPW-2011_2

Figure 6.9-69. Sample Database Capacity Plan Layout.

Our approach to database capacity analysis uses a combination of tool-based estimates and predictive trending based on actual data growth, where applicable.

Deloitte recognizes that database growth should be monitored periodically to continuously maintain the overall performance of the system. Deloitte works proactively to gather statistics on the data growth for each of the in-scope applications, as illustrated in Figure 6.9-70.



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Figure 6.9-70. Quarterly Database Capacity Planning Process.

Deloitte submits capacity plan documents to BIS each quarter for OLTP and Online Data Store (ODS) databases for the upcoming quarter.

The following identifies the steps we use to manage the process:

- Create a repository to capture required capacity data points
- Create utility/scripts to extract information from the production database
- Schedule a batch process to exercise those scripts to capture data and populate the repository
- Analyze the data and provide the capacity plan

Our team has worked with the BIS database administration team to set up a repository in the production utility server. The capacity plan schema “CAPPLAN” captures the necessary required data points.



Figure 6.9-71 shows the structure of the capacity plan repository table.

Instance	Owner	Segment	Type	Tablespace	Bytes
MCIP	WLM	T_WI_CAT_ACTV_TRANS	TABLE	WLM_DATA	1409286144
MCIP	WLM	T_WI_CAT_TRANS	TABLE	WLM_DATA	768606208
MCIP	WLM	T_WI_CAT_NOTES_TRANS	TABLE	WLM_DATA	338690048
MCIP	WLM	T_WI_CAT_ACTV_ASGMT_TRANS	TABLE	WLM_DATA	1026555904
MCIP	WLM	T_STAFF	TABLE	WLM_DATA	1048576
MCIP	WLM	PK_T_WI_CAT_NOTES_TRANS	TABLE	WLM_IDX	54525952
MCIP	WLM	PK_T_WI_CAT_TRANS	TABLE	WLM_IDX	126877696
MCIP	WLM	PK_T_WI_CAT_ACTV_TRANS	TABLE	WLM_IDX	499122176
MCIP	WLM	PK_T_WI_CAT_ACTV_ASGMT_TRANS	TABLE	WLM_IDX	255852544
MCIP	WLM	PK_T_STAFF	TABLE	WLM_IDX	1048576

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Figure 6.9-71. Sample records from Capacity Plan schema.

Deloitte's process for generating capacity plan reports automates a crucial activity to aid BIS in managing DPW database infrastructure and resources.

The team has created utility scripts to extract capacity plan data from all OLTP production databases. Using Oracle's built-in job scheduler, these scripts run daily to capture the required capacity plan data. The data collected every day provides a snapshot of all database segments (tables/indices). The result set is populated to the CAPPLAN repository. Deloitte uses the data stored in this repository to provide database growth trends and perform capacity forecasting.

The data stored in the repository also helps the Deloitte team and BIS DBAs debug production issues when a table or index segment shows an abnormal growth, for example. This can also serve as a triggering point for a DBA to perform administrative work such as table/index reorganization.

The team submits capacity plan documents to BIS every quarter. The document contains capacity projections for all OLTP and Online Data Store (ODS) databases for the upcoming quarter. We will continue to follow the same process for updating the capacity plans.

The quarterly capacity plan estimates are calculated based on three primary factors:

- The capture of the **Current Size** from the production (OLTP) databases for each application.
- An analysis of 90 days data stored in the repository to calculate the **Average Growth**
- And calculations of database growth based on the implementation of **New Initiatives**.

DBAs analyzes the data growth from previous quarter (i.e. last 90 days daily growth for each application) and projects what is the expected growth for the upcoming quarter.

Current Size + Average Growth + New Initiatives = Expected Growth



Our approach for Open Systems capacity planning is to work with the application teams to identify new initiative requirements. We set up automated scripts to capture daily growth from production and store in a repository and analyze the data growth for previous quarter to prepare the capacity plan document.

For mainframe environments, we communicate and coordinate mainframe-related initiatives and work with DPW to notify them of their storage requirements using the capacity planning process. We continue to monitor current data growth for any abnormal patterns that would require BIS attention.

Figure 6.9-72 provides database administration metrics and highlights the complexity and scale of the current Oracle database.

Application	Number of Database Tables	Number of Database Columns	Number of Packages/Procedures	Number of Lines of Code	Database Size (GB)
eCIS	840	9,767	537	28,0251	2,181
HCSIS	973	11,360	3,233	575,860	170
PELICAN	1,043	13,961	797	686,627	446
COMPASS	143	894	99	23,886	63
PACSES Open System	580	8,233	108	60,581	264
Enterprise Services	16	94	8	4,901	24

Figure 6.9-72. Complexity and Scale of the Current Oracle Database Administration.

The Deloitte ITSS team is actively involved in supporting and monitoring those databases and assisting the application teams in the completion of the quarterly capacity plans.

Database Upgrade Support

Deloitte works closely with BIS database administration to support the necessary software upgrades. Examples of our support include:

- Deloitte helped DPW with the last major upgrade of the database environments from 9i to Oracle 10g.
- BIS leveraged our team to coordinate appropriate times to gain exclusive control of the various development database servers.
- The Deloitte team was able to work with BIS to determine target migration dates for various environments and perform end-to-end testing.
- We helped DPW minimize down times across environments in order to support ongoing initiative development work in lower environments and critical business operations in production.

In addition to task coordination, our team also represents the applications at various BIS coordination meetings where upgrades such as database platforms, patches and driver updates are discussed. We are aware of BIS plans to migrate over to the next major Oracle database platform 11G starting in the next fiscal year. As part of our close collaboration with BIS and in-depth understanding of DPW's complex database environment, we will continue to work with the BIS database group to perform research and compatibility analysis focusing on areas over and above standard database structures. Some of these areas include:

Advanced Queue. The eCIS application extensively utilizes the Oracle Advanced Queue feature for their Workload Dashboard subsystem – the backbone of their business operations.

XML and User-Defined Data Types. Various applications in DPW use XML data types (eCIS, COMPASS, HCSIS, PELICAN) and user-defined data types (eCIS Phase IVb).

Oracle Fine Grained Access. Since HCSIS extensively utilizes Oracle FGA, we will continue to work with BIS staff as part of the Oracle 11G upgrade planning and analysis to perform detailed compatibility verifications of how HCSIS currently uses this feature.

Additionally, we continue to work with BIS to identify potential compatibility issues and opportunities for leveraging new Oracle features for each of the in scope DPW applications.

Figure 6.9-73 describes Deloitte's process for supporting system upgrades.

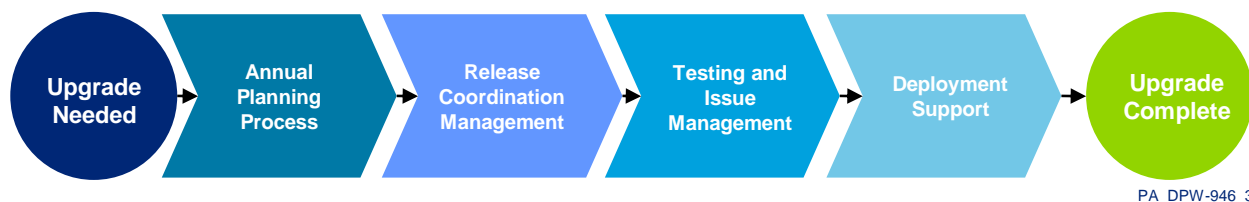


Figure 6.9-73. Database Upgrade Support Process.

Deloitte's process for supporting system upgrades involves coordinated scheduling, testing, and implementation support.

IT Annual Planning Process. As part of the DPW annual planning process, the proposed business and technology initiatives for the upcoming year are discussed and prioritized. Any major infrastructure upgrade, such as operating systems changes, database upgrades, or other vendor software upgrades are prioritized along with the other application modifications and maintenance activities. Deloitte supports DPW in scoping and estimating the required effort to test the applications in support of these initiatives, especially for database upgrades.

Database Release Coordination and Planning. Deloitte reviews the applications' release schedules and works to align the database upgrade timeline to specific releases. This allows the application teams to perform a full regression test along with the testing required for the release. Both the application initiative and the database

upgrade are verified in concert with each other. This approach optimizes DPW’s testing efforts and enables optimum use of limited application release windows.

Deloitte assists DPW with creating a plan and testing of the database upgrades within each application’s test environments. This support includes facilitating recurring meetings with application architects and developers to review and coordinate needed testing activities, and to review technical issues identified with the DPW database stakeholders.

Database Testing and Issue Management. Regression testing scenarios for testing these database upgrades are identified with the support of the application teams. During testing, Deloitte works with DPW to validate the database upgrade by creating a list of applicable test scenarios to verify a material portion of the application functionality. Regression testing is performed using these scenarios and any issues identified that require code modifications are tracked using the standard non-functional PCR process.

Database Upgrade Implementation Support. Once the database upgrade has been verified in the lower environments, Deloitte coordinates with DPW and the application teams to obtain a final sign off to allow the upgrade to be propagated through the other environments. If application changes are required, Deloitte implements the changes in coordination with a prioritized release along with that upgrade.

Database Quality Assurance

Our team provides experienced database management quality assurance support and serves as the single point of contact for requests between the project teams and BIS. Figure 6.9-74 depicts our structured ITIL-based process to review requests for completeness, accuracy, and adherence to standards and the strategic vision of DPW.

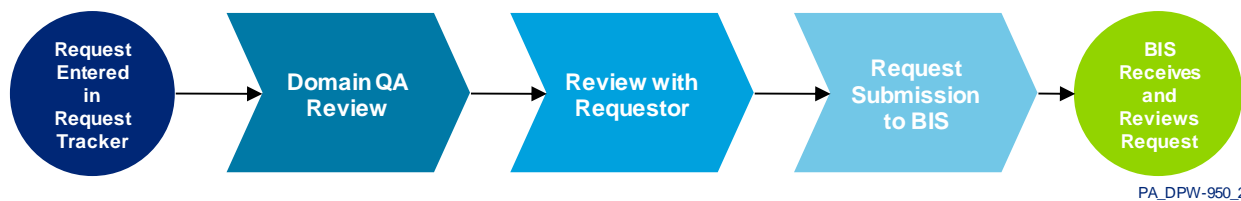


Figure 6.9-74. Deloitte Database Support Quality Assurance Process.
Deloitte’s database support quality assurance approach uses an ITIL-based process that supports applicable domains.

The project teams use our ITSS Request Tracker tool as part of an ITIL-compliant change management process. Upon submittal of the requests into the Request Tracker tool, the team initiates its quality assurance as described below.

Database Domain QA Review. Once submitted, each request is thoroughly reviewed by ITSS database support staff for accuracy, completeness and alignment with DPW’s long-term vision. Our experienced staff performs detailed checks on the request and its contents, as depicted in Figure 6.9-75.



Request Type	Deloitte Performs DPW Required QA Reviews
Database ACD	<ul style="list-style-type: none"> Review for accuracy against database naming conventions. Review for design accuracy, appropriate normalization and completeness.
Lower Environments Data Refresh	<ul style="list-style-type: none"> Review for accuracy and completeness in terms of specified dates, timeframes, source/target information and business justification. Review for tasks against ongoing activities to determine resource availability.
Database code migration	<ul style="list-style-type: none"> Review details against DPW database coding and naming standards. Review for timeframes, source/target information and business justification.
PDM implementation	<ul style="list-style-type: none"> Review against existing status of PDM review. Review for accuracy around schema names and environments. Review for timeframes, source/target information and business justification.
Schedule LDM review	<ul style="list-style-type: none"> Review for timelines against deliverable submission dates for GSD. Review attached materials for content accuracy and comprehensiveness.
Schedule PDM review	<ul style="list-style-type: none"> Review for timelines against deliverable submission dates for DSD. Review attached materials for content accuracy and comprehensiveness.
PL/SQL Code Review Request	<ul style="list-style-type: none"> Review attached code against DPW database coding and naming standards. Review supporting documents for accuracy and completeness. Review explain plans prior to scheduling a code review session with the application team.
Performance Tuning analysis Request	<ul style="list-style-type: none"> Review attached code against DPW database coding and naming standards. Review supporting documents for accuracy and completeness. Review explain plans prior to scheduling a code review session with the application team.
Database Access Request	<ul style="list-style-type: none"> Review attached request for completeness, accuracy and business justification. Review appropriate approvals from within the application team.
Emergency Ad hoc Request	<ul style="list-style-type: none"> Review attached request for timeframes, business justification and system impacts. Review appropriate approvals and detailed plan of action.

Figure 6.9-75. Our Experienced ITSS Team Performs Database Quality Assurance Review on Project Team Requests.

Review with Requestor. If a request does not meet the required QA standards, we engage the requestor and work to complete or produce any missing required items, or to revise items which need correction or clarification. During this process, any changes are documented as history notes in the Request Tracker to maintain a change log. After correcting any defects in the request, it is resubmitted for approval and the QA checks are performed again.



Request Submission to BIS. Once the ITSS database support resource approves the request, it is prioritized for processing. The Request Tracker tool communicates the updated status of each request back to the originator. This step is also recorded in the change history in accordance with ITIL precepts. Each request, along with its status history, change history, and actions taken by involved parties, are retained within the Request Tracker’s database.

The ITSS team works with the appropriate BIS database team to process the request. Based on this structured communication model, BIS knows the specific Deloitte team member to contact if there is a need for further review or discussion surrounding the request.

Communication/Coordination

ITSS supports the communication needs from the application teams by providing BIS with a high level scope analysis and a summary of the requirements to the database team.

Deloitte creates the CMMI-compliant Communication Plan that describes the key communication protocols between stakeholders in all DPW domains, including the database domain. The Communication Plan is a key document that provides a specific approach for written, spoken, and electronic communication methods that are to be used on the DPW projects. As with every CMMI-based plan, it is reviewed and updated on an annual basis as stakeholders or communication requirements change based on the needs of the stakeholders or project activities.

The plan also outlines the database support domain documents, the meetings necessary to support activities for project management and for operational support issues. Figure 6.9-76 provides a list of the meetings which support communication and coordination activities.

Communication Plan Meeting	Deloitte’s Approach Enables Better Communications
BIS Database Administration Status Meeting	<ul style="list-style-type: none"> Discuss the 45 day tracker for upcoming releases, database upgrade patches and hardware upgrades. Additionally, existing open issues, key design changes and changes to DPW database coding and naming standards.
DPW BIS Cross Project Logistics Meeting	<ul style="list-style-type: none"> Discuss the changes across all domains. The database support domain specific items or impact areas are represented by Deloitte Technical team DBAs and BIS Database group.
Weekly Database Design Meeting	<ul style="list-style-type: none"> Discuss design related issues around database centric documents across initiatives.

Figure 6.9-76. Communication Plan Meeting Description.





Configuration Management

IV	Page IV-387	RFP Reference: E. Information Technology (IT) Shared Services Model & Direct Technical Support Services for Lot#6 Offeror and Lot#7 Offeror
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The Selected Offerors of Lots # 6 and Lot #7 will be performing the work associated with Systems Support Services initiatives and Direct IT Support Services using an IT Shared Services Model.

Figure 7 below, is a table that highlights specific application operational support services by domains. This includes service offerings in the following domains

Configuration Management

- **Deployment Planning** – Create playbooks, coordinate technical details with BIS, coordinate logistics discussions
- **Deployment Execution** – receive, plan, execute and verify application deployments through the test environments. Assist DPW with production deployments, including playbook management, stakeholder communication and application team testing coordination
- **Performance** – Proactively monitor application behavior for tuning opportunities. Work with BIS to identify system tuning solutions
- **Upgrade Support** – Support BIS in planning and execution of system upgrades
- **Quality Assurance** – Serve as the single point of contact from the project teams to BIS server team. Review each request for completeness, accuracy and adherence to the DPW strategic vision
- **Communication/Coordination** – Communicate upcoming requests from the application teams to the BIS server team. Provide a summary of the requirements and high level scope to assist in resource planning.

We provide a comprehensive set of Lot 7 configuration management support services that is based on our 10 years of experience with the DPW applications. Our configuration management team supports DPW’s diverse mix of platforms and technologies, providing detailed playbooks for efficient deployment management. The team uses automated tools and methods to reduce deployment time, enhance consistency and quality of deployment processes, and support process changes related to the expansion of open systems infrastructure. In addition, our team serves in a critical coordination role. They assess requests from multiple application teams and help BIS coordinate deployment activities across initiatives for efficient schedule and resource management.

Figure 6.9-77 summarizes our understanding of the breakout of Lot 6 and Lot 7 configuration management support activities.

Lot 6	Lot 7
<ul style="list-style-type: none"> • Configuration management quality assurance - serve as the single point of contact from the project teams to BIS server team 	<ul style="list-style-type: none"> • Configuration management quality assurance - serve as the single point of contact from the project teams to BIS server team
<ul style="list-style-type: none"> • Configuration management communications/coordination - communicate upcoming requests from the application teams to the BIS server team 	<ul style="list-style-type: none"> • Configuration management communications/coordination - communicate upcoming requests from the application teams to the BIS server team



Lot 6	Lot 7
<ul style="list-style-type: none">• N/A	<ul style="list-style-type: none">• Create deployment playbooks and coordinate deployment with BIS and the application teams• Plan, execute and verify application deployments through the test environments• Proactively monitor in-scope applications for tuning opportunities• Support BIS in planning and execution of system upgrades

Figure 6.9-77. Breakout of Lot 6 and Lot 7 Configuration Management Support Activities.

Our team uses its specialized business and technical knowledge of each of the different DPW applications to support DPW configuration management requirements.

DPW's infrastructure uses a diverse set of technology platforms, including two separate Unisys mainframe systems, Microsoft Windows and .NET, Oracle and SQL Server databases, the Cognos platform, and an array of vendor COTS products/applications to support data processing, enterprise application integration, and business rules definitions. Our team manages the consistent configuration of each platform and tool, and promotes changes from the development region, through the various test environments and finally to production.

Figure 6.9-78 below highlights the types of application-specific configuration management support activities provided by the team.

Benefits to DPW

Deloitte brings:

- Knowledgeable Configuration Management Team with DPW system-specific experience developed over 10 years.
- Deployment playbook best practices from similar HHS environments in other states that enhance process efficiency, consistency, and quality.
- Demonstrated use of automated deployment process tools and techniques that reduce deployment time, enhance quality, and support new deployment processes in an environment migrating from mainframes to distributed open system platforms.



Applications	Deloitte Understands Key System-Specific Characteristics for Configuration Management
iCIS	<ul style="list-style-type: none"> • CIS, TPL, IEVS – The CIS Workbench is used to migrate software through the lower environments and to bundle software for production implementations • COMPASS – Flash centric architecture allows for a high degree of configurability via changes that do not require application code changes or deployments, but require only XML files to be modified • eCIS – The eCIS application is deployed to six web servers in the production environment, and utilizes 14 supporting servers
HCSIS	<ul style="list-style-type: none"> • HCSIS uses a Microsoft 'Web Gardening' configuration of IIS to support increased numbers of connections to the web server, and to manage the large number of database connections more effectively.
PACSES	<ul style="list-style-type: none"> • PACSES Mainframe - the PACSES mainframe application contains an integrated framework called the Support Layer that requires close coordination with members of the project team if changes and/or enhancements are required. • PACSES Open Systems - The PACSES leverages the Aqualogic solution hosted by OA/OIT to support their portal solution. Additional coordination and configuration planning is required to support changes to this functionality as the activities
PELICAN	<ul style="list-style-type: none"> • PELICAN Provider Certification leverages disconnected processing via Tablet PC's, which need deployments to occur in sync with the server changes
Child Welfare	<ul style="list-style-type: none"> • The current Child Welfare applications use a wide variety of different deployment structures and methods when implementing release changes
Enterprise Services	<ul style="list-style-type: none"> • Deployment and coordination of Enterprise Services involve .NET code, Java code, Microsoft IIS, Apache, webMethods, BizTalk, Informatica and WCF products, as well as the SOA Security Manager infrastructure.

Figure 6.9-78. Key Application-specific Configuration Management Activities.

The overall deployment cycle of a major release represents an average of 6-18 months of effort. As part of each initiative's release cycle, Deloitte works with DPW to manage multiple aspects of each system's configuration and coordinates the overall configuration of the platforms throughout the enterprise, including

- **Deployment Planning.** Create implementation playbooks, review playbooks and instructions with BIS and Program Office staff, and manage deployment logistics.
- **Deployment Execution.** Perform and validate deployments in the DPW test environments, and work with BIS to perform and validate TFP and Production deployments.
- **Performance.** Work with DPW to monitor and identify performance improvement opportunities, and implement solutions.
- **Upgrade Support.** Work with BIS to manage upgrades to operating systems and software products.

- **Quality Assurance.** Drive continuous improvement by effectively managing requests between application development staff and BIS, and review communications for compliance and validity.
- **Communication and Coordination.** Create and manage communications plans to keep stakeholders informed and engaged in decision-making related to configuration management.

Deployment Planning

Deloitte uses a comprehensive, ITIL-based process for deployment planning. We work closely with DPW stakeholders throughout the process by assisting in development of annual release plans and playbooks as well as change management activities, as depicted in 6.9-79.

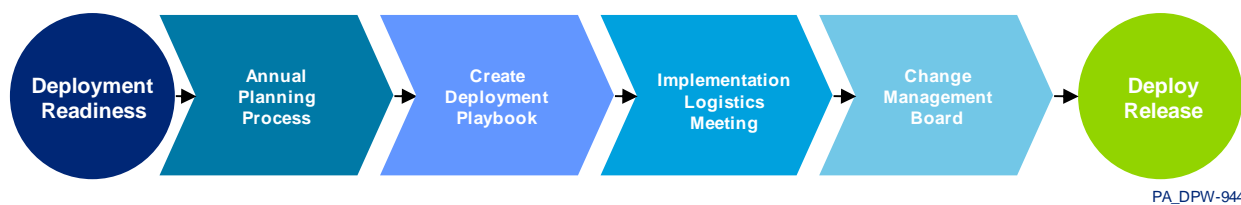


Figure 6.9-79. Deployment Planning Process.

Effective deployment planning requires involvement from all involved DPW stakeholders.

IT Annual Planning Process. Each fiscal year, DPW facilitates an Annual Planning Process, where each potential release is scoped and an overall timeline is constructed. Drivers in this planning process include federal and state legislative and policy changes, resource availability, budget and technical infrastructure change management plans. During annual planning, Deloitte works closely with DPW to assess the timelines needed for each potential change, and to propose target dates to business and technical stakeholders. The output of the annual planning process is the CIO Runway that lists each initiative, and the timelines for development, testing and production implementation. This CIO Runway forms the basis for release planning and ongoing management of initiatives.

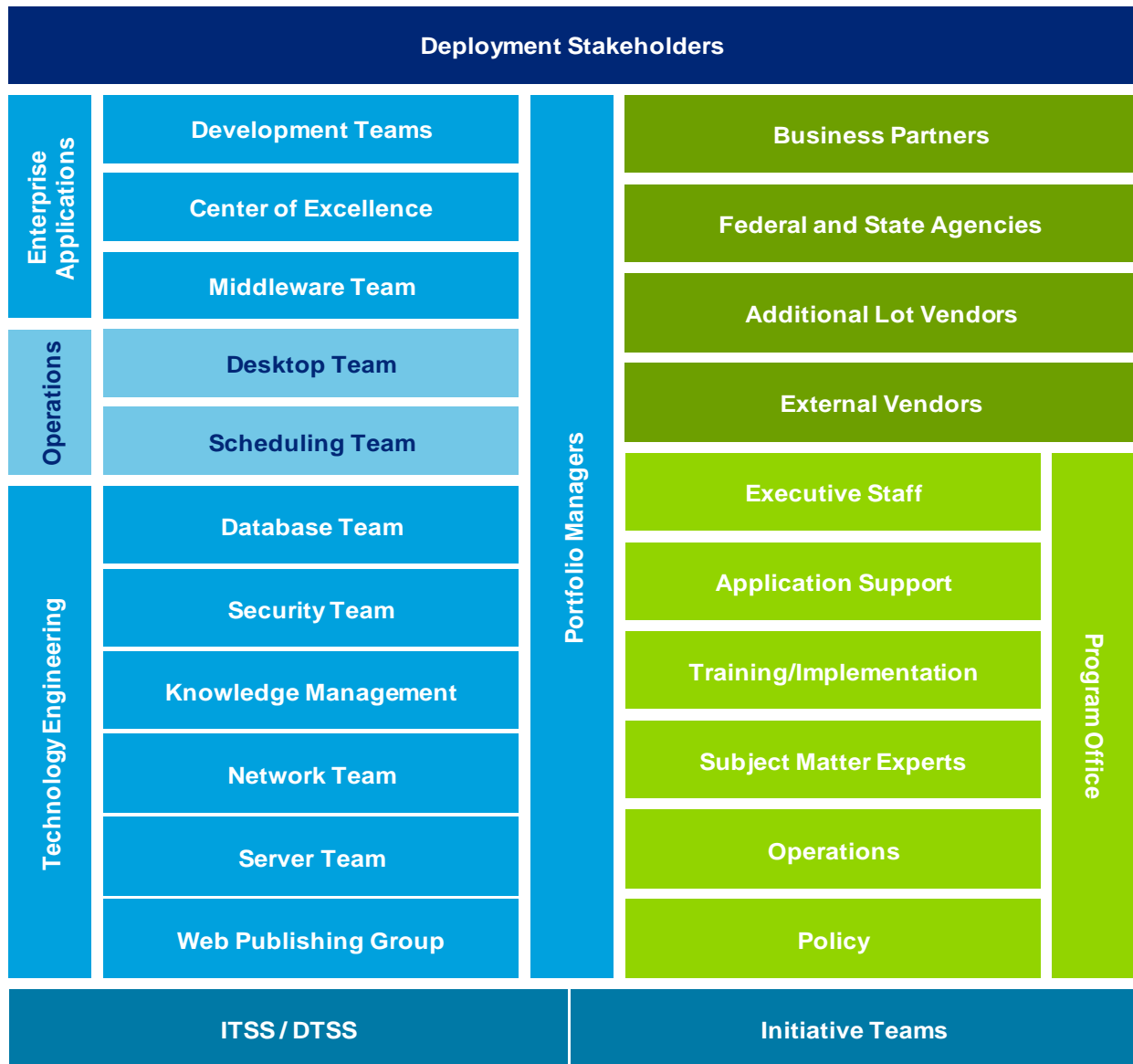
Create Deployment Playbook. As each release is composed of multiple software and technical components, Deloitte develops a detailed playbook for each release to manage the components, deployment tasks, and dependencies. We create the playbook at the beginning of each release, and periodically update the document as the release migrates into each test region. We update the playbook and accompanying deployment instructions as new components are added, or as we identify and address technical issues and logistics. In addition, Deloitte creates playbooks for BIS the TFP and production deployments.

For each playbook, the team creates a set of deployment instructions for each domain, such as web, database, middleware, and any other technology areas impacted by the deployment. The instructions include the technical details, such as conversion steps and a step-by-step overview for completing the implementation.



Each playbook lists the steps, sequence of activities to be performed, and the stakeholders responsible for each facet of the deployment. Each playbook is organized into the following sections:

- **Pre-Deployment.** Pre-Deployment activities are the steps which can be executed prior to production deployment date. Our team works with BIS and other DPW stakeholders to identify these steps. If some of the activities can be coordinated prior to production deployment it decreases the number of steps and complexity on the production deployment date.
- **Production Deployment.** Production deployment activities are the steps to be executed on the day of the production implementation. These typically include deployment activities for each application component, any validation or data conversion steps and a Go/No-Go decision.
- **Rollback Strategy.** We understand that in certain situation, there is a potential for a deployment rollback if issues arise that cannot be corrected during the deployment. As part of our risk mitigation strategy, Deloitte coordinates with DPW stakeholders to define the potential rollback scenarios and procedures. Additionally, our team works with DPW to rehearse the rollback in a test environment prior to the deployment to production. We document the rollback scenarios, detailed steps, and timing based on the rollback rehearsal.
- **Stakeholder Involvement.** We review the playbooks with BIS and Program Office stakeholders and incorporate feedback. Each deployment requires participation from a diverse group of stakeholders, as shown in Figure 6.9-80.



PA_DPW-2038

Figure 6.9-80. We Identify Deployment Stakeholders and Points of Coordination in the Playbooks.
Our playbooks define stakeholder involvement across DPW domains which is critical element of deployment success.

In addition to BIS staff, Program Office stakeholders can include operations and training staff and external stakeholders such as business partners and other state and federal agencies. During deployment, stakeholders perform deployment tasks, validations, tests, and other tasks based on the playbook.

Implementation Logistics Meetings. Playbook creation and implementation planning is an iterative process. It depends on feedback from DPW stakeholders, other impacted system stakeholders, and other interested parties. Following the creation of the playbook, Deloitte participates in DPW’s Implementation Logistics Meetings. The meetings are a forum for stakeholders to review and discuss the playbooks, and address questions. We incorporate feedback from BIS stakeholders into the playbook and deployment instructions, and review the playbooks again in a subsequent meeting.

Change Management Board. Deloitte presents the application release playbook and instructions for approval to DPW's Quality Assurance group and Change Management Board (CMB). The Change Management Board is the formal vehicle for obtaining a final go-ahead from DPW stakeholders. At the CMB meeting, Deloitte presents an Application Implementation Request (AIR) form that contains information required by DPW to review and approve the implementation.

Deployment Execution

Our team receives, plans, executes, and verifies application deployments into Integration, SAT and Load Test environments, and works with DPW to coordinate deployment activities for TFP and Production environments, as depicted in Figure 6.9-81.

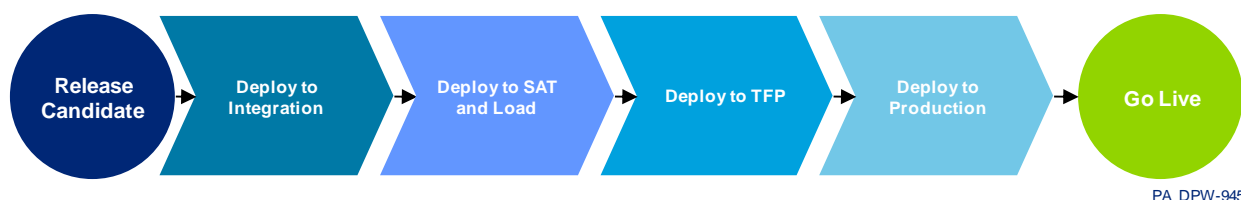


Figure 6.9-81. Deployment Execution Process

Our team coordinates deployments in test environments, and assists BIS with production deployments.

Deploy to Integration. Our approach to Integration Deployment includes the coordination and rehearsal of the deployment activities as well as facilitating the migration of application code to integration. We perform deployments at the request of development teams and during predefined windows.

Deploy to SAT and Load. Our team migrates releases to the SAT web servers, and either the SAT or Load database. We deploy the SAT and Load versions of each application simultaneously.

We perform deployments at the request of development teams, and during predefined windows.

Deploy to TFP. Prior to TFP deployments, Deloitte works with DPW to prepare and review comprehensive playbooks and deployment instructions that outline the activities and coordination touch points for the release.

The TFP deployment follows the same process performed during migrations to Integration and the SAT and Load environments. During each TFP deployment, Deloitte coordinates with BIS staff to complete each deployment activity, and coordinates with Program Office stakeholders to validate preparations for the production deployment.

Have you heard? 

In FY09-10, Deloitte and DPW collaborated to perform more than 1,900 migrations of code into the DPW test environments, and completed the deployment in excess of 100 production releases. These activities represent the successful deployment of more than 16 million lines of software code.



Following the TFP deployment, we update the Production Playbook with updated deployment activity durations and any potential opportunities for process improvement.

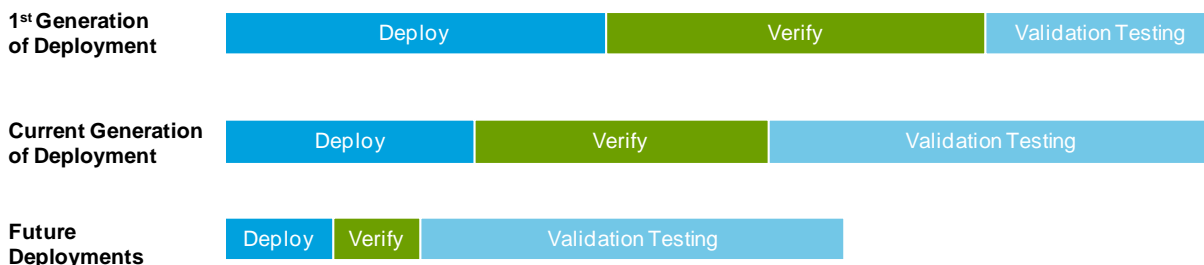
Deploy to Production. During each production deployment, Deloitte follows the playbook rehearsed during the TFP deployment. The Production deployment follows the same procedures and processes performed during migrations to TFP, with application of appropriate changes to support different environmental components.

During each Production deployment, Deloitte coordinates with BIS staff to complete each deployment activity, and coordinates with Program Office stakeholders to validate preparations for the deployment. Deloitte provides on-site resources to assist DPW with these deployments and support activities such as coordinate conference calls and provide status throughout the entire deployment process.

Future Deployments. DPW’s on-going vision to adopt a EA-SOA strategy and to migrate applications from legacy mainframe systems to distributed open systems applications and has brought new dynamics to the deployment process.

Efficiencies Through Next Generation Automation. As workflows move from the mainframe to open systems, additional servers are required to deliver the same transactional capacity that a mainframe system provides. The DPW technical landscape has experienced significant growth in the past five years, and we expect that it will continue to grow as new systems and services are enabled within the organization.

As the physical infrastructure topology grows, Deloitte addresses the deployment challenges for each server and across the technical environment. We are working with DPW to assess the scalability of the current generation of deployment processes, scripting, and automation to support the number of servers targeted for deployment. In addition, the time needed by stakeholders to validate all facets of the application has increased with the deployment of more complex business functions. With the migration to SOA and open system platforms, we stand ready to assist DPW in the next major evolution of deployment processes and automation. Figure 6.9-82 depicts our progress in reducing the duration of physical release deployment activities using the current generation deployment approach and tools.



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Figure 6.9-82. Deployment Process Comparison Over Time.

With each generation of our deployment methodology, we introduce additional levels of automation to increase deployment efficiency and reduce manual verification efforts.

However, we need to make additional progress to reduce the overall deployment cycle time. During DPW's early COM+ based open systems deployments, the deployment approach was primarily manual and required verification of each step for each configuration area.

We have enhanced the deployment process and reduced manual verification steps by introducing push button nAnt deployment and post-deployment automation. The approach enables 'one-button' deployment of application code, database packages and reference table data. The new approach demonstrates that automated processes can now replace many manual processes. For example, our post-deployment verifications now focus on reviewing logs for successful completion, and validating that configuration files contain correct data.

Future generations of deployments will focus on minimizing manual deployment steps across an increasing number of DPW servers and platforms. Future generation deployment processes need to maximize the use automation. The goal is to reduce both the deployment time and the amount of manual effort required to validate component deployments across each server.

Deloitte works with DPW to craft a future architectural vision that continues to increase the use of virtualization and investigate cloud-based application hosting. In support of this vision, DPW will require new tools and processes to deploy applications and to perform configuration management.

Deployment and Operational Support for Child Welfare Systems. Our team will support DPW in the deployment and ongoing operational support of the existing Child Welfare Systems as DPW pursues the overarching strategy to reengineer the systems and align them to DPW standards. Deloitte conducted a preliminary assessment of many of the applications in the Child Welfare Systems portfolio and their potential system needs, as summarized in Figure 6.9-83.

Have you heard?

- Deloitte has developed and implemented SACWIS-compliant Child Welfare Systems in 8 states over 15 years
- Deloitte has a practice that specializes in Child Welfare NIEM standards implementation and can bring knowledgeable resources to DPW to assist in the development of a NIEM compliant reference model.



DPW Child Welfare Application	Config Management and Operations	Security – IAM
ChildLine Millennium System	<ul style="list-style-type: none"> • Provide environment support of this Graphical User Interface Application written on Microsoft Visual basic using SQL Server database as the backend • Perform Application Migrations using existing DPW deployment procedure • Perform daily Application /Infrastructure health checks • Perform Application monitoring/availability using Sightline tool 	<ul style="list-style-type: none"> • Not integrated with the DPW IAM infrastructure
Family Centers	<ul style="list-style-type: none"> • Provide environment support of this Internet facing web Application that runs on Apache Web Server using SQL Server database • Perform Application Migrations using existing DPW deployment procedure • Perform daily Application /Infrastructure health checks • Perform Application monitoring/availability using Sightline tool 	<ul style="list-style-type: none"> • Protected by Siteminder for authentication/authorization
Adoptpakids.org Web site	<ul style="list-style-type: none"> • Provide environment support of this Internet facing web Application that runs on Microsoft IIS Web Server using SQL Server database • Perform Application Migrations using existing DPW deployment procedure • Perform daily Application /Infrastructure health checks • Perform Application monitoring/availability using Sightline tool 	<ul style="list-style-type: none"> • Not integrated with the DPW IAM infrastructure
Automated Intake and Incident Reporting System (AIIRS):	<ul style="list-style-type: none"> • Provide environment support of this Intranet facing web Application that runs on Microsoft IIS Web Server using Oracle database • Perform Application Migrations using existing DPW deployment procedure • Perform daily Application /Infrastructure health checks • Perform Application monitoring/availability using Sightline tool 	<ul style="list-style-type: none"> • Provide IAM support as AIIRS uses DPW IAM System for authentication/authorization
IV-E QA and Contracts:	<ul style="list-style-type: none"> • Provide environment support of this Internet facing web Application that runs on Microsoft IIS Web Server using SQL Server database • Perform Application Migrations using existing DPW deployment procedure • Perform daily Application /Infrastructure health checks • Perform Application monitoring/availability using Sightline tool 	<ul style="list-style-type: none"> • Provide IAM support as IV-E QA uses DPW IAM System for authentication/authorization • Support SOA security manager for IV-E QA web services protection • Support Docushare security for IV-E QA contracts

Figure 6.9-83. Summary of Preliminary Child Welfare Systems Deployment and Operational System Needs Assessment.

Configuration Management Performance

Deloitte provides continuous evaluation of current infrastructure resource consumption and system tuning to deliver optimal performance levels to DPW users. Deloitte works with BIS to establish performance thresholds for application servers, databases, and mainframe systems. Once these thresholds are defined, we work with DPW to incorporate them into the Sightline tool to create automated system monitoring alerts.

Our team will continue to work with DPW to identify key systems supporting each application and evaluate criticality and current levels of resource usage. These two factors determine the relevant performance metrics to monitor, such as CPU usage, available memory, network consumption, and at what levels the user community may be impacted. After establishing these thresholds, we use the Sightline tool to provide continuous, automated monitoring of affected systems. Alerts from the system can be used to drive discussions with DPW around additional capacity needs or performance tuning opportunities.

Have you heard?

During DPW's last major operating system upgrade from Windows Server 2000 to Windows Server 2003, Deloitte worked with the department as part of a 14 month plan to perform full regression testing of each in-scope application and to support all of the server configuration changes and software implementations needed to complete the upgrade.

Configuration Management Performance for the Mainframe Environment

Deloitte also recognizes the importance of monitoring and tuning mainframe performance levels. To accomplish this, we compile raw data from Sightline and transform it into the Mainframe Performance Dashboard. This dashboard displays critical mainframe performance indicators, such as transactions per section and daily transactions. Trend information provides historical context for current performance values. Based on our approach, the dashboard not only supports system monitoring and opportunities for system tuning but also supports the capacity planning process.

We use a variety of other tools for monitoring mainframe system resources including UDSMON and SUDS.

UDSMON. Our DBAs use this tool to monitor run units (transactions) that are actively accessing the database. The key use of UDSMON is to identify items that are queuing and run units that are performing large number of database commands which may lead to I/O performance issues.

SUDS. We use this tool in the batch environment to interactively monitor and analyze UDS Control. We examine schemas, check UDS Control's D-bank, and view the status of active threads. For the CIS and PACSES mainframes, SUDS reports are generated

nightly that can show, among other things, queuing that has occurred during batch execution.

With this data, we may alter the execution sequence of these jobs in batch or create a dependency within OpCon that precludes these jobs running at the same time. We can also view the complete batch cycle for other opportunities to improve throughput by altering execution

Configuration Management Upgrade Support

Our team provides periodic maintenance and upgrades as part of overall systems management. Regular application of patches to an operating system or system software helps to maintain the performance and stability of the system. Our team assists BIS and provides support during an operating system upgrade or change.

Our understanding of DPW's open systems infrastructure is that all servers are currently running Windows Server 2003, except for a small subset that has already moved to Windows 2008 platform.

We anticipate during the period of this contract, that an upgrade to Windows 2008 will be accomplished. We also anticipate that DPW will investigate a transition from 32-bit servers to 64-bit architecture for servers where the hardware is able to support this configuration. A 64-bit server configuration allows .NET applications to use additional memory to maximize the contribution that each server makes in supporting the workload of DPW.

Mainframe Upgrades

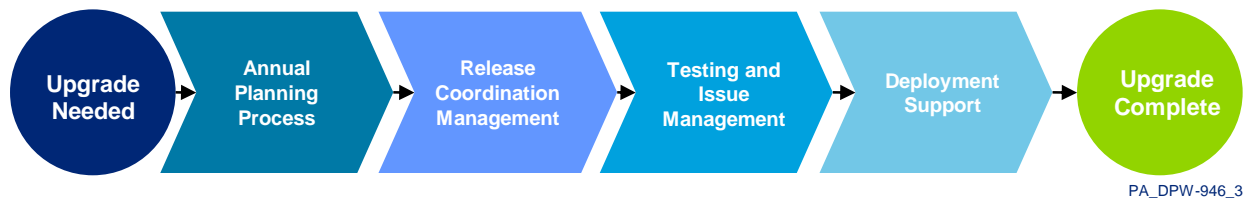
Within the past year, DPW has just completed the Dorado upgrade of their Unisys mainframe platform for both CIS and PACSES. In the latter part of this year, DPW will upgrade the Unisys mainframe operating system to its latest release – version 12.1. It is expected that both the PACSES and CIS mainframe applications will require a full compilation of all of the software and a full regression test will be required as well.

Some of the unique aspects of the PACSES application, specifically the Support Layer, may require some change with this new version of the operating system. Past experience with other operating system upgrades has caused issues for the Support Layer and has required significant code modifications to accommodate that upgrade. We anticipate that will be the case with this upgrade as well.

The sequence for implementing the upgrade will be to install 12.1 on the test mainframe (HSH-D) so that CIS and PACSES can separately test their applications. When the results are satisfactory and any application (or Support Layer) fixes have been made, the operating system will be moved to HSH-C for CIS for further testing.

Once testing is completed, our team implements the operating system upgrade in the PACSES production mainframe (HSH-F) and the CIS mainframe (HSH-A) at separate times.

We use a standard process for upgrading open systems and mainframe systems. Figure 6.9-84 depicts Deloitte's process for supporting system upgrades.



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Figure 6.9-84. Upgrade Support Process

Deloitte's process for supporting system upgrades involves coordinated scheduling, testing, and implementation support.

IT Annual Planning Process. As mentioned in the Deployment Planning section, each year DPW conducts an annual planning process. Any major infrastructure upgrades, such as operating systems changes or vendor software upgrades are prioritized along with application modifications and maintenance activities. Deloitte participates in the annual planning process and supports DPW in scoping and estimating the required effort to test the applications in support of the change, as it relates to system upgrades.

Release Coordination Management. Once DPW prioritizes an operating system upgrade, we review each application's release schedule and align the upgrade with a release, so that full regression testing can be performed once for the software changes and infrastructure changes. Deloitte assists DPW in building a plan and testing the system upgrades within each application test environment. Our ITSS support includes facilitating recurring meetings with application architects and developers to review and coordinate needed testing activities, and to review technical issues identified with stakeholders in DPW technical domains.

Testing and Issue Management. With the support of the applications teams, we identify and develop regression test scenarios for testing system upgrades. In addition, Deloitte works with DPW to validate the system upgrade by creating a list of applicable test scenarios to verify a material portion of the application functionality. We perform regression tests and track any issues using the PCR process.

Implementation Support. Once the system upgrade has been verified in the lower environments, Deloitte coordinates with DPW and the application teams to obtain a final sign off to allow the upgrade to be propagated through the other environments. If application changes are required, Deloitte implements these changes in coordination with a prioritized release.

Configuration Management Quality Assurance

Our team provides experienced configuration management quality assurance support and serves as the single point of contact for requests between the project teams and BIS server team. Figure 6.9-85 depicts our structured ITIL-based process to review requests for completeness, accuracy, and adherence to standards and the strategic vision of DPW.

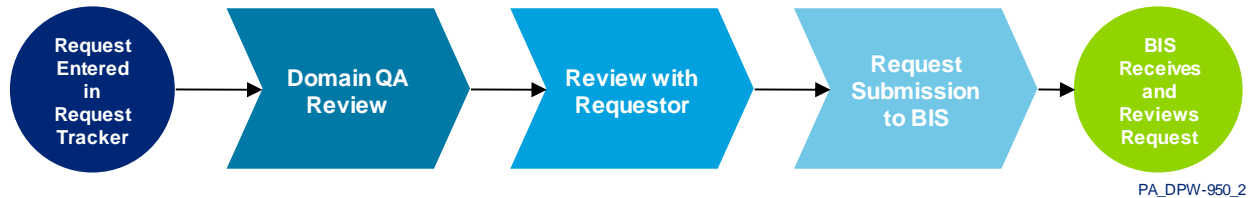


Figure 6.9-85. Deloitte Request Management and Quality Assurance Process.

Deloitte’s configuration management quality assurance approach uses an ITIL-based process that support activities across applicable domains.

The project teams use our ITSS Request Tracker tool as part of an ITIL-compliant change management process. Upon submittal of the requests into the Request Tracker tool, the team initiates its quality assurance process as described below.

Domain QA Review. Once submitted, each request is thoroughly reviewed by ITSS Configuration Management domain personnel for accuracy, completeness and alignment with DPW’s long-term vision. The Configuration Management resource performs detailed checks on the request and its contents, as outlined in Figure 6.9-86.

Request Type	Deloitte Performs DPW Required QA Processes
Server Access Request	<ul style="list-style-type: none"> • Verify that access request is justified and that appropriate controls are in place • Validate user account exists and is active
Application Implementation Request	<ul style="list-style-type: none"> • Prepare QA Diff sheet and verify component version differences • Verify that Program Office approval has been received via e-mail
Configuration Change Request	<ul style="list-style-type: none"> • Verify change was performed and tested in lower environments • Validate that business or technical justification for change is provided and reviewed with BIS • Verify change appears on Implementation Calendar, if required
Implementation Calendar Change Request	<ul style="list-style-type: none"> • Validate that there are no conflicting activities with activities that are proposed • Verify that all required information, including a point of contact, is provided

Figure 6.9-86. Configuration Management Team’s Quality Assurance Steps.

Review with Requestor. If a request does not meet the required QA standards, we engage the requestor and work to complete or produce any missing required items, or to revise items which need correction or clarification. During this process, any changes are documented as history notes in the Request Tracker to maintain a change log. After



correcting any defects in the request, it is resubmitted for approval and the QA checks are performed again.

Request Submission to BIS. Once the ITSS Configuration Management resource approves the request, it is prioritized for processing. The Request Tracker tool communicates the updated status of each request back to the originator.

Our team submits configuration management requests to BIS team for planning and processing.

Configuration Management Communication/Coordination

ITSS supports the communication needs from the project teams by providing BIS with a high level scope analysis and a summary of the requirements to the server team.

Deloitte creates the CMMI-compliant Communication Plan that describes the key communication protocols between stakeholders in DPW domains, including the database domain. The Communication Plan is a key document that provides a specific approach for written, spoken, and electronic communication methods that are to be used on the DPW projects. As with every CMMI-based plan, it is reviewed and updated on an annual basis as stakeholders or communication requirements change based on the needs of the stakeholders or project activities.

Figure 6.9-87 provides a list of the meetings which support these activities.

Communication Plan Meeting	Deloitte's Approach Enables Better Communications
Implementation Logistics	Deloitte will present the production playbook during the meeting. Production playbook lists the deployment steps/resources/dependencies for production deployment. We will determine that all domains have clarity on the steps involved for the production deployment support.
Change Management Board	Deloitte will present information on business/technology changes for any proposed application implementation request (AIR). The AIR will provide information on business reason for the application change, code diff sheet and program office approval information.
DTE Server Team Meeting	Deloitte will discuss the potential upcoming release and infrastructure changes impact on the domain. Deloitte will work with BIS to identify priority and resource requirements to provide production deployment support.

Figure 6.9-87. Communication Plan Meeting Description.





Security

IV	Page IV-387	RFP Reference: E. Information Technology (IT) Shared Services Model & Direct Technical Support Services for Lot#6 Offeror and Lot#7 Offeror
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The Selected Offerors of Lots # 6 and Lot #7 will be performing the work associated with Systems Support Services initiatives and Direct IT Support Services using an IT Shared Services Model.

Figure 7 below, is a table that highlights specific application operational support services by domains. This includes service offerings in the following domains

Security

- **Security Design** – Work with BIS to design and implement security solutions using the standard DPW architecture and security tools
- **CA(2)** – create and maintain the CA(2) document. This document is required for each major release of an application. This process also includes secure code review, and web application vulnerability scanning.
- **Security Upgrade Support** – Support BIS in planning and execution of security software
- **Security Quality Assurance** – Serve as the single point of contact from the project teams to BIS’ security team. Review each request for completeness, accuracy and adherence to the processes set up by the DPW security team
- **Security Vulnerability Testing** – Support DPW’s IT projects by performing vulnerability tests of the code developed by the project teams in non-production environments. The testing will be done using DPW standard tool sets
- **Security Communication/Coordination** – Communicate upcoming requests from the application teams to the BIS security team.
- **IAM (Identity and Access Management Support)** Work with BIS staff to help support DPW’s IAM infrastructure, to also include Provisioning and Role Based access control assessments as needed.
- **SIEM** Work with BIS to provide support on DPW’s Security Incident Event Management System.

Deloitte provides an integrated set of Lot 7 security support services that help to enhance the security of DPW’s technical architecture, and enable sustainable, repeatable, scalable security controls using DPW security tools. Our approach to information security and data privacy spans the entire SDM, and helps DPW to integrate application, data, infrastructure, and network security controls into the technical infrastructure, thereby positioning the Department for future growth and expansion.

Figure 6.9-88 summarizes our understanding of the breakout of Lot 6 and Lot 7 security support activities.

Lot 6	Lot 7
<ul style="list-style-type: none"> • Security design - design and implementation of security solutions using the standard DPW architecture and tools 	<ul style="list-style-type: none"> • Security design - design and implementation of security solutions using the standard DPW architecture and tools
<ul style="list-style-type: none"> • Security quality assurance - serve as the single point of contact from the project teams to BIS security team 	<ul style="list-style-type: none"> • Security quality assurance - serve as the single point of contact from the project teams to BIS security team
<ul style="list-style-type: none"> • Security communications coordination - communicate upcoming requests from the application teams to the BIS security team 	<ul style="list-style-type: none"> • Security communications coordination - communicate upcoming requests from the application teams to the BIS security team



Lot 6	Lot 7
<ul style="list-style-type: none"> • N/A 	<ul style="list-style-type: none"> • Create and maintain the (CA)² document for each major release of an application • Support BIS in planning and execution of security software • Perform vulnerability tests of the code developed by the project teams in non-production environments • Work with BIS to help support DPW's IAM infrastructure • Work with BIS to provide support for DPW's SIEM system

Figure 6.9-88. Breakout of Lot 6 and Lot 7 Security Support Activities.

Our team uses its specialized business and technical knowledge of each of the different DPW applications to support DPW security management requirements.

Our security team's approach is aligned with your strategic goals as DPW implements leading EA-SOA practices, new business processes, and deploys inter- and intra-departmental integrations. In an effort to provide enhanced support to citizens and DPW stakeholders in an open systems environment, the operations of Department applications involve sharing services and data across applications and multiple locations. This sharing increases the risk of a security compromise or data breach. Citizen privacy and security concerns are on the rise, and in accordance with DPW and Commonwealth regulations and standards, applications must be secure yet flexible and extensible within the technology architecture.

Deloitte works with DPW to continue to mature and develop the Department's vision for security in support of current operations and project team needs as well as rollout of the SOA strategy. We provide an integrated security solution by leveraging key service components in support of DPW RFP requirements and Commonwealth/DPW standards, as illustrated in Figure 6.9-89.

Benefits to DPW

Deloitte brings:

- Broad portfolio of security disciplines including Security Management, Privacy and Data Protection, Application Security, Identity and Access Management, Vulnerability Management, Security Incident Event Management (SIEM), and federal and state security standards
- Experience with Commonwealth and DPW-specific security standards and requirements such as DPW Security and Privacy Standards, Commonwealth ITB-SEC005 and CA(2) Policy
- On-demand access to recognized leaders in Information Security and IT Risk Management.
 - 700 Certified Information Systems Security Professionals (CISSP)
 - 120 Certified Information Privacy Professionals (CIPP)

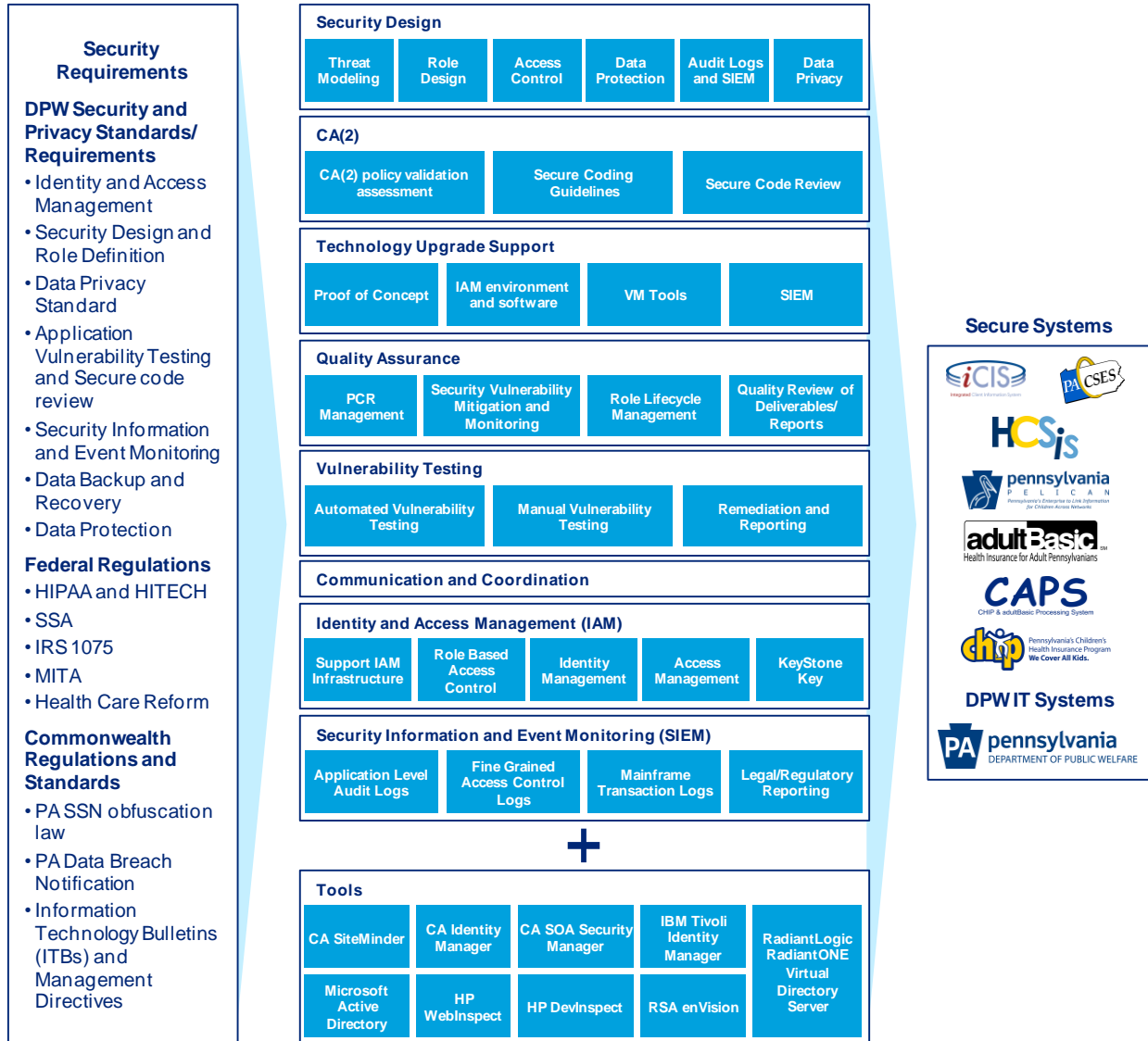


Figure 6.9-89. Our Approach Includes a Set of Security Services to Support DPW Requirements.
Our Approach to security addresses DPW requirements and standards as well as Commonwealth and Federal regulations and standards.

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In Figure 6.9-90 below, we highlight the types of application-specific security support provided by our team

Applications	Deloitte's Understanding of System-specific Characteristics for Security Support
<p>iCIS</p>	<p>CIS, IEVS and TPL (CIS Mainframe)</p> <ul style="list-style-type: none"> • CIS Unisys Mainframe requires that an integrated user authentication is maintained with Commonwealth (CWOPA) Active Directory (AD). This reduces the need for users to use SSNs for Mainframe login • CIS Mainframe must comply with regulatory requirements such as Internal Revenue Service (IRS) publication 1075 and the Social Security Administration (SSA) • CIS mainframe audit* logs and transaction logs must integrate with the SIEM system, EMC/RSA enVision, in order to identify potential violations to regulatory requirements (IRSA 1075 and SSA) through real-time monitoring and periodic reporting. <p>eCIS</p> <ul style="list-style-type: none"> • eCIS requires an Identity and Access Management (IAM) infrastructure to support more than 395,000 user authentications and more than 50 million user authorizations on a monthly basis • eCIS requires efficient synchronization between the application's Fine Grained Access Controls(FGAC) and SiteMinder to provide Coarse Grained Access (page level/Role based) and thereby leaving no room for error. eCIS requires Desktop Single Sign On (SSO) for intranet users and Web-based SSO for Internet users • eCIS application audit logs including FGA requires integration with the DPW SIEM system to monitor and report violations to SSA security requirements <p>COMPASS</p> <ul style="list-style-type: none"> • COMPASS requires CA SiteMinder based single sign-on user navigation experience across multiple simultaneous technology platforms – Adobe Flex and Microsoft .NET Framework • COMPASS requires community partner delegated administration, user self registration and password self-service managed through CA Identity Manager for more than 110,000 Citizen users, Community Partners (Business Partners) and Commonwealth staff.
<p>HCSIS</p>	<ul style="list-style-type: none"> • HCSIS requires an IAM infrastructure to supports more than 426,362 user authentications and more than 19 million user authorizations on a monthly basis with over 230 user roles • HCSIS security design requires appropriate integration with the Oracle database, FGA controls and Coarse grained access (Page level/role based) provided by CA SiteMinder • Each HCSIS user in the Active Directory should be appropriately synchronized with those application users present in the Database (FGA) for unique "HCSIS key". HCSIS application manages more than 230 application user roles • HCSIS Business partners require the CA Identity Manager to perform delegated administration, user self-registration and password self-service.

* For purposes of this project, the terms "audit" and "auditing" in our proposal refer to the implemented system's ability to track and record specified activities in a log or repository. It does not refer to any third-party opinion on the adequacy of the design or operating effectiveness of internal controls.



Applications	Deloitte's Understanding of System-specific Characteristics for Security Support
<p>PACSES</p>	<p>PACSES Mainframe</p> <ul style="list-style-type: none"> • PACSES Mainframe must comply with the regulatory requirements of the IRS 1075. • PACSES Mainframe transaction logs require integration with the DPW SIEM system to generate alerts and reports for monitoring violations to IRS 1075. <p>PACSES Open Systems</p> <ul style="list-style-type: none"> • PACSES Home Page (PHP) application is hosted on the OIT's web servers with the BEA Aqualogic Platform. PHP requires SSO to be established and maintained with this externally (non-DPW) hosted Web site and perform user authentication/authorization based on CWOPA and PACSES domains. • Paternity Tracking System (PTS) requires Desktop SSO solution for intranet based users and Web-based SSO for Internet users.
<p>PELICAN</p>	<ul style="list-style-type: none"> • Maintain the DPW IAM infrastructure that supports more than 546,070 user authentications, more than 36 million user authorizations on a monthly basis with over a 100 user roles • PELICAN requires transparent SSO between its application suite – CCW, PPCS, PKC and ELN and between the Microsoft .NET platform and legacy COM+ • PELICAN needs business partner user management by delegated administrators, user self-registration (Provider Self Service) and password self service using CA Identity Manager • PELICAN requires integration of application based FGA with CA SiteMinder based Coarse Grained Access Controls (Page level/Role based). PELICAN Microsoft .NET based web applications leverage services extensively. Each service needs to be analyzed manually and understand the response to multiple disparate requests – if unauthorized access to data can be obtained. • PPCS web services for the SmartClient interface requires protection through a custom user authentication and authorization LDAP call to the Microsoft Active Directory.ELN services exchange information to external systems. This requires appropriate protection using CA SOA Security Manager
<p>Child Welfare</p>	<ul style="list-style-type: none"> • Child Welfare application stores sensitive information related to Child Abuse and Neglect. Child welfare applications require appropriate data protection techniques, including mitigation of any remaining findings from Deloitte's vulnerability tests of AdoptPAKids.org Web site, IV-E QA, Contracts, Family Centers. • Child Welfare application requires reporting and monitoring techniques to meet the requirements of Federal regulations such as Adoption and Foster Care Analysis and Reporting System (AFCARS), HIPAA and HITECH • Child Welfare application and services require integration with the DPW IAM security infrastructure.
<p>Enterprise Services</p>	<ul style="list-style-type: none"> • Enterprise Services require protection using CA SOA Security Manager also integrated with WebMethods services • Secure SOA Implementation at DPW is the first such implementation in the State Government sector.

Figure 6.9-90. Our Understanding of DPW Application Characteristics to Provide Security Support.

Deloitte provides security support through our processes, techniques, and use of DPW standard security tools sets, as follows:

- **Security Design.** Address security requirements, identify and mitigate security threats in early design phases and before code is developed.
- **(CA)².** Support Commonwealth Application Certification and Accreditation by providing policy validation, assessment reports, source code review and vulnerability assessments to help DPW meet Commonwealth ITB-SEC005, CA(2) policy.
- **Upgrade Support.** Work with BIS to manage upgrades to security software.
- **Quality Assurance.** Drive continuous improvement by effectively managing requests between application development staff and BIS security team, and reviewing communications for compliance and validity.
- **Vulnerability Testing.** Perform vulnerability testing during application development using DPW standard tools and techniques.
- **Communication/Coordination.** Create and manage communication plans to keep stakeholders informed and engaged in decision-making.
- **Identity and Access Management (IAM).** Use our IAM methodologies, DPW IAM tools, and work with BIS to support IAM infrastructure and assessments.
- **SIEM.** Use our experience to support and implement DPW’s SIEM system.

Staff Spotlight
Praveen Srivastava

Security Specialist



“I am excited to be part of the DPW team and improve the security design aspects of the applications”.

Our Security Solution meets Commonwealth Security Policies and Standards

Our security team has worked on a number of projects for both DPW and the Commonwealth using the Commonwealth’s security and privacy standards. Not only are we familiar with the standards, but we assisting in the development of several of the standards. Figure 6.9-91 illustrates examples of DPW standards and Commonwealth ITBs that we have supported on DPW and other Commonwealth agency engagements.

DPW/ Commonwealth Standard	Deloitte’s Understanding of DPW and Commonwealth Standards
ITB-SEC005	Commonwealth Application Certification and Accreditation - (CA) ² policy
ITB-SEC007	Minimum Standards for User IDs and Passwords
ITB-SEC013	Identity Protection and Access Management (IPAM) Architectural Standard - Identity Management Services
ITB-SEC014	Identity Protection and Access Management (IPAM) Architecture Standard - Personal Identity Verification



DPW/ Commonwealth Standard	Deloitte's Understanding of DPW and Commonwealth Standards
ITB-SEC019	Policy and Procedures for Protecting Commonwealth Electronic Data
ITB-SEC020	Encryption Standards for Data at Rest
ITB-SEC021	Security Information and Event Management (SIEM) Policy
ITB-SEC024	IT Security Incident Reporting Policy
ITB-SEC031	Encryption Standards for Data in Transit
ITB-B.5	Security & Digital Certificate Policy and Encryption & Internet/Intranet Browser Standards for e-Government Web Sites & Applications.
DPW Data Privacy Standard	Describes the Department's minimum expectation to identify and mitigate data privacy risks during SDM
DPW Role Life cycle Management	Provides instructions for the process to request the DPW security teams for creation of new application roles and maintenance of existing user roles
DPW Web Application Security (CA SiteMinder) Standard	Provides the standard for Web Application Security to limit the number of disparate security systems within DPW's infrastructure
DPW Web Application Security Scanning Standard	Describes the Department's minimum expectations for web application security reviews, vulnerability testing and threat mitigation.
DPW Unified Security for Web Applications Standards	Describes the Department's minimum expectations for user identity and access management using CA SiteMinder
DPW IT Security Incident Reporting Policy	Describes the procedures to be followed when reporting IT security incidents such as loss of IT assets and potential loss of data
KeyStone Technology Plan	Provides the vision of the Commonwealth for a Citizen Centric Service delivery orientation and a shared services operational delivery model

Figure 6.9-91. Our Security Team is Experienced in Commonwealth Security ITBs and DPW Security Standards.

Security Design

Our approach for effective security is to make it transparent to the end user. At the same time, we understand the importance of integrating and implementing a broad security framework into the system development life cycle in support of DPW's complex business application solutions.

Our security design approach takes into consideration the following standards:

- DPW security and privacy standards,
- Commonwealth security and privacy ITBs,
- Security requirements from Federal/State regulations, such as IRS 1075, Health Information Portability and Accountability Act (HIPAA) and SSA.

Security design helps to identify and mitigate potential threats and vulnerabilities early in the SDM process. Our team works to “build in” security from the early stages of the application development life cycle rather than retrofit security capabilities in downstream SDM processes. Deloitte's approach to secure design uses standard DPW architecture and security tools, and includes the following key considerations:

- Identify and mitigate threats which may result in potential security vulnerabilities through Threat Modeling.
- Perform Role Based Access Control (RBAC) assessments using DPW's Role Life cycle Management guidelines to define new application user roles and maintain/retire existing user roles.
- Design user authentication and authorization controls using DPW's standard IAM and fine grained access tools.
- Design data protection controls to secure data at rest, in motion and in use.
- Design and integrate application security audit logs and mainframe audit logs with the SIEM system.

Identify and catalog Personally Identifiable Information (PII), map the flow of sensitive PII data and design appropriate, technical security controls to prevent inadvertent exposure of DPW's PII, in support of Addendum 4 of the RFP.

Deloitte's Security Experience at the Commonwealth includes performing security assessments, IAM, vulnerability testing and application security at:

- Department of Public Welfare (DPW)
- Department of Labor and Industry (L&I)
- Office of Information Technology (OIT)
- Pennsylvania Department of Transportation



Approach for Security Design

Figure 6.9-92 below illustrates our approach to supporting security design for DPW applications

Threads	Deloitte's Activities Meets Security Requirements	Benefits for DPW
Threat Modeling	<ul style="list-style-type: none"> Review security objectives, regulatory requirements and goals for the critical application components. Analyze use cases, critical components, user roles to access them, trust boundaries for information domain and related use case scenarios. Identify potential vulnerabilities that may impact the application. Identify, categorize and prioritize threats related to recognized vulnerabilities based on damage potential, ability to reproduce the attack, ability to exploit affected user(s), and ability to discover the vulnerability. Design and develop appropriate security controls to mitigate the identified threats that might lead to potential vulnerabilities. 	<ul style="list-style-type: none"> Enhances efficient design process by proactively identifying security threats early in the SDM process for "built in" security. Reduces downstream development and maintenance efforts.
Role Design	<ul style="list-style-type: none"> Review business requirements and applicable security requirements based on DPW standards, Commonwealth ITBs and applicable Federal/State regulations. Work with the application stakeholders to design user roles and page level permission levels. Conduct an impact assessment to identify user role duplication, overlap of existing user roles, role consolidation and opportunities for role de-provisioning. Finalize user roles based on the results of the impact assessment. Create and submit the Role Definition and the appropriate Role Creation/Maintenance request to DPW Security Team. Facilitate the Role Creation/Maintenance approval process for Role Creation and Role Maintenance between DPW security RBAC team and the application stakeholders. 	<ul style="list-style-type: none"> Enhances design compliance with DPW's Role Life cycle Management process. Simplifies and introduces a business centric approach to access management. Enables efficient compliance for enforcing Segregation of Duties.



Threads	Deloitte's Activities Meets Security Requirements	Benefits for DPW
<p>Authentication and Authorization</p>	<ul style="list-style-type: none"> Review business requirements for authentication and authorization. Design Coarse Grained Access Controls to provide page level access controls based on user roles using CA SiteMinder and SOA Security Manager (for web services). Design application-based Fine Grained Access Controls to provide application level granular access to data objects within the application. Example includes county level data access restrictions for the same user role. Integrate the Coarse Grained Access Controls and Fine Grained Access Controls into the DPW's Application Security Integration Architecture. Design and develop user provisioning using DPW security tools – CA Identity Manager and IBM Tivoli Identity Manager (ITIM) for Citizens, business partners and Commonwealth users. 	<ul style="list-style-type: none"> Enhances security by preventing users from unauthorized access to citizen information. Provides centralized management of user roles and user permissions through CA SiteMinder.
<p>Data Protection</p>	<ul style="list-style-type: none"> Review business requirements and applicable data protection regulatory requirements. Design data protection controls to secure: <ul style="list-style-type: none"> Data at Rest using database encryption tools such as Oracle Transparent Data Encryption (TDE) and SQL Server TDE. Design Database user roles and configure native user activity monitoring and logging. As part of this project, we will help DPW evaluate and select a suitable database encryption tool, Data in Motion using at the minimum, 128-bit key encryption, through HTTPS with TLSv1/SSLv3 technology and IPsec, Data in Use using coarse grained and fine grained access controls, user role management and segregation of duties and user activity monitoring to log user access to sensitive data, Data in Cache by masking sensitive PII, such as Social Security Number (SSN) and Federal Employer Identity Number (FEIN), displayed on web pages, services and documents acknowledged by DPW Data redaction (data de-identification) using techniques such as data scrambling to restrict replication of production data in lower environments (during production refresh). 	<ul style="list-style-type: none"> Supports encryption of sensitive database fields and helps prevent unauthorized access to data. Helps reduce attacks on communication channels. Helps prevent malicious users from retrieving PII data from browser cache through masking techniques on web pages and documents. Helps protect data through use of data scrambling techniques in lower environments.



Threads	Deloitte's Activities Meets Security Requirements	Benefits for DPW
Audit* Logs and SIEM	<ul style="list-style-type: none"> Review business requirements and applicable regulatory requirements for SIEM integration. Design application audit logs including application-level fine grained access control logs to record user access to sensitive PII. Design CIS and PACSES Mainframe transaction audit logs to record user access sensitive PII. Integrate the application with fine grained access controls and Mainframe audit logs using DPW's SIEM system. Configure DPW SIEM system to identify and report violations to Federal and State legal/regulatory requirements such as HIPAA, SSA and IRS 1075. 	<ul style="list-style-type: none"> Maintains SIEM as the scalable distributed platform for appropriately aggregating data for central analysis. Provides periodic reports and alerts to track violations to Federal and State legal/regulatory requirements.
Data Privacy	<ul style="list-style-type: none"> Review business requirements and applicable data privacy requirements. Review data handling analysis performed to limit the collection and identify the flow of PII through the proposed business processes. Create a PII inventory to categorize and catalog PII present in: <ul style="list-style-type: none"> Application user interface/screens Reports, correspondences and notice (We catalog this as part of DSD activities today – Mainframe and Open Systems) Database (open systems and mainframe) XML files Log files Categorize PII as Special handling PII, Health information, Personal information and Sensitive PII. Perform data handling analysis to limit the collection of PII. Develop data flow diagrams to analyze, limit and appropriately protect the flow of PII. Design and develop suitable technical and process controls to safeguard PII data. Assist DPW to identify, evaluate and select suitable data privacy tools such as Data Leakage Prevention and Information Rights Management solutions to secure citizen information. 	<ul style="list-style-type: none"> Enhances efficiency of design by Identifying and addressing data privacy risks early in the SDM process. Provides data flow mapping that represents the flow of PII across the data life cycle – collection, storage, use, sharing and destruction. Helps design privacy technical and processing early in SDM.process.
Regulations and Standards	<ul style="list-style-type: none"> Review applicable DPW standards, Commonwealth ITBs and Federal/State regulatory requirements. Design security controls to meet the requirements of rationalized security requirements. 	<ul style="list-style-type: none"> Provides a secure solution that meets the applicable Federal, Commonwealth, and DPW legal/regulatory security requirements.

Figure 6.9-92. Key Security Design Threads and Activities.

Applicability of Security Design Threads and Activities for DPW Platforms

- **Open Systems.** We use the security design threads and activities described above to develop security capabilities in DPW's Open Systems applications.
- **PACSES Mainframe.** We conduct the following activities in support of PACSES security design:
 - Use data protection techniques such as Mainframe Terminal Security Service (TSS) and TeamQuest Site Management Complex (SIMAN).
 - Catalog PII data generated by Correspondences, Notices and Reports as part of each PACSES Mainframe major release.
 - Integrate PACSES Mainframe audit logs and transaction logs with DPW's SIEM solution. This helps DPW identify security exceptions and violations to Federal regulatory requirements such as IRS 1075 and SSA.
- **CIS Mainframe.** We conduct the following activities in support of CIS security design:
 - Use data protection techniques such as Mainframe Terminal Security Service (TSS) and TeamQuest Site Management Complex (SIMAN).
 - Catalog PII data generated by Correspondences, Notices and Reports as part of each CIS Mainframe major release.
 - Integrate CIS Mainframe audit logs and transaction logs with DPW's SIEM solution. This helps DPW in identifying security exceptions and violations to regulatory requirements such as IRS 1075 and SSA.

Commonwealth Application Certification and Accreditation, CA(2)

Our approach to application security is designed to comply with the requirements set forth by the (Commonwealth ITB-SEC005) (CA)² policy.

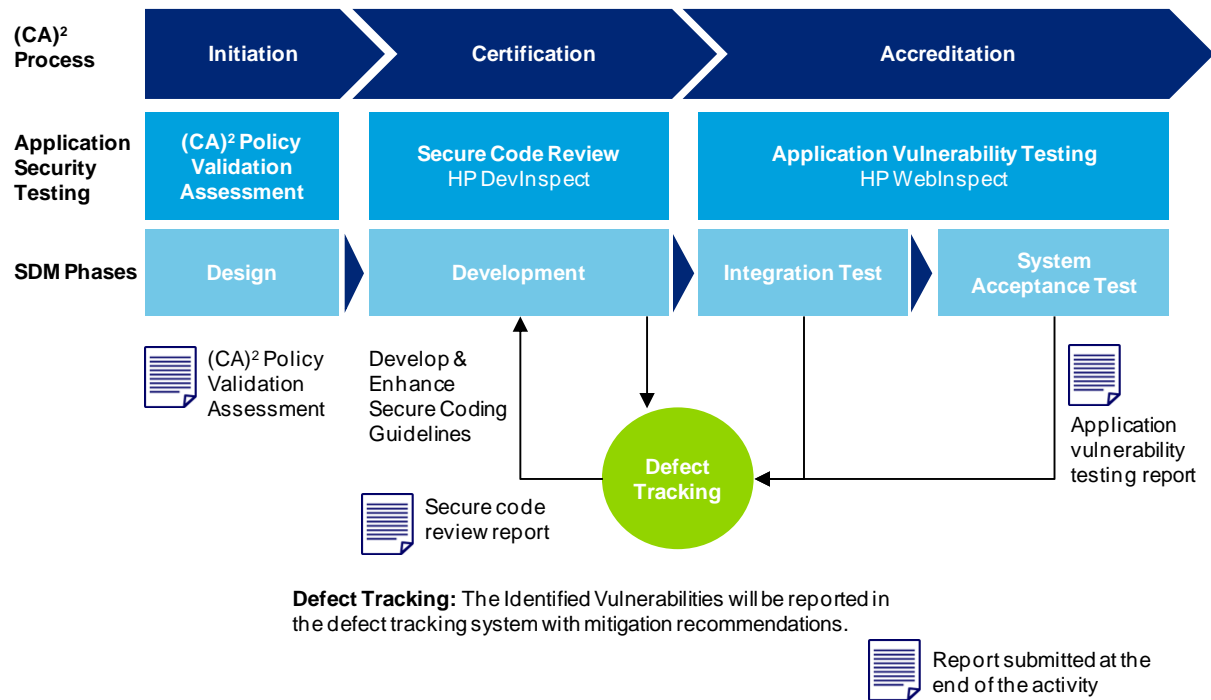
The (CA)² policy is monitored by the Office of Information Technology (OIT) and consists of three relevant phases – Initiation, Certification and Accreditation. We have been working with DPW, since the inception of CA(2) in April 2009. As per DPW's RFP requirements and practices, we perform the following activities for major application releases:

- (CA)² Policy Validation Assessment
- Secure Code Review
- Vulnerability Testing.

Figure 6.9-93 illustrates the deliverables, processes and the defect tracking mechanism used to help DPW comply with (CA)² policy.

Have you
heard? 

Deloitte has worked with DPW to submit more than 20 (CA)² policy validation assessment report as part of DSD deliverables since April 2009.



PA_DPW-2023

Figure 6.9-93. The ITSS Security Team Helps DPW Comply with Commonwealth Application Certification and Accreditation (CA)² Policy.

We assist DPW in the submittal of secure code reviews and follow-up as part of the Certification and Accreditation phases of the (CA)² process.

Approach to Help DPW Comply with (CA)² Policy

The ITSS security team assists DPW in meeting the (CA)² policy, as described in Figure 6.9-94.



(CA) ² Policy Phase	SDM Phase	Deloitte's Activities to meet (CA) ² Requirements	Benefits for DPW
Initiation Phase	DSD	<ul style="list-style-type: none"> • Support (CA)² Policy Validation Assessment. • Assist DPW (CA)² security team member in the development of the policy validation assessment by identifying and measuring the following key aspects of each major application release: <ul style="list-style-type: none"> - Compliance with OA/OIT policies, procedures and standards - Data security level - Security measures to address potential security risks. • Assist the Department's (CA)² security team member to address any questions and comments from the (CA)² administrator during the review of the policy validation assessment, after initial submission. 	<ul style="list-style-type: none"> • Helps to understand the level of compliance of DPW applications, and apply mitigation controls based on early assessment. • Supports compliance with ITB-SEC005 – (CA)² initiation phase.
Certification Phase	Development	<ul style="list-style-type: none"> • Develop and establish secure coding principles to assist development of secure DPW applications, that includes at a minimum: <ul style="list-style-type: none"> - Principles of strong parameter validation - Default deny permissions - Principle least privilege and access based on need-to-know/need-to-use • Conduct secure code reviews on new custom developed web application/web service source code using automated tools, i.e. HP DevInspect and HP SwfScan. The tasks include: <ul style="list-style-type: none"> - Review application architecture and source code - Identify security vulnerabilities within the application design, - Identify security vulnerabilities in the source code of the application - Provide recommendations and guidelines to mitigate the identified insecure coding practices • Document and submit the identified vulnerabilities along with the remediation plan and application vulnerability testing report. • Enhance secure coding guidelines from the vulnerabilities identified. 	<ul style="list-style-type: none"> • Provides the developers with secure application development coding guidelines. • Helps identify and mitigate insecure coding practices early during the SDM. • Complies with ITB-SEC005 (CA)² certification phase.



(CA)2 Policy Phase	SDM Phase	Deloitte's Activities to meet (CA)2 Requirements	Benefits for DPW
		<ul style="list-style-type: none"> Assist the Department's (CA)² security team member in the submission of the secure code review report during the certification phase of the (CA)² process. 	
Accreditation Phase	Integration Test and SAT	<ul style="list-style-type: none"> Conduct web application vulnerability testing for major and minor web application releases using automated scanning tools such as HP WebInspect and manual techniques. Submit vulnerability testing report at the end of the activity. Assist the department's ((CA)² security team member in the submission to OIT during the (CA)² Accreditation phase. 	<ul style="list-style-type: none"> Limit and control security vulnerabilities within the lower environments through early identification and mitigation Manual testing helps identify critical vulnerabilities when conducted along with automated testing. We have also observed that automated tools provide considerable amount of false positives and may fail to identify critical vulnerabilities Complies with ITB-SEC005 - (CA)² accreditation phase

Figure 6.9-94. Our ITSS Security Team Brings a Methodology and Experience for Assisting DPW with Compliance to (CA)² policy.

As DPW continues to embrace new technologies such as Rich Internet Applications (RIA), we will work with DPW to identify supported, secure code review tools. For example, we assisted DPW in the identification and assessment of various tools to support code review and security vulnerability testing of RIA Flex based COMPASS applications. As a result of the effort, DPW chose the HP SwfScan as the secure coding tool set for RIA Flex.

We are aware that HP plans to discontinuing support for the HP DevInspect in August 2011. We will assist DPW in identifying and selecting a suitable and comparable tool for secure code reviews prior to that deadline.

Applicability of CA(2) for Various DPW platforms

- Open Systems.** We currently perform CA(2) policy validation assessments, secure code reviews and web application, vulnerability scanning to help DPW comply with the CA(2) policy.
- PACSES Mainframe.** The Commonwealth ITB-SEC005, CA(2) policy applies to web application releases only.

- **CIS Mainframe.** The Commonwealth ITB-SEC005, CA(2) policy applies to each web application release only.

Security Upgrade Support

The ITSS security team supports the periodic maintenance and upgrade of security software in order to improve the overall performance and stability of the applications. We support security technology and infrastructure upgrades and maintenance activities prioritized by the Department and application stakeholders.

DPW's enterprise security environment is complex and includes the following security components:

- IAM infrastructure, supporting over 75,000 user authentications and over five million daily user authorization requests across 58 DPW applications.
- DPW's SIEM system, correlating more than 15,000 events per second from several disparate devices including Mainframe, Databases, Open systems applications and supporting infrastructure.

DPW's complex security implementation requires effective planning, coordination and rigorous testing for technology upgrades, before integrated with DPW's applications.

We support technology upgrades to DPW's security software including:

- IAM tools and supporting software: CA IAM Suite – CA SiteMinder, CA Identity Manager and CA SOA Security Manager, IBM Tivoli Identity Manager (ITIM), IBM WebSphere application server, RadiantLogic RadiantOne Virtual Directory Server and Microsoft Act.
- Active Directory.
- SIEM: RSA envision.
- Web Application Firewall: Imperva SecureSphere.
- Vulnerability Testing and Code Review: HP WebInspect, HP DevInspect, Paros Proxy and HP SwfScan.
- Custom IAM components developed by DPW such as SecurityObject, User self-registration service, Advanced Password Services and E-Signature service.
- New Security Software procured during the course of this project

Approach to Support Security Technology Upgrades

We support technology upgrades, including vendor patches, vendor hot fixes, software new release/new version, new security products, and custom components developed by DPW's security team and used by DPW's applications.

Figure 6.9-95 illustrates our approach to support security software upgrades.



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Figure 6.9-95. Security Technology Upgrade Support Process

Deloitte's process for supporting system upgrades involves coordinated scheduling, testing, and implementation support.

Identify Upgrade Requirement. We work with both DPW and application stakeholders to identify the business drivers for introducing upgrades to DPW security software. In addition, the team proactively monitors vendor software vulnerability updates, such as patches and hot fixes. Based on our extensive experience supporting security software upgrades for large-scale production environments, we use the following criteria for categorizing the business drivers for security upgrades:

- Maintenance of current product versions.
- New business initiatives and requirements that need additional security features not supported by the current security software.
- Dependencies from other components that support the security infrastructure.
- DPW's Annual Technology Planning Process.

Conduct Business Impact Analysis and Develop Release Plan. As security software upgrades are prioritized by DPW, we work with the DPW application stakeholders and Program Offices to identify the business impact for the change. Our ITSS security team works with the application stakeholders to develop a plan for introducing security upgrades in upcoming application releases.

Support Proof of Concept. We work with application stakeholders to develop use cases in order to support the testing of a Proof of Concept of the technology upgrade. We then analyze the outcome of the test to identify the impacts and provide advice on configuration changes to the DPW application/security infrastructure.

Release Coordination Management. Deloitte assists DPW in building a deployment plan, regression testing and vulnerability testing of the security software upgrade within the impacted application test environment. Our support includes facilitating recurring meetings with application stakeholders to coordinate the required testing activities, review and mitigate any technical issues. Once an integrated deployment plan is drafted, we submit the plan to DPW's Change Management Board (CMB) for approval.

Testing and Issue Management. We work with the applications teams to develop security-related regression testing scenarios for testing system changes. During testing, we work with DPW to analyze the security software upgrades by creating a list of applicable test scenarios that cover a certain portion of the application functionality.

We perform the tests using the regression and vulnerability tests. We track any issues through the PCR process.

Implementation Support. Once analyzed in the lower environments, we work with application stakeholders and DPW to obtain the required approvals and deploy the security software upgrade into the production environment. If additional application modifications or security software configuration changes are required, we coordinate with DPW and application teams to incorporate the changes in a prioritized release.

The team coordinates with DPW CISO and follows a structured upgrade process based on the type of software upgrade. Figure 6.9-96 summarizes the key elements of our process based on the size, type, and complexity of the security software upgrade.

Security Software Upgrade Type	Upgrade Process Steps					
	Identify Upgrade Requirement	Business Impact Analysis and Release Plan	Support Proof of Concept	Release Coordination Management	Testing and Issue Management	Implementation Support
Software Patches	No	Yes	No	Yes	Yes	Yes
Software Hot Fix	No	Yes	No	Yes	Yes	Yes
Software New Release/Version	Yes	Yes	Yes	Yes	Yes	Yes
New Security Software	Yes	Yes	Yes	Yes	Yes	Yes
Custom Developed Security Software Upgrade	Yes	Yes	Yes	Yes	Yes	Yes

Figure 6.9-96. Individual Steps of Our Upgrade Process Vary Based on the Size, Type, and Complexity of the Security Software Upgrade.

Security Quality Assurance

Our team provides experienced security Quality Assurance (QA) support and serves as the single point of contact for requests between the project teams and BIS security team. Figure 6.9-97 depicts our structured ITIL-based process to review requests for completeness, accuracy, and adherence to the processes set up by the DPW security team.



PA_DPW-2022

Figure 6.9-97. Deloitte’s Request Management and Quality Assurance Process.

Our quality assurance process enables the security domain single point of contact to review each request for accuracy, completeness and adherence to the processes set up by the DPW security team.

The project teams use Automated Tracking System (ATS) to track security change requests. Upon submittal of the requests, the team initiates its quality assurance as described below.

Domain QA Review. Once submitted, each request is thoroughly reviewed by our team for accuracy, completeness and alignment with the processes established by the DPW security team. We manage security requests using ATS for each of the application environments. Our staff reviews each request for completion of the requested change in lower environments before migrating the release to the production environment. Deloitte performs detailed checks on the request and its contents, as outlined in Figure 6.9-98.

Request Type	Deloitte Performs the DPW Required Quality Assurance Steps
Role Creation and Role Maintenance	<ul style="list-style-type: none"> • Analyze if the request has been placed within the required time frame. • Check if the appropriate application environment is provided. • Analyze if the user role definition meets the guidelines provided by DPW's Role Life cycle Management. For example, eCIS application requires an additional check to detect the presence of the corresponding program office user roles for requested application user roles. • Check for user role approval from the appropriate Program Office. • Identify if the user permission matrix provided along with the request is current. • Perform an impact analysis to identify if the requested user role change causes role duplication or existence of similar user role permission. • Analyze if the appropriate attribute change/addition of new attributes are defined. • Identify if the dependencies of these user roles are appropriately identified and suitably mitigated for user role retirement and modification, • Check if the request describes the users affected by this role change if provided. • Check if reference PCRs are provided to support this activity, if already performed in lower environment.



Request Type	Deloitte Performs the DPW Required Quality Assurance Steps
User creation and provisioning	<ul style="list-style-type: none"> • Identify if the request has been placed within the required time frame • Check if the appropriate application environment is provided • Identify if the request contains changes that are to be performed on the user repository (Active Directory) • Conduct an impact analysis on the requested change to identify if the change request functions as requested, i.e. does not impact other users than intended • Analyze the user provisioning change for impact on other applications/systems • Check if reference PCRs are provided to support this activity, if already performed in lower environment.
Security policy change	<ul style="list-style-type: none"> • Identify if the request has been placed within the required time frame • Check if the appropriate application environment is provided • Identify if the reason for the required policy change is provided along with the approval from Program Office • Perform an impact analysis to check if the new user security policy change would impact other related user roles, users and applications • Check if the affected user base affected by the policy change is provided in the PCR. Perform an analysis to identify the affected user based matches the data provided in the PCR • Check if reference PCRs are provided to support this activity, if already performed in lower environment.
User conversion	<ul style="list-style-type: none"> • Compare if the request has been placed within the required time frame • Check if the appropriate application environment is provided • Identify if the reason for the user conversion is provided along with the approval from Program Office • Check if the request contains the users affected, Active Directory (AD) to perform the user conversion along with the appropriate AD attributes to be modified • Perform an impact analysis to check if the new user conversion would impact existing user roles and applications • Check if reference PCRs are provided to support this activity, if already performed in lower environment
Password reset/Account unlock	<ul style="list-style-type: none"> • Identify if the request has been placed within the required time frame • Check if the appropriate application environment is provided • Identify if the reason for the password reset is provided along with the approval from Program Office • Identify if this change cannot be performed by the application stakeholders using CA Identity manager password self-service functionality.

Figure 6.9-98. Deloitte Security Domain Quality Assurance Steps.

Review with Requestor. If a request does not meet the required QA standards, we engage the requestor and work to complete or produce any missing required items, or to revise items which need correction or clarification. During this process, we document changes as history notes in the Request Tracker to maintain a change log. After correcting errors in the request, we resubmit for approval and then perform the QA checks again.




Request Submission to BIS. Once the BIS security team member acknowledges the request, we prioritize it for processing. We use ATS to communicate status and to maintain a history log of requests and actions.

Security Vulnerability Testing

We conduct controlled vulnerability tests during the Integration Test phase of SDM in accordance with DPW’s Security Vulnerability Scanning Policy (STD-ENSS020). We conduct Vulnerability Tests for each major and minor application release using automated tools and manual techniques. Vulnerability tests help identify security vulnerabilities that may potentially impact the confidentiality, integrity or availability of DPW data.

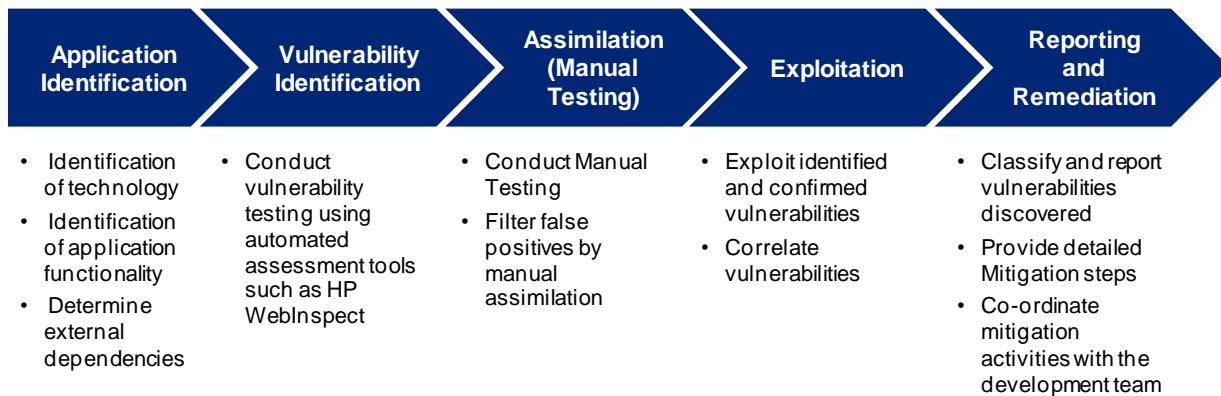
We conduct vulnerability testing and mitigation early in the SDM to reduce the efforts and costs of mitigating security issues found in downstream SDM phases or in the production environment. We use DPW’s standard product, HP WebInspect, for automated vulnerability scanning.

Have you heard? 

Deloitte’s proactive vulnerability testing resulted in cost avoidance of approximately \$6.8 million over a one-year period (FY’09) from credit monitoring services if the vulnerabilities had resulted in a data breach.

Security Vulnerability Testing Process

Deloitte has extensive experience in performing application security vulnerability testing. We have assisted DPW to establish the Web Application Vulnerability Scanning Standard and have conducted vulnerability assessments for DPW applications since the establishment of this standard. Figure 6.9-99 illustrates our DPW security vulnerability testing process.



PA_DPW-2021

Figure 6.9-99. Deloitte’s Security Vulnerability Assessment Approach.

We use a five-phase process to perform vulnerability testing on DPW applications for continued assistance in securing DPW applications.



Our security vulnerability testing process is comprised of five phases including:

- **Application Identification.** Work with the application stakeholders to understand the architecture, business logic/functionality, external dependencies, user roles and privileges within the application.
- **Vulnerability Identification.** Perform vulnerability tests using automated vulnerability scanning tools such as HP WebInspect.
- **Assimilation (Manual Testing).** Perform a manual review of the tool results to filter false positives. We use a series of manual tests to provide a more detailed profile of the web application.
- **Exploitation.** Attempt to exploit the identified vulnerabilities, with the approval of DPW, and correlate the identified vulnerabilities.
- **Reporting and Remediation.** Assist application stakeholders and DPW to identify the “root causes” and mitigation measures of the identified security vulnerabilities.

Have you heard? 

Since the implementation of the DPW Web Application Vulnerability Scanning standard, Deloitte has performed more than 1000 vulnerability scans, demonstrating our deep experience in securing DPW applications.

Security Vulnerability Testing Techniques and Manual Testing

As part of the security vulnerability assessment, we perform a Black Box and a White Box assessment on the web applications and services, using automated tools such as HP WebInspect and manual techniques. We describe each of these assessment types in Figure 6.9-100.

Deloitte Vulnerability Assessment Techniques	Deloitte Approach Addresses Security Vulnerability Assessment Requirements
Black Box Testing	<ul style="list-style-type: none"> • Perform vulnerability tests for a non-user perspective (in a potential external attacker’s view). • Tester does not have privileged knowledge of the application.
White Box Testing	<ul style="list-style-type: none"> • Perform vulnerability tests from a non-user and end-user perspective (potential external and internal attackers). • Tester does have privileged knowledge of the application (like user credentials of different roles) and/or access to the source code or supporting infrastructure.

**Deloitte
Vulnerability
Assessment
Techniques**

**Deloitte Approach Addresses Security Vulnerability Assessment
Requirements**

Manual Testing

- Correlates application actions/events and vulnerabilities to identify consequences on other pages and/or on the entire system through:
 - Insecure configuration Testing, to determine the security of the web server configuration,
 - Manipulation testing, to attempt bypassing the application controls through manipulation of the user interfaces/parameters and application states,
 - Aggregation Testing, to determine if the application discloses information that assists to launch further advanced attacks on the application,
 - Iteration Testing, to analyze if iterative, repetitive, or “brute force” techniques can be used for timing attacks or to bypass session/state management,
 - E.g. Phishing attacks and Persistent Cross Site Scripting.
- Explore potential new threats & develop potential new attack vector(s):
 - Forceful browsing,
 - Unauthorized access to restricted records,
 - Privilege escalation,
 - Attacks on Session Management,
- Develop detailed understanding of the Business/Application Process.

Figure 6.9-100. Security Vulnerability Assessment Techniques.

Deloitte’s approach to performing security vulnerability assessments has become a standard best practice for DPW, PID, L&I and OIT.

Automated vulnerability scans provide a reasonable security baseline. Based on our extensive experience in vulnerability assessments, we recognize that automated tests generate considerable false positives and may fail to identify security vulnerabilities within the business layer of the application

Security Vulnerability Test Report

At the end of the testing activity, we assimilate the test logs to filter false positives. We document the results of the vulnerability assessment and submit them as part of the vulnerability testing report to the DPW CISO. We divide the security vulnerability test report into three major sections as discussed in Figure 6.9-101.



Vulnerability Assessment Report Sections	Deloitte Vulnerability Assessment Report Details	Stakeholder	Tools/ Techniques
Security Vulnerability Description	<ul style="list-style-type: none"> • Describes the identified security vulnerability, vulnerability location(s), number of instances where identified and vulnerability severity (high, medium and low) • Provide the suggested vulnerability mitigation upon analyzing the root cause • Map each vulnerability identified to a system specific vulnerability ID, to track root cause and reemergence of vulnerabilities • Benchmarks the vulnerabilities identified with Open Web Application Security Project (OWASP) Top Ten vulnerabilities in 2010 	<ul style="list-style-type: none"> • Deloitte Vulnerability test specialist 	<ul style="list-style-type: none"> • HP WebInspect • Manual Testing Techniques
Vulnerability Categorization/ Business Impact	<ul style="list-style-type: none"> • Describes the business criticality of the security vulnerabilities identified and user groups impacted 	<ul style="list-style-type: none"> • DPW CISO, Business and technical Stakeholders 	<ul style="list-style-type: none"> • Application Business Impact Analysis
Mitigation timeline	<ul style="list-style-type: none"> • Provides the PCRs recorded for each vulnerability identified to monitor for mitigation during SAT phase of SDM • Helps to track the mitigation status when submitted to the DPW CISO 	<ul style="list-style-type: none"> • DPW CISO, Business and technical Stakeholders 	<ul style="list-style-type: none"> • ATS

Figure 6.9-101. Deloitte’s Security Vulnerability Assessment Report Provides Reliable Information for Security Vulnerability Assessments.

Security Vulnerability Assessment Dashboard. The dashboard provides a graphical representation of the vulnerabilities identified within the application in terms of vulnerability severity (as High, Medium or Low), and corresponding benchmark with the Open Web Application Security Project (OWASP) Top Ten vulnerabilities – 2010. The dashboard, shown in Figure 6.9-102, is included as part of the vulnerability assessment report submitted to DPW’s CISO at the end of the testing activities.



Web Application Vulnerability Testing Summary – SampleApplication R10.0

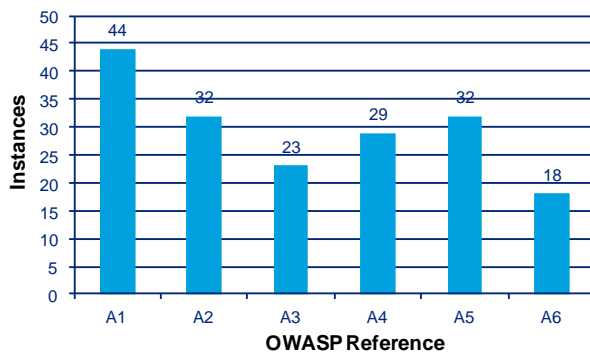
OWASP Top 10 Vulnerabilities - 2010
A1 - Injection
A2 - Cross-Site Scripting (XSS)
A3 - Broken Authentication and Session Management
A4 - Insecure Direct Object References
A5 - Cross-Site Request Forgery (CSRF)
A6 - Security Misconfiguration
A7 - Insecure Cryptographic Storage
A8 - Failure to Restrict URL Access
A9 - Insufficient Transport Layer Protection
A10 - Unvalidated Redirects and Forwards

Severity Ratings	
Security	Description
High	Exploitation of the vulnerability will result in "super-user" access (i.e., "administrator"). Exploitation may also result in web defacement, phishing attacks, sensitive data disclosure etc Exploitation of the vulnerability results in unauthorized access to privileged information
Medium	Exploitation of the vulnerability could gain access to sensitive information on the host or unauthorized access to non-sensitive data and may result in framing further attacks on the application.
Low/ Informational	Exploitation of the vulnerability could result in unauthorized access to informational data only.

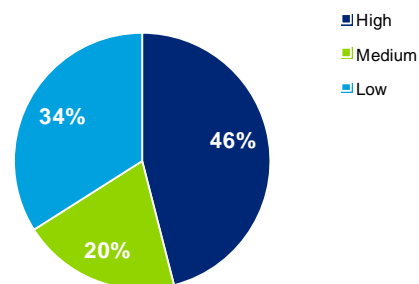
Vulnerability Type	Instances
A1	44
A2	32
A3	23
A4	29
A5	32
A6	18

Severity	Instances
High	83
Medium	35
Low	60
Total	178

Vulnerability instances - OWASP Reference



Vulnerability Serveryity



PA_DPW-2017

Figure 6.9-102. Sample Vulnerability Assessment Dashboard.

Deloitte provides a single consolidated view of the vulnerabilities identified per application release.

Security Vulnerability Remediation

We work with application stakeholders to identify the root cause and business impact of identified vulnerabilities in order to prioritize the remediation efforts. Those vulnerabilities categorized as high severity are mitigated during the SAT test phase. Any exceptions will be discussed with the DPW CISO along with the mitigation plan. For vulnerabilities categorized as Medium or Low severity, we facilitate discussions between the application stakeholders and DPW CISO to reach a consensus for the mitigation plan in accordance with the DPW Web Application Security Scanning Standard.

Security Vulnerability Monitoring. The vulnerabilities that are not mitigated during the SAT phase are monitored for timely closure as described by the mitigation plan and managed through the PCR process.



Security Vulnerability Testing Coordination with DPW's "Trusted Agent"

The Web Application Vulnerability Testing is carefully planned and controlled, and performed in close coordination with Commonwealth personnel. The Commonwealth identifies at least one staff member to serve as a "trusted agent" and is responsible for:

- Make decisions to proceed with applicable testing
- Participate in the testing activity
- Identify mission critical systems of DPW, Commonwealth, business partners or affiliates, and third parties, as applicable

The "trusted agent" coordinates and authorizes Deloitte access to DPW's information technology components which have been identified by the Commonwealth for vulnerability testing. In order to avoid interruptions, we recommend running many of the assessment tasks during non-business hours. At DPW's direction, we execute as many of these tasks as practical during non-business hours.

Applicability of Security Vulnerability Testing for Various DPW Platforms

- **Open Systems.** We perform vulnerability testing for each major and minor Open System release during the Integration testing phase of SDM, using automated tools and manual techniques. We work with the application stakeholders to mitigate the vulnerabilities in the SAT phase of SDM. The team submits a Security Vulnerability Test Report to the DPW CISO which provides details of the vulnerabilities identified and the mitigations applied.
- **PACSES Mainframe.** As per the DPW Security Vulnerability Scanning Standard, the tools and processes do not support performing vulnerability scans on the PACSES mainframe code.



- **CIS Mainframe.** As per the DPW Security Vulnerability Scanning Standard, the tools and processes do not support performing vulnerability scans on the PACSES mainframe code.

Security Communication/Coordination

A consistent CMMI model for communication is followed by the security team through our use of a Communication Plan. The Communication Plan is a key document which provides a specific, structured model identifying the written, spoken and electronic communication between security team and DPW stakeholders. As with CMMi plans, this is reviewed and updated on an annual basis with stakeholders or as communication requirements change based on the needs of the stakeholders or project activities.

The security team documents the meetings necessary to support such activities for Project Management, IT Operations or to address operations support issues. The table below provides a list of the meetings which support these activities.

Communication Plan Meeting	Deloitte's Activities Support Security Communication/Coordination Needs
Weekly Security Meeting	<ul style="list-style-type: none"> • Discuss the status of the ongoing security initiatives, the upcoming initiatives and production deployment logistics. In addition, we review the following topics: • Present RBAC Approval and Maintenance Requests • Review number of security PCRs in open, closed, and In-progress status • Review vulnerability identification and mitigation status • Review and submit security deliverables and reports • Present CA(2) policy validation assessments • Assess leading industry security trends and improvement opportunities
Vulnerability Consensus Meeting	<ul style="list-style-type: none"> • Support Security vulnerability Consensus Meeting between project teams and DPW at the end of a vulnerability assessment
Change Management Board	<ul style="list-style-type: none"> • Present information on business/technology changes for the proposed application implementation request (AIR). The AIR provides information on business reasons for the application change, code diff sheet and program office approval information
Production Deployment Logistics	<ul style="list-style-type: none"> • Present the production playbook during the meeting. Production playbook lists the deployment steps, resources, and dependencies for production deployment. We confirm the steps, roles and responsibilities of each domain for the production deployment
ITSS Project Team Meeting	<ul style="list-style-type: none"> • Assess overall resource requirements for domains across application releases



Communication Plan Meeting	Deloitte's Activities Support Security Communication/Coordination Needs
Monthly Security and Privacy Steering Team Meeting	<ul style="list-style-type: none"> • Present the following topics: <ul style="list-style-type: none"> - Project status update on each security initiative and upcoming initiatives - Security Key Performance Indicators (KPIs) such as IAM user base change and number of security incidents in production environment - IAM infrastructure statistics, including number of user authentication and authorizations on a monthly basis - Updates on DPW, Commonwealth, or Federal standards and regulations - Regulatory audit findings and remediation status

Figure 6.9-103. We Use Communication Plan Meetings for Coordination with Stakeholders and Across Domains.

Identity and Access Management (IAM) Support

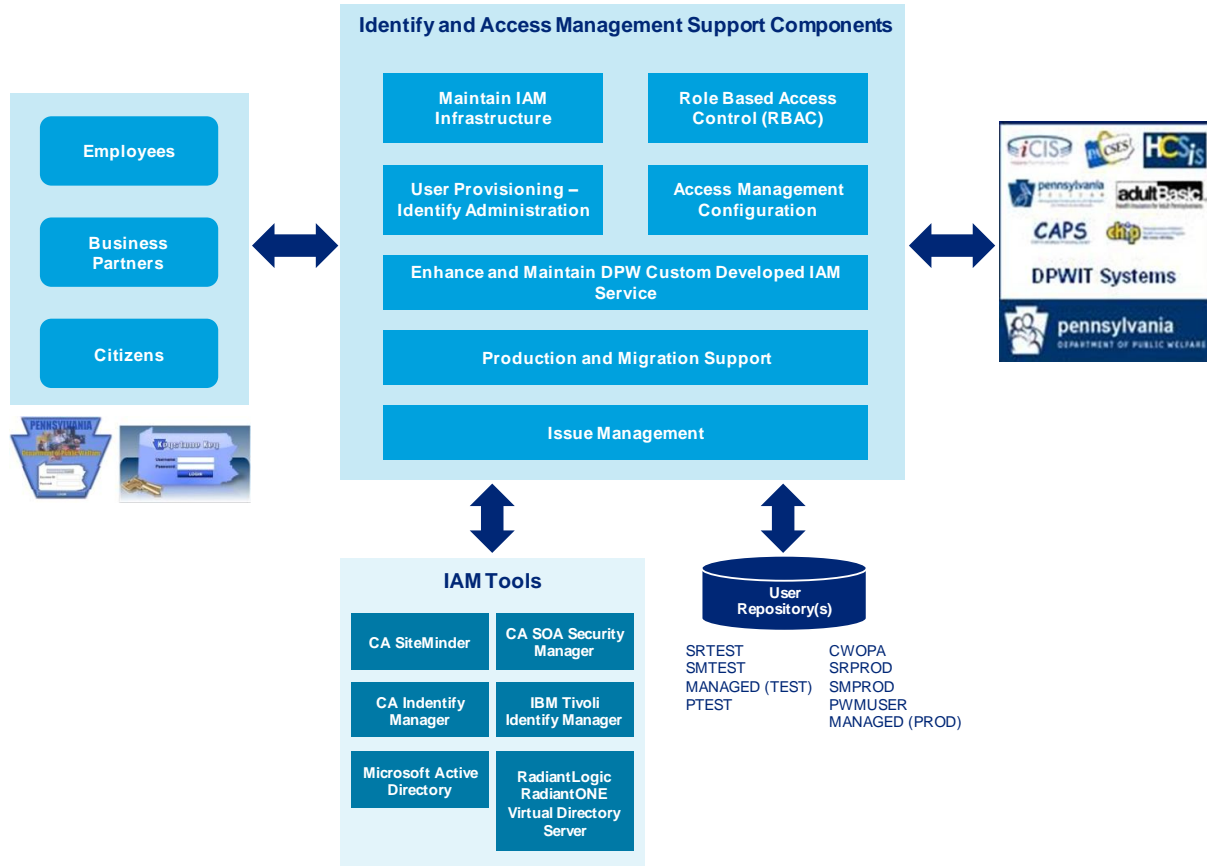
Our extensive experience in helping DPW establish an enterprise IAM architecture provides our security team with detailed knowledge of DPW's security tools, environments and infrastructure. In addition to supporting the DPW security team with maintaining the security infrastructure, we facilitate the gathering of IAM business requirements from the project teams. Our understanding of DPW's current environment and future requirements makes Deloitte uniquely positioned to assist DPW with the growth and maturity of the IAM service offerings.

Approach for IAM Support

We work with DPW to support and maintain the security IAM infrastructure. We currently work with application stakeholders to integrate and maintain the DPW applications with required IAM services. Figure 6.9-104 illustrates the activities we perform as part of IAM support.

Our IAM Experience at the Commonwealth

- Successfully implemented IAM (SSO) at Commonwealth agencies – DPW, L&I and PennDOT
- Assisted OA/OIT in Defining Enterprise IAM Technical Architecture and Roadmap for Commonwealth in 2008
- Successfully integrated common IAM model between DPW and L&I – for the business partner and citizen users leveraging SSO for eGovernment services.



PA_DPW-2027

Figure 6.9-104. Deloitte’s IAM Support Components.

Our understanding of DPW’s current environment and future requirements makes Deloitte uniquely positioned to assist DPW with the growth and maturity of the IAM service offerings.

Figure 6.9-105 describes the activities we perform as part of each IAM support component.

IAM Support Components	Deloitte’s IAM Support Activities Meet DPW Requirements
<p>Maintain IAM Infrastructure</p>	<ul style="list-style-type: none"> • Support the DPW security team in the management of the shared security infrastructure including: <ul style="list-style-type: none"> - Microsoft Active Directory User repositories – CWOPA, SRPROD, MANAGED, PWMUSER, SRTEST, SMTEST and PTEST - CA IAM Suite – CA SiteMinder (R8 SP2 and R12), CA Identity Manager (R6 and R12) and CA SOA Security Manager - RadiantLogic RadiantOne Virtual Directory Server (VDS) - IBM Tivoli Identity Manager (ITIM) - IBM WebSphere Application Server - DPW’s Proof of Concept Environment for IAM



IAM Support Components	Deloitte's IAM Support Activities Meet DPW Requirements
<p>Role Based Access Control (RBAC)</p>	<ul style="list-style-type: none"> • Analyze business requirements and applicable security requirements based on DPW standards, Commonwealth ITBs and applicable Federal/State regulations • Work with the application stakeholders to design user roles and page level permission levels • Conduct an impact assessment to identify for user role duplication, overlap of existing user roles, role consolidation and opportunities for role de-provisioning • Finalize user roles based on the results of the impact assessment • Create and submit the Role Definition and the appropriate Role Creation/Maintenance request to DPW for implementation • Facilitate the Role Creation/Maintenance approval process for Role Creation and Role. Maintenance between DPW security RBAC team and the application stakeholders
<p>User Provisioning: Identity Administration</p>	<ul style="list-style-type: none"> • Support DPW in the enhancement and maintenance of User Provisioning services developed with CA Identity Manager such as: <ul style="list-style-type: none"> - Business Partner Self-Registration - Business Password Self-Service solutions - Electronic registration by Business Partner Organizations (self-service by Representatives) - E-signature of Data Release Agreement and User Agreement - Retrieve user ID (self-service) - Workflow based approvals by Program Office or Delegated Administrator - Delegated Administration model - Deactivate/Remove Access • Work with DPW to implement IBM TIM user provisioning solution and support deployment to DPW applications • Assist application stakeholders to design and implement DPW user provisioning services and the ITIM user provisioning solution • Identify opportunities where new user provisioning services can be created and existing services can be expanded to other DPW Program Offices, applications and users. Our design and implementation approach is based on developing an extensible framework of services that can be reused as DPW grows its IAM footprint <ul style="list-style-type: none"> - As an example, the self-service password reset using Graphical Identification and Authentication (GINA) technology was an outcome of a business process design efforts for PACSES. A similar approach and technology can be used to support password reset for DPW users using the ITIM solution



IAM Support Components	Deloitte's IAM Support Activities Meet DPW Requirements
<p>Access Management Configuration</p>	<ul style="list-style-type: none"> • Use CA SiteMinder and CA SOA Security Manager (for web services) to configure user authentication and authorization to DPW applications (Single Sign-On) in accordance with the Commonwealth and DPW security standards • Design Coarse Grained Access Controls, providing page level access controls based on user roles using CA SiteMinder and SOA Security Manager (for web services) • Design Fine Grained Access Controls, providing application level granular access to data objects within the application • Maintain user repositories (Microsoft Active Directory) CWOPA for Commonwealth staff; Managed, SMPROD and PWMUSER (until users are migrated to managed) for business partners and SRPROD for citizens • Design and implement user authorization with Coarse-grained (Page level) access controls using CA SiteMinder • Design and integrate CA SiteMinder based Coarse Grained Access Control with the application- based Fine Grained Access Controls • Design and integrate user provisioning systems with ITIM for CWOPA users, business partners and citizen users • Maintain CA Identity Manager user provisioning solution • Extend Password Self-Service and Business Partner Delegated Administration solution to each project application secured with IAM solution
<p>Enhance and Maintain DPW custom developed IAM Services</p>	<ul style="list-style-type: none"> • Assist DPW to develop and maintain the custom developed IAM services, and assist application stakeholders in the integration of these services into DPW applications. The custom developed IAM services include: <ul style="list-style-type: none"> - User Self-Registration Service (Example: PELICAN and COMPASS business partner self-registration) - Advanced Password Services (Example: COMPASS business partner self-service) - e-Signature Service (Example: Commonwealth New User Agreement Acknowledgement) - User Delegated Administration Service (Example: HCSIS and PELICAN delegated administration)
<p>Production and Migration Support</p>	<ul style="list-style-type: none"> • Assist application stakeholders to develop the application deployment plan for each release requiring security support • Assist application stakeholders by incorporating the identified security changes in lower environments • Develop custom scripts to facilitate custom Security Policy and User Repository changes (e.g. User bulk uploads) • Attend production deployment playbook meetings, CMB meetings to assist the application stakeholders on security modifications for the releases discussed • Support DPW security to migrate the appropriate changes required by the application release to production deployments
<p>Issue Management</p>	<ul style="list-style-type: none"> • Monitor IAM infrastructure trends and performance metrics proactively to identify stoppage or slowness of IAM software and services • Work with application stakeholders and DPW to resolve PCRs created for supporting application development throughout SDM

Figure 6.9-105. IAM Support Activities.

Figure 6.9-105 lists the activities that we perform for RBAC and User Provisioning. We will work with DPW to support future assessments for RBAC and User Provisioning.

IAM Support Types to Meet DPW requirements

- **Open Systems.** Perform IAM support activities.
- **PACSES Mainframe.** Provide support for integrated PACSES Mainframe authentication using Commonwealth/PACSES common user repository (Microsoft Active Directory). PACSES Mainframe users authenticate using Commonwealth/PACSES domain username and password.
- **CIS Mainframe.** Provide support for integrated CIS Mainframe authentication using Commonwealth common user repository (Microsoft Active Directory). CIS Mainframe users authenticate using Commonwealth domain username and password.

Security Incident Event Management (SIEM)

SIEM system automates the process of log consolidation and analysis. They normalize and store event data, correlate it, help produce reports, issue alerts and assist in forensic analysis. We understand and support DPW's vision to leverage SIEM as a scalable distributed platform for appropriately aggregating data for centralized analysis and action that helps to:

- Use DPW SIEM system, EMC/RSA enVision, as a single point for collection of audit logs.
- Monitor and correlate, in real-time, security incidents and events across device types.
- Maintain digital chain of custody with unaltered log data for data retention and forensic requirements.
- Help maintain compliance with legal/regulatory requirements.

Have you
heard? 

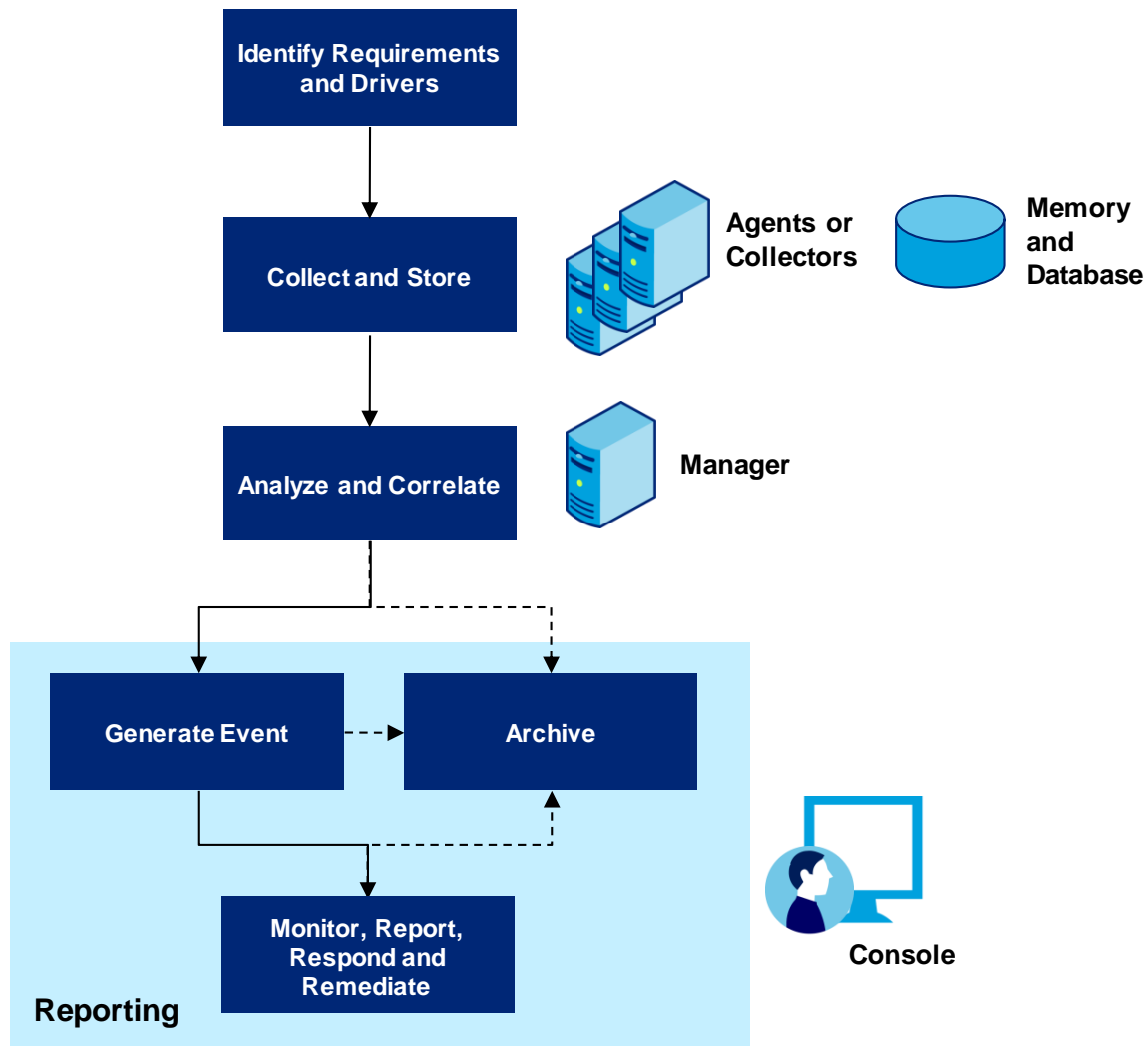
Deloitte assists DPW in leveraging SIEM system that integrates about 15,000 events/sec from over a 100 devices into a common analysis and reporting tool, providing enhanced visibility into information security and improved detection and response capabilities.

Deloitte supports DPW to configure and enhance the implementation of the DPW SIEM System.

We work with application stakeholders to design the application security audit logs, Fine Grained Access Control logs and Mainframe transaction logs to consistently integrate with DPW's SIEM solution.

Our Approach to SIEM Integration

DPW's SIEM solution generates periodic reports and real-time alerts for compliance and security exceptions. We have worked with DPW to configure the SIEM system and extract periodic reports. The activities involved in our four step SIEM integration approach are illustrated in Figure 6.9-106.



PA_DPW-2020

Figure 6.9-106. Our Framework for SIEM Integration.

Deloitte works with DPW to configure SIEM system and extract periodic reports for better visibility into information security, improved detection and response capabilities.

The four phases of our SIEM integration framework includes

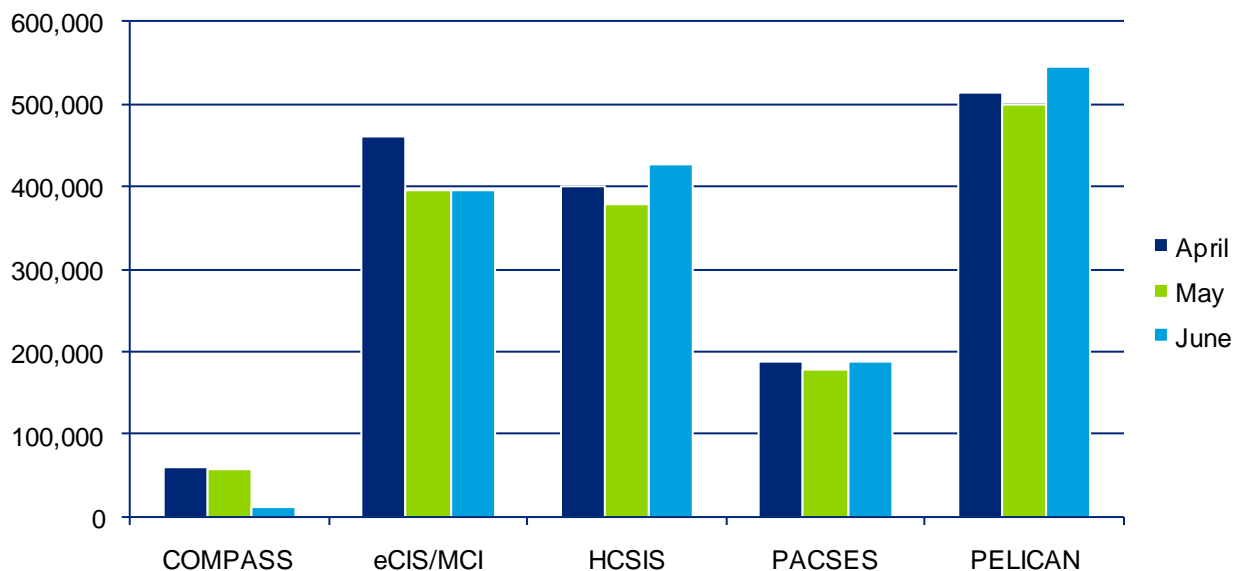
- **Phase 1 – Identify requirements and Drivers.** Work with the application stakeholders to identify the appropriate application security audit logs and Mainframe audit logs to be integrated with DPW SIEM system.
- **Phase 2 – Collect and Store.** Configure DPW's SIEM agents to interface to the identified components to retrieve systems log and events logs in real-time. We work with the application stakeholders to configure RSA enVision agents to collect audit logs and security events generated applications and mainframes. We will integrate the following logs with DPW SIEM system:
 - **Application Security Audit Logs and Fine Grained Access (FGA).** Provide integration of application audit logs with the SIEM solution, including the Application based FGA and Oracle FGA logs. We maintain guidelines to configure and integrate application audit logs with DPW SIEM
 - **Mainframe Audit Logs and Transaction Logs.** Provide integration of the PACSES Mainframe and the CIS Mainframe audit logs to monitor violations for applicable regulatory compliance requirements such as HIPAA, HITECH, IRS 1075 and SSA through the DPW SIEM solution. The violations to these compliance requirements are monitored in real-time to perform the appropriate corrective action. This integration assists DPW to meet key regulatory audit requirements from SSA and IRS 1075
- **Phase 3 – Analyze.** Define the various log/event correlation techniques that have been used to provide the reports for meeting the business and regulatory requirements, such as SSA and IRS 1075. We assist DPW to integrate the eCIS application security audit logs, CIS Mainframe audit logs and PACSES Mainframe audit logs using DPW SIEM system. This cost-effective integration helped DPW meet the Audit Logging requirement of SSA and IRS 1075. We are working with DPW to integrate PACSES and CIS Mainframe transaction audit Logs with DPW SIEM system.
- **Phase 4 – Reporting.** Configure DPW's SIEM solution reporting engine to generate periodic and ad hoc reports based on business requirements, KPIs and regulatory reporting. We use the reporting engine of DPW's SIEM solution for producing both ad hoc and periodic reports for defined monitoring categories, such as:
 - **Regulatory Compliance Monitoring** for real-time and periodic reporting of violations to DPW standards, Commonwealth ITBs and Federal regulations such as HIPAA, SSA and IRS 1075.

Have you
heard? 

Deloitte helped DPW integrate CIS mainframe audit logs with SIEM system to address a key SSA Audit Finding.

- **Performance Monitoring** for generating periodic reports to provide DPW with performance measurements of its security infrastructure, such as IAM systems, against defined DPW security KPIs
- **Trend Analysis and Monitoring** for detecting patterns in security infrastructure operations, performance and security exceptions over a period of time such as Quarterly. Figure 6.9-107 illustrates a sample trend analysis of user authentication attempts from CA SiteMinder logs over a period of three months.

User Authentications – Sample Trend Analysis



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Figure 6.9-107. Sample User Authentication Trend Analysis.

Monitoring user authentication attempts helps understand the application usage trends and forecast security infrastructure capacity requirements.

Applicability of SIEM Integration for Various DPW Platforms

- **Open Systems.** We work with application stakeholders to identify and integrate the application security audit logs to DPW SIEM.
- **PACSES Mainframe.** We work with application stakeholders to integrate the PACSES Mainframe audit logs with DPW SIEM. This helps DPW monitor exceptions to regulatory compliance such as SSA and IRS 1075.
- **CIS Mainframe.** We work with application stakeholders to integrate the CIS Mainframe audit logs with DPW SIEM. This helps DPW monitor exceptions to regulatory compliance such as SSA and IRS 1075.





Architecture

IV	Page IV-387	RFP Reference: E. Information Technology (IT) Shared Services Model & Direct Technical Support Services for Lot#6 Offeror and Lot#7 Offeror
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The Selected Offerors of Lots # 6 and Lot #7 will be performing the work associated with Systems Support Services initiatives and Direct IT Support Services using an IT Shared Services Model.

Figure 7 below, is a table that highlights specific application operational support services by domains. This includes service offerings in the following domains.

Architecture

- **Design** – Work with the application teams to create a strategic application design that aligns with the broader enterprise vision of DPW/BIS
- **Standards Alignment** – Facilitate initiative presentations to the Architecture Review Board (ARB) to verify adherence to standards. Perform ARB presentation rehearsals with the application team for efficient execution. Manage the vendor’s Architecture Review Board team to verify consistent solutions and practices are being leveraged across all applications. Manage and maintain the Application Life cycle Management Dashboard and overall application baseline to facilitate timeliness and improved accuracy
- **Communication/Coordination** – Facilitate application team presentations at the Architectural Review Board III meetings to confirm integration, both technically and from a personnel perspective, of new architectural solutions within BIS.

Deloitte provides DPW with Lot 7 architecture design, coordination, and standards alignment services across the in-scope DPW applications. We work with the application teams to create a strategic application design that aligns with DPW’s EA-SOA vision and supports the application teams in the review of this design as part of DPW’s Architecture Review Board (ARB). Our approach continues the Department’s evolution to a flexible enterprise architecture by using industry best practice service-oriented architecture patterns and development approaches, accommodating change in the underlying implementation technologies, and maintaining alignment with the DPW Application Life cycle Management (ALM) dashboard. We use a low risk approach that supports DPW’s mission critical systems and ongoing operations while assisting DPW IT in the critical transformation to a more flexible and open platform.

Figure 6.9-108 summarizes our understanding of the breakout of Lot 6 and Lot 7 architecture support activities.

Lot 6	Lot 7
<ul style="list-style-type: none"> • Architecture design - work with the application teams to create a strategic application design that aligns with the broader EA-SOA vision 	<ul style="list-style-type: none"> • Architecture design - work with the application teams to create a strategic application design that aligns with the broader EA-SOA vision
<ul style="list-style-type: none"> • Architecture communications/coordination – Facilitate application team presentations at the ARB 3 meetings 	<ul style="list-style-type: none"> • Architecture communications/coordination – Facilitate application team presentations at the ARB 3 meetings
<ul style="list-style-type: none"> • Support the preparation and delivery of ARB meetings to verify adherence to standards 	<ul style="list-style-type: none"> • Support the preparation and delivery of ARB meetings to verify adherence to standards
<ul style="list-style-type: none"> • Manage Deloitte’s Architecture Review Board team to verify consistent solutions and practices are being leveraged across all applications 	<ul style="list-style-type: none"> • Manage Deloitte’s Architecture Review Board team to verify consistent solutions and practices are being leveraged across all applications
<ul style="list-style-type: none"> • Manage and maintain the Application Life cycle Management (ALM) dashboard 	<ul style="list-style-type: none"> • Manage and maintain the Application Life cycle Management (ALM) dashboard

Figure 6.9-108. Breakout of Lot 6 and Lot 7 Architecture Support Activities.

The team uses its specialized business and technical knowledge of each of the different DPW applications, DPW's highly diverse technical environment, and the overall EA-SOA vision to support the Department's architecture support requirements.

The key communication components of architecture include the following:

- **Design** is about communicating enterprise expectations to the application teams and then communicating design proposals and alternatives back to DPW enterprise stakeholders.
- **Standards Alignment** is about communicating standards and practices to the application teams and then working with enterprise stakeholders to verify alignment of the proposed architecture with these standards and practices.
- **Communication/Coordination** is especially important in the context mentioned in the RFP, potentially complex technical ARB 3 meetings. In these sessions, it is essential to strike a balance between distilling down the technical communications to a level that can be understood by the majority of meeting participants while at the same time retaining sufficient detail for architects and developers to use after the meeting.

This communications-based description of architectural activities used above, while very accurate, is a single faceted view of architecture. The complexity that underlies these communications is in developing the level of understanding of the myriad of patterns, practices, principles, and standards that underlie modern enterprise application architectures and then applying this knowledge to DPW's enterprise application architecture.

In Figure 6.9-109, we highlight the types of application-specific architecture support provided by our team.

Benefits to DPW

Deloitte brings:

- Consistent track record in delivering successful enterprise-level SOA-enabled architecture migration programs in the public sector, such as TX TIERS, NY SPIN (Statewide Police Information Network), FL SUNTAX, MI Treasury MITAS, and the ongoing evolution in PA DPW, including successful H-NET platform for data and process connectivity.
- On-demand access to over 700 practitioners from Deloitte's Business Integration and 'Services Thinking' Practices with extensive experience in designing, building, and implementing EA-SOA architectures
- Established suite of EA-SOA project accelerators, service artifacts, support tools, best practices, and lessons learned from other public sector programs for efficient re-use and adaption by DPW.



Applications	Deloitte's Approach Supports System-Specific Architecture Requirements
ICIS	<ul style="list-style-type: none"> • Support the design and implementation of a scalable architecture to enable the message-based, transaction intensive mainframe integration between CIS and eCIS as eligibility functions are transitioned from the mainframe to server applications. • Identify and integrate additional enterprise service functionality to augment the provider search and submit application functions and foster the single point of access/service hub aspect of the COMPASS portal. • Work with the COMPASS team to collect and leverage practices, principles, and lessons learned with their Flex-based RIA development process and to disseminate these practices and principles to other applications as the move towards RIA-based interfaces.
PACSES	<ul style="list-style-type: none"> • Support the orchestration of forms processes spanning the mainframe, COTS products and DPW enterprise services necessary to automate the forms intensive courts-based child support processes. • Work with the PACSES team to support the design and optimization of server and mainframe batch processes that help confirm the timely delivery of data to the appropriate application for processing according to PACSES SLAs. • Assist with interactions between PACSES and other Commonwealth agencies and business partners to upgrade PACSES interfaces to accommodate new service-based data exchanges for the large number of interfaces necessary to support PACSES enforcement processing.
HCSIS	<ul style="list-style-type: none"> • Drive progress in the design and implementation of user-based configurability to accommodate the needs of a single HCSIS application to meet the needs of more than 9 different programs • Work with the HCSIS application team to align unique aspects of their application architecture, such as IIS web gardening and Oracle FGAC security with evolving DPW enterprise standards and technologies.
PELICAN	<ul style="list-style-type: none"> • Provide service and data architecture support to the PELICAN team to help confirm the alignment of PELICAN ELN data with other DPW client data repositories and to produce the required reports in the most architecturally effective mechanism possible. • Support the PELICAN team in activities to finalize the alignment of the application with Microsoft .NET technologies and the decommissioning of COM+ services within PELICAN.
Child Welfare	<ul style="list-style-type: none"> • Work with DPW and OCYF to identify existing enterprise services, modules, architectural patterns and practices, and other DPW enterprise assets that can be leveraged to support the Commonwealth's child welfare system.
Enterprise Services	<ul style="list-style-type: none"> • Continue to work with DPW and the application teams to support the identification of new enterprise services as well as reuse opportunities for existing services as part of the Architecture Review Board (ARB) process. • Support the creation and expansion of a service metrics dashboard which, in a manner analogous to the DPW business metrics dashboard, provides regular data about service utilization.

Figure 6.9-109. Deloitte's Approach Meets DPW's Diverse the Architecture Requirements.

The remainder of this section then focuses on our approach to each of the core architecture service offerings covered in the RFP based upon our understanding and experience with DPW's enterprise application architectures.

Architecture Design

Maintaining an application design that aligns with the core DPW/BIS enterprise architectural vision is critical in evolving the DPW applications to meet ongoing or expected program or technical requirements. Deloitte works with both the application teams and DPW on an ongoing basis to align the application architectures with DPW's architectural vision. There are several critical checkpoints when feedback can be most effectively solicited and incorporated throughout the initiative planning process and SDLC. These checkpoints are defined below:

- **IT Annual Scoping Process.** The annual process is used to evaluate and prioritize initiatives for the coming year. Key program office, DPW/BIS and application team leaders are involved in the scoping process, presenting the ideal opportunity to align initiatives with the DPW architectural vision early in the planning process.
- **Artifact Submissions.** Many of the design, development, and testing artifact submissions are intended to produce documents that demonstrate compliance with one or more DPW IT standards. Deliverable reviews present the opportunity to gauge alignment with a particular set of DPW standards that reflect the enterprise application IT strategy.
- **Architecture Review Boards (ARBs).** ARB meetings bring program office, DPW technical staff, and application team staff together to review the requirements, design, technical decision points, or implementation details (ARBs 1, 2, 3 and 4, respectively) and their impact on an application's architecture. These meetings provide ongoing checkpoints throughout the SDLC to assess and modify elements of an application's design to align with DPW's vision and direction.
- **Service Design Reviews.** For services meant to be reused across the enterprise, a variety of service design reviews are conducted. These may be conducted as part of ARB 3 meetings, vendor-specific peer architecture reviews, or dedicated ITSS service assessments. The goals of these reviews are to determine alignment with the DPW architectural vision and to evaluate the reusability of these services across DPW applications.
- **COTS Product Evaluation.** When COTS product or transfer technology solutions are being evaluated, a multiphase DPW standard evaluation and selection process is followed. This process works from initial feasibility studies through procurement and

Have you heard?

DPW and Deloitte Collaborated on H-Net an early EA-SOA platform resulting in.....

- Establishment of the DPW IT domains as we know them now
- Establishment of the original DPW business architecture
- Establishment of the ARB process
- Selection of webMethods Messaging / Service Hub
- Selection of an Identity and Access Management Platform – SiteMinder



implementation and is meant to verify that the selection process conforms to a consistent set of processes for evaluating these COTS products across DPW applications.

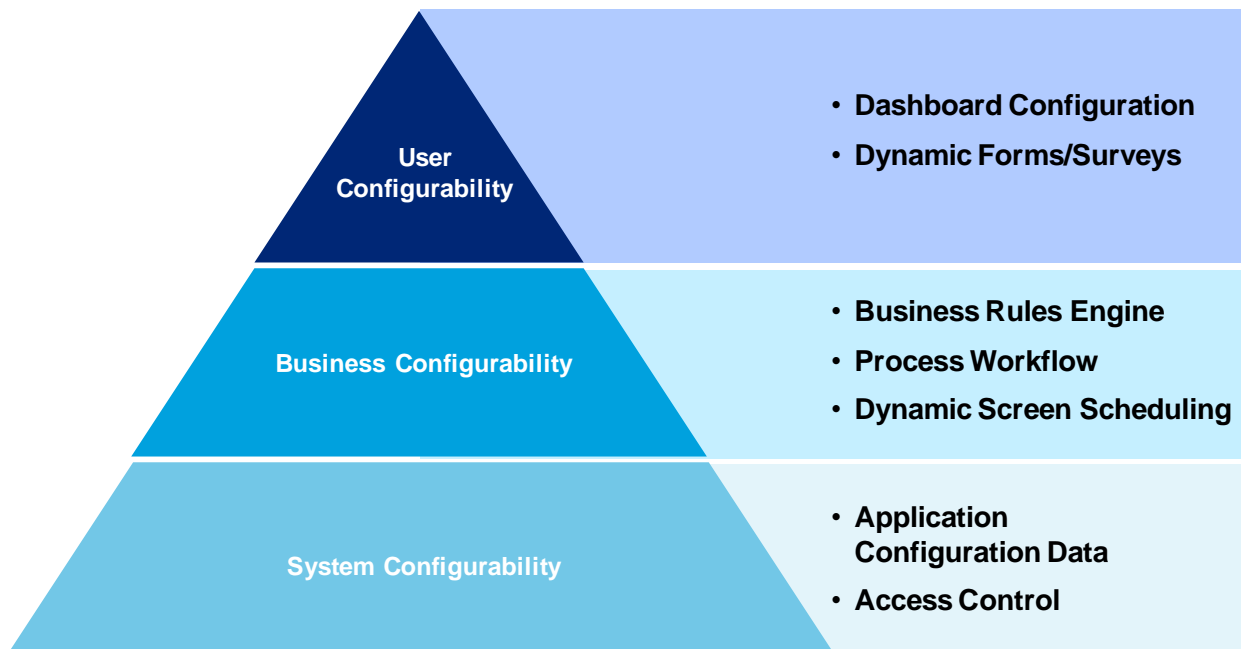
These key checkpoints throughout the SDLC allow Deloitte to work with DPW to assess and align the application design with the broader DPW enterprise vision. As part of this alignment process, there are several key architectural categories that will come under consideration. These architecture categories, as well as the checkpoints at which they are reviewed, along with the tools that will be used to record and measure these assessments are outlined in Figure 6.9-110.

Deloitte Meets DPW Architecture Review Requirements	Checkpoint(s)	Review Tool(s)
SOA Standards and Patterns. Includes analysis of the reuse of existing services as well as potential for the creation of new enterprise services. When new enterprise services are being considered, DPW design patterns and practices (e.g. master data service, callback service, etc.) are used to drive key design decisions for the service.	Annual Scoping, ARBs, Service Design Reviews	DPW Service Manifest
DPW IT Domain Guidelines. DPW IT domain guidelines are codified in DPW/BIS IT standards as well as OA/OIT standards. Alignment with these standards is documented with particular deliverables and reviewed across DPW IT domains during the ARB 2 and ARB 4 meetings.	Deliverable Submissions, ARBs	ARB Checklist
COTS Product Usage. COTS product usage or the potential need for additional or new COTS licenses is determined during the annual scoping session and then reviewed during the ARBs. New product selections follow the Department's documented COTS product review process.	Annual Scoping, ARBs, COTS Product Reviews	ALM Dashboard

Figure 6.9-110. Architecture Review Categories and Checkpoints.

The DPW architecture review checkpoints are used to record and measure alignment of DPW's enterprise applications with the broader DPW enterprise vision using standard review tools.

Even with a solid architectural strategy and checkpoint process in place, it is very likely that DPW's strategy will continue to evolve over the next several years and checkpoints in the review process may be added, modified, or even removed. To enable the accommodation of these ongoing changes, Deloitte will continue to work with DPW to incorporate a process for assessing new or modified DPW strategic technical directions, as needed. These includes strategic guidelines and standards, such as designing and architecting for configurability, which is an evolving DPW architectural goal, as illustrated in Figure 6.9-111.



PA_DPW-555

Figure 6.9-111. Design for Configurability: An Evolving DPW Architectural Goal.

DPW applications are built for configurability, supporting various levels of configuration from system configurability by technical support staff to end-user configurability.

The **Designing for Configurability Process** represents an evolving architectural trend that is used across multiple DPW application work orders, and is addressed as part of this process. As part of the design change process, our team developed a configuration model for system, business, and user configurability. This model is shared with DPW decision-makers and application team leadership and is used as the basis of discussion of configurable solution design for application work orders and to support the creation of configurable systems design guidelines and standards.

As a new architectural goal evolves, Deloitte continues to work with DPW to develop a new, or augment the existing, architectural review framework and evaluation process, as needed. Additionally, we will continue to work with DPW to publish these new architectural goals and review mechanisms so that they can be understood and incorporated into future designs.

Architecture Standards Alignment

Adherence to DPW and OA/OIT standards is essential to the quality and consistency of the software delivered to DPW. Deloitte adheres to these software development standards and additionally follows established DPW processes to provide the appropriate review and control points to DPW during the SDLC. The processes Deloitte uses to maintain standards alignment are outlined in Figure 6.9-112 and are explained in greater detail in the remainder of this section.

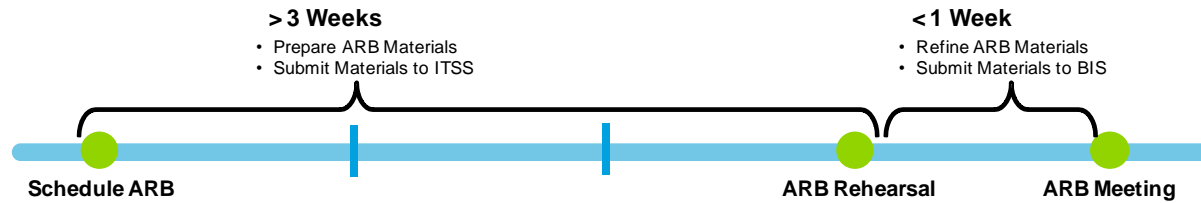


Deloitte Meets DPW Standards Requirements	Frequency
DPW Architecture Review Board (ARB). DPW's standard process for conducting periodic architectural reviews throughout the SDLC.	As Specified in RFP Appendix S
Deloitte Application Architecture Review Board (DAARB). Deloitte's vendor specific review board to analyze practices and confirm consistency across Deloitte managed DPW development work.	Meets Weekly
Application Life cycle Management (ALM). A report on technologies used across applications to manage consistency of DPW standard technologies and to measure compliance with technology deprecation and upgrades across the enterprise. Complies with the format specified in appendix RR of the RFP.	Dashboard Submitted Monthly, Baseline Updated Bi-Annually
Standards Change Impact Assessment. An assessment of the impact of new or modified DPW or OA/OIT standards that are released during the contract period on the scope of work. This includes one-time accommodations and changes that need to be made to incorporate the new standard.	As New Standards are Released

Figure 6.9-112. DPW Standards Alignment Processes.

The DPW standards alignment processes provide several control points for the alignment of applications with DPW architecture standards at throughout the application life cycle.

Deloitte facilitates the end-to-end involvement of the application teams in the ARB process specified in appendix S of the RFP. We understand the importance of coordination in the ARB process to maximize its effectiveness and we provide detailed guidance to the application teams on how to prepare for and execute an ARB review with DPW. In addition to this guidance, Deloitte coordinates an extensive set of review activities leading up to an ARB. In practice, we have found that these preparation practices result in the best use of DPW stakeholder time during the 1 or 1.5 hour timeslots available for the ARB reviews. Figure 6.9-113 depicts the timeline and detailed steps in preparation for an ARB.



Activity	Timeline	Responsible
Enter ITSS tracker ticket requesting scheduling of ARB meeting	4+ weeks before ARB date	Application Team
Request ARB date be placed on DPW ARB calendar	4+ weeks before ARB date	ITSS
Add ARB to DPW ARB calendar	4+ weeks before ARB date	DPW
Schedule ARB meeting and ARB rehearsal	4+ weeks before ARB date	ITSS
Forward ARB meeting invite to portfolio and project managers as well as program office staff.	4+ weeks before ARB date	Application Team
Prepare ARB materials and submit to ITSS for internal ARB review	Before ARB rehearsal	Application Team
Conduct ARB rehearsal	1 week before ARB date	ITSS, Application Team
Update ARB materials based upon rehearsal notes	1 week before ARB date	Application Team
Submit final ARB materials to ITSS	3 – 4 days before ARB date	Application Team
Submit final ARB materials to DPW	3 – 4 days before ARB date	ITSS
Send ARB materials to ARB invitees	2 – 3 days before ARB date	DPW
Conduct ARB	ARB Meeting	DPW, Application Team, ITSS
Send out meeting minutes from ARB	1 – 2 days after ARB date	DPW
As applicable, follow up on ARB action items from meeting minutes	1 - 3 weeks after ARB date	DPW, ITSS, Application Team

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Figure 6.9-113. ARB Preparation Timeline and Activities.

Deloitte provides detailed guidance to the application teams to assist in preparing for DPW ARB meetings.

In preparation for the DPW ARB sessions, we conduct the internal Deloitte Application Architecture Review Board (DAARB) cross application coordination meetings to verify consistent solutions and practices are being leveraged across applications. Since the DPW enterprise is a diverse set of six applications and 27 systems, it is paramount that this coordination takes place in support of DPW’s IT vision. These meetings are held on a weekly basis to keep Deloitte architects and application managers up-to-date on trends across DPW applications and to support regular knowledge sharing. The following represents the key goals of and activities from, this meeting:

- **ALM Updates.** Application Life cycle Maintenance (ALM) baseline updates are requested by DAARB members on behalf of the Deloitte applications. The DAARB team provides final approval of ALM baseline changes that apply to the Deloitte applications.
- **New Enterprise Services and COTS Products.** New enterprise services and COTS products proposed for introduction into the DPW environment are reviewed by the DAARB. The Deloitte chief application architect incorporates feedback from the DAARB into the comprehensive feedback to DPW on new enterprise services and COTS products.

- **New DPW Standards.** New DPW and OA/OIT technical standards that apply to the Deloitte applications are reviewed with the DAARB and the team’s input is solicited for the impact assessment for the new standard.
- **Lessons Learned.** Documented lessons learned are shared with and reviewed with the DAARB so that steps that one DPW project took to avoid or remediate a particular issue can be understood and, as applicable, applied by the DPW projects participating in the DAARB.

The Application Life cycle Management (ALM) process incorporates two major elements, the ALM Baseline and the ALM Dashboards. As illustrated in Figure 6.9-114, the ALM baseline represents the collection of application technologies approved for use across DPW applications. There is only a single ALM baseline. The ALM dashboard represents how an application’s technology stack aligns with the technologies in the ALM baseline.

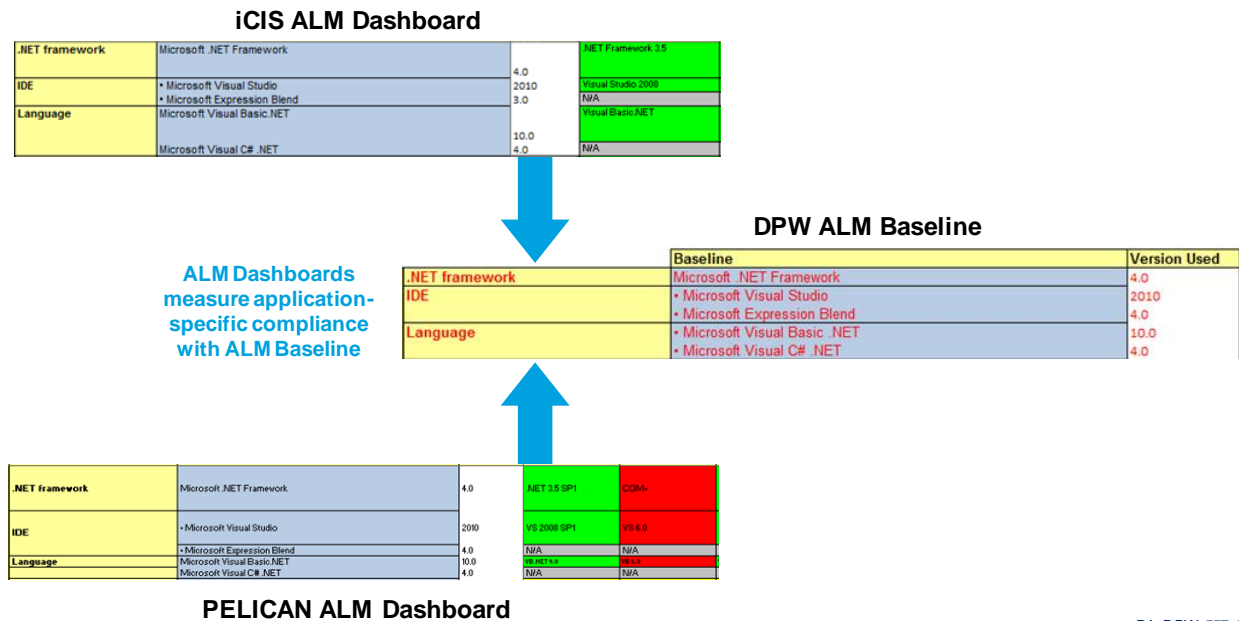


Figure 6.9-114. Relationship Between the ALM Dashboard and ALM Baseline.

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The DPW ALM baseline represents the collection of approved technologies for use across DPW applications. The ALM dashboard measures application compliance with the DPW baseline.

Deloitte’s plan for managing the ALM process to facilitate alignment of technologies across the DPW baseline includes three key processes:

- **Managing Changes to the ALM Baseline.** We will continue to work with DPW and the DAARB to identify changes to technologies on the DPW application baseline and to facilitate the process of review, approval, and publication of new ALM baselines up to two times per year.
- **Managing Upgrades from Deprecated/Legacy Technologies.** We will continue to coordinate product end-of-life, support discontinuation, or technology migrations with DPW and identify timelines when applications must be off of a legacy technology and

onto a new one. Changes are reflected in applications' ALM dashboards and upgrade requests are logged as non-functional change requests for affected applications and tracked as part of the ARB process.

- **Regular ALM Submissions and Reviews.** Deloitte coordinates the submission of application ALM dashboard updates on a monthly basis so that these updates can be reflected on the CTO dashboard. In addition, we work with the application teams to reflect initiative and release specific ALM dashboard changes and to cover these changes as part of the ARB process.

We recognize that new standards will be released while others will be modified or deprecated entirely. We will continue to work with DPW to follow the agreed upon change control processes when changes to standards are released that impact the DPW application SDLC and/or the operational functions for which we are responsible.

Architecture Communication/Coordination

As stated in the introduction to this section, architecture is, in many ways, directly related to communication. The DPW ARB 3 meetings, also known as technical ARBs, are different than the ARB 1, 2, and 4 meetings. The ARB 3 meetings are designed to share technical concepts or new ideas with DPW resulting from Deloitte's research or initiatives that we are progressing through the SDLC.

Due to these systematic differences in the ARB 3 meetings, special communication and coordination activities are followed by the Lot 7 vendor. Deloitte assumes the responsibility for the following activities as part of the ARB 3 process:

- **ARB Scheduling.** We work with DPW and the application teams to determine whether ARB 3 meetings are required for a particular initiative and, if they are, determine how many should be scheduled and where they should occur in the ARB process flow.
- **ARB Content.** We use our understanding of DPW ARB 3 expectations and knowledge of the initiative and technology in question to assist the application teams in the creation and review of content suitable for the planned attendees at the ARB 3 meeting.
- **ARB Stakeholder Coordination.** The new architectural solutions that are often the subject of ARB 3 review meetings often involve coordination across multiple business partners, including other Commonwealth and non-Commonwealth agencies, product vendors and other external entities. Coordinating communications both before and during the ARB 3 sessions is critical to the success of these reviews. Deloitte works with DPW and the application teams to identify stakeholders for particular ARB 3 sessions and to integrate these stakeholders into the ARB preparation and review process.



Our team has been involved in the ARB 3 process since its inception and has the experience and capabilities necessary to provide the appropriate level of communication and coordination for these meetings. Through our experience in content creation and stakeholder coordination activities, we believe we have the depth of understanding with the process that will continue to make the ARB 3 process a productive process for the stakeholders involved.





Middleware

IV	Page IV-388	RFP Reference: E. Information Technology (IT) Shared Services Model & Direct Technical Support Services for Lot#6 Offeror and Lot#7 Offeror
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The Selected Offerors of Lots # 6 and Lot #7 will be performing the work associated with Systems Support Services initiatives and Direct IT Support Services using an IT Shared Services Model.

Figure 7 below, is a table that highlights specific application operational support services by domains. This includes service offerings in the following domains

Middleware

- **Design** – Work with BIS' middleware team to design WebMethods/OpenTI solutions to support project initiatives.
- **Quality Assurance** – Serve as the single point of contact from the project teams to BIS middleware team. Review each request for completeness, accuracy and adherence to the strategic vision of DPW/BIS
- **Communication/Coordination** – Communicate upcoming requests from the application teams to the BIS middleware team. Provide a summary of the system requirements and high-level scope to assist in resource planning.

Middleware and an enterprise service bus (ESB) platform is a critical component of DPW's strategy for services enablement, event-driven management, and secure inter- and intra-departmental business processing. Deloitte brings its breadth of experience in the middleware domain to effectively design middleware solutions using DPW's middleware technologies, including webMethods, OpenTI and BizTalk. Deloitte manages quality assurance by serving as the liaison between each of the application teams and DPW, and by reviewing each request sent to BIS for alignment to DPW's strategic vision. Deloitte additionally collaborates with DPW to assist with resource and schedule planning.

Figure 6.9-115 summarizes our understanding of the breakout of Lot 6 and Lot 7 middleware support activities.

Lot 6	Lot 7
<ul style="list-style-type: none"> • Middleware design - Work with the BIS middleware team to design webMethods/OpenTI solutions to support project initiatives 	<ul style="list-style-type: none"> • Middleware design - Work with the BIS middleware team to design webMethods/OpenTI solutions to support project initiatives
<ul style="list-style-type: none"> • Middleware quality assurance - serve as the single point of contact from the project teams to BIS middleware team 	<ul style="list-style-type: none"> • Database quality assurance - serve as the single point of contact from the project teams to BIS middleware team
<ul style="list-style-type: none"> • Middleware communications/coordination - communicate upcoming requests from the application teams to the BIS middleware team 	<ul style="list-style-type: none"> • Middleware communications/coordination - communicate upcoming requests from the application teams to the BIS middleware team

Figure 6.9-115. Breakout of Lot 6 and Lot 7 Middleware Support Activities.



The team uses its specialized business and technical knowledge of each of the different DPW applications and DPW's highly diverse technical environment to support the Department's middleware support requirements.

Development of cross-system interfaces requires close and careful coordination between stakeholders. The coordination spans multiple business and technology domains – business domain owners, DPW application developers, vendor technical support developers, application architects, and technical domain staff within DPW. Deloitte understands the complexity present in the design, development, troubleshooting and maintenance of interfaces built upon specialized technologies, such as webMethods, OpenTI, and BizTalk. During the design and development cycles, Deloitte works to coordinate requests and activities with the resources in DEA's Middleware Services Unit (MSU).

In Figure 6.9-116, we highlight the types of application-specific middleware support provided by our team.

Benefits to DPW

Deloitte brings:

- Over 10 years of experience in providing middleware and ESB platforms to federate inter- and intra-agency processes and information sharing in the public sector, such as FL SUNTAX, FDIC, and Texas Department of Health and Human Resources.
- In-depth experience with webMethods, OpenTI and BizTalk middleware technologies used by DPW as well as other market-leading COTS ESB platforms used to support large-scale public sector environments.
- Established suite of project accelerators, support tools, best practices, and lessons learned from other public sector programs for creating a secure “integration highway” between disparate systems/platforms, such as mainframe, standard COTS applications, other agencies, and external partners.



Applications	Deloitte's Approach Supports System-Specific Middleware Requirements
iCIS	<ul style="list-style-type: none"> • CIS, TPL, IEVS – the CIS case initiation process performs a complex two-phase commit to both the CIS and eCIS databases hundreds of thousands of transactions per day. • eCIS is involved in more than 60 real-time OpenTI interfaces to retrieve and update data from the CIS mainframe. • COMPASS uses the Enterprise Application Submission service to process, route, renew and refer more than 4,500 applications for benefits each business day.
PACSES	<ul style="list-style-type: none"> • PACSES Mainframe – generates over 15.8 million forms each year using DPW's webMethods infrastructure and the Enterprise Correspondence service. • PACSES Open Systems – The PIM application uses a web service-based adapter to pull case diary data in real time from the PACSES mainframe.
HCSIS	<ul style="list-style-type: none"> • HCSIS uses BizTalk to produce 5010 compliant HIPAA 837 transaction files to submit TSM billing claims to PROMISe for payments.
PELICAN	<ul style="list-style-type: none"> • PELICAN Child Care Works was the first consumer of the Enterprise Correspondence service for real-time generation of notices
Child Welfare	<ul style="list-style-type: none"> • IV-E QA system has one interface, currently in webMethods and is being transitioned to BizTalk. • Reengineered Child Welfare System will make extensive use of the DPW's middleware technologies.
Enterprise Services	<ul style="list-style-type: none"> • Middleware-hosted Enterprise Services use .NET, Java, Microsoft IIS, Apache, webMethods, BizTalk, Informatica and WCF technologies, as well as the SOA Security Manager infrastructure.

Figure 6.9-116. Key System-Specific Characteristics that Drive Our Middleware Support Services.

In this section we provide an overview of our approach on the following aspects of middleware:

- **Middleware Design.** Work with DPW to design, prototype and architect highly-scalable services, interfaces and integrations. We integrate DPW resources into the design process to collaboratively build middleware solutions.
- **Middleware Quality Assurance.** Drive continuous improvement by effectively managing requests between application development staff and BIS, and review communications and requests for compliance and validity.
- **Middleware Communication and Coordination.** Create and manage communications plans to keep stakeholders informed and engaged in decision-making and architectural management of middleware.

Middleware Design

Middleware is at the core of DPW's SOA architecture. The design of middleware solutions is an important aspect of services enablement. Deloitte's experience in working with the DPW middleware team over the past five years has allowed us to design, implement and maintain multiple real-time interfaces to the mainframe, and enterprise services that support each of the in-scope systems. During this time, we have worked with DPW to create a catalog of reusable services that can be viewed as building blocks to construct DPW's systems using a service-oriented approach, as shown in Figure 6.9-117.

Staff Spotlight Michael Neway

ESB/Middleware Architect



"I look forward to continuing the integration of DPW's diverse enterprise applications and technologies as well as developing end-to-end business processes with a variety of external agencies and business partners using leading tools such as BizTalk and webMethods."



webMethods Services	Enterprise Correspondence	Case Initiation	OpenTI Interfaces
	Enterprise Application Submission	Active Benefit Check	
	Enterprise Provider Search	Get Case Info	
	PA JNET Interface	Case Search	
	Enterprise Notifications	Individual Search	
	Enterprise Rate Change Notices	Eligibility Status Check	
	SIS Assessments	AutoSSI	
	ELN – PDE Teacher Data Fetch	CIS-PACSES Interface	
	PA SecureID Fetch	Case/Individual Refresh	
	Citizenship/Identity Verification	Worker Refresh	
	CIS Case/Individual Refresh	Case Wrap-up	
BizTalk	NSLP Enrollment Upload	Integration with Active Directory	
	TSM Billing and EDI	Data Retrieval from Mainframe	
	Enterprise Data Cross Match (EDCM)	Data Retrieval from Open Systems	

PA_DPW-2061

Figure 6.9-117. Current Catalogue of DPW Middleware Interfaces and Services-Based Solutions.

Deloitte understands DPW's middleware solutions that offer nearly 100 interfaces built using .NET, OpenTI, BizTalk and webMethods.

DPW's current middleware platform uses three primary technologies. Mainframe data access is performed in primarily a transactional context using the **OpenTI** platform. Integration tools, such as **webMethods** and **BizTalk** are used to construct services for real-time and near real-time processing, and scheduled executions.

With three diverse technologies to manage, one of the first activities as part of the design process is to select the right integration tool based on the technical requirements for the interface. Differentiators within each product, and performance expectations, such as anticipated transaction volume, monitoring/visibility requirements, and assured delivery of messages, are key aspects of making this selection. In addition, patterns such as synchronous or asynchronous messaging and one or two-phase commit transactions need to be carefully considered and reviewed in cooperation with the DPW team as part of the design process.

To manage the design decision making process, Deloitte has worked with DPW to create the **DPW Service Technology Selection Framework**, shown in Figure 6.9-118. This tool describes each type of technology available at DPW for building interfaces, and cross-reference features that may be required based upon the design.



	File Transfers	Data Access		Point to Point Calls		Integration Solutions / ESB	
	FTP / eGov / Secure eGov	Direct DB Link	Mainframe DB Connectivity (via resource adapter)	Transaction Integrators (OpenTI)	Point-to-point web services	BizTalk	webMethods
Real-time messaging / "Blocking calls" – "Simple Services"	No	Yes	Yes	Yes	Yes	No	Yes
Asynchronous/ Near Real-time	No	No	No	No	No	Yes	Yes
• For legacy service integration	-	-	-	-	-	No	Yes
• For application integration (EAI)	-	-	-	-	-	Yes, preferred	Yes
• Requiring guaranteed message delivery	-	-	-	-	-	Yes – via MessageBox	Yes – via message broker
Requiring 2-phase Commit	-	-	-	Yes	No	No	No
Requiring Data Transformations, Orchestration or BPM	No	No	No	No	No	Yes – Delayed services	Yes – real-time / near-real-time services
Bulk Processing Operations	No	Yes	No	No	No	Yes	No
Batch Processing	Yes	Yes	No	No	No	Yes	No
• With EDI / HIPAA / B2B or G2G requirements	Yes	No	-	-	-	Yes	No
File-based	Yes	No	No	No	No	Yes	No
Summary	Use to support legacy interfaces	Use for direct data integration requirements	Use for single-table reads and updates to the mainframe	Use for complex, multi-table reads and updates to the mainframe	Use for data retrieval services	Use to facilitate most delayed processing, asynchronous and synchronization scenarios	Use to facilitate most or orchestrated near-real-time scenarios

PA_DPW-626

Figure 6.9-118. DPW Service Technology Selection Framework.

The DPW Service Technology Selection Framework presents options for integration at DPW and is used by our team to make recommendations for technology selection based upon technical and response time requirements.

The DPW Service Technology Selection Framework, shown above, organizes application-to-application interactions into four categories. Although multiple technologies are available for integration, from a Middleware team perspective, two of these are relevant – Point-to-Point Calls and Integration Solutions/ESB. The other technologies are supported by database and file transfer support staff within DPW.

Point-to-Point Calls. Within Point-to-Point calls, Deloitte understands that DPW supports real-time connectivity between the open systems platform and the Unisys mainframe environment. To facilitate design activities for Unisys OpenTI components, Deloitte gathers technical requirements, including preparing component specifications, XML schemas and mainframe procedure signatures and provide these as part of our Detailed Systems Design (DSD) deliverable. During DSD, we review the upcoming initiative’s scope and requirements, and actively participate with DPW to finalize the specifications.



Integration Solutions/ESB. DPW’s middleware infrastructure is composed of two integration products, including Microsoft’s BizTalk and SoftwareAG’s webMethods. In working with DPW in multiple product proof of concept and implementation activities, we have developed in-depth experience in DPW’s business needs and approach to middleware and infrastructure. This experience allows our middleware team to optimize the use and capabilities of each product. Figure 6.9-119 highlights these key characteristics and where each product is most suitable for implementation within DPW.

webMethods	BizTalk
Synchronous and Asynchronous	Asynchronous and File-Driven
Real-time and Immediate Processing	Delayed and Disconnected Processing
Event-driven and web service calls	File-driven and scheduled calls
Workflow and Assured Processing	HIPAA and EDI Capabilities

PA_DPW-973

Figure 6.9-119. webMethods and BizTalk Key Capabilities as Applied to DPW Environment.

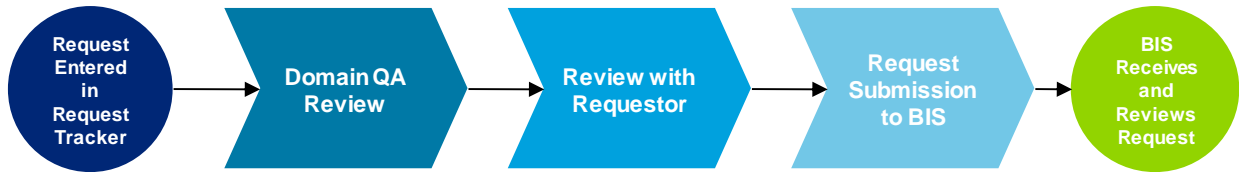
Deloitte’s middleware architecture approach enables the DPW application teams to select the appropriate tools based on our specific knowledge of the DPW business and operating environment.

Designs using webMethods provide functionality that is called in real time, such as a service called to retrieve data while a page is rendering. Services which are orchestrating multi-step business processes are also good candidates for webMethods design. For webMethods services, Deloitte works with DPW to gather technical requirements and to prepare a technical specification document, which outlines any business requirements and technical expectations. We additionally collaborate with DPW to create message and operation contracts, which define the data sent between applications, and which methods that are exposed for consumption.

BizTalk services are chosen for enabling functionality that relies on more time-consuming processing, such as synchronizing data between two systems in bulk, or processing flat files as an input. Generally, these service calls are not part of page rendering, and are performed out-of-process, which means that a user does not depend on the processing to complete for a page to load. During the design of BizTalk services, Deloitte works with DPW to collect and prepare a technical requirements document, to determine flat file definitions and XML schemas, and to assess scheduling considerations for processes that can run offline.

Middleware Quality Assurance

Our team provides experienced middleware quality assurance support and serves as the single point of contact for requests between the project teams and BIS. Figure 6.9-120 depicts our structured ITIL-based process to review requests for completeness, accuracy, and adherence to standards and the strategic vision of DPW.



PA_DPW-950_2

Figure 6.9-120. Deloitte Middleware Support Quality Assurance Process.

Deloitte's database support quality assurance approach uses an ITIL-based process that supports applicable domains.

The project teams use our ITSS Request Tracker tool as part of an ITIL-compliant process for managing middleware domain change requests. Upon submittal of the requests into the Request Tracker tool, the middleware team initiates its quality assurance as described below.

Domain QA Review. Once submitted, our middleware team analyzes the request for accuracy, completeness, and alignment with DPW's long-term vision. Our staff performs detailed review on the request and its contents, as outlined in the Figure 6.9-121.

Request Type	Deloitte Performs the Required Quality Assurance Steps
BizTalk MSU Request	<ul style="list-style-type: none"> • Validate that required items are attached to the request, such as XSD schemas, WSDLs for web services, requirements documentation and test data samples. • Verify that dependant application services are configured and that security has been configured through the SOA Manager process.
OpenTI MSU Request	<ul style="list-style-type: none"> • Validate that required items are attached to the request, such as COBOL Proc Definitions, XSD schemas, data type definitions, and application component names and locations. • Verify that dependant application components are properly registered and available for the DPW Middleware team to consume.
webMethods MSU Request	<ul style="list-style-type: none"> • Validate that required items are attached to the request, such as XSD schemas, WSDLs for web services, requirements documentation and test data samples. • Perform QA check of documentation for adherence to DPW Middleware standards. • Verify that dependant application services are configured and that security has been configured through the SOA Manager process.

Figure 6.9-121. Quality Assurance Steps Performed by Our Middleware Team.

Review with Requestor. If a request does not meet the required QA standards, we engage the requestor and work to complete or produce any missing required items, or to revise items which need correction or clarification. During this process, any changes are documented as history notes in the Request Tracker to maintain a change log. After



correcting any defects in the request, it is resubmitted for approval and the QA checks are performed again.

Request Submission to BIS. Once the ITSS Middleware domain resource approves the request, it is prioritized for processing, and the Request Tracker tool is used to communicate the updated status of each request back to the requestor. This step records the change history to maintain ITIL request process alignment. Each request, along with its status history, change history and actions taken by involved parties are retained within the Request Tracker’s database.

During the submission process, Deloitte completes and submits a Request for Middleware Services (MSU) form for each request. We include relevant required information, such as target dates by test environment, a description of the initiative, and contact information for the point of contact. Upon completion, this form and the required attachments are submitted using the middleware team email inbox.

Middleware Communication and Coordination

ITSS supports the communication needs from the application teams by providing BIS with a high level scope analysis and a summary of the requirements to the server team.

Deloitte creates the CMMI-compliant Communication Plan that describes the key communication protocols between stakeholders in DPW domains, including the middleware domain. The Communication Plan is an important document that provides a specific approach for written, spoken, and electronic communication methods that are to be used on the DPW projects. As with every CMMI-based plan, it is reviewed and updated on an annual basis as stakeholders or communication requirements change based on the needs of the stakeholders or project activities.

Deloitte’s middleware team documents the meetings necessary to support activities for Project Management, ongoing IT Operations or to address operations support issues. Figure 6.9-122 provides a list of the meetings which support these activities.

Communication Plan Meeting	Deloitte’s Approach Enables Better Communications
Middleware Team Meeting	Weekly; review upcoming initiatives, the status of each piece of work, and challenges within any in-flight
Architecture Review Board	Per Initiative; review service architecture, key design considerations, and infrastructure impacts with DPW stakeholders

Figure 6.9-122. Communication Plan Meeting Description.

Deloitte facilitates a weekly meeting with the DPW Middleware staff to review upcoming initiatives, the status of various design activities, and risks/issues within any in-flight initiatives. During these discussions, Deloitte provides an ITSS liaison that communicates back to DPW, works to provide continuity across initiatives and efforts, and confirms that standards are met and processes are followed.





Groupware/Network

IV	Page IV-388	RFP Reference: E. Information Technology (IT) Shared Services Model & Direct Technical Support Services for Lot#6 Offeror and Lot#7 Offeror
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The Selected Offerors of Lots # 6 and Lot #7 will be performing the work associated with Systems Support Services initiatives and Direct IT Support Services using an IT Shared Services Model.

Figure 7 below, is a table that highlights specific application operational support services by domains. This includes service offerings in the following domains

Groupware/Network

- **Desktop Support** – Work with BIS to assist in managing CWOPA desktop computer compliance with DPW standards and protocols. Includes SMS push support and software deployment coordination and management. (Note: DPW will manage the SMS pushes, anti-virus definition updates, etc.)
- **Laptop Support** – Work with BIS to manage safeboot accounts and access to Commonwealth equipment being used by Offeror staff
- **Network Support** – Support the network team with tasks or maintenance activities as required to support the Offeror’s CWOPA network services
- **Quality Assurance** – Serve as the single point of contact from the project teams to BIS network team. Review each request for completeness, accuracy and adherence to the strategic vision of DPW/BIS
- **Communication/Coordination** – Communicate upcoming requests from the application teams to the BIS network team. Provide a summary of the system requirements and high-level scope to assist in resource planning.

Deloitte provides a complete set of Lot 7 Groupware/Network services that includes technical support for our development teams such as desktop, laptop and network services support. Our team manages compliance of our IT assets, infrastructure, and network connectivity in accordance with CWOPA and DWP standards and protocols, and supports monitoring and management of software licenses. Deloitte has 10 years of experience working with DPW’s highly diverse technical environment, and supporting operations that require high levels of secure integration with DPW and Commonwealth-owned computing hardware and network infrastructures. In addition, our team supports an important coordination role. They assess and process requests from the application teams and help BIS coordinate system requirements and high level scope for efficient resource planning.

Figure 6.9-123 summarizes our understanding of the breakout of Lot 6 and Lot 7 groupware/network services support activities.

Lot 6	Lot 7
<ul style="list-style-type: none"> • Work with BIS to assist in managing CWOPA desktop computer compliance with DPW standards and protocols 	<ul style="list-style-type: none"> • Work with BIS to assist in managing CWOPA desktop computer compliance with DPW standards and protocols
<ul style="list-style-type: none"> • Support the network team with tasks or maintenance activities as required to support the Deloitte’s CWOPA network services 	<ul style="list-style-type: none"> • Support the network team with tasks or maintenance activities as required to support the Deloitte’s CWOPA network services
<ul style="list-style-type: none"> • Groupware quality assurance - serve as the single point of contact from the project teams to BIS network team 	<ul style="list-style-type: none"> • Groupware quality assurance - serve as the single point of contact from the project teams to BIS network team



Lot 6	Lot 7
<ul style="list-style-type: none"> Groupware communications/coordination - communicate upcoming requests from the application teams to the BIS network team N/A 	<ul style="list-style-type: none"> Groupware communications/coordination - Communicate upcoming requests from the application teams to the BIS network team Work with BIS to manage Safeboot accounts and access to Commonwealth equipment being used by Deloitte staff

Figure 6.9-123 Breakout of Lot 6 and Lot 7 Groupware/Network Support Activities.

Deloitte has demonstrated our ability over the past few years to provide groupware and network support, including technical support for desktops, laptops, and networking components consistent with DPW standards and desktop images. We strive to meet the Department’s quality assurance expectations by serving as a liaison to DPW’s groupware and network domains, and by validating that requests submitted by Deloitte are complete and accurate. We will continue to coordinate closely with DPW staff and communicate upcoming activities and anticipate support needs.

The team uses its specialized technical knowledge of DPW’s diverse application and technical environments to provide groupware/network services. In Figure 6.9-124, we highlight the types of application-specific support provided by the team.

Benefits to DPW

Deloitte brings:

- Over 10 years of experience working with DPW’s highly diverse technical environment, and supporting operations that require high levels of secure integration with DPW and Commonwealth-owned computing hardware and network infrastructures.

Applications	Deloitte Understands Key System-Specific Characteristics for Groupware/Network Support
iCIS	<ul style="list-style-type: none"> CIS, TPL, IEVS – Connectivity to the CIS mainframe terminal occurs using specific TCP ports on the network, which must be configured to not “time out.” eCIS – Imaging solution interfaces with CAO hardware to support centralized image storage and retrieval. The transfer and storage of said images consume network resources to render. COMPASS – Flash centric architecture leverages the end user desktop to provide computing resources. This uses network distributed resource delivery to support desktop/server service based integration.
PACSES	<ul style="list-style-type: none"> PACSES uses a separate network domain, distinct from CWOPA, to support mainframe connectivity to the DRS offices, e-mail (PACSES.com) as well as additional connectivity to Federal based interfaces.
HCSIS	<ul style="list-style-type: none"> HCSIS supports both intranet as well as Internet based traffic. Because of the need to support a variety of business partner configurations, HCSIS also has test desktops with various browser versions.
PELICAN	<ul style="list-style-type: none"> PELICAN leverages a combination of DPW managed desktops at the CCIS, sites with direct CWOPA connectivity and sites that access PELICAN via the Internet.
Child Welfare	<ul style="list-style-type: none"> Child Line is an Internet based application with 24x7 availability requirements.


Applications	Deloitte Understands Key System-Specific Characteristics for Groupware/Network Support
Enterprise Services	<ul style="list-style-type: none">• Enterprise services change the paradigm of web application connectivity from a single connection pool to the database to multiple distributed transactions and resource dependencies across many smaller service calls.

Figure 6.9-124. Key Application-specific Characteristics that Drive Groupware/Network Support Activities.

Our team has a detailed understanding of the roles, responsibilities and expectations of DPW with regard to Groupware/Network support. Our team will continue to work collaboratively with DPW’s Groupware/Network services team as they provide the overall strategy for operational support as well as strategic vision to meet the needs of the business.

Our support plan includes services surrounding:

- **Desktop Support.** Manage CWOPA desktop in compliance with DPW network and desktop standards.
- **Laptop Support.** Support DPW laptops and Safeboot security used for remote access to the CWOPA VPN connectivity.
- **Network Support.** Work with the DPW network team to manage outages, interruptions and changes.
- **Quality Assurance.** Drive continuous improvement by effectively managing requests between application development staff and BIS, and reviewing communications and requests for compliance and validity.
- **Communication/Coordination.** Create and manage communications plans to keep stakeholders informed and engaged in decision-making related to groupware and network services.

Have you heard? 

During the PACSES Forms Redesign effort, Deloitte worked with DPW to perform network load and stress tests for segments utilized by county printers at 70 DRS sites throughout Pennsylvania. The testing and analysis enabled the forms generation and printing solution to be deployed, monitored and managed from a single DPW datacenter in Harrisburg, providing increased efficiency and end user satisfaction to the counties.

Desktop Support

Deloitte understands that we provide the workstation hardware and that DPW manages desktop images, software updates, now via SCCM (System Center Configuration Manager), as well as virus definition management. Our team serves as an extension of the DPW team. We serve as a resource at the Deloitte facility to manage the installation of images to CWOPA developer machines and to work through the existing protocols to have new software added to the image when required. We work closely with the DPW team to manage the number of software licenses used and proactively plan for future needs. For any new desktop software, we work through the existing work order process to facilitate approval and purchase of required software.

Laptop Support

The Commonwealth provides a limited number of laptops to the project teams for offsite/off hour support. These machines are tracked and managed by our on-site support team and signed out to staff as requested. Safeboot, the Commonwealth's solution for laptop security, is used to confirm only secured users can access a laptop. Our team provides a liaison to work with the DPW team to request, configure and manage Deloitte requests for Safeboot accounts. This includes the removal of accounts if staff transition to other projects.

We understand that as DPW prepares to roll out Windows 7 as a computing platform, the Safeboot solution is likely to be replaced by Microsoft's BitLocker. We will work with DPW to transition to the new platform.

Network Support

Our team understands the network, coupled with the overall infrastructure capacity and architecture of the application plays a critical role in application performance and end user satisfaction. To effectively support DPW's network management solution, our team will continue to work closely with the DPW team to effectively, and proactively, plan for increases in network consumption. We will continue to provide notification of any unique business initiative that may reflect a temporary surge in capacity consumptions (similar to how the first week of LIHEAP causes increases in COMPASS utilization). We will continue to work closely with the DPW team in support of critical modification design and development efforts. An example of this close collaboration is the effort associated with the architectural shift in the imaging solution.

We understand that the network support includes internal operational systems, such as CIS, eCIS, and PACSES, as well as Internet based applications like COMPASS, HCSIS, PELICAN and the PACSES Child Support Web Site. These different systems have unique network demands that require varying approaches for support. For example, we work with the network vendor selected to support the PACSES solution and reports directly to the BIS network services team. This interaction is critical to support the overall PACSES operational solution that includes the mainframe and many open system based solutions that pull data from the mainframe. The PACSES suite of applications also includes an IVR solution that is accessed by the general public to support easy, self service access to their Child Support information.

Other unique network configurations are found within the PELICAN suite of solutions. We will continue to work with DPW to manage communications and coordination with the 'Option 1' and 'Option 2' sites. These sites have varying levels of DPW 'ownership.' Some are managed directly to and including the work station level, while others are managed only to the router supporting the overall site. These differences are important to understand when supporting production issues or calls from the field. Additionally, the eCIS application has a unique feature that interfaces directly with the Commonwealth's Exchange solution. This feature provides calendaring information on the Work Load Dashboard subsystem within eCIS. Architecturally, it is important for our team to work



closely with DPW and CTC to support any upgrades to Exchange or any application changes that may alter the Exchange interface behavior.

In addition, we continue to work closely with the DPW team to support any planned maintenance activity, such as upgrades to the infrastructure. This could include assisting DIMO in managing batch schedules if critical network maintenance must be done during off peak hours.

Groupware/Network Quality Assurance

Deloitte's ITSS group network team works with DPW for networking, desktop and software needs to and from the project teams. We verify that requests coming from the projects are complete, accurate, and adhere to the strategic vision of DPW. We provide any relevant groupware/network updates at our regularly scheduled project team/steering team meetings.

Groupware/Network Communications/Coordination

ITSS group/network team serves as the central point of contact between the application teams and the BIS network team, providing support for system requirements and high level scope to assist in resource planning.

We have defined protocols for issue/problem communication and coordination and proactively work with the DPW team to communicate upcoming capacity needs, impacts and improvement opportunities. We work with DPW through the ARB process as well as project/steering team meetings to communicate any issues that may have an impact on overall capacity or performance.





Knowledge Management

IV	Page IV-388	RFP Reference: E. Information Technology (IT) Shared Services Model & Direct Technical Support Services for Lot#6 Offeror and Lot#7 Offeror
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The Selected Offerors of Lots # 6 and Lot #7 will be performing the work associated with Systems Support Services initiatives and Direct IT Support Services using an IT Shared Services Model.

Figure 7 below, is a table that highlights specific application operational support services by domains. This includes service offerings in the following domains

Knowledge Management

- **Metadata Management** – capture, validate, and post metadata to the EDW Metadata Application
- **Document Creation** – documentation adheres to published BIS standards and utilized approved/published Enterprise Knowledge Management templates
- **Knowledge Management Quality Assurance** - Serve as the single point of contact from the project teams to BIS Knowledge Management team. Review each request for completeness, accuracy and adherence to published BIS standards
- **Knowledge Management Design** - Work with BIS EKMS to design Knowledge Management solutions to support project initiatives involving Cognos BI and Data Warehouse.
- **Knowledge Management Deployment Planning** - Create playbooks, coordinate technical details with BIS, and coordinate deployment logistics
- **Knowledge Management Capacity Planning** - Provide capacity estimates and support application capacity planning
- **Knowledge Management Application Testing** - For BI application functionality and load testing, provide BIS with test cases and scenarios prior to testing and provide test results prior to TFP.
- **Knowledge Management Communication/Coordination** – Communicate upcoming requests from the application teams to the BIS knowledge management team. Provide a summary of the system requirements and high-level scope to assist in resource planning.

Our Lot 7 ITSS knowledge management team brings many years of enterprise information management experience, and assisted DPW in the early formulation of the Department’s current knowledge management strategy, methods, and tool selections. We have specialized knowledge of DPW’s business applications and of DPW’s business intelligence (BI) tools for efficient metadata management and adherence to BIS standards. The Deloitte team collaborates with DPW to coordinate upcoming requests from the various business units to BIS knowledge management team. This collaboration will continue to drive clear communication across the teams.

Figure 6.9-125 summarizes our understanding of the breakout of Lot 6 and Lot 7 groupware/network services support activities.

Lot 6	Lot 7
<ul style="list-style-type: none"> • Knowledge management design - Work with BIS EKMS to design Knowledge Management solutions to support project initiatives involving Cognos BI and Data Warehouse 	<ul style="list-style-type: none"> • Knowledge management design - Work with BIS EKMS to design Knowledge Management solutions to support project initiatives involving Cognos BI and Data Warehouse
<ul style="list-style-type: none"> • Knowledge management quality assurance - Serve as the single point of contact from the project teams to BIS Knowledge Management team 	<ul style="list-style-type: none"> • Knowledge management quality assurance - Serve as the single point of contact from the project teams to BIS Knowledge Management team
<ul style="list-style-type: none"> • Knowledge management communications/coordination - Communicate upcoming requests from the application teams to the BIS knowledge management team 	<ul style="list-style-type: none"> • Knowledge management communications/coordination - Communicate upcoming requests from the application teams to the BIS knowledge management team



Lot 6	Lot 7
<ul style="list-style-type: none"> • Provide EKMS with estimates for the initial capacity plan 	<ul style="list-style-type: none"> • Provide EKMS capacity estimates and support application capacity planning • Capture, validate, and post metadata to the EDW Metadata Application • Coordinate EKMS deployments including the creation of playbooks, coordination of technical details with BIS, and coordination of deployment logistics • For BI application functionality and load testing, provide BIS with test cases and scenarios prior to testing and provide test results prior to TFP

Figure 6.9-125. Breakout of Lot 6 and lot 7 Knowledge Management Activities.

The Knowledge Management initiatives at DPW leverage multiple technologies and tools to manage enterprise data, including:

- **Enterprise Metadata Management.** DPW uses a Deloitte’s custom built metadata management tool, developed in MS-Access and .NET, to provide DPW a comprehensive view of business data from source systems to target system using analytical structures.
- **Extract, Transform and Load.** DPW’s enterprise standard ETL tool is Informatica. The tool provides automated and efficient extracts of data, application of required reporting transformations and subsequent, loading of the data to the enterprise repository.
- **Business Intelligence Reporting.** DPW’s standard tool for business analytics is the Cognos Business Intelligence suite of tools. These tools allow DPW to create their own ad hoc reports, slice and dice data across different dimensions, and access dashboards with key performance indicators.

Benefits to DPW

Deloitte brings:

- 15 years of combined experience with Cognos Business Intelligence and Informatica ETL, providing improved enterprise-wide business reporting and analytics to end users.
- Established suite of project accelerators, enabling tools and techniques, best practices, and lessons learned from other knowledge management and business intelligence projects operating in large-scale environments with heterogeneous systems.

The data warehouse and operational data stores are built on the Oracle database server platform. The database architecture is in compliance with DPW’s defined knowledge management standards. Common to these platforms is the requirement to manage the consistent configuration of each tool, and to promote changes from the development region, through different test environments and into production.

The ITSS knowledge management team uses its specialized business and technical experience with DPW’s diverse applications, and expertise with DPW’s business intelligence tools to provide knowledge management services to DPW. In Figure 6.9-126, we highlight the types of application-specific support provided by the team.



Application	Deloitte Understands Key System-Specific Characteristics for Knowledge Management Support
iCIS	<p>The Office of Income Maintenance (OIM) relies on a BI/DW solution to monitor the timely completion of work items and activities performed by County Assistance Offices and Change Centers across the Commonwealth. The BI/DW solution consists of the following:</p> <ul style="list-style-type: none">• Executive dashboard• Analytical reports• Source Data from eCIS Workload Dashboard application• Informatica is used to refresh the Enterprise Data Warehouse daily <p>The data warehouse provides immense business value, including increased child support collections by providing monthly reports to the program office with defaulters and delinquent payers, increased focus on federal performance measures which results in increased federal funding of child support program at around \$20-\$25 million/year and increased TANF reimbursement. Data gleaned from the OIM data warehouse has allowed DPW to increase focus on self assessment and business process reviews at County DRS level to provide information on how to improve performance and service delivery.</p>
HCSIS	<p>The Office of Developmental Programs (ODP), the Office of Long Term Living (OLTL) and the Office of Child Development and Early Learning (OCDEL) are three program offices that support a diverse user base. In addition to the multiple users having a mix of Business Intelligence needs, the BI/DW solution consists of the following:</p> <ul style="list-style-type: none">• Cognos Report Studio is used by Technical report authors to create custom reports• Executive dashboards are used by business users across the program offices• Users also have access to a variety of Cubes and Reports.• Source Data: HCSIS (primary), PELICAN ELN Master Repository, CIS and the Department of Aging• Informatica is used to refresh the ODS daily and the EDW monthly <p>The HCSIS data warehouse provides DPW with both aggregate and detailed information to support their office's business intelligence needs. The data warehouse provides the ability to perform trend analysis, historical reporting, and cross program consumer population analysis. The HCSIS data warehouse has increased the flexibility with which users can view and analyze data.</p>



Application	Deloitte Understands Key System-Specific Characteristics for Knowledge Management Support
<p>PACSES</p>	<p>The PACSES (Pennsylvania Child Support Enforcement System) data warehouse provides valuable business intelligence to a broad group of Child Support stakeholders, from county-level case workers, to program office policy makers and executives. The Directors' Dashboard provides county DRS Directors with a high-level, executive view of critical information about their county operations to help improve performance.</p> <p>The BI/DW solution consists of the following:</p> <ul style="list-style-type: none"> • Cognos reporting • Informatica is used to refresh the data warehouse monthly • The data extract process moves data from the mainframe in flat file format via COBOL programs. This data is then transferred to the Informatica server via FTP for transformation and loading into the data warehouse <p>The PACSES data warehouse enables counties to monitor and track performance on key performance indicators and give management greater visibility into their progress towards performance targets, as well as recommended actions to help improve particular performance areas. It also provides a central repository designed to support the reporting and data analysis needs of the organization and a consolidated view of the information they need to effectively manage their program.</p>
<p>PELICAN</p>	<p>The PELICAN data warehouse solution provides the Office of Child Development and Early Learning (OCDEL) the ability to analyze data. The data that is analyzed is child, staff and provider related information to forecast funding needs, evaluate impact of operational and program decisions over time and monitor outcome of various programs to help OCDEL improve the efficiency of child care programs. The BI/DW solution consists of the following:</p> <ul style="list-style-type: none"> • Cognos reporting • Informatica is used to refresh the data warehouse monthly <p>The PELICAN data warehouse allows OCDEL to monitor the progress of children and their families. It enables OCDEL to design prevention strategies to mitigate challenges faced by families that affect school readiness and academic success by using the data available through PELICAN DW.</p> <p>OCDEL is able to monitor the financial and administrative support system that has been established to improve early childhood learning and child care services by accessing associated data from the PELICAN Data Warehouse. The implementation of the data warehouse has enabled OCDEL to increase the number of children participating in early learning programs and monitor trend of fund needed by office/region for more accurate allocations in future years and track provider licensing compliance.</p>
<p>Enterprise Services</p>	<p>Data from MPI and MCI are loaded into the EDW on a recurring basis. In September this information will also be loaded into the ODS to allow for this information to be leveraged across initiatives to minimize the duplication of client and provider data.</p>

Figure 6.9-126. Key Application-specific Characteristics that Drive Our Enterprise Knowledge Management Activities.

Deloitte works with DPW to manage multiple aspects of each Enterprise Information Management initiative. Coordinating communication throughout the enterprise during upgrades and administration will continue. The following describes how Deloitte will continue to support Knowledge Management:



- **Metadata Management.** Capture, validate, and post metadata to the Enterprise Metadata Application as part of the delivery of BI initiatives. The metadata will continue to provide consistent data definitions across the business intelligence, extract transform and load (ETL) tools and overall data architecture.
- **Document Creation.** Adhere to the approved and published BIS standards and Enterprise Knowledge Management templates that apply to the creation of artifacts throughout the SDM. Documents created across work orders and projects use these templates in order to provide consistent documentation across DPW projects that adhere to BIS standards.
- **Knowledge Management Quality Assurance.** Provide a single point of contact from the project teams to BIS Enterprise Knowledge Management System (EKMS) team by extending the shared services model to business intelligence (BI) initiatives. Members of our ITSS team review BI requests for completeness, accuracy, and adherence to BIS standards
- **Knowledge Management Design.** Work with BIS EKMS team to design knowledge management solutions to support project initiatives that have Cognos BI and data warehouse components. The design phase is very important during the project life cycle to facilitate the usage of a common methodology and adherence to standards.
- **Knowledge Management Deployment Planning.** Create playbooks, coordinate technical details with BIS, and coordinate deployment logistics for BI initiatives. Deloitte's approach to deployment planning for DPW focuses on creating clear deployment plans, while preventing unintended impacts to the production operations of DPW.
- **Knowledge Management Capacity Planning.** Provide capacity estimates and support application capacity planning. Deloitte assists with capacity planning activities for knowledge management solutions including Cognos, Informatica, and the Enterprise Data Warehouse (EDW).
- **Knowledge Management Application Testing.** Provide test cases and scenarios for application and load testing prior to the testing phase of BI initiatives. Once the test cases and scenarios have been accepted and executed, Deloitte will provide test results.
- **Knowledge Management Communication/Coordination.** Communicate upcoming requests from the application teams to the knowledge management team.

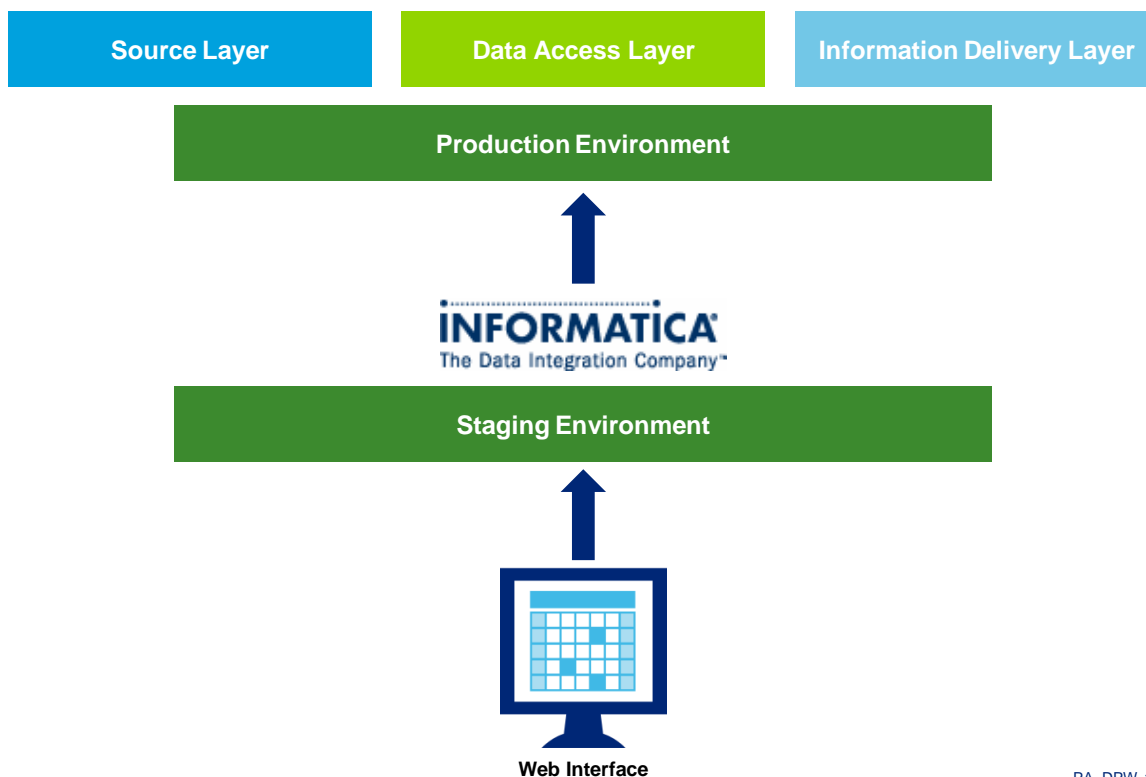
Metadata Management

Metadata is information regarding the characteristics of any artifact, such as its name, security classification, location, perceived importance, quality or value to the enterprise, and its relationships to other artifacts. Metadata Management facilitates enterprise-wide data standardization from the time data is created until it is consumed in reports. The standardization is achieved by designing and implementing a repository of business rules, data standards, and data definitions that is referenced across the enterprise.

DPW's current metadata management application allows information to be entered about data elements as they are transformed from source system to target system to analytical structure. The information is stored in a centralized Oracle database and is accessible to business and technical users through a web interface for enterprise reporting and analytics. Deloitte understands the importance of metadata management and captures, validates, and post metadata to the selected enterprise Metadata Application as part of the delivery of BI initiatives.

Capturing Metadata

Our approach to capturing metadata encompasses the inclusion of information around data elements as they move through the various layers of the information life cycle. This information is captured in a centralized metadata repository which users can access, as depicted in Figure 6.9-127.



PA_DPW-1310

Figure 6.9-127. Deloitte Understands DPW's Metadata Management Approach

Within DPW, a centralized metadata repository captures information about the various layers of the information life cycle. Users can access this repository for enterprise-level reporting and analytics.

Source Layer. The first layer of the information life cycle is the source layer. Metadata entered within this layer relates to the data as it exists within the operational systems. The metadata in this layer includes the type of information typically included within a data dictionary. Deloitte leverages the application data dictionary and data model to accurately reflect the source system structure, attributes, and properties. For example,

in this layer we include details around business definitions, structure and hierarchy of data, subject areas, and definition of metrics.

Data Access Layer. The next layer is the data access layer. Metadata entered within this layer documents the transformation process from the source system to the DW/ODS tables and/or BI metadata layer. Most of the calculations performed to transform source data into actionable business intelligence are accomplished as part of the Extraction, Transformation, and Load (ETL) processes. As a result, the key component of this section is the documentation of the transformation rules and cleansing processes needed for BI initiatives. We leverage the data dictionary and ETL design documentation to enter information in this layer.

Information Delivery Layer. The Information Delivery layer contains metadata around BI content that end users access directly. In the case of DPW this is composed of cubes, reports, and maps. The information in this metadata layer relates to the business names and business logic used in the reports. We leverage the technical specifications for cubes and reports submitted as part of the design process.

Validating Metadata

In order to determine valid information is being entered in the metadata application, Deloitte cross references the content with submitted design artifacts. By reusing content within design artifacts, the information entered in the metadata application has been inherently reviewed and approved by both technical and business users as part of the deliverable review process. We also work with end users to validate that the information entered in the metadata application is accurate and easy to understand.

Posting Metadata

Deloitte developed the metadata application that is used by DPW and the EKMS team to provide a flexible environment for metadata management needs. The application can store detailed technical information and business information for end users. EKMS has become experienced with the application and has defined the metadata objects (e.g., reports, tables, data elements, programs), the interrelationships between metadata objects, and the object characteristics they need to support the business.

Environments (Staging, Production) and Web Interface. Deloitte currently enters information into the metadata application in the staging environment during the user acceptance testing and test for production phases of BI initiatives. Metadata related to the source and information delivery layers is entered manually through the web interface. Information related to the data access layer is populated by executing Informatica mappings that write to the metadata application database directly. By timing the data entry of metadata to enter data during and after the user acceptance testing phase, we capture metadata after BI content has been tested and approved by users. Once metadata has been entered and validated for each layer in staging environment, we work with BIS to promote the information to the production environment. These activities are conducted as part of an initiative's deployment process. Once information

has been promoted to production, metadata is available for end user access through the web as shown in Figure 6.9-128.

Metadata Application

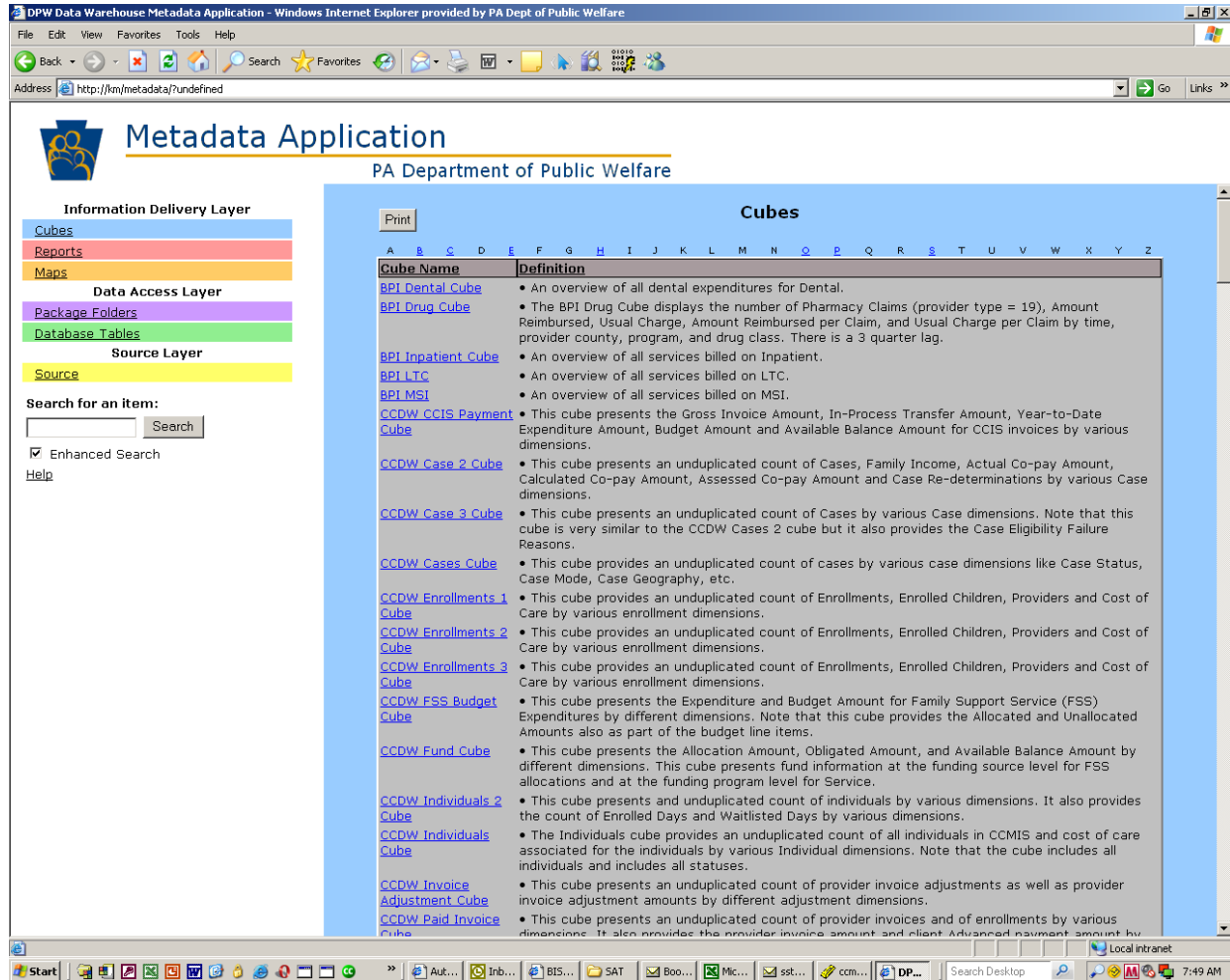
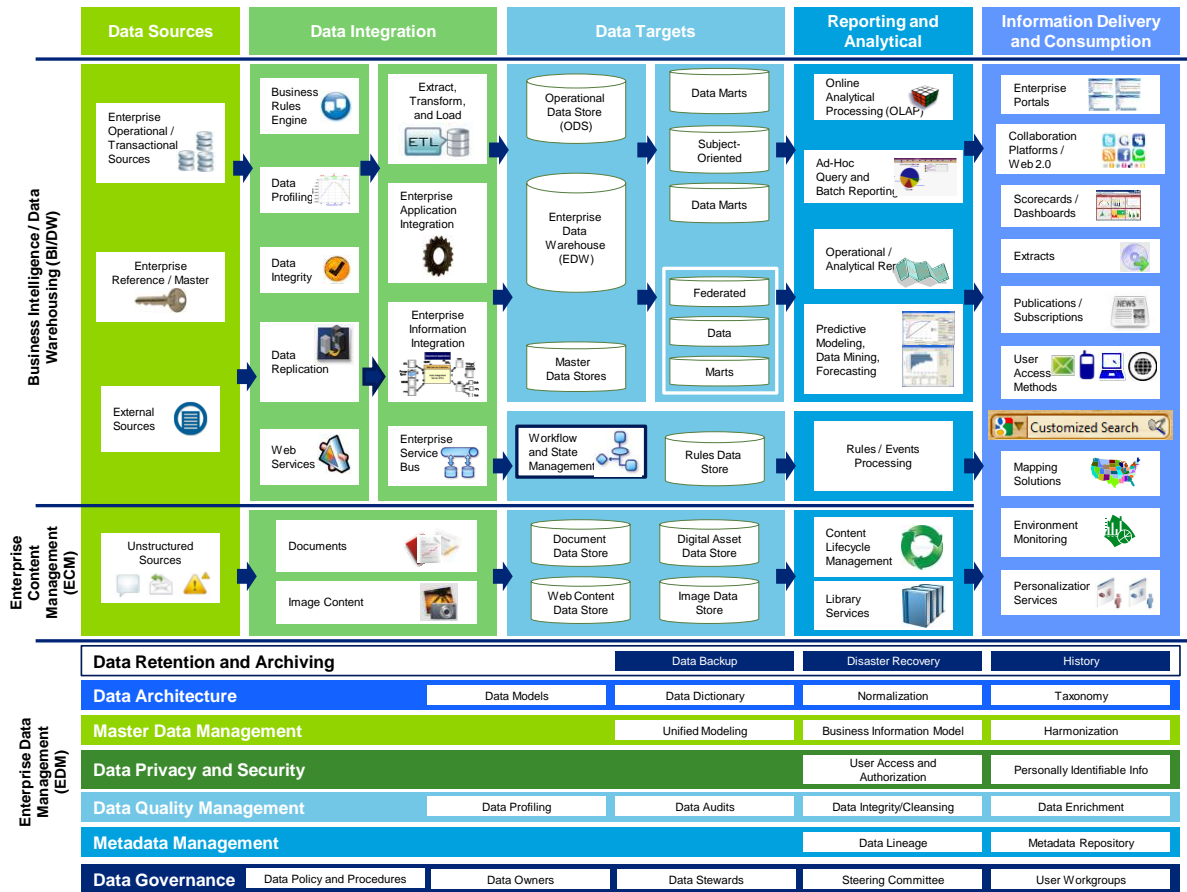


Figure 6.9-128. Example View of Metadata Application.

Information entered in DPW's metadata tool encompasses the entire data life cycle with web accessibility to users.

Deloitte understands that BIS' vision of metadata management is to enhance the metadata entry process to encompass information related to operational systems and have a holistic end-to-end view of data across DPW. Figure 6.9-129 illustrates how metadata is involved across the entire spectrum of the technical architecture.



PA_DPW-1319

Figure 6.9-129. DPW's Future Vision for Enterprise-level Metadata Management.

DPW's vision is for holistic enterprise information management that provides end-to-end views of data across processes.

Deloitte can help DPW achieve this vision by enhancing the existing metadata management tool or implementing a COTS product. Deloitte understands that some of the key questions to consider in determining whether to acquire a COTS product or enhance the existing application are:

- Who are the targeted users of metadata and how will they use it?
- Will metadata management support the data governance process?
- Should metadata be a stand-alone or an integrated component of the EIM solution?
- Will metadata be managed through a single application or maintained in disparate tools and stored or accessed through a metadata tool?
- Can the metadata solution support data quality management processes?

Deloitte works with BIS through the process of deciding which metadata management tool to use. Deloitte will also work with BIS through the process of migrating to the new tool and migrating existing metadata.



Based on Deloitte's experience in delivering enterprise information management (EIM) projects throughout the nation, we understand that metadata can be the center of a data governance effort. We understand the context of the data content is the central concept of effective data stewardship. DPW will benefit from a comprehensive view of their metadata, and of metadata management, when they fully understand its implications. Deloitte will help DPW achieve the business benefits of enterprise data management by enhancing and enriching the metadata available for DPW's information assets and harnessing them for enhanced quality of service.

Document Creation

Deloitte adheres to the approved and published BIS standards and Enterprise Knowledge Management templates that apply to the creation of artifacts throughout the SDM.

Following Existing Guidelines and Templates

Deloitte assisted DPW in creating templates, standards and guidelines for knowledge management initiatives as part of the HNET initiative. Since the HNET initiative, EKMS team has maintained these templates, standards and guidelines which are also available through the Enterprise Knowledge Management intranet Web site <http://km/pgm/asp/DWdevresourcetoc.asp>. Deloitte uses these templates in order to provide consistent documentation across DPW projects that adhere to BIS standards.

Figure 6.9-130 presents an inventory of published knowledge management templates, standards, and guidelines that the Deloitte team follows across DPW knowledge management initiatives.

Published BIS Standards, Templates and Guidelines

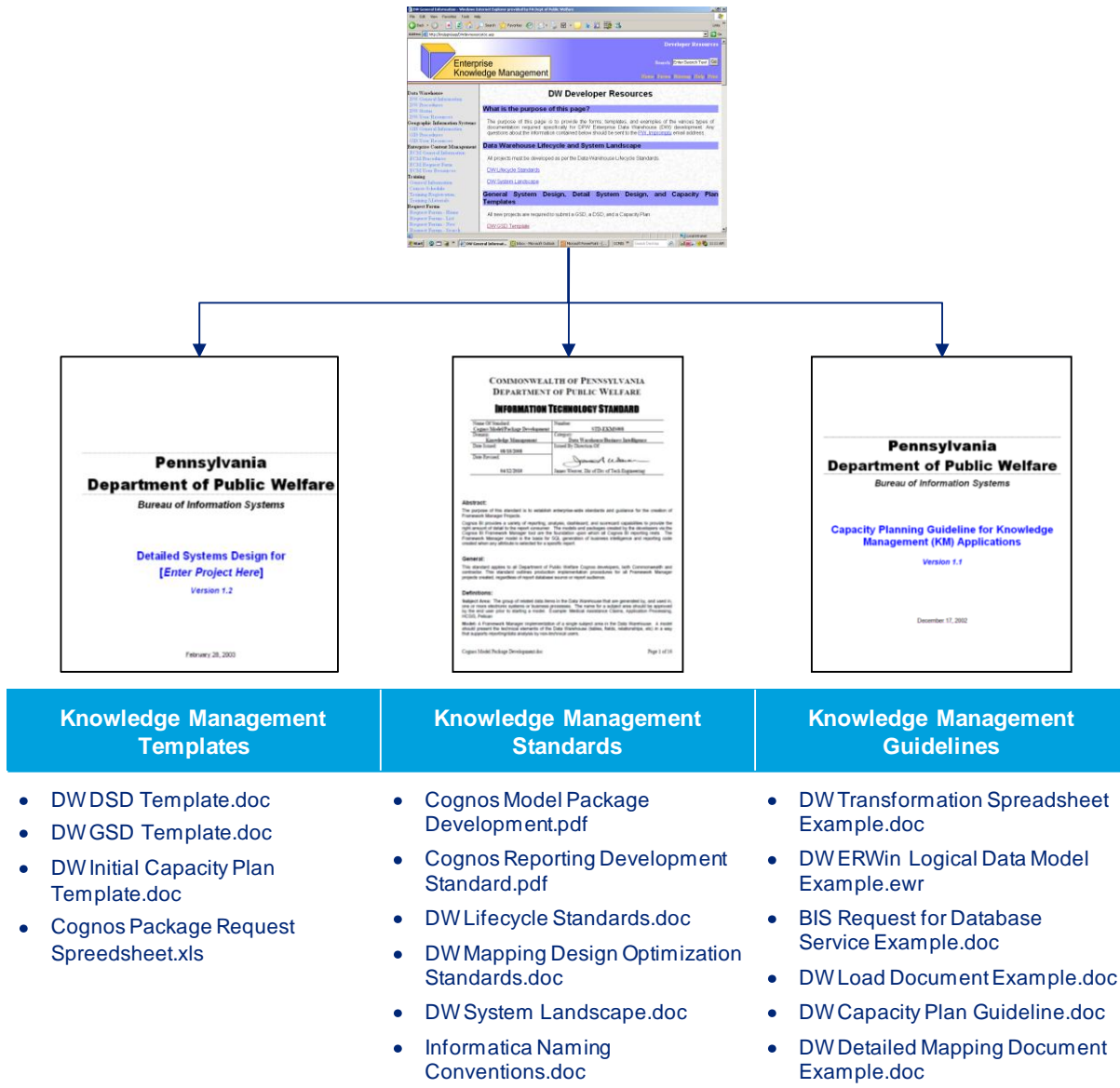


Figure 6.9-130. Published BIS Standards, Templates and Guidelines.

PA_DPW-2033

Our approach uses templates, standards, and guidelines, and encompasses the entire design landscape for BI projects.

SDLC documents created using these templates are shared with the Knowledge Management team by following the established PMO deliverable submission process. As discussed further in the quality assurance portion of this section, Deloitte has also established quality assurance processes to verify that documentation created across the projects comply with the established standards and are consistent with published guidelines.

Enhance Existing Guidelines, Standards and Templates

To support the evolving BI strategy, our team works closely with the DPW EKMS team to assist in the introduction of enhanced EKMS technologies, approaches, and adoption of best practices. We work closely with DPW to enhance templates and standards that capture project objectives, design details, assumptions and tasks more comprehensively. Deloitte works with the DPW EKMS team to identify templates and accelerators from the Enterprise Information Methodology that can be used to make enhancements to BIS/EKMS documentation templates. We will also support EKMS in quality improvement initiatives to identify improvements to the guidelines, templates and standards and we work with EKMS to promote the adoption of these enhancements across the project teams.

Knowledge Management Quality Assurance

Our team provides experienced knowledge management quality assurance support and serves as the single point of contact for requests between the project teams and BIS EKMS team. Figure 6.9-131 depicts our structured ITIL-based process to review requests for completeness, accuracy, and adherence to published BIS standards.



Figure 6.9-131. Deloitte’s Knowledge Management Support Quality Assurance Process.
Deloitte’s knowledge management quality assurance team uses an ITIL-based approach for consistent, repeatable processes.

ITSS knowledge management team serves as the central point of contact between the application teams and the BIS EKMS team. Upon submittal of the requests into the Request Tracker tool, our knowledge management team initiates its quality assurance as described below.

Knowledge Management, QA Review. Once submitted, each request is thoroughly reviewed by our knowledge management team for accuracy, completeness and adherence to published BIS standards. We perform detailed checks on the request and its contents, as outlined in Figure 6.9-132.

Knowledge Management Request Type	Deloitte’s Approach to Knowledge Management Quality Assurance
Cognos Deployment Form	<ul style="list-style-type: none"> Form submission date is at least 5 business days prior to deployment date to Staging. Content name and date/time match what is currently available in Cognos Development environment. Special instructions have been listed based on initiative’s requirements.



Knowledge Management Request Type	Deloitte's Approach to Knowledge Management Quality Assurance
Application Implementation Request (AIR)	<ul style="list-style-type: none"> • AIR request date is at least 8 days prior to Production deployment for standard releases. • Informatica EDW Production repository selected as destination server for DW initiatives and ODS Production repository for initiatives with ODS components. • Data dictionary has been approved if DBMS change selected as a component for the deployment
Request for Database Services	<ul style="list-style-type: none"> • Session to review PDM changes has taken place with Database and EKMS and outstanding questions have been resolved. • Data warehouse checkbox is selected.

Figure 6.9-132. Deloitte's Approach to Knowledge Management, Quality Assurance Helps to Enhance Enterprise BI and Reporting.

Review with Requestor. If a request does not meet the required QA standards, we engage the requestor and work to complete or produce any missing required items, or to revise items which need correction or clarification. During this process, any changes are documented as history notes in the Request Tracker to maintain a change log. After correcting any defects in the request, it is resubmitted for approval and the QA checks are performed again.

Request Submission to BIS. Once the request passes the QA check, it is prioritized for processing, and the Request Tracker tool is used to communicate status of each request back to the original requestor as a status update. This step records the change history to maintain ITIL compliance. Each request, along with its status history, change history and actions taken by involved parties are persisted within the Request Tracker's database.

By applying the shared services model, Deloitte promotes consistency and quality across initiatives. Deloitte implements a singular architecture review board for Knowledge Management initiatives which is used to perform quality reviews across project teams. This board helps enforce adherence to technical standards and best practices in a consistent way across projects. This is accomplished through detailed review of technical designs to validate that it complies with standards and follows best practices. Once development efforts start, ITSS facilitates the review of ETL and BI code to verify that it complies with the guidelines set by BIS. Examples of this include reviewing Informatica mappings and sessions to check that naming conventions and development standards are being followed.

Deloitte understands that BIS' vision for EIM is a vision of consistency across projects in the usage of tools and methods and an integrated EIM architecture across Program Offices. Having a singular review board facilitates the consistent use of design techniques that align with BIS standards and strategic vision. This helps to promote the implementation of BIS' vision of integration, and supports the development of a consistent, single-view of clients, providers, and services across DPW programs.

Knowledge Management Design

As part of project initiatives, Deloitte works with BIS EKMS to design knowledge management solutions that have Cognos BI and data warehouse components. Each initiative has specific user requirements that can be supported by multiple design approaches for database structures, business intelligence functionality, and ETL. In designing these solutions we work with the multiple stakeholders that are impacted by the initiative and users of the BI output.

Figure 6.9-133 illustrates the Software Development Life cycle as it applies to knowledge management initiatives.

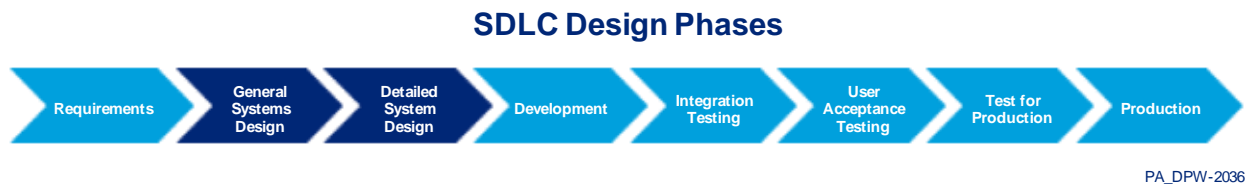


Figure 6.9-133. The design phase is critical to the System Development Life cycle (SDLC), and includes both general and detailed system design activities.

The system design phases bridge the gap between requirements and development. Systems design is the process of defining the hardware and software architecture, components, modules, interfaces, and data to satisfy specified requirements.

The Systems Design phase can be categorized into General Systems Design (GSD) and Detailed Systems Design (DSD).

As the Lot 7 vendor, we focus our efforts on the DSD as described below.

Detailed Systems Design

The DSD phase follows the GSD phase in the SDM. It is in this phase, where the technical design is finalized and creates the basis of development activities. As part of the DSD phase, we work with BIS to create the technical specifications for the components of the solution.

Figure 6.9-134 describes our design steps in support of the business requirements and BIS EKMS standards and follows technical best practices.\



Design Activity	Deloitte Conducts Design Activities as a Lot 7 Vendor
Review GSD Materials	<ul style="list-style-type: none"> • Build on the high-level design created as part of GSD and focus on the detailed technical specifications. • Review specifications such as detailed design specifications for the ETL processes, cube design, the physical data model and the data dictionary, metadata management plan, as well as capacity and user access requirements. • Review specifications during DSD sessions with BIS and thither DPW stakeholders.
Analyze Existing/Legacy Systems	<ul style="list-style-type: none"> • Conduct system area analysis, such as assess various data structures and storage mechanisms including file based storage. • Review programs/transactions on the legacy system that may consist of additional data validation edits, business rules, or transformations for a complete view of data use.
Create Materials	<ul style="list-style-type: none"> • Build on deliverables using existing materials, such as from the GSD phase. • Develop key deliverables including: <ul style="list-style-type: none"> - Detailed System Design - This document provides an overview and scope of the initiative - Expected business outcomes, user navigation, testing strategy, data storage plan, data elements, and the business logic - Physical Data Model - Provides tables, columns and relationships for the solution - Data Dictionary - Provides definitions and other details of the tables and fields - Updated Screen Shot Details - This document contains screen shots of the proposed reports and dashboards with detailed filtering logic - Staging Area Load Process - Describes the logic used to derive data from the source system in the database staging tables - Load Process - Describes the logic that occurs to transform data from the staging tables into the database - Element Details and Definitions - Provides the details on Measures and Dimensions - Cognos Cubes and Report Details - Provides details on the Cubes and Analytical reports - Source to Target Data Mapping - Provides the end-to-end mapping between the cubes, dashboards and source systems.
Submit Deliverables as part of DSD	<ul style="list-style-type: none"> • Review, incorporate feedback from meetings with BIS. The application team submits the deliverables as part of the DSD deliverable.

Figure 6.9-134. Our ITSS EKMS Team Supports the Design Process with Business Intelligence Solution Design Expertise and Best Practices

The design phase allows BIS and Deloitte to help align technical specifications to the strategic vision of the Department. By working through these processes, a reusable design approach can be established and leveraged to create a consistent architecture across the knowledge management projects and initiatives.

Deployment Planning

Through our collaboration with DPW, Deloitte has developed a comprehensive process for deployment planning. Our process encompasses the complete deployment planning process including the creation of playbooks, coordination of technical details with BIS, and coordination of deployment logistics. By extending the Deloitte shared services model, we apply our experience and lessons learned in deployment planning and coordination to the BI area. We also leverage our experience in deployment planning for BI initiatives to enhance existing deployment coordination efforts for knowledge management deployments.

Figure 6.9-135 depicts our process for knowledge management or business intelligence solution deployment planning.

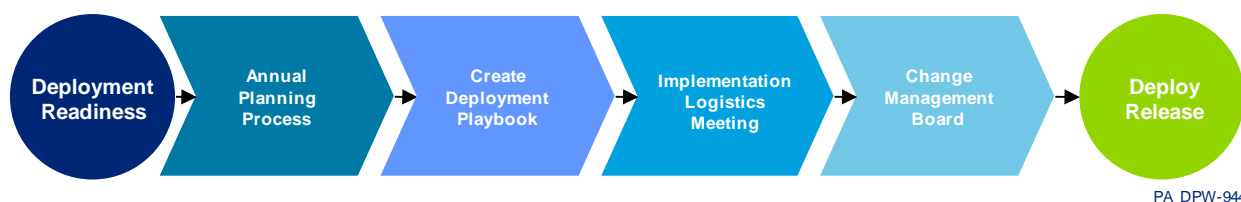


Figure 6.9-135. Deloitte’s Comprehensive Deployment Planning Process Encompasses Readiness Analysis, and Uses the Implementation of Deployment Steps for a Release.

Annual Planning Process Each fiscal year, DPW conducts an Annual Planning Process, where each potential release is scoped and an overall timeline is constructed. Drivers in the planning process include federal and state legislative and policy changes, resource availability, budget and technical infrastructure change management plans. During annual planning, Deloitte works closely with DPW’s knowledge management team and stakeholders to assess the timelines needed for each potential change, and propose target dates to business and technical stakeholders. The output of the annual planning process is the CIO Runway which is a detailed listing of each initiative and timelines for development, testing and production implementation. The CIO Runway is used to manage and align initiatives into common software releases for implementation.

Create Deployment Playbook As multiple technologies are involved in each release of a DPW application, Deloitte manages a detailed playbook for each release to manage the disparate components of each deployment. The playbook is created beginning with the early releases into the Integration test region. We make iterative updates to the documentation as the release migrates into each test region. As issues are identified or new components are added, these items are added to the draft playbook along with detailed documentation in the deployment instructions document.

Prior to production deployment of each release, Deloitte creates playbooks for the test for production and production deployments. Each playbook lists the steps, sequence of activities to be performed, and the stakeholders responsible for each facet of the deployment.



Each playbook is organized into the following sections:

- **Pre-Deployment.** Pre-Deployment activities are the steps which can be executed prior to deployment date. Deloitte works with DPW stakeholders to identify these steps. It also includes the preparation and submission of request forms required by BIS. In the case of knowledge management initiatives, these include the Cognos Staging and Production request forms.
- **Production Deployment** Production deployment activities are the steps to be executed on the day of production deployment. This typically includes deployment activities for each application component, any validation or data conversion steps and Go/No-Go decision call.
- **Rollback Strategy** We understand that in extreme cases, there is a potential for a deployment rollback if issues arise that cannot be corrected during the deployment. As part of our risk mitigation strategy, Deloitte coordinates with DPW stakeholders to define the potential rollback scenarios. Additionally, our team works with DPW to rehearse the rollback in a test environment prior to the deployment to production to allow DPW to plan for this contingency. The rollback scenarios and steps that we execute are detailed, along with the actual times identified during the rollback rehearsal.
- **Stakeholder Involvement** Each deployment requires participation from a diverse group of internal and external stakeholders. Internal stakeholders encompass Program Office users and representatives from multiple domains within BIS- DEA, DTE, and DIMO. External stakeholders include business partners and other state and federal agencies.

Each playbook is complemented by a set of deployment instructions, which detail the steps required by each domain, including web, database, middleware, knowledge management and any other technology areas impacted by the deployment. Technical details, such as conversion steps and a step-by-step overview for completing the implementation are included in these instructions.

Implementation Logistics Meeting Playbook creation and implementation planning is an iterative process, which depends on feedback from multiple DPW and Deloitte stakeholders. Following the creation of the playbook, Deloitte participates in DPW's Implementation Logistics Meetings, which allows stakeholders to perform a detailed review of each playbook step and provides a platform to address questions. Feedback from BIS stakeholders is incorporated back into the playbook and deployment instructions, and reviewed again and a subsequent meeting.

Change Management Board. Deloitte presents the application release playbook and instructions for approval to DPW's Quality Assurance group and Change Management Board (CMB). The Change Management Board is the formal vehicle for obtaining a final go-ahead from DPW stakeholders. At the CMB meeting, Deloitte presents an Application Implementation Request (AIR) form that contains information required by DPW to review and approve the implementation.

Once the CMB gives the go-ahead for the release, implementation steps outlined in the playbook are performed. During deployment, stakeholders perform deployment tasks, validations, and testing to check that implementation is successful and fulfills expectations.

Knowledge Management Capacity Planning

Deloitte performs Cognos Business Intelligence, Data Warehouse, and Informatica ETL related capacity planning. Our team works to support quarterly capacity planning as well as initiative based capacity planning. Deloitte’s proficiency in assisting DPW capacity planning comes from years of experience monitoring the production infrastructure for growth in BI Users, Informatica workflows, database and data warehouse tables for both mainframe and open system projects while concurrently supporting the design and implementation readiness planning of various initiatives. Figure 6.9-136 highlights how capacity planning is managed for knowledge management as part of the DPW capacity planning process.

Capacity Plan Input	Deloitte Activities to Conduct Knowledge Management-Centric Capacity Planning
Initial Planning	<ul style="list-style-type: none"> Provide an in-depth analysis of project database increases and behavioral changes during the Physical Data Model review, which would potentially impact database capacity, topology or configuration.
Quarterly Planning	<ul style="list-style-type: none"> Collect, analyze, and present on a quarterly basis databased on capacity planning metrics. This includes expected increases in disk consumption, connection volumes, CPU and memory utilization, etc. Assist BIS to assimilate the data and assess resource requirements for the evolving BI infrastructure.

Figure 6.9-136. Deloitte’s Proactive Approach to Knowledge Management Capacity Planning Uses a Metrics-based Approach to Anticipate Growth in IT Resource Requirements.

Initial Planning

Prior to each knowledge management initiative going live, Deloitte presents the capacity plan during the ARB IV for database-related capacity planning. The capacity plan is submitted in order to plan for anticipated growth in data volume that impact cube sizes and also to plan for the increase in Informatica workflows that affect repository sizes.

The ARB IV meeting takes place close towards the end of Systems Acceptance Testing phase and before the initiative’s go-live date. Deloitte uses this meeting to present a revised capacity plan from the ARB II meeting. These revisions take into account the results of Systems Acceptance Testing and Load Testing.

In addition to the initiative-specific capacity plans, Deloitte provides to DPW management an enterprise-wide capacity plan at the beginning of each quarter for each application. This capacity plan summarizes growth of the databases for day-to-day usage, and growth anticipated from new initiatives in the upcoming quarter, including increases in the number of cubes and Informatica workflows associated with business

intelligence and data warehouse initiatives. This allows for proactive discussion and planning for any major anticipated increases on an on-going basis.

Figure 6.9-137 provides a sample database capacity plan layout for data warehouse initiatives:

Business Intelligence Metrics (Production Only)				
Area	Description	Current	Expected Increase for Report Period	Estimated number for the Report Period
Data Warehouse Metrics	Cognos – Number of Users	120 users (OCDEL, PA Pre-K Counts and Deloitte User Classes)	No Expected Increase	120 users (OCDEL, PA Pre-K Counts and Deloitte User Classes)
	Cognos – Number of Reports	79 reports	6 reports	85 reports
	Cognos - Number of Cubes	47 / month	8/month	55 / month
	Cognos – Number and Size of Output Versions	N/A	N/A	N/A
	Cognos – Number of Dashboard Pages	19 / Day	No Expected Increase	19 / Day
ODS Metrics	Informatica - Number of ETL Processes	767/month	76/month	843/month
	Cognos – Number of Users	120 users (OCDEL, PA Pre-K Counts and Deloitte User Classes)	No Expected Increase	120 users (OCDEL, PA Pre-K Counts and Deloitte User Classes)
	Cognos – Number of Reports	14	No Expected Increase	14
	Cognos - Number of Cubes	0	No Expected Increase	0
	Cognos – Number and Size of Output Versions	N/A	No Expected Increase	N/A
	Cognos – Number of Dashboard Pages	N/A	No Expected Increase	N/A
	Informatica - Number of ETL Processes	54/day	No Expected Increase	54/day

Figure 6.9-137. Sample Database Capacity Management Plan Supports BI Initiatives.

Deloitte’s capacity planning for BI initiatives considers current size and future growth of database environments, OLAP cubes and ETL workflows.

Quarterly Planning

Deloitte recognizes that a metrics-based approach supported by tools provides the most effective support for capacity planning. The Deloitte team worked with the BIS database administration team to establish a repository in the production utility to support this effort. We propose to expand the repository to include metrics on the Enterprise Data Warehouse (EDW) and Online Data Store (ODS). The capacity plan schema “CAPPLAN” will capture required data points for EDW and ODS. Deloitte will use the existing utility scripts to extract capacity plan data for EDW and ODS databases. Using Oracle built-in job scheduler, these scripts will run daily to capture required capacity plan data. The data collected everyday is a daily snapshot of database segments (tables/indices). The resulting data set will be populated to a centralized repository. Deloitte will use the data stored in this repository to analyze trends and provide enhanced capacity forecasting.

Deloitte submits capacity plan documents to BIS every quarter. The document contains capacity projections for OLTP, ODS, and EDW databases for the next quarter.

Quarterly capacity plan is calculated based on the following factors:

- Capture current size from production (ODS, EDW) for subject areas
- Analyze 90 days of data stored in the repository to calculate average growth
- Capture the anticipated increase in the number of OLAP cubes
- Capture the anticipated increase in the number of Informatica mappings/workflows

Figure 6.9-138 shows some key figures that indicate the complexity and scale of the current knowledge management environment that is actively supported in terms of monitoring, index management and troubleshooting.

Application	Number of Database Tables	Informatica Mappings/ Workflows	Number of Cubes	Number of Reports
eCIS	50	2	0	5054
HCSIS	385	546	5	10
PELICAN	202	777	48	80
PACSES	84	361	50	238

Figure 6.9-138. Snapshot of Scale and Complexity of BI Components by DPW Application.

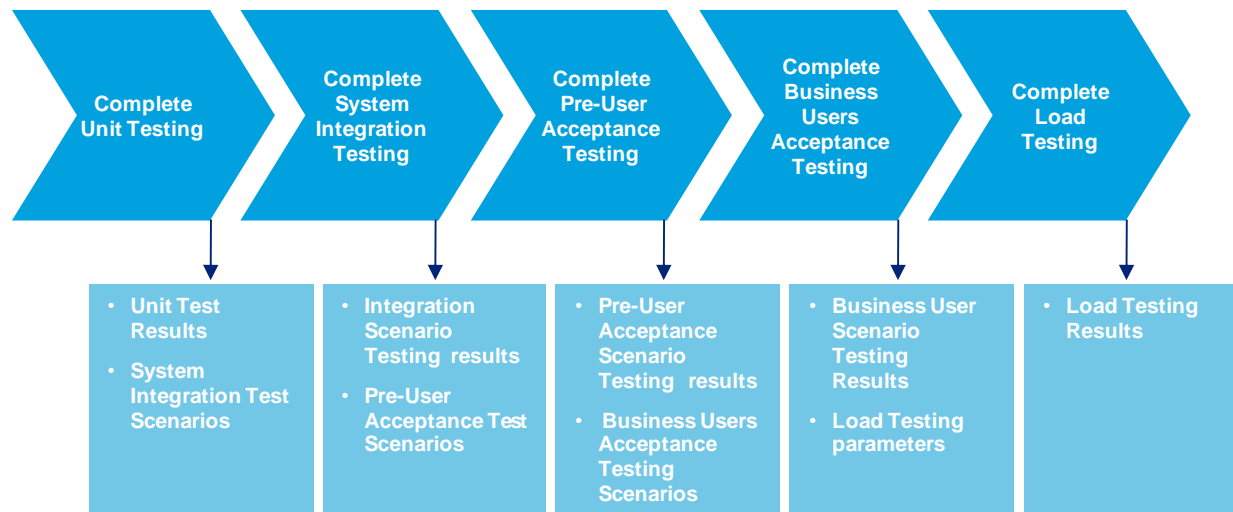
Application Testing

Deloitte provides BIS with the test cases and scenarios for application functionality and load testing prior to the testing phase of BI initiatives. Once the test cases and scenarios have been executed, Deloitte provides test results from lower environments prior to TFP.

For each phase of testing, scenarios are created to validate that the BI solution meets the agreed upon technical and business requirements. The test scenario results are documented during each step of the testing process and are shared with BIS in a timely manner. For example, during the development phase, we complete unit test checklist for each component as it is built. The checklists are collectively shared with BIS and EKMS teams towards the end of the development phase.

Figure 6.9-139 provides the phases for application and load testing.

Scenarios and Test Results Shared with BIS at Every Phase of Application and Load Testing



PA_DPW-2041

Figure 6.9-139. Deloitte’s Approach to Testing Uses a Multi-phase Approach.

We provide BIS with test cases and scenarios prior to testing and provide test results prior to TFP.

Through System Integration, Pre-User Acceptance and Business User Acceptance tests, scenario testing focuses on verifying that the functional and non-functional requirements being addressed by the BI solution are thoroughly tested. Our team subjects the solution to possible input combinations, verifying error and exception handling features, validating that response time is acceptable. The scenarios and scenario testing results for System Integration phase, Pre-User Acceptance Test phase and Acceptance Test phase are shared with BIS per the PMO deliverable submission process.

Deloitte and DPW have collaboratively developed Cognos load testing procedures. Deloitte will continue to perform Cognos load testing along with business user acceptance testing to determine that Cognos reports and cubes are performing at or above the expected level of performance. Key metrics across the various software and hardware components that support Cognos are identified and documented in the load testing plan. We summarize key metrics at the end of the load test process to validate whether the reports are performing at the expected levels.

The Cognos reports are tested by introducing certain variations to understand the benefits offered by various tuning options. Key metrics are measured for each of these variations. These variations are typically tested over a specific number of rounds, including:

- The first round is typically meant to vet the testing plan, discover any critical issues with what is being testing, and establish what performance configuration changes should be made, if any.



- The second round and any subsequent rounds should have an established plan to work towards testing a true simulation of production usage of Cognos Reporting.

Load testing will be executed after the completion of business user acceptance tests when the BI solution is more stable and already free of defects that may affect the performance test.

Knowledge Management Communication/Coordination

We develop a formal Communication Plan based on CMMI principles. The Communication Plan is a key document that provides a specific, structured model for written, spoken and electronic communication between Deloitte and the BIS knowledge management team. As with all CMMI-based plans, this is reviewed and updated on an annual basis with stakeholders or as communication requirements change based on the needs of the stakeholders or project activities.

The plan documents the meetings necessary to support activities for Project Management, IT Operations or address operations support issues.

Figure 6.9-140 provides a list of the meetings which support these activities.

Communication Plan Meeting	Meeting Description
Subproject and project team meetings	Discuss outstanding application changes, identify and address potential issues to the project, discuss upcoming initiatives
Monthly DTE meetings	Discuss application issues that relate to DTE domain and upcoming initiatives that may require DTE support
Design sessions	Identify how business requirements can be effectively translated into technical design
Reporting Status meetings	Discuss upcoming reporting releases and application issues with program offices and EKMS

Figure 6.9-140. Communication Plan Meeting and Description.

Deloitte plans to establish integrated cross-team communication meetings between our ITSS knowledge management team and the BIS EKMS team. Communication and coordination activities will be performed as part of on-going liaison activities which will include discussions of upcoming releases, business requirements, and resource planning.

Channeling communications and coordination through a our centralized technology support team enables consistent and efficient execution of quality assurance activities as the liaison will also provide oversight reviews by working closely with Deloitte’s experienced leadership. This approach to project management emphasizes the following:

- **Collaboration between teams.** Cross-team coordination between BIS staff and Deloitte team members helps to confirm a successful execution of the project and



facilitates effective knowledge transfer from consultant to client upon completion of initiatives.

- **Comprehensive communication through a common liaison.** A common liaison keeps participants in the development process informed of project status and conditions. This can be accomplished through timely and accurate project status reporting.
- **Complete accountability.** Deloitte helps EKMS to determine clear lines of accountability for the thorough completion of deliverables. Our approach provides each team member with a clear understanding of the project objectives, assignments, schedules, quality, and standards.
- **Quality assurance.** Detailed tracking of project tasks combined with a structured set of quality assurance review procedures allows for early detection and correction of deficiencies.





Operations

IV

Page
IV-388

RFP Reference: E. Information Technology (IT) Shared Services Model & Direct Technical Support Services for Lot#6 Offeror and Lot#7 Offeror

The Selected Offerors of Lots # 6 and Lot #7 will be performing the work associated with Systems Support Services initiatives and Direct IT Support Services using an IT Shared Services Model.

Figure 7 below, is a table that highlights specific application operational support services by domains. This includes service offerings in the following domains

Operations

- **Operations - Batch Management** – Support creation of batch run books, escalation protocols and restart instructions for all project batch jobs. Assist BIS to set up the OPCON scheduler to support project batch schedules. Provide first-line of support to BIS for batch issues/questions
- **Operations - Capacity Planning** – Support the collection, assimilation and presentation of quarterly capacity plans
- **Operations - Load and Break Testing** – Facilitate the scheduling, execution and analysis of load and break tests. Work with the project team to assimilate results and present to BIS management with each major release
- **Operations - Reporting** – Automate and distribute operational project reports – such as the Daily Business Metrics - to project team, program office and BIS staff.

Our ITSS team provides a complete set of Lot 7 operational support services that includes assistance in managing nightly batch cycles, forecasting and presenting quarterly capacity needs, performing load and break testing of major releases, and distributing automated operational reports to key stakeholders.

Operations focuses on maintaining service delivery to DPW end users and continuously improving the underlying technology used to deliver and support those services. Our experience at DPW demonstrates that providing strong operations support extends into each phase of the SDM. Prior to migrating software to production, our testing processes provide validation that new application functionality and batch processes integrate well in the existing environment. After deployment, Deloitte uses resources with knowledge of the DPW system topology combined with automated reporting solutions to meet DPW service delivery levels.

Figure 6.9-141 summarizes our understanding of the breakout of Lot 6 and Lot 7 operations support activities.

Benefits to DPW

Deloitte brings:

- Over 10 years of experience developing the detailed know-how to support DPW's unique and complex mix of mission critical open and proprietary systems, batch and online processes, mainframe and Web-based technologies that supports many different types of user communities in a high availability environment.
- A team that has consistently delivered DPW system availability in excess of 99 percent.



Lot 6	Lot 7
N/A	<ul style="list-style-type: none"> Support creation of batch run books, escalation protocols and restart instructions for all project batch jobs Assist BIS to set up the OPCON scheduler to support project batch schedules
N/A	<ul style="list-style-type: none"> Support the collection, assimilation and presentation of quarterly capacity plans
N/A	<ul style="list-style-type: none"> Facilitate the scheduling, execution and analysis of load and break tests Work with the project team to assimilate load test results and present to BIS management with each major release
N/A	<ul style="list-style-type: none"> Automate and distribute operational project reports – such as the Daily Business Metrics - to project team, program office and BIS staff

Figure 6.9-141. Breakout of Lot 6 and lot 7 Operations Support Activities.

Our team uses its specialized technical knowledge of DPW’s diverse application and technical environments to provide operations support services. In Figure 6.9-142 we highlight the types of application-specific support provided by the team.

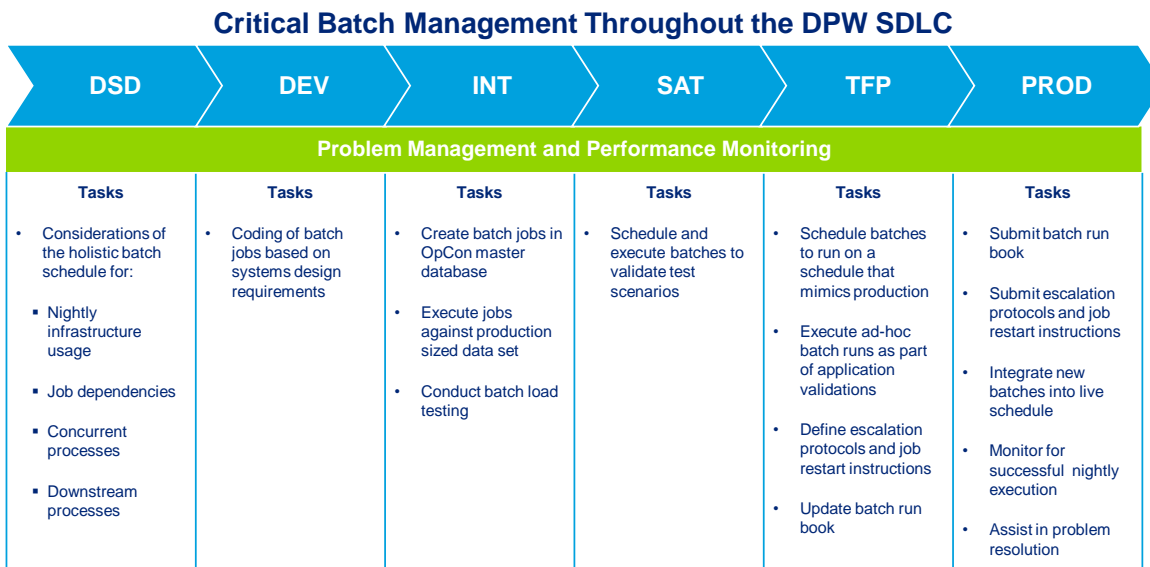
Applications	Deloitte Understands Key System-Specific Characteristics for Operations Support
iCIS	<ul style="list-style-type: none"> CIS, TPL, IEVS – Over 900 batch jobs execute on the CIS mainframe carrying out critical processes such as cash disbursement and income eligibility determination. eCIS - Nightly batches have 22 external interfaces to exchange data between private, state, and federal entities. COMPASS – New technology protocols, such as Rich Internet Application (RIA) and Windows Communication Foundation (WCF) are exercised during load testing.
HCSIS	<ul style="list-style-type: none"> Nightly batch processes interface with the PROMISE database to gather rates information for providers. Trends revealed by the Daily Business Metrics report show that each July, the contract renewal process increases by 1,200 percent over normal levels, requiring additional capacity to support the surge.
PACSES	<ul style="list-style-type: none"> PACSES Open Systems – The Performance Improvement Module (PIM) is load tested through use of the AJAX platform. PACSES Mainframe – Over 1,000 mainframe batch jobs execute per night including SCDU check files, which result in 7-8 million payments across Pennsylvania.
PELICAN	<ul style="list-style-type: none"> Fiscal Year-End Rollover (FYRO) Process runs annually as a batch process to open new budgets for cases. Five different subsystems – CCW, PPCS, PKC, ELN, and PPCS - comprising the PELICAN suite are exercised in parallel when conducting load and break testing.
Child Welfare	<ul style="list-style-type: none"> Batches that submit ACF data as part of IV-E reporting requirements.
Enterprise Services	<ul style="list-style-type: none"> Web services such as MCI.NET, Enterprise Rate Service, and the File Storage Web Service (FSWS) are consumed simultaneously across the enterprise during each nightly batch cycle. Load testing of the Enterprise Rate Service requires coordination with PROMISE.

Figure 6.9-142. Key Application-specific Characteristics that Drive Operations Support Activities.



Operations - Batch Management

Our ITSS operations team brings knowledge of the thousands of batch jobs that execute across the different DPW environments. Many critical DPW processes such as benefit issuance, correspondence generation, and provider invoicing depend entirely on open systems and mainframe batches completing in tandem successfully. Similar to the applications they support, batches have key milestones throughout the systems development life cycle and undergo continuous performance monitoring. Our team understands this life cycle and the key tasks associated with each phase as depicted in Figure 6.9-143.



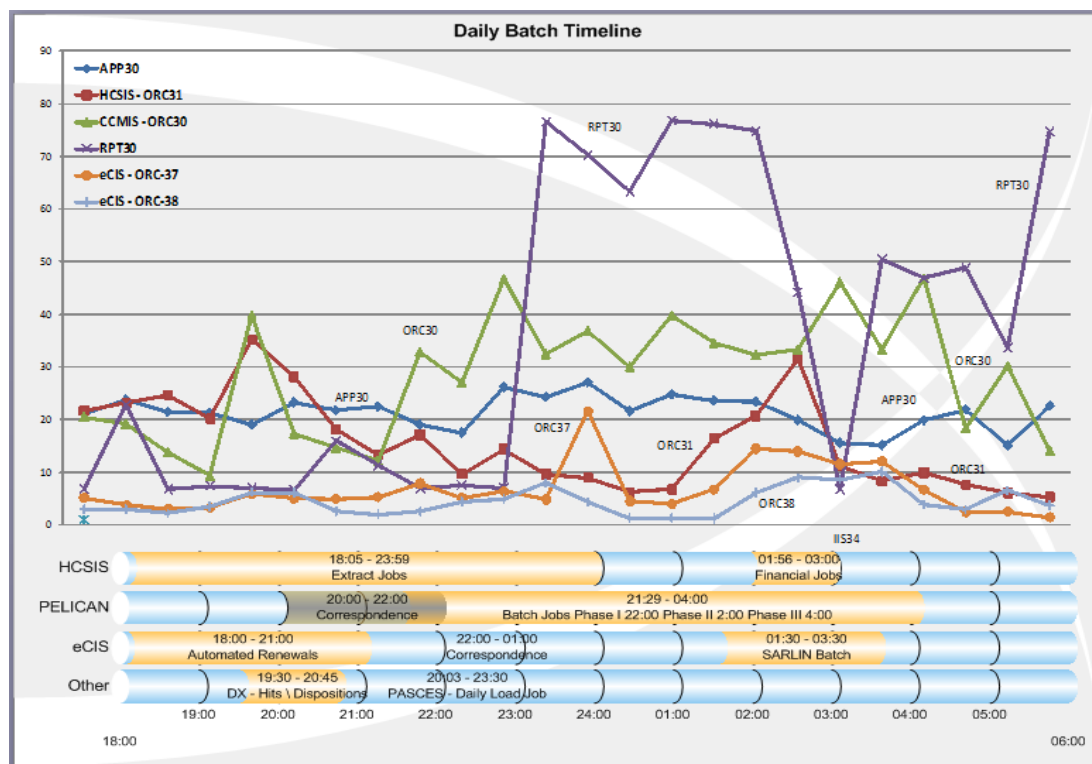
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Figure 6.9-143. Critical Batch Management Throughout the DPW SDLC.

Deloitte tracks batch milestones throughout the course of the SDLC to provide DPW confirmation of production readiness.

During the DSD phase Deloitte and the Program Offices jointly discuss and determine those business functions that are best accommodated by a batch process. Our team analyzes the impact of new batches on the batch topology to minimize the need for structural changes in downstream development phases.

Operating in a shared services model gives Deloitte a unique, overall view of the complex DPW batch environment. We use this insight to determine the optimal approach for integrating these new batches into the production schedules. Several considerations go into this analysis. The primary consideration is the current resource usage of the production batch infrastructure. We are the only vendor that understands DPW's complex batch architecture and impacts to the associated infrastructure. Figure 6.9-144 maps resource footprint information from the Sightline tool against a timeline of each open system application's critical processes:



PA_DPW-653

Figure 6.9-144. Open Systems Daily Batch Timeline.

Reviewing the enterprise wide-nightly production batch cycle early in the SDLC allows for identification of time periods where sufficient infrastructure capacity exists to accommodate new batch processes and their dependent processes, thereby preventing unnecessary process conflicts and optimizing the use of DPW IT assets.

Based on this analysis, Deloitte identifies system resource levels that can accommodate additional workload. Deloitte strives to minimize scheduling batch processes in an overlapping manner to reduce the risk of failure due to resource contention or over-utilization. By evenly distributing workload throughout the evening and later in the night, batches have the best chance to complete execution before causing any potential disruption to the end users.

Analysis of the job dependencies of a batch is another important consideration. These dependencies are rules defined in OpCon that prevent a batch job from running until pre-defined criteria are met, such as the successful completion of another batch job. We understand that proper planning for the introduction of new batch job dependencies minimizes delays in nightly processing.

In the Development phase, the application teams develop batch processes based on the requirements laid out in the DSD phase.

During the Integration Testing phase, the first key task is to introduce new batches into the OpCon schedules for the first time. The Deloitte team brings years of experience in collaborating with the DPW batch scheduling team and the application teams to specify requirements for batch cycle additions and changes. Collaboration and coordination activities include:

- Application teams create batch Addition/Change/Deletion (ACD) forms.
- Operations shared services team performs a quality check of the ACD forms.
- DPW batch scheduling team create new jobs in the master OpCon job repository.
- The PACSES Technical Services Team schedules PACSES mainframe batch jobs based on the recommendations of the PACSES application teams.

Figure 6.9-145 illustrates our process for coordinating batch scheduling for the Integration Testing environment and subsequent environments.

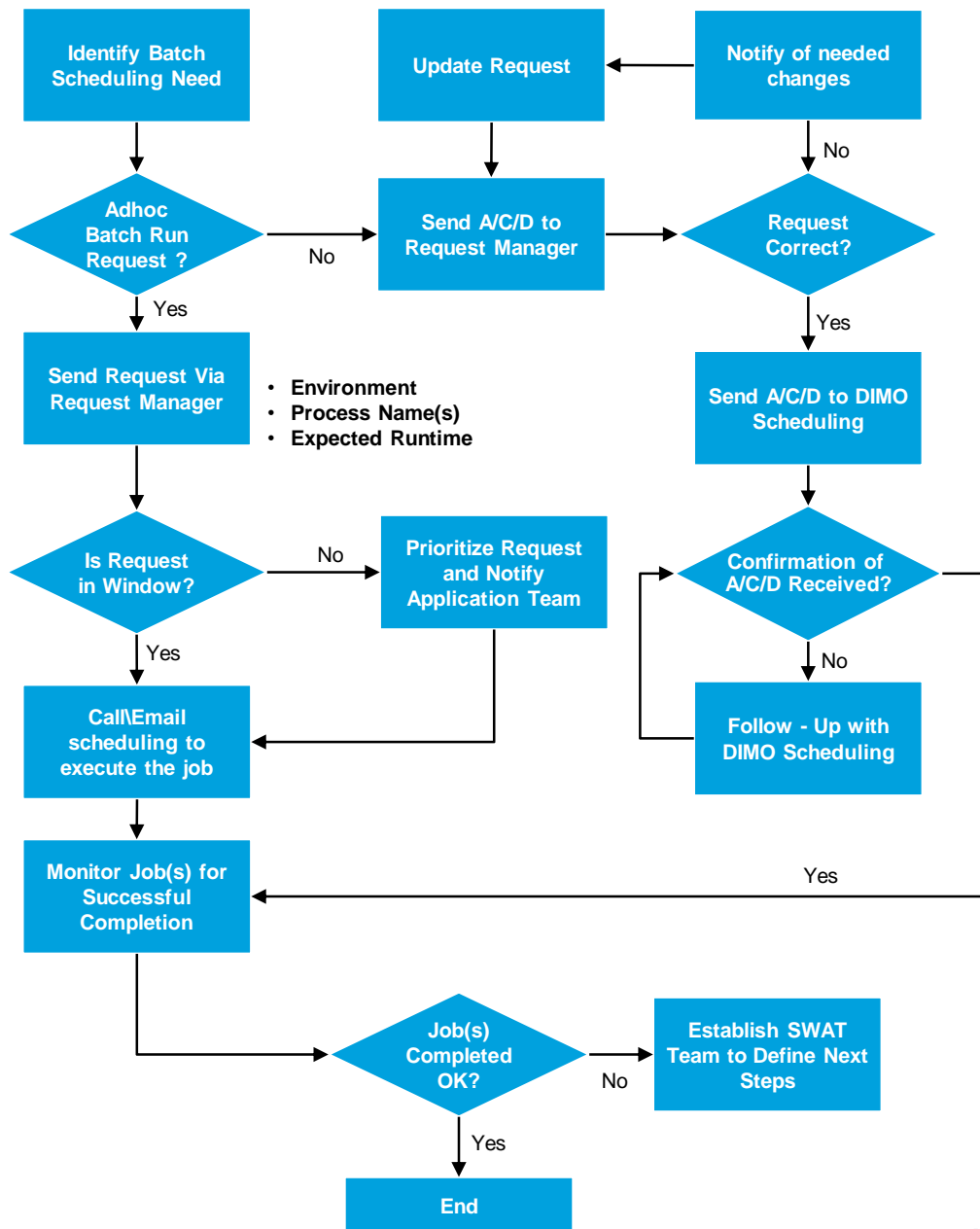
Staff Spotlight Matt Orbin

System Configuration Specialist



"I am proud to have been part of the challenging Client Notice Redesign batch initiative that integrated OpCon, Informatica, and Adobe technologies to deliver critical, time-sensitive correspondences to Pennsylvania's citizens. I look forward to continuing my support of DPW and delivering stable and long-term operations in batch processing."

Open Systems Mainframe Batch Scheduling



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Figure 6.9-145. Batch Scheduling Process.

Deloitte collaborates with DPW to establish a standardized process for integrating new batches and scheduling ad hoc job executions that is common across the application teams.

To **initiate** this process, the application teams submit standardized batch ACD forms to the shared services team for review. These forms serve as scheduling instructions for the DPW batch scheduling team to assist in the set up of the OPCON scheduler for each environment from integration through production, and includes the following information:



- Name of the batch job and the schedule it is to be added into.
- Frequency at which the batch job should run.
- How a batch job starts (e.g., event-driven, based on a start time, or based on the completion of dependent processes).
- Date of integration into the production schedule.

Upon **receipt** of batch scheduling requests, the Deloitte team conducts a quality assurance check. If needed, we engage the application teams to help establish a better understanding of the overall batch environment and discuss more efficient ways to set up a new batch process.

After **completing** the quality assurance check, the shared services team forwards the ACD requests to the DPW batch team. We recognize that processing batch ACDs can be a time consuming process. To allow ample time for the DPW batch scheduling team to review and facilitate requests, we propose the following lead times for submission (unless an emergency or expedited change is required):

- One business day lead time provided for one to two batch ACDs.
- Three business days lead time provided for three to six batch ACDs.
- One week lead time provided for any requests involving seven or more batch ACDs.

With these lead times, the DPW batch team can **review** and pose any questions around the schedule changes and specifications found in the ACDs. Once batches are successfully added to the OpCon master repository, our team validates that jobs processed successfully.

Another key task during the integration phase is to **conduct** batch load testing. This allows for identification of batch performance optimization opportunities before migration into the higher environments. We recognize that to accurately gauge the performance of an open systems batch job, it must be exercised against a database with production volume data. We work with the application teams to understand which parts of the database each batch accesses and conduct data refreshes to populate the necessary data. Batches are then executed through OpCon. After completion, we analyze batch key performance indicators (KPIs), such as total runtime, database query performance, and resource usage statistics from the server infrastructure. Based on this analysis, we provide recommendations for performance improvements to the application teams.

During the Systems Acceptance Testing phase, batches are **tested** as end-to-end business process validations. Test user groups work through different online scenarios to simulate normal business operations and batches execute to confirm that nightly processing functionality compliments the online tests cases, as expected. This phase continues until test scenarios process successfully.

The Test for Production phase serves as both a rehearsal for production deployments and **confirmation** that a release can meet the rigorous demands of end users. We



recognize the vital role batches play in accomplishing both tasks. Post-deployment job execution indicates successful code migration and connectivity between various infrastructure components. Our team understands that DPW databases in the TFP environment undergo regular data refreshes with live production data. Executing against a robust data set provides an accurate representation of production behavior and allows for final performance tuning before going live.

Prior to the completion of the TFP phase, Deloitte updates a batch run book to the DPW batch scheduling team. The DPW operations staff can use this manual as a comprehensive, easy to understand information source about each production batch schedule. Figure 6.9-146 shows a sample screenshot of a batch manual.

Job Id	Description	Job Dependencies (predecessor)	Dependent Jobs (successor)	Frequency	Run time (24H Format)	Expected Run Time length (in minutes)	Input File	Output File	Resolution /Escalation Process	ECIS On-call support instructions
ECSIMPSAR001	The purpose of this job is to import the SAR flatfile which is sent to PWISPRDAPP30. This job is only added to the ECIS-PROD schedule upon the arrival of the trigger file (CMR60D.tgr) in the input folder. This is accomplished by a \$job.ADD event from the Argus FileWatcher.	N/A	ECSGENSAR002	5 days a week (m-f)	On demand	5	CMR60D.tgr	Log file	Tier1: The escalation procedures described below should be followed.	Check the log and determine the reason for failure. If the job stopped abruptly, ask scheduling to restart it again. If the jobs encountered a different error, contact: Raj Gundala (717) 555-5555 Or backup: Matt Schnure (717) 555-5555

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Figure 6.9-146. Snapshot of the iCIS Production Batch Manual.

By maintaining a production batch manual for each application, Deloitte maintains complete information on each batch schedule, allowing for efficient determination of steps to take in the event of issues with the batch schedules.

The batch manual for each application is a living document, updated each time a release involves changes to the batch schedule. By consulting one of our batch manuals, the DPW team can quickly assess what each batch does, any upstream or downstream processes dependent on that job, execution method, and the escalation protocol to be followed in event of a failure. In order to provide first line support to DPW for batch issues and questions, the batch manual contains contact information for an on-call Deloitte resource with deep knowledge of that particular job. These resources collaborate with DPW staff to diagnose the root cause of a batch issue and determine the appropriate remediation steps to restore normal operations.

For migration to the production environment, batches are integrated into live batch schedules. The focus of the Deloitte team shifts from testing to the ongoing monitoring for successful completion and sustained performance levels.

In the event of a functional issue with a batch in any environment, Deloitte uses the standard PCR process to prioritize and track a fix. Until a fix is developed and implemented, Deloitte researches and provides the necessary workaround steps to minimize impact to normal operations. Infrastructure outages and scheduling issues that cause significant disruption to the batch schedules can warrant the creation of a SWAT team. The goal of this team is to escalate the issue and bring about rapid resolution to



support the DPW business. Key stakeholders from across the enterprise are brought to bear to diagnose and resolve the issue. Our experience implementing batches with DPW gives Deloitte the insight into the most critical batch processes that need to execute. These batches are prioritized to maintain the needs of the business.

Operations - Capacity Planning

Deloitte's proficiency in assisting DPW with capacity planning comes from years of experience monitoring the production infrastructure of both the mainframe and open system environments while concurrently supporting the design and implementation readiness planning of various initiatives. We compile and present to key stakeholders capacity plans for individual initiatives during the ARB II and ARB IV meetings and a quarterly capacity plan for holistic application capacity forecasting.

Initiative Based Capacity Planning

The ARB II meeting occurs during the General System Design phase. This is the first quantifiable capacity plan delivered for the initiative and contains initial estimates of metrics such as file server disk consumption, network bandwidth and increases in the total user base. After this meeting, DPW has an understanding of where the primary impacts to the infrastructure are expected.

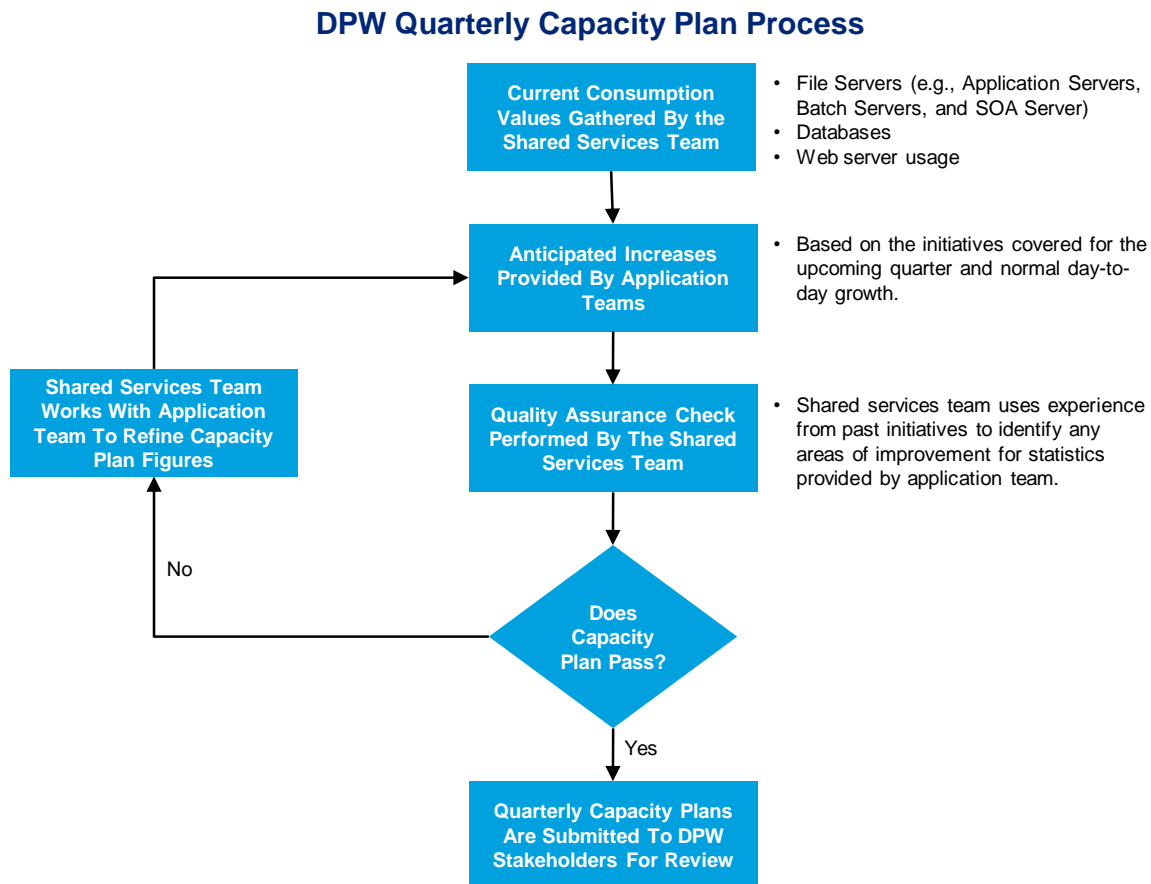
The ARB IV meeting takes place during the latter portions of the Systems Acceptance Testing phase and before the initiative's go-live date. Deloitte uses this meeting to present revised capacity numbers from the ARB II meeting. These revisions take into account any infrastructure impacts uncovered during the Systems Acceptance Testing and Load Testing phases of systems development.

Quarterly Capacity Planning

In addition to the ARB II and ARB IV capacity plans, Deloitte provides DPW management an enterprise-wide capacity plan at the beginning of each quarter for each in-scope application. This capacity plan provides an overview of initiatives planned for implementation over the upcoming quarter, and the anticipated cumulative growth in system resource consumption. This allows for proactive discussion and planning for any major anticipated increases on an on-going basis.

Capacity Planning Process

Each capacity plan undergoes a thorough review by the Deloitte shared services team prior to submission to DPW. Our proposed process for open systems and mainframe capacity plan creation can be seen in Figure 6.9-147:



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Figure 6.9-147. Quarterly Capacity Plan Process.

The Deloitte capacity planning process makes use of our experience with implementing new initiatives to fine-tune forecasted capacity increases.

By using the Sightline tool, the Deloitte team gathers current resource usage statistics of file servers, databases, and web servers for the application teams.

Based on the requirements of the initiative(s) covered in the capacity plan, the application teams then estimate increases in system needs and factor that amount into the current baseline. The total of these two figures represent the expected increase in capacity.

At this stage, the Deloitte team evaluates the capacity plan for the accuracy of forecasted increases. Our years of experience with past implementations and their impacts on the DPW infrastructure positions us better than any other vendor to validate assessments about future capacity needs. If needed, we work with the application teams to refine their capacity figures. Once we feel that the capacity plan is complete,



we meet with you to review the results and any impacts that may require additional resources.

Regardless of when a capacity plan is submitted, Deloitte provides a standardized set of information, which includes the following:

- The scope of the initiative(s) being covered in the capacity plan.
- Any anticipated increases to the application user base.
- Any increases to resources usage and disk consumption of the database and file storage servers.
- Any increases to network bandwidth consumption.
- Any increases to enterprise service consumption.

These figures are presented in a standard layout across the in-scope applications and mainframes, a sample of which is seen in Figure 6.9-148:

File System Storage (All Environments)			
Server Type (Web, Utility, Report) (add or delete rows as required)		Current Size	Change Expected
<i>System Acceptance Test</i>			
Web Server	PWISSATWEB17	6.80 GB	Increase of 2.53 GB for eCIS Release 17.3
	PWISSATWEB18	2.55 GB	Increase of 1.55 GB for eCIS Release 17.3
	PWISSATWEB19	7.66 GB	Increase of 1.45 GB for Phase IV-B Initiative
	PWISSATWEB20	2.74 GB	Increase of 2.14 GB for Phase IV-B Initiative
	PWISSATWEB25	0.28 GB	Increase of 0.30 GB for Phase IV-B Initiative
	PWISSATWEB26	0.24 GB	Increase of 0.34 GB for Phase IV-B Initiative
	PWISSATWEB27	0.26 GB	Increase of 0.31 GB for Phase IV-B Initiative
	PWISSATWEB28	0.25 GB	Increase of 0.32 GB for Phase IV-B Initiative
Utility Server	PWISSATAPP21	46.8 GB	Increase of 4.45 GB for Release 17.3
	PWISSATAPP22	0.59 GB	Increase of 0.32 GB for Phase IV-B Initiative
Report Server	PWISSATRPT02	0.34 GB	No significant change anticipated.
	PWISSATSR525	5.00 MB	No significant change anticipated.
FSWS	PWISSATSOA20	19.4 GB	No significant change anticipated.
	PWISSATSOA21	7.42 GB	No significant change anticipated.
iRep	PWISSATWEB17	0.50 GB	No significant change anticipated.
	PWISSATWEB18	0.22 GB	No significant change anticipated.
	PWISSATWEB20	0.16 GB	No significant change anticipated.
	PWISSATWEB25	0.12 GB	No significant change anticipated.
	PWISSATWEB26	0.12 GB	No significant change anticipated.
	PWISSATWEB27	0.12 GB	No significant change anticipated.
	PWISSATWEB28	0.12 GB	No significant change anticipated.
Data Warehouse Servers	PWISHBGEKM12	27.9 GB	No significant change anticipated.
Web Services Servers	PWISSATSOA20	3.58 GB	Increase of 0.15 GB for eCIS Release 17.3
	PWISSATSOA21	2.26 GB	Increase of 0.12 GB for eCIS Release 17.3
<i>Test for Production</i>			
Web Server	PWISTFPWEB20	9.27 GB	Increase of 12.5 GB for Phase IV-B Initiative
Utility Server	PWISTFPAPP23	2.39 GB	Increase of 3.65 GB for Phase IV-B Initiative

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Figure 6.9-148. Capacity Plan File System Storage Report.

Our capacity plan deliverables clearly indicate areas where additional system resources are needed to maintain acceptable levels of service delivery to the end users.



This sample previews how File System Storage usage appears in our capacity plans. Servers are broken down by environment, and then separated once again by type of server for easy reference. The current consumption of disk space and any change anticipated by the application teams drives decision making as to whether or not a particular server requires more hard disk capacity to properly support an initiative.

Equipped with the information from these reports, DPW gains a deep understanding of the system needs for supporting upcoming initiatives.

Future of Capacity Forecasting. As DPW becomes a more integrated and enterprise service centric organization, monitoring key enterprise services such as the enterprise correspondence service becomes crucial. While these services provide DPW increased business agility, they present new challenges for accurate system resource monitoring and forecasting. A SOA based system architecture experiences heavier network traffic due to the increased amount of systems a request travels through. Deloitte makes full use of our wide breadth of experienced web service resources to develop a methodology for tracking daily metrics of service consumption. This data is used to assess business trend patterns and forecast dynamic capacity allocation needs for complex bulk processes.

Our team recognizes the difficulty in estimating the database capacity requirements of user configurable solutions such as Enterprise Incident Management and the ELN Program Expansion. These initiatives allow users to open cases independently of automated processes, which makes normal trend-analysis based forecasting challenging. We work with DPW to further refine the capacity planning process to better understand usage patterns for such solutions and the system resources necessary to accommodate them.

Load and Break Testing

In load testing, our team verifies that the constructed applications can maintain adequate throughput, satisfactory response, and timely completion of operation under different conditions of load, stress, and volume. Break testing is performed to determine at what point, or under what extreme conditions, application failures occur. This testing verifies product quality and reduces the risk of releasing poor performing software into the production environment. The objective is to benchmark performance under load, volume, and stress that the applications should be able to handle, while meeting the performance expectations of the application users. Both load and break testing takes place during the end of the System Acceptance Testing phase of the SDLC.

The Future of Load Testing for DPW

As DPW migrates to becoming an industrial SOA centric organization, enterprise service load testing becomes increasingly vital. Deloitte recognizes that SOA, being loosely coupled and distributed in nature, calls for a fundamental shift from the traditional SDLC testing practices. Figure 6.9-149 displays the different testing approaches for traditional systems testing compared to SOA based testing.



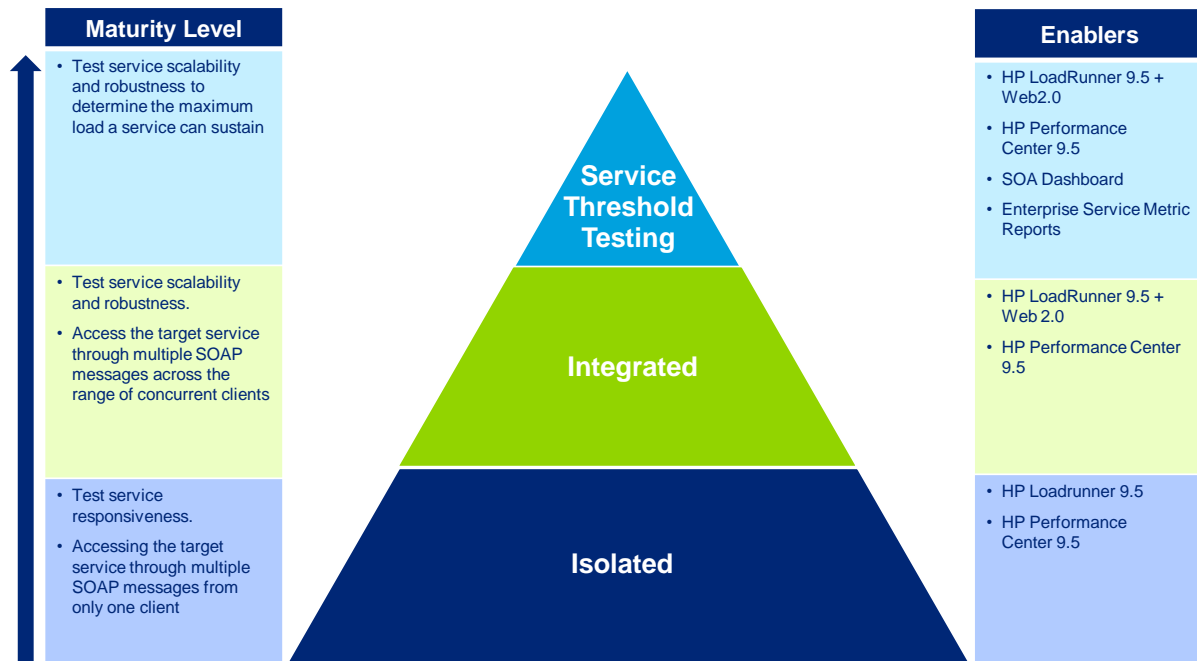
	Traditional Testing	SOA Testing
Functional (Unit/System) Testing	<ul style="list-style-type: none"> • Test a single compilable unit of code or interaction between multiple units of code, but all within the same application • Stress code coverage in addition to checking for boundary conditions, all inputs/outputs, among other considerations 	<ul style="list-style-type: none"> • Test a service or group of connected services interacting with each other via a common messaging protocol • Validate all inputs and outputs of a given service component or between services/components
Systems Integration Testing (SIT)	<ul style="list-style-type: none"> • Test complete business processes and/or interfaces end-to-end during the Construction phase, involving all applications required for fulfillment • Retain a strong application-based testing focus in the execution of the end-to-end business scenarios 	<ul style="list-style-type: none"> • Test complete business processes and workflows end-to-end during the Assembly phase; check the connectivity between the services/components • Focus on testing the service, message and transport-based aspects in the execution of end-to-end business scenarios
User Acceptance Testing (UAT)	<ul style="list-style-type: none"> • Perform a business scenario-driven, independent assessment of the functional capabilities of the application(s) involved in the UAT tests • Link applications themselves via inbound/outbound interfaces to execute the business scenarios 	<ul style="list-style-type: none"> • Perform a business scenario-driven, independent assessment of the functional capabilities of the services or a network of services involved in the UAT tests • Link different services or service components to execute the business scenarios
Load Testing	<ul style="list-style-type: none"> • Validate response time, throughput, and resource utilization for normal vs. peak concurrent users at different application and system workload • Check system performance under volumes projected in the capacity plan 	<ul style="list-style-type: none"> • Test service scalability and robustness; determine response time, throughput and resource utilization for services • Determine service scalability by accessing the target service through multiple SOAP messages across the range of concurrent clients
Break Testing	<ul style="list-style-type: none"> • Focus testing efforts on component level failover scenarios; include target load and transaction mix • Trigger failover by making application/environment configuration changes; validate RPO and RTO targets (SLA) 	<ul style="list-style-type: none"> • Emphasize testing of service component/service level failover scenarios • Trigger failover by making service/environment configuration changes; validate RPO and RTO targets (SLA)

PA_DPW-940

Figure 6.9-149. Traditional Testing vs. SOA Testing – A Paradigm Shift.

Deloitte's deep experience transitioning large, complex organizations from a traditional testing approach to a methodology rooted in SOA.

By embracing these paradigm shifts, especially concerning performance and break testing, the Deloitte team can bring to bear the appropriate tools and enablers to elevate the level of web services testing maturity at DPW. Figure 6.9-150 demonstrates the different levels of services testing from isolated tests, to integrated tests, and finally to forward-looking service threshold testing.



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Figure 6.9-150. Web Services Testing Maturity Levels.

Our approach for maturing the DPW services load testing process provides insight into the scalability and performance of enterprise web services by accounting for traffic from each applicable system.

Isolated Testing. This testing model most closely resembles traditional load testing. When testing a web service in isolation, only one client sends Simple Object Access Protocol (SOAP) messages. For example, exercising the MCI.NET service would require that only the HCSIS application send requests. While this testing provides insight into how a service responds under some load, neglecting traffic from the other systems that use the MCI service does not align with the principle of sharing a web service across multiple clients.

Integrated Testing. To properly estimate the scalability and robustness of a web service, it needs to successfully process an enterprise-wide equivalent load. Again considering the MCI.NET service, this testing model would account for requests from HCSIS, PELICAN, and eCIS simultaneously. By involving each system that consumes the MCI.NET service, integrated load testing provides a more accurate projection of a service’s responsiveness in production.

Service Threshold Testing. The final level of services testing maturity pushes the envelope beyond processing requests from applicable systems to determining the maximum load a service can sustain. Determining this limit provides insight into the scalability limits of a service before changes are required. By using the results of service threshold testing, proactive monitoring when a web service approaches the maximum threshold can be implemented and procurement needs determined well in advance.

Load Testing

Deloitte has experience in developing, managing, and maintaining load test scenarios that accurately mimic the actions of DPW users. By closely emulating the expected user base of a system performing normal business activities for a sustained period, our load testing approach provides confidence that an application is ready for the rigorous demands of the DPW organization. Our team brings highly qualified staff with deep knowledge of the DPW load testing solution, HP LoadRunner 9.5, and the underlying infrastructure used to execute tests. An illustration of the load testing solution can be found in Figure 6.9-151.

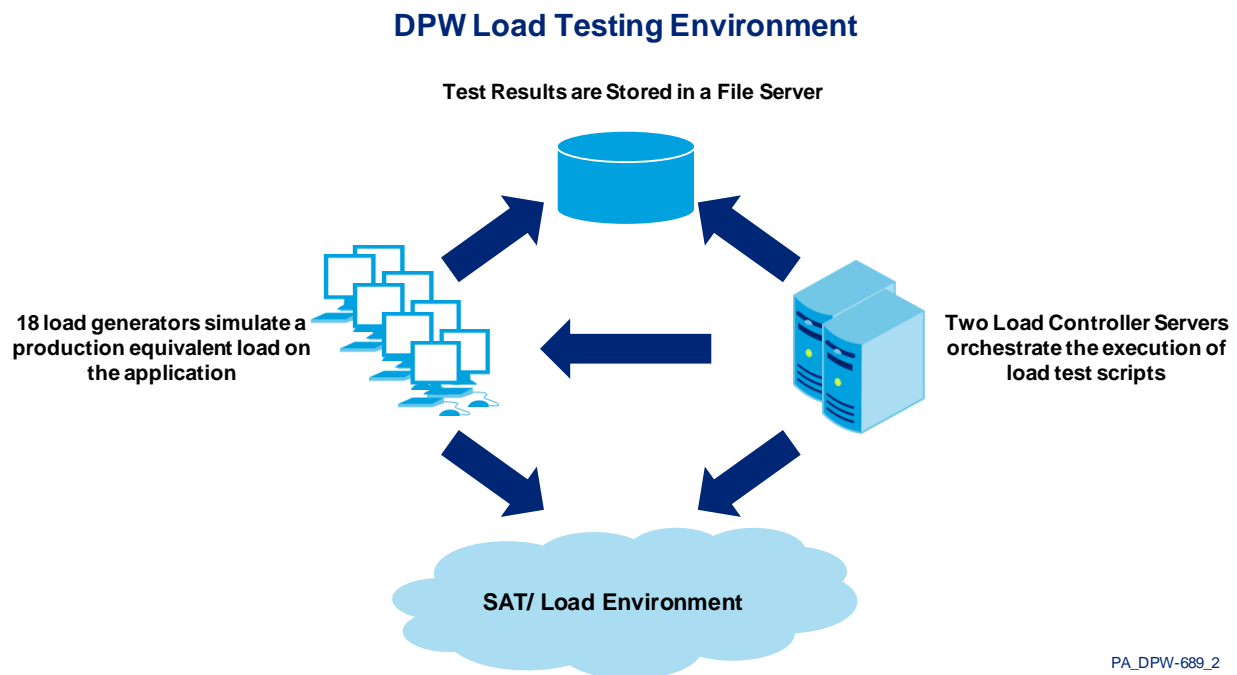


Figure 6.9-151. DPW Load Testing Environment.

The DPW load environment consists of three different components – load controller servers, load generator servers, and a test result repository.

There are a total of 21 components that comprise the DPW Load Testing solution. Tests are controlled by two load controller servers, which perform a dual role of stressing the application and coordinating the activities of the 18 load generator servers. The sole purpose of the load generators is to execute test scripts that simulate the activities of human users at a production equivalent volume. Each instance of a script is executed through a self-contained program called a vUser (virtual user). These servers communicate transaction response times, script execution statistics, and a wide variety of other metrics back to the results repository for review at the conclusion of a test.

Maximizing the value of load testing requires a cross-domain effort driven by a standardized process. Our proposed load testing process comes from years of executing and delivering load testing results for DPW. We understand the infrastructure elements involved in a load test, the role each domain plays in successful execution, and how to present the results in a way that provides the most value to DPW.

The key elements of our proposed approach for open systems load testing can be seen in Figure 6.9-152.

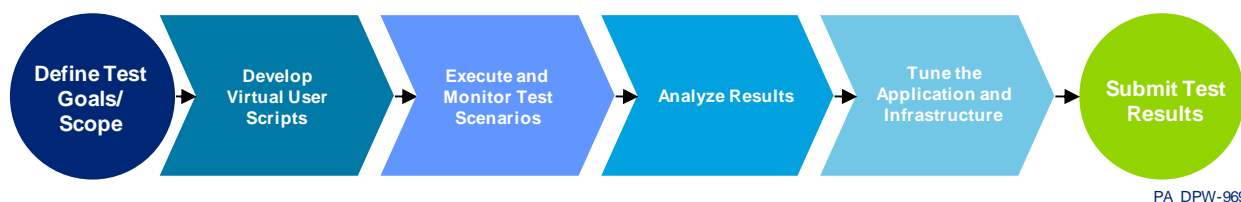


Figure 6.9-152. DPW Load Testing Process.

Deloitte establishes a standardized process for conducting a load test for each application to minimize the amount of preparation time needed.

Define Test Goals/Scope. The scope and performance targets for an initiative are established prior to conducting any load testing. These requirements aim to derive the effects of new business functionality or changes to existing functionality on the overall application. With the requirements defined, a test plan outlines the schedule of load tests. DPW stakeholders can review the dates, times, and scope of each load test by accessing the shared load test calendar.

Develop Virtual User Scripts. A virtual user script is a process that executes a particular business function, such as starting a new COMPASS application. The application teams determine the mission critical business functions to be exercised and program an automated script to simulate a human user performing work. The load placed on a particular component of the application can be adjusted by assigning more or less virtual users to a particular script, or by changing the speed at which the program completes the end-to-end process.

Execute and Monitor Load Test Scenarios. Several domains contribute to the successful execution of a load test. Figure 6.9-153 summarizes the key tasks for each test by domain.

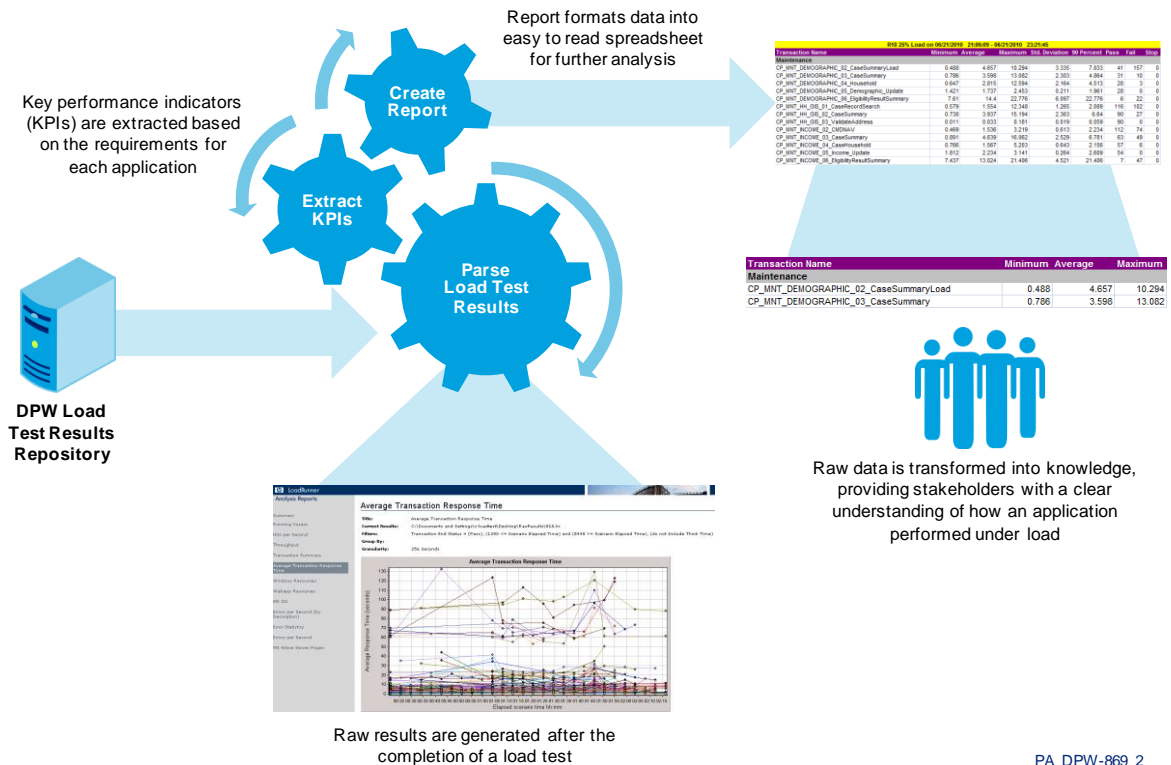


Shared Services Domain	Key Tasks Performed for Load Test Preparation and Execution
Database	<ul style="list-style-type: none"> • Identify data needs for testing purposes across test phases as well as environments. • Coordinate initial and ongoing delivery of data to load testing environment. • Analyze database schema and packages before a test begins. • Analyze SQL query performance after a load test completes.
Configuration Management	<ul style="list-style-type: none"> • Oversee and support preparation and configuration of test environment. • Deploy appropriate application code to the load test web servers.
Security	<ul style="list-style-type: none"> • Provide appropriate credentials to test user accounts.
Middleware	<ul style="list-style-type: none"> • Initialize webMethods queues.
Operations	<ul style="list-style-type: none"> • Build load test scenario in HP LoadRunner 9.5 according to application team specifications. • Execute load test. • Monitor for and troubleshoot any issues to keep the test running smoothly.
Mainframe	<ul style="list-style-type: none"> • Execute batches against test machines.

Figure 6.9-153. Key Tasks Performed for Load Test Preparation and Execution

Analyze Results. After a load test finishes, the Deloitte team uses built-in functionality of HP LoadRunner 9.5 to generate a raw data dump of performance statistics. We understand that these raw results provide a seemingly overwhelming amount of information. To bring this down to a manageable level for DPW review, Deloitte employs an automated tool to extract the most salient information. Figure 6.9-154 illustrates the tool for accomplishing this task:

Deloitte Load Test Results Analysis Tool v2.6



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Figure 6.9-154. Deloitte Load Test Results Analysis Tool v2.6.

An automated tool to extract key performance indicators defined for each application increases the efficiency of determining if a load test completed successfully or if further performance tuning opportunities exist.

Our tool analyzes and parses the raw results data provided by HP LoadRunner 9.5 at the end of a test. We work with DPW and the application teams to establish a set of key performance indicators (KPIs) for each application, such as specific business metric transaction response times or resource usage on a particular server, and configure the tool to search for those items. Once extracted, the tool automatically compiles the data into a formatted spreadsheet for distribution to key stakeholders through the DPW load test calendar. This tool follows the ITIL principle of transforming raw data into actionable knowledge by providing clear indications of where performance tuning opportunities exist.

Tune Application and Infrastructure. Based on the results from the Load Test Results Analysis tool, the Deloitte team addresses performance and infrastructure tuning opportunities before executing further load tests. Subsequent tests validate the success of tuning efforts or if further room for performance enhancement exists.

Submit Test Results. Testing continues until two consistent, acceptable load tests are achieved. Tests which display response times, business metric targets, and server usage comparable to or better than the previous release are defined as acceptable. Having two tests confirms repeatability of results. Our team works with the application



teams to compile results into a standardized deliverable for submission to DPW that details the following items:

- Scope of the application changes for the upcoming release.
- Performance tuning conducted throughout the testing cycle.
- Side-by-side comparison of current tests with metrics from the previous release.
- Comparison of load test database query execution statistics against the production database.

At DPW's request, we facilitate a meeting with key stakeholders to review the results and address any questions or concerns prior to moving the application to TFP.

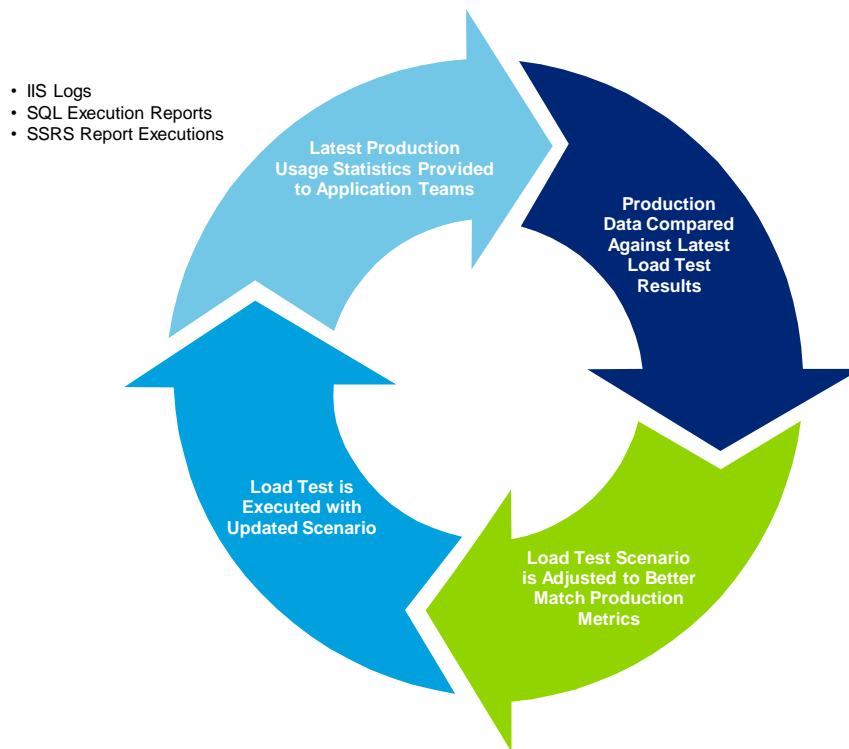
Continuous Load Testing Improvement

We understand that DPW applications continue to evolve to meet changing business needs. This can include introducing new business functionality or changes in existing functionality to address shifts in usage patterns. Gaining the maximum value from load testing requires that the strain placed on applications and their underlying infrastructure closely resembles the expected behavior in the field. Creating an automated program that accurately reproduces human behavior is an extremely challenging task. Our team conducts a Production Workload Analysis by using a variety of different data sources to gain insight into how your end users are interacting with your systems:

- Web server Internet Information Service (IIS) logs detail which functionality is accessed most by users.
- Database AWR/ADDM reports display the most frequently executed queries and queries with the largest resource footprint.
- SSRS Report Execution statistics show the types of reports users are requesting most.

Deloitte consolidates the knowledge from these sources into an iterative process for improving load testing efforts. This process is outlined in Figure 6.9-155.

Deloitte's Load Testing Continuous Improvement Process



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Figure 6.9-155. Load Test Continuous Improvement Process.

By continuously adapting load test scenarios to better match actual user patterns, Deloitte can provide to you a more accurate representation of how an application will perform after going live.

Latest Production Usage Statistics Provided to Application Teams. Before each round of load testing starts, current IIS Logs, SQL execution reports, and SSRS subscription reports are analyzed to determine current usage patterns.

Production Data Compared Against Latest Load Test Results. Usage patterns are compared against the last load test scenario to identify any opportunities to better match actual user behavior.

Load Test Scenario is Adjusted to Better Match Production Metrics. Based on the Production Workload Analysis, the amount of virtual users in a load test and the execution frequency at which those virtual users are modified to bridge the gap between test scenario and live usage patterns.

Load Test is Executed with Updated Scenario. Tests are executed according to this updated scenario until satisfactory results are achieved.

Applying our process each time a new load testing cycle starts better aligns the testing effort with the behavior of your users. More accurate mapping of load test scripts to actual production metrics minimizes the risk of having to retest a piece of application functionality after production because of an unexpected increase in load.

Load Testing Challenges

As the DPW technology platform continues to grow and incorporate different technologies, DPW's load testing solution needs to expand alongside it to accommodate new initiatives. DPW will need to evaluate HP LoadRunner 9.5 to load test AJAX-based applications or some of the upcoming COTS products. DPW recognizes that without proper load testing, predicting the production behavior of an application and forecasting for potential infrastructure improvements is a difficult task.

Combining our knowledge of your technology landscape with the capabilities of our Global Testing Practice, Deloitte can work with you to expand the different load test solutions to augment the existing platform. Our collaborative efforts can determine the best option to test current applications. We consider the future of DPW, and assist in finding the optimal solution for testing future initiatives that involve Rich Internet Applications (RIA), Windows Communication Foundation (WCF), and other enterprise service technologies.

Additionally, non browser based applications cannot be load tested through the Performance Center tool. This is not a material concern for open system solutions and CIS, since CIS is accessible via Web TS. However, the PACSES mainframe application is not browser based and, as such, cannot make use of the Performance Center tool. PACSES load testing is currently performed manually through the use of custom scripts, coordinated concurrent testers simulation load and batch volume load testing. As tests are running, results are observed and reviewed for appropriate results. Anomalies in performance are analyzed to determine corrective action steps be taken. This can result in database changes (for example, adding an index to a table) or application changes (for example, accessing the data in a different manner). The results of these load tests are documented and available for review by DPW.

Break Testing

By performing effective break testing, Deloitte proactively measures the recoverability of in-scope systems. The setup, coordination, and execution of break testing follow the same process as load testing. Because of these similarities, this activity takes place during the Systems Acceptance Phase of the SDLC as well. As part of load testing planning, we work with the application teams to identify the mission critical components of a system. During a normal load test, the Deloitte team forces the failure of one critical component to document the application's behavior. System failure can come from several different sources:

- **System Software Failure.** Run away process, abnormal termination, system lock, etc.
- **Hardware Failure.** Internal disk error, memory or CPU failure, power supply failure, etc.
- **Emergency Maintenance.** Required installation of patches or an unscheduled reboot.
- **Unauthorized Access.** Virus or "hack" attempt.



- **Database Engine Failure.** Insufficient memory, DASD or processing resources; database locking and/or configuration issues.

Each break testing scenario depends upon the particular component being “broken,” as seen in Figure 6.9-156.

Infrastructure Component	Deloitte Approach to Break Testing
Web servers	Server hosting web application code becomes unavailable and load balancing reroutes requests to other servers.
Enterprise service servers	Server hosting enterprise service code becomes unavailable and load balancing reroutes requests to other servers.
Database servers	Database node becomes unavailable and incoming requests are rerouted to another cluster.
Security management servers	Server responsible for authentication and authorization services becomes unavailable and requests are rerouted to another server.
Middleware	webMethods server becomes unavailable and incoming requests are rerouted to another server.
Network	Network hardware or firewall components fail and network redundancy handles incoming requests.
COTS Software	Servers hosting COTS software become unavailable and incoming requests are rerouted to another server, if available.

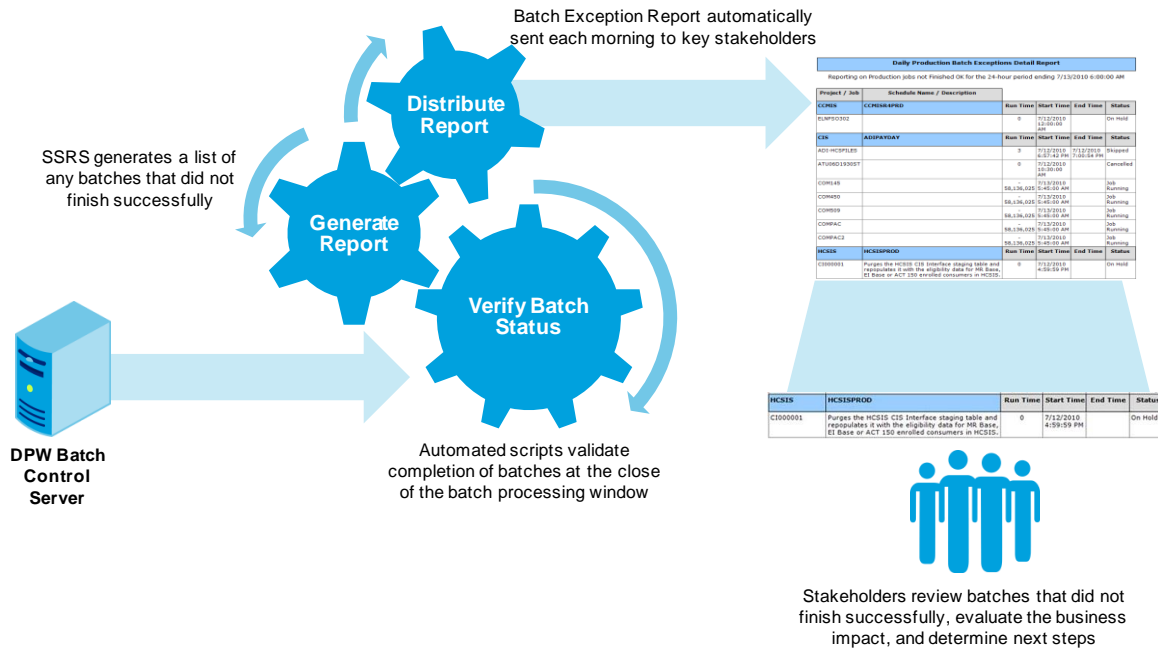
Figure 6.9-156. Deloitte Approach to Break Testing.

Upon completion of break testing, the Deloitte team compiles the results of break testing scenarios into a deliverable for review with DPW management. Results are shared during the load testing results review for analysis.

Operations - Reporting

To provide insight into the mission critical technology and business processes of DPW, Deloitte automates and distributes operational reports to key stakeholders from the project teams, Program Office, and BIS staff. Our team works closely with the DPW to identify critical production metrics, batch jobs, and end user activity for daily reporting. Figure 6.9-157 illustrates an example of how using the SSRS 2008 reporting solution delivers the Daily Production Batch Exception Report.

Deloitte Batch Status Reporting Framework v3.5



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Figure 6.9-157. Deloitte Batch Status Reporting Framework v3.5.

Deloitte combines custom automated scripts and SSRS subscriptions to inform key stakeholders of any batches that did not finish successfully the previous evening.

Verify Batch Status. Each day at the start of the online processing window, automated scripts gather information from the DPW batch control server about any jobs that did not complete successfully for in-scope systems.

Generate Report. SSRS automatically compiles and formats the list of batches gathered by the automated scripts into a table displaying job names, descriptions, schedules, and final status.

Distribute Report. Based on the defined key stakeholders for each in-scope system, SSRS automatically distributes the report via e-mail.

This report significantly reduces the need to manually examine the thousands of batch jobs that execute each evening for any anomalies. By knowing which, if any, batch processes did not complete successfully before working hours begin, the Deloitte team assists DPW and the program offices to determine remedial steps for minimizing the impact on normal operations.

In addition to the Daily Production Batch Exception Report, we propose to automate and distribute additional operations reports, detailed in Figure 6.9-158:

Operational Report	Benefit to DPW
Daily Production Business Metrics Report	BIS and program office staff can track the usage patterns of end users against key business metrics for each application for daily activity summaries and historic trending analysis.
Daily Enterprise Service Metrics Report	BIS and the project teams can measure the consumption of enterprise web services across different applications for daily activity summaries and historic trending analysis.
Daily Batch Long Runtime Report	BIS and the project teams are alerted of possible batch performance degradation for any batches that have a runtime longer than one standard deviation from the average of the past 30 days.
Daily Infrastructure Health Check Report	Key stakeholders receive validation that mission critical components of the infrastructure are available and functioning properly at the beginning of each business day.

Figure 6.9-158. Operational Reports and their Benefit to DPW.

Without our automated reports, gathering comparable operational data might take a set of employees several hours. As part of our continual improvement, the Deloitte team works with you to identify new opportunities for production reporting. We have the skills and tools to deliver new reports as needs arise.

Operations - Quality Assurance

Our team provides experienced operations quality assurance support and serves as the single point of contact for requests between the project teams and BIS on operations-related requests. Figure 6.9-159 depicts our structured ITIL-based process to review requests for completeness, accuracy, and adherence to DPW standards.

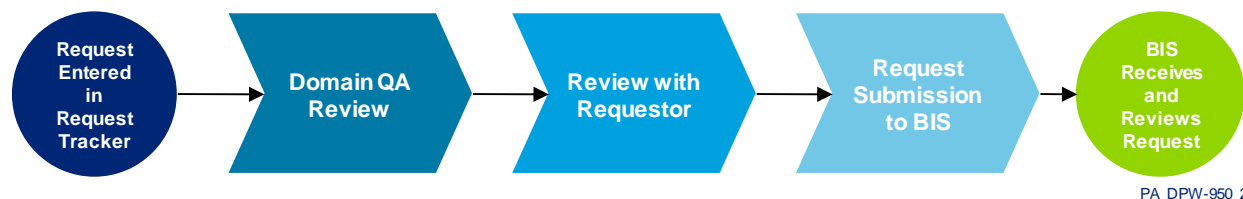


Figure 6.9-159. Deloitte Operations Quality Assurance Process.

Deloitte's demonstrated Request Management and Quality Assurance process manages requests to and from BIS and provides quality assurance checks prior to submission.

The project teams use our ITSS Request Tracker tool as part of an ITIL-compliant process for managing operations support change requests. Upon submittal of the requests into the Request Tracker tool, the team initiates its quality assurance as described below.

Domain QA Review. Once submitted, each request is thoroughly reviewed by the Operations domain single point of contact for accuracy, completeness and alignment



with DPW’s long-term vision. The Operations domain performs detailed checks on the request and its contents, as outlined in Figure 6.9-160.

Request Type	Quality Assurance Steps Performed
Batch ACD Form	<ul style="list-style-type: none"> • Validate that the ACD form correctly documents necessary batch scheduling instructions, such as batch name, scheduling frequency, job dependencies, and escalation protocol in case of job failure.
Secure File Transfer MSU Request	<ul style="list-style-type: none"> • Verify that information is properly completed, such as file name, source and destination, and request frequency. • Confirm that information is filled contained in the standard DPW request form.

Figure 6.9-160. Request Type and Quality Assurance Steps Performed.

Review with Requestor. If a request does not meet the required QA standards, we engage the requestor and work to complete or produce any missing required items, or to revise items which need correction or clarification. During this process, any changes are documented as history notes in the Request Tracker to maintain a change log. After correcting any defects in the request, it is resubmitted for approval and the QA checks are performed again.

Request Submission to BIS. Once the Operations domain single point of contact approves the request, it is prioritized for processing, and the Request Tracker tool is used to communicate status of each request back to the original requestor as a status update. This step records the change history to maintain ITIL compliance. Each request, along with its status history, change history and actions taken by involved parties are persisted within the Request Tracker’s database.

Deloitte team works with the appropriate BIS technical domain to submit the request. Based on this structured communication model, BIS knows the specific Deloitte team member to contact if there is a need for further review or discussion surrounding the request.





Production Support

IV	Page IV-388	RFP Reference: E. Information Technology (IT) Shared Services Model & Direct Technical Support Services for Lot#6 Offeror and Lot#7 Offeror
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The Selected Offerors of Lots # 6 and Lot #7 will be performing the work associated with Systems Support Services initiatives and Direct IT Support Services using an IT Shared Services Model.

Figure 7 below, is a table that highlights specific application operational support services by domains. This includes service offerings in the following domains

Production Support - Issue Management – Work with BIS to investigate, analyze and recommend solutions to production issues impacting all in-scope applications

Production Support - Infrastructure Management – Support BIS in the planning and testing of infrastructure upgrades such as software patches, hardware replacement, etc.

Our ITSS production support team supports DPW’s production environment, providing effective issue and infrastructure upgrade support, such as software patches and hardware replacement and other activities as directed by DPW.

Figure 6.9-161 summarizes our understanding of the breakout of Lot 6 and Lot 7 operations support activities.

Lot 6	Lot 7
N/A	<ul style="list-style-type: none"> Support BIS in the planning and testing of infrastructure upgrades such as software patches, hardware replacement
N/A	<ul style="list-style-type: none"> Work with BIS to investigate, analyze and recommend solutions to production issues impacting in-scope applications

Figure 6.9-161. Breakout of Lot 6 and lot 7 Production Support Activities.

Our team uses its specialized technical knowledge of DPW’s diverse application and technical environments to provide production support services.

Providing effective service delivery requires quick resolution to issues impacting the end-users and comprehensive planning to manage upgrades and infrastructure changes to mitigate interruptions. Deloitte has experience in providing production support assistance in technically complex, large-scale public sector environments that deliver mission critical services to citizens and stakeholders.

In Figure 6.9-162 we highlight the types of application-specific production support provided by the team.

Benefits to DPW

Deloitte brings:

- Over 10 years of experience developing the detailed know-how to support DPW’s unique and complex production environment, including mix of mission critical open and proprietary systems, batch and online processes, mainframe and Web-based technologies.



Applications	Deloitte Understands Key System-Specific Characteristics for Production Support
iCIS	<ul style="list-style-type: none"> • CIS, TPL, IEVS – Upgrades to the mainframe operating system require thorough testing of interfaces and recompilation of each mainframe program. • eCIS – Operating system upgrades for eCIS require additional testing of the Imaging module and the AJAX functionality within the Workload Dashboard. • COMPASS – This application is public facing and any performance degradations are experienced by Pennsylvania citizens.
HCSIS	<ul style="list-style-type: none"> • HCSIS help desk uses information straight from the field to identify and escalate potential issues.
PACSES	<ul style="list-style-type: none"> • PACSES Mainframe – The support layer of the PACSES mainframe requires significant testing during mainframe operating systems upgrades to provide continued availability to the application. • PACSES Open Systems - PACSES CSWS and IVR are public facing applications which require additional coordination for infrastructure upgrade and maintenance activities.
PELICAN	<ul style="list-style-type: none"> • Deployments for the PPCS application entail certifications and involve coordinating users in the field with tablet PCs returning their machines to an office to obtain new versions of the software used to perform provider assessments in the field. This activity must be communicated and coordinated across the entire user base.
Child Welfare	<ul style="list-style-type: none"> • The variety of open source and alternative database technologies present with the legacy Child Welfare suite of applications requires additional planning, coordination and validation for infrastructure upgrades.
Enterprise Services	<ul style="list-style-type: none"> • Enterprise Services hosted on DPW's webMethods platform use an enterprise Java-based logging solution to produce consistent trace files detailing both successful and error transactions for issue analysis.

Figure 6.9-162. Key Application-specific Characteristics that Drive Our Production Support Services.

Our approach to meet DPW's production support requirements falls in to three major areas:

- **Production Support – Issue Management.** Our ITIL-aligned approach to working with DPW to manage Problems, Issues and Incidents.
- **Production Support – Infrastructure Management.** Our proven management approach for infrastructure change at DPW.
- **Future Enhancements to Production Support.** Deloitte's future vision for production support and working with DPW to enhance tools and processes.

Production Support - Issue Management

We recognize that within the past several years, DPW has made significant strides in operational issue triage with the establishment of their application problem reporting and resolution process. We have jointly deployed consistent and repeatable processes for production support which has significantly increased the awareness of DPW application stakeholders and provided enhanced support to users.

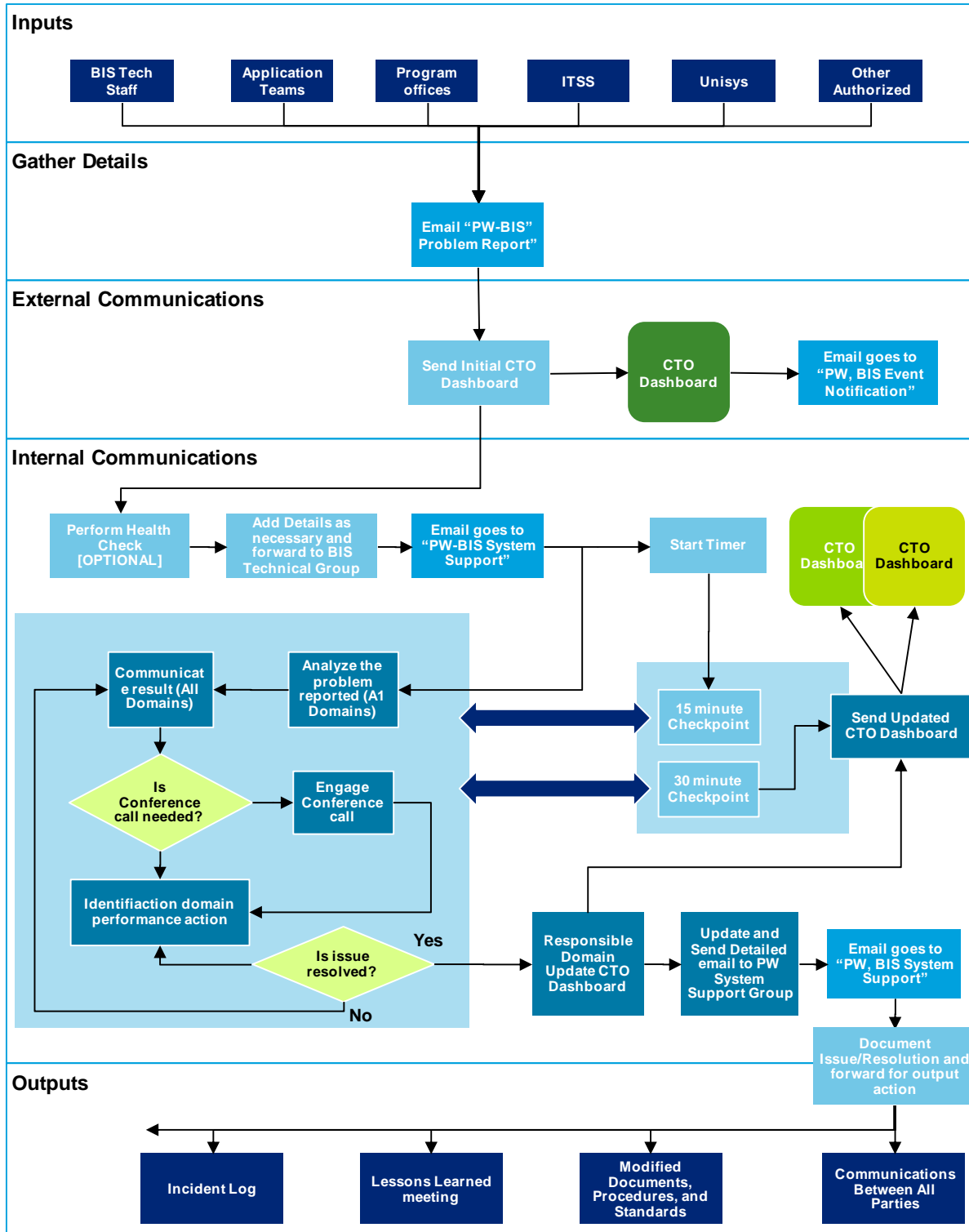


DPW's application/system problem workflow process has five core elements:

- **Inputs.** Represents DPW stakeholders authorized to report application/system problems.
- **Gather Details.** The DPW supported mechanism to capture problem reports as part of this process.
- **External Communications.** Communications events triggered upon receipt and confirmation of a problem report, including email alert distribution and updates to the CTO dashboard.
- **Internal Communications.** Represents the end-to-end problem resolution and progress reporting process within DPW.
- **Outputs.** The knowledge-based and process and procedure improvement based outputs from the resolution of a problem.

Figure 6.9-163 illustrates these core elements.

DPW Application/System Problem Workflow Process



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Figure 6.9-163. DPW Application/System Problem Workflow Process.

For problems causing an interruption to end-users, our approach to problem management focuses on restoring services and recovering infrastructure components quickly, while tracking incident details to build lessons learned to attempt to prevent future problems.



This process contains many of the elements commonly found in an issue triage and resolution process and has served DPW well. Deloitte recognizes the benefits of this process and propose, as part of our issue triage and resolution process, to continue this process. In addition, we continue to work with DPW to analyze this process for improvement opportunities as part of the implementation of ITIL-based processes across the DPW enterprise.

Based upon ITIL version 3, we also propose that the existing process be analyzed for alignment with 3 ITIL processes: incident, problem and event management. These processes provide the basic foundation for increasing overall service delivery quality and reducing service disruptions. In addition, output information from these processes provides the primary basis for improving IT delivery efficiency and quality.

- **Incident Management.** Provide efficient handling of incidents when they do occur to restore normal state service operations as quickly as possible. Key benefits include reduction in outage times and efficient communications about incident status and resolution activities.
- **Problem Management.** Conduct root cause analysis of incidents with the goal of preventing their occurrence in the first place. Key benefits include increased availability due to lower numbers of incidents and increased problem solving skills among IT support staff.
- **Event Management.** Monitor IT service delivery infrastructure, capturing alarms, events and changes of state and then forwarding these to appropriate personnel for further handling. A key benefit of this process is to resolve incidents and problems before users are impacted by them.

We continue to work with DPW to map these core ITIL processes to the existing DPW Application/System Problem Workflow Process to jointly take these processes to the next stage of maturity. Figures 6.9-164, 6.9-165, and 6.9-166 outline the key processes, activities, and benefits to DPW.

DPW Process Step	ITIL Incident Management Activity	Deloitte ITIL Approach Benefit to DPW
Incident Log	Confirm incidents are appropriately logged, classified and prioritized	Our incident data templates and prioritization scoring schema provides the basis for effective incident communications and a foundation for proactive service improvement
Corrective Action Plan	Develop a plan to outline the approach, tasks and activities required to bring an incident to resolution and validate success	Provides a roadmap towards incident closure and direction to involved stakeholders to use throughout resolution
Analyze the Problem Reported	Use and structure incident analysis activities around a consistent incident life cycle	Effectively targets the focus areas for resolving incidents using a consistent approach across DPW IT areas



DPW Process Step	ITIL Incident Management Activity	Deloitte ITIL Approach Benefit to DPW
Lessons Learned Meeting	Conduct post-delivery reviews for major incidents	Provides effective policies and meeting agendas to efficiently capture lessons learned and communicate these to DPW IT support staff
Communications Between Parties	Develop a standard Customer Statement for major incidents that includes a description of the incident/problem in brief business terms	Provides incident communications templates and policies for communicating major incidents

Figure 6.9-164. Deloitte’s ITIL-Integrated Incident Management Process for DPW.

DPW Process Step	ITIL Problem Management Activity	Deloitte ITIL Approach Benefit to DPW
Analyze the Problem Reported	<ul style="list-style-type: none"> • Conduct discovery efforts to see what is going on – identify symptoms, what is happening • Conduct hypothesis to identify one or more candidates as to the root cause – identify root cause options in meeting and assign staff to investigate each one • Identify Root Cause 	Provides a highly structured approach and set of analysis tools and aids for identifying root causes of problems.
Identified Domain Performs Action	Use structured problem removal approach and communicate known errors to the Service Desk	Effectively takes consistent steps to remove problems from the infrastructure – known errors at the Service Desk reduce incident down time for recurring incidents
Modified Documents, Procedures and Standards	Proactively implement changes to remove root causes of problems and continually improve service quality	Deloitte approach takes a holistic view of problem causes and remedies that includes process, organization, training and communication changes in addition to technology changes
Communicate Results	Use a 10 step problem resolution approach that can quickly communicate the status of activities undertaken to solve a problem.	The 10 step approach identifies and problem resolution pipeline which can quickly indicate the status of problems and shift communications of problems to service desk staff versus interrupting resources working on the problem.

Figure 6.9-165. Deloitte’s ITIL-Integrated Problem Management Process for DPW.

DPW Process Step	ITIL Issue Management Activity	Deloitte ITIL Approach Benefit to DPW
Events and Inputs	Use effective monitoring and alerting to catch incidents before users see them	Provides continual program and measurements to establish effective alerting thresholds and implement effective automation that forward events to incident handling staff
CTO Dashboard	Use effective decision making metrics to monitor and communicate measurements to IT executives	Provides metrics model and metrics communication architecture to develop knowledge and information that can be effectively used by DPW executives to take timely actions

Figure 6.9-166. Deloitte’s ITIL-Integrated Issue or Event Management Process for DPW.

Deloitte proposes the use of an IT metrics model that translates low level operational data into key performance indicators and critical success factors that can be used for actionable decision making. We illustrate the model in Figure 6.9-167.

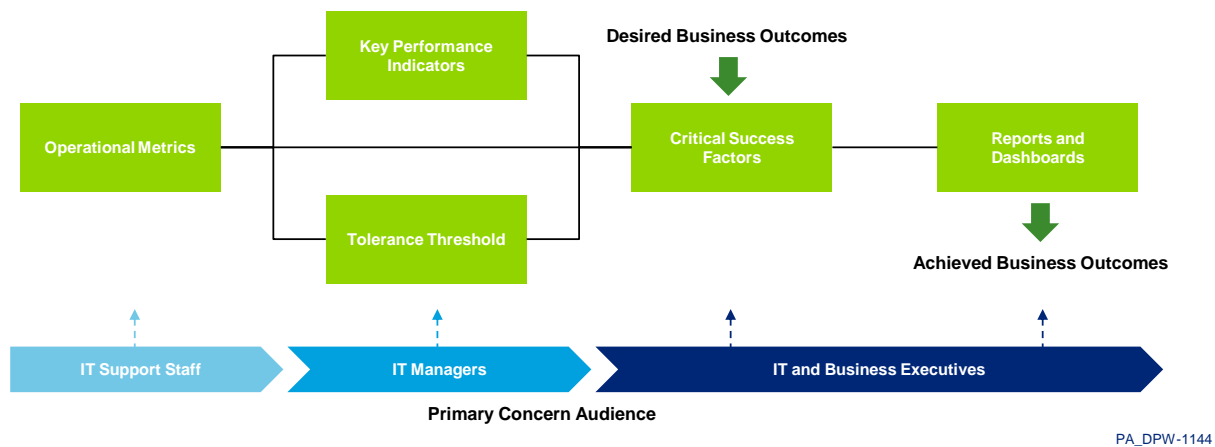


Figure 6.9-167. IT Service Improvement and Metrics Model.

Deloitte works with DPW to establish, collect and report on metrics to drive continuous improvement in services provided to DPW.

We will continue to support DPW in this effort by first identifying which metrics should be collected and developed using the above model. We then map DPW monitoring and measurement capabilities into this model and tailor reporting for DPW stakeholders, managers and executives. These metrics then become input to an ongoing continual service improvement program to proactively identify trends and opportunities to improve services.

Corrective Action Plan and Testing Results

For issues requiring a software change, and where the severity of the problem is escalated to the appropriate level of severity, Deloitte prepares a Corrective Action Plan (CAP). The CAP details our understanding of the problem, and contains either a

diagnosis of the problem or a description of the activities being undertaken to diagnose the problem, and an estimated time to bring the issue to resolution.

Deloitte provides regular status updates to DPW until the issue is resolved. The resolution may consist of both a short-term solution to facilitate a temporary fix in production and long-term solution in order to fully address the problem. Deloitte may suggest one or more technical or business methods to resolve or workaround the issue while a fix is prepared. During this process, the results of analysis and testing are collected and shared with DPW as information becomes available. Additionally, Deloitte coordinates with DPW to form a problem resolution SWAT team to provide a collaborative environment for testing, troubleshooting and problem resolution.

Infrastructure Management

Our team supports periodic upgrades of the BIS infrastructure, including software patches, hardware replacements, and other upgrades. These changes are driven by a variety of sources, including upgrades to COTS products, upgrades and patches to the operating systems, or hardware platform changes. As changes occur in the technical landscape, Deloitte works with DPW to mitigate the effects of the upgrades. This may include testing support, feasibility studies and other prioritized work. Depending on the size and scope of an infrastructure change, Deloitte uses a defined process for support system upgrades.

Figure 6.9-168 describes Deloitte's process for supporting minor infrastructure changes, such as software patches and hardware maintenance.



Figure 6.9-168. Infrastructure Maintenance Support Process.

Deloitte's process for supporting infrastructure maintenance activities involves coordinated planning, scheduling, and implementation support.

Maintenance Planning Process. To sustain hardware performance and keep software up to date, DPW conducts regular infrastructure maintenance. While many of these activities can be planned well in advance, upgrades to patch critical software security vulnerabilities and address hardware component failures require timely action. Deloitte participates in planning and analyzing the impact of maintenance activities.

Activity Coordination Management. Depending on the scope of a maintenance activity, certain systems may need to have access temporarily suspended for end users and/or batch processing held. Deloitte coordinates with DPW and the application teams to identify the necessary steps to minimize the impacts on the normal course of business.

Deployment Support. After the completion of maintenance activities, Deloitte supports DPW by validating that affected business functionality and batch processes resume normal functionality.

Figure 6.9-169 describes Deloitte’s process for supporting major system upgrades, such as operating systems changes, mainframe upgrades, or vendor software upgrades:

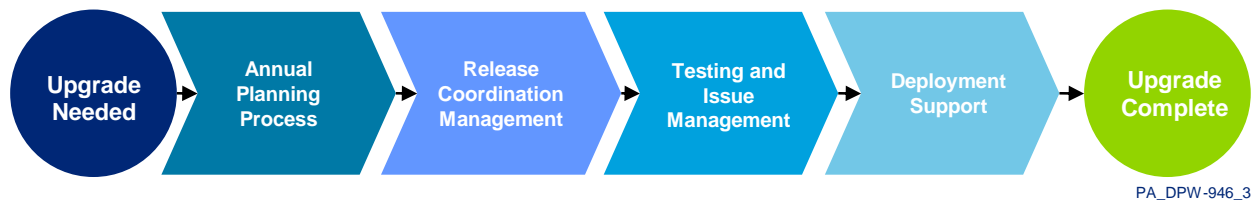


Figure 6.9-169. Infrastructure Upgrade Support Process.

Deloitte’s process for supporting major system upgrades involves coordinated scheduling, testing, and implementation support.

Annual Planning Process. During DPW’s annual planning process, any major infrastructure upgrades are prioritized along with application modifications and maintenance activities. Deloitte participates in this process and supports DPW in scoping and estimating the required effort to test the applications in support of the change.

Release Coordination Management. Once DPW prioritizes a major upgrade, we review each application’s release schedule and attempt to coordinate the upgrade timeline to a release, so that full regression testing can be performed simultaneously for both the software changes and infrastructure changes. Deloitte assists DPW with building a plan and testing of operating system upgrades within each application test environment. Our support includes facilitating recurring meetings with application architects and developers to review and coordinate necessary testing activities, and to review technical issues identified with stakeholders in DPW technical domains.

Testing and Issue Management. Although some changes are transparent to the operations of your applications, our experience has shown that changes to underlying infrastructure require testing and validation to verify and potentially mitigate the impact of the change. Regression testing scenarios for validating system changes are identified with the support of the application domain. During testing, Deloitte works with DPW to validate the infrastructure change by creating a list of applicable test scenarios which cover a material portion of the application functionality. We perform regression testing using these scenarios, and track identified issues that require code modifications through the standard non-functional ATS PCR process.

Deployment Support. Once validated in the lower environments, Deloitte coordinates with representatives from the program offices owning the applications, and work with them to gain an approval sign-off to allow the progression of a major infrastructure upgrade into the production environment. If application changes are required, Deloitte implements these changes in coordination with a prioritized release. In addition, we



provide analysis and details of each issue found to assist you in working with vendors to close issues that arise from a COTS product perspective.

As changes occur, we expect these upgrades, enhancements, and patches to be applied to both the open systems environment as well as the mainframe environment. As required changes are identified, our team communicates with the technical domains at DPW and the DPH for the PACSES mainframe responsible for those infrastructure components, and works with you to track issues identified using the standard non-functional PCR process within ATS. Our team utilizes the same processes to manage the changes and mitigate risks independent of the supporting infrastructure.

Future Enhancements to Production Support

The continued expansion of the DPW environments, both in number of servers and complexity of applications, presents opportunities to explore new paradigms of infrastructure management. For example, as the iCIS application progresses through the Incremental Renewal strategy into Phase 5, we recommend that DPW consider the following:

- Increase in the number of web and application servers required to replace the full processing capacity of the CIS mainframes.
- Amount of time required to complete deployments to iCIS servers based on the increased surface area of the environment.

Deloitte recognizes the significant investments DPW has made in its open systems environment. In working with DPW over the past five years, the VMWare footprint has increased. We have worked with DPW to use image-based deployments of new machines. This approach has led to significant reductions in the time required to configure and support new servers during load testing and proof of concept efforts.

For the next step in DPW's infrastructure evolution, we suggest that DPW explore application virtual machine images. Using this approach, application deployment is based on activating a number of virtual servers with a pre-installed and configured version of the application. The images are configured identically, including software libraries and dependencies.

The key difference between the test and production environments is the number of machines active and allocated to that function at a given time. This approach has the potential to reduce the complexity of open systems migration to a fraction of the current model. In addition, the approach can be used to expand capacity to and support temporary surges in volume or disaster recovery.



Direct Technical Support Services

IV	Page IV-386	RFP Reference: LOT #6 & Lot #7, Systems Architecture Lot #6 and Technical Support Services Lot #7, E. Information Technology (IT) Shared Services Model & Direct Technical Support Services for Lot #6 Offeror and Lot #7 Offeror
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Shared service operates in two venues...2) Ongoing strategic and tactical consulting engagements or direct technical support services.

Figure 8: highlights the strategic consulting IT Shared Direct Support Services Table. This includes service offerings in the following domains:

- Technology Engineering
- Enterprise Applications
- Enterprise ITIL & Software Engineering Processes

The Selected Offerors of Lots # 6 and Lot #7 will be performing the work associated with Systems Support Services initiatives and Direct IT Support Services using an IT Shared Services Model.

Figure 9 is a table that highlights specific IT shared services resource classifications and FTEs supporting both specific application operational support and IT Shared Direct Support Services.

To fulfill the various needs of the Department and as outlined in the RFP, Deloitte’s Shared Services Support team is based on a staff deployment model containing three distinct roles: Customer Direct Technical Support, Vendor Technical Support, and Shared Technical Consulting Support. Each role provides distinct skills and characteristics aligning with DPW’s strategic direction (Figure 6.9-170).

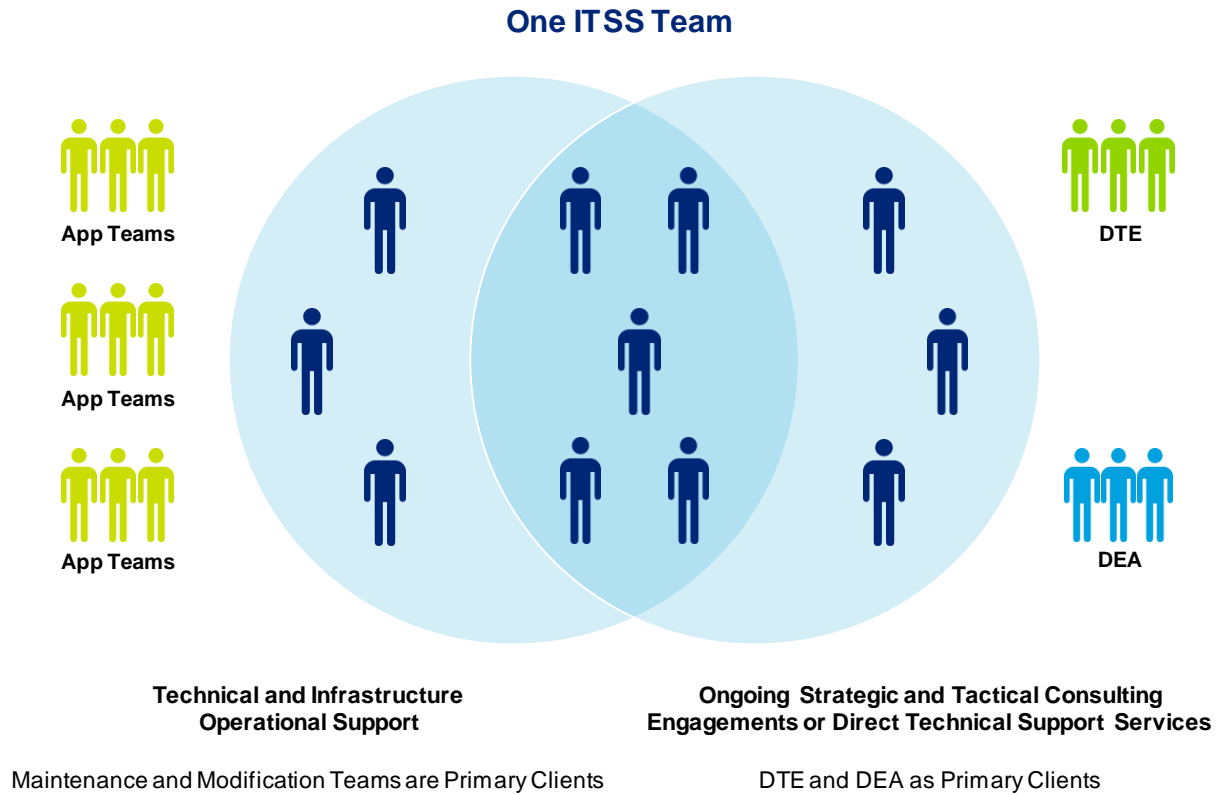
Resource Type	Team Characteristics	Benefits
Customer Direct Technical Support	<ul style="list-style-type: none"> • Co-located at the Willow Oak facility with the DPW/BIS technical team • Receives direction from BIS management • Integrates fully with the DPW-BIS technical team • Functions as dedicated resources to BIS providing support to any of the initiative, including the in-scope systems of this RFP. 	<ul style="list-style-type: none"> • Focuses on the overall Department Enterprise Architecture, Strategy, implementation and support • Provides on-site mentoring support by working side by side with Commonwealth staff • Provides tactical and strategic consulting services supporting the development and production infrastructure
Vendor Technical Support	<ul style="list-style-type: none"> • Resides physically in the Offeror’s determined location • Receives direction from Shared Services Support Manager • Supports multiple in-scope systems and applications as identified in this RFP. 	<ul style="list-style-type: none"> • Provides focused technical support to the strategic initiatives covered by this RFP – through the systems development life cycle • Fully integrated with the application teams while serving as an onsite advocate, single point-of-contact and quality assurance liaison for BIS. • Helps verify the BIS strategic vision is integrated into the technical solutions offered by the system teams



Resource Type	Team Characteristics	Benefits
Shared Technical Consulting Support	<ul style="list-style-type: none"> • Shares time between the Offeror’s facility and DPW Willow Oak facility • Receives direction from Shared Services Support Manager and BIS management • Provides enhanced coordination and sharing of strategy, tactics and knowledge between application teams and DPW-BIS 	<ul style="list-style-type: none"> • Key shared resources bring an intimate, detailed knowledge of new application initiatives while providing proactive infrastructure and architectural support to BIS. • Promote cross team knowledge sharing, collaboration and change management. • Shared resources will promote knowledge sharing with BIS resources; taking the emerging technology direction to the system development teams and bringing the latest application design approaches, needs and developments to DPW.

Figure 6.9-170. Distinct Skills and Characteristics Aligning with DPW’s Strategic Direction.

In establishing the proposed model, DPW and Deloitte are able to use best practices and experiences to understand future opportunities, including leveraging the ITSS shared technical support model to identify opportunities for greater sharing of resources and skills. In this sense, the ‘sharing’ of resources between the projects (Vendor Technical Support) and BIS (Customer Direct Technical Support) creates ‘One ITSS Team’ fully integrated to support project initiatives as well as the BIS strategic vision.



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Figure 6.9-171. One ITSS Team.

In sharing resources across support activities, Deloitte encourages open communication and better coordination between the application teams, ITSS, and BIS. This increases the productivity and efficiency of the overall team while helping to transition knowledge to DPW staff.

While the sharing of resources has obvious benefits, the critical mass and daily tasks required of BIS sections does require dedicated resources to be on site supporting business initiatives. We provide resources with the deep knowledge of DPW processes, methodologies and technologies to support prioritized activities identified by BIS management.



A summary example of said activities is highlighted in Figure 6.9-172 below with a more detailed listing to follow.

Direct Technical Support – Technology Engineering	Deloitte’s Activities Meet DPW’s DTSS Requirements for Technical Engineering
Security strategy, architecture design and implementation support	<ul style="list-style-type: none"> • Security program strategic support – Bring emerging techniques and processes to better comply with regulations such as HIPAA, HITECH and IRS/SSA audit requirements • Facilitate product selections and lead proof-of-concepts for new products or product upgrades • Perform vulnerability management and threat analysis. • Assist in security standards development and upkeep. • Security software installation, configuration and operational management support including role creation assistance, application integration design review and confirmation support, infrastructure performance and availability management as well as issue resolution assistance.
Open system and mainframe server configuration management support	<ul style="list-style-type: none"> • Server installation, configuration and operational management support including system software installation/upgrade, performance and availability monitoring, capacity planning assistance,
Oracle database administration support	<ul style="list-style-type: none"> • Production database monitoring and management, including performance tuning, patching, upgrades, design review, capacity planning, deployment support and issue management.
Middleware Architecture Support	<ul style="list-style-type: none"> • Middleware software engine installation, configuration and operational support, including patching/upgrades, performance tuning, and application integration design review and confirmation as well as middleware issue management.
Knowledge Management Support	<ul style="list-style-type: none"> • Provide knowledge management team support in for Cognos, Informatica and emerging Enterprise Information Management related initiatives. Support includes monitoring and management, performance tuning, patching, upgrades, configuration review, deployment support, request and issue management.
DPW Technology Strategy Assistance and Commercial Off-the Shelf (COTS) product support	<ul style="list-style-type: none"> • COTS tool analysis, management and operational support, including tool analysis and proof of concept support, patching/upgrade coordination and execution, software deployment, configuration and issue management support.

Figure 6.9-172. Summary Example of Activities.



Direct Technical Support – Enterprise Applications	Deloitte’s Activities Meet DPW’s DTSS Requirements for Enterprise Applications
Middleware design, coding and implementation support	<ul style="list-style-type: none"> • Creation of the detailed design specification, unit testing approach and middleware package code required to support the larger application design. • Deployment coordination and implementation support of middleware packages in alignment with the larger application implementation.
Middleware problem identification, trouble shooting, and resolution	<ul style="list-style-type: none"> • Proactive monitoring of middleware package consumption, responsiveness and availability. • Middleware package instrumentation and diagnostic planning and implementation. • Participate in SWAT calls to expeditiously identify the root cause or required mitigation step to establish production functionality.
Middleware architecture reviews	<ul style="list-style-type: none"> • Participate in application design reviews that impact the middleware infrastructure.
Middleware Technology Pilots and/or Proof of Concepts	<ul style="list-style-type: none"> • Support the planning, coordination, execution and analysis of required proof of concepts to support middleware adapter purchases, configuration alterations, architectural change readiness, etc.
Research and evaluation of new standards	<ul style="list-style-type: none"> • Assist BIS in the creation of relevant middleware design standards. • Review and evaluate various domain standards for impacts to the middleware team.
Technology platform enhancements, migrations, and upgrades	<ul style="list-style-type: none"> • Support the planning, coordination, implementation and post implementation support of required middleware software upgrades and patches. • Support infrastructure configuration enhancements such as server operating system upgrades, patch verification, etc.
Integrated SQA Models & standards	<ul style="list-style-type: none"> • Support DPW in the maturation of the SOA foundation, including the design and governance of a true Enterprise Service Bus • Maintain middleware standards and ‘decision matrices’ that highlight what middleware solution/tool to use in a particular circumstance. • Continue to enhance and mature the DPW vision of Enterprise Service Enablement by supporting the design and creation of reusable enterprise services.

Figure 6.9-173. Summary Example of Activities.

Direct Technical Support – Enterprise ITIL and Software Engineering Process	Deloitte’s Activities Meet DPW’s DTSS Requirements for ITIL and SEP
Solution Development and Delivery Models	<ul style="list-style-type: none"> Support BIS in maturing the adoption of ITIL centric processes, including the development of a service catalog, enhancement of problem/issue management protocols as well as refined service transition and service operational process improvements.
SEP Process Improvement Initiatives	<ul style="list-style-type: none"> Support BIS in the adoption of enhance software engineering process that could provide rapid application development strategies, enhanced time to market and decrease product issues.

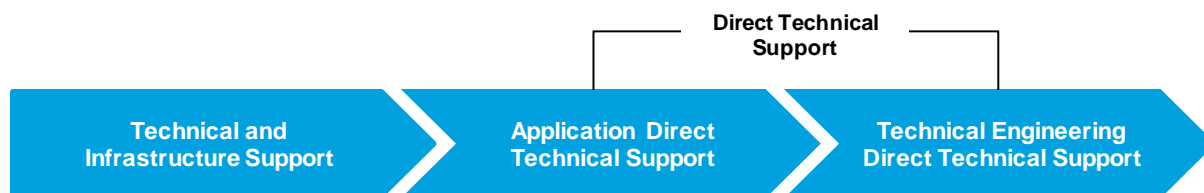
Figure 6.9-174. Summary Example of Activities.

The following sections explain in more detail the defined scope of services offered under Direct Technical Support and our strategy to deliver these services to support your operational and strategic vision.

Scope of Direct Technical Support Services

IV	Page IV-388	RFP Reference: Direct Technical Support Overview
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The selected Offeror for **Lot #7** will be responsible for the Direct Technical Support Consulting Service activities necessary to support the DPW Application and Technical Engineering staff. These services span across all Systems Support Services outlined in **Section D, 1** of this RFP. DPW requires that the selected Offeror provide suitably qualified personnel resources.



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Figure 6.9-175. Direct Technical Support Services.

Direct technical support services consists of the work performed across two categories of direct support:

- Application direct technical support
- Technical engineering direct technical support

In Lot 7, this direct support work is focused on BIS middleware support (Application Direct Technical) and DPW IT domain team support provided directly to DPW (Technical Engineering Direct Technical). We begin our coverage of direct technical support with details on how we will provide Application Direct Technical Support and then move on to Technical Engineering Direct Technical Support in the following section.



Application Direct Technical Support Activities

IV

Page
IV-389

RFP Reference: Direct Technical Support Overview

The various types of Direct Technical support activities expected to be performed by the selected Offeror of **Lot # 7** for the in-scope applications include:

- Application Direct Technical Support activities

Application Direct Technical Support services focus on providing the DPW Division of Enterprise Applications (DEA) middleware design and development services within the webMethods, BizTalk, and OpenTI architectural foundation. Our team works closely with DPW to provide support needed to meet integration challenges to support the needs of the business while advancing the strategic SOA vision of the Department.

Middleware

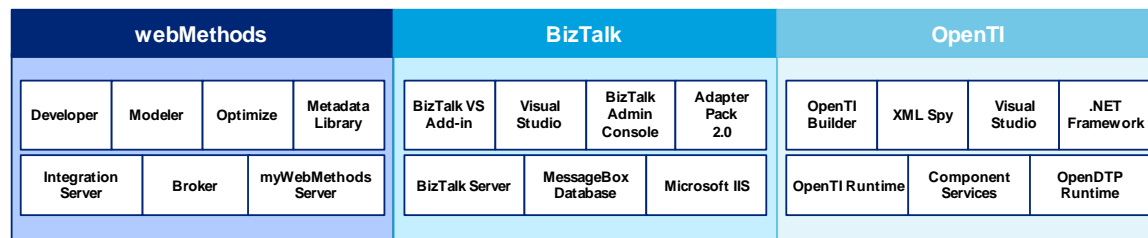
DPW uses middleware technologies to support effective data integration between the numerous technologies that make up the overall system topology. Middleware services tie the open system and mainframe platforms together to create a singular business system that allows for an incremental approach to system renewal. Additionally, middleware solutions are critical to align with the SOA vision of orchestrated, loosely coupled services that support multiple lines of business while consolidating business processes into one solution.

Supported by webMethods, BizTalk, and OpenTI technologies, Figure 6.9-176 highlights the services that are currently in operation within DPW's production middleware environment.

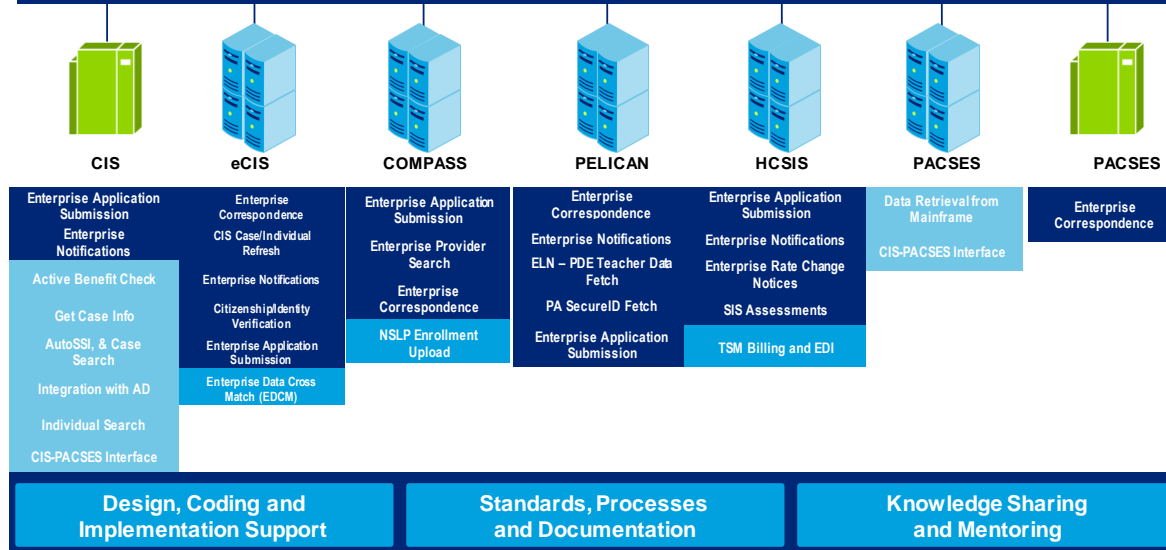
Benefits to DPW

Deloitte brings:

- Knowledgeable Middleware Team equipped with a deep knowledge of the intricacies of the complex DPW infrastructure.
- Knowledge of using DPW standard standards, middleware tools such as webMethods and BizTalk.
- Industry leading practices and solutions such as “Services Thinking”, to support DPW's SOA.



Deloitte's Support for DEA



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Figure 6.9-176. DPW Middleware Services.

DPW's Middleware Services interface with over a dozen separate line-of-business systems, spanning four Commonwealth agencies, external vendors, and federal systems.

Working with Deloitte over the past 10 years, DPW has implemented dozens of complex enterprise services using these technologies. Examples include the use of:

- **webMethods.** To build and host enterprise services and to perform real-time application integration, such as Enterprise Correspondence, which generates over 70,000 correspondences to clients and providers each business day
- **OpenTI.** To integrate open systems and mainframe databases, including complex 2-phase commit transactions between the CIS and eCIS databases
- **BizTalk.** To process file-driven, scheduled and data synchronization application integration, and to implement HIPAA transactions for HCSIS to interface with PROMISE

Within the following sections, we outline our approach meeting the requirements for Application Direct Technical Support across these technologies. BIS/DEA middleware team manager will prioritize the various activities outlined in this section based on resources available as part of the application direct technical support services.



DPW Middleware Team Design, Coding, and Implementation Support

IV	Page IV-389	RFP Reference: Direct Technical Support Overview
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- Provide design, coding, and implementation support to the DPW Middleware Team. The specialized technical services support will focus specifically on middleware functions using WebMethods middleware and integration broker concepts for integration needs within DPW's application suite. The resources will support the DEA Middleware Team in defining the integration approach, architecture direction, application integration standards, and ongoing maintenance and operation functions.

Deloitte works closely with DPW to design, code and implement Middleware solutions. During development, our team builds middleware packages using webMethods products available at DPW, including the message broker which serves as the foundation to an Enterprise Service Bus (ESB). Deloitte supports the DEA middleware team in defining integration approaches to enhance and expand the ESB concept to align with the Department's SOA vision. Additionally, our team works to create and enhance middleware centric standards and to provide production support to middleware solutions created in support of project initiatives.

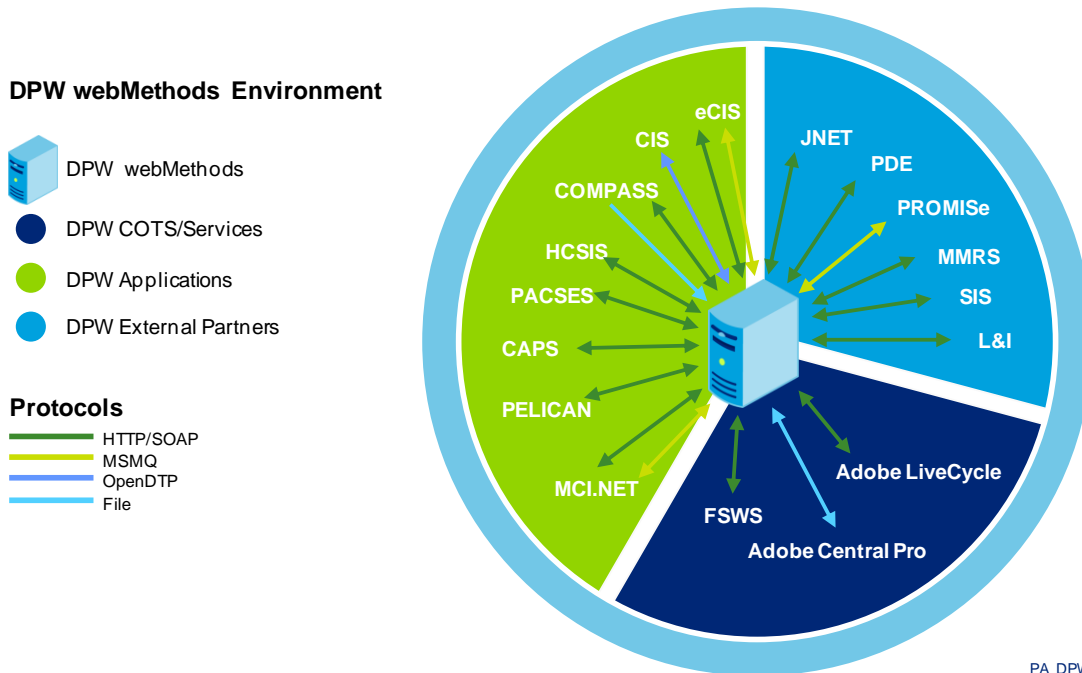
Our team has a vast understanding of the current design, configurations, and processes used to support the in-scope applications, including:

Applications	Deloitte's Understanding of Application Specific Middleware Requirements that Help DPW
iCIS	<ul style="list-style-type: none"> • COMPASS – Application routing and renewal services require careful coordination to support interfaces to eCIS, CIS, HCSIS, and Pelican • eCIS – Utilizes both web service interfaces and real-time mainframe connectivity to CIS on DPW's webMethods platform • MCI.NET sends more than 4 million automated notifications each business day to systems, keeping client demographic data synchronized
HCSIS	<ul style="list-style-type: none"> • HCSIS is supported by multiple real-time interfaces external to DPW's server infrastructure, including PROMISe, PDE and AAIDD
PACSES	<ul style="list-style-type: none"> • PACSES generates more than 60,000 forms per day using DPW's Enterprise Correspondence service, which are printed at 70 locations throughout the Commonwealth, using DPW's webMethods infrastructure. Each form must be generated and printed within 15 seconds.
PELICAN	<ul style="list-style-type: none"> • PELICAN's Early Learning Network (ELN) supports real-time inquiries to the Department of Education to retrieve data about teachers to enhance reporting capabilities within the system
Child Welfare	<ul style="list-style-type: none"> • Child Line's certificate printing subsystem is a potential candidate for inclusion in DPW's Enterprise Correspondence service

Figure 6.9-177. Deloitte Approach Meets Middleware Requirements.

Deloitte understands the current complex usage of the webMethods suite, including the use of the webMethods Integration Server, Broker, myWebMethods Server and an array of resource adapters to connect to various data sources both inside and outside the department's infrastructure. We present a summary of DPW's current webMethods interfaces, and the underlying technologies used in the Figure 6.9-178.

The DPW webMethods Environment



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Figure 6.9-178. DPW webMethods Environment.

Deloitte's Middleware team knows that DPW's webMethods environment interfaces with over a dozen separate line-of-business systems, spanning four Commonwealth agencies, external vendors, and federal systems.

As shown in the figure above, our team has deep knowledge of the enterprise services within DPW's environment. The current services represent a highly scalable architecture, which features services designed to use Integration Server and the webMethods Message Broker for orchestration.

As part of our Middleware support, we will provide experienced support for existing middleware solutions, and, more importantly, the substantial increase in services used by Incremental Renewal Phase IV-B. Phase IV-B will substantially increase importance middleware services play within DPW as the majority of online CAO transactions will require access to data managed by webMethods. The table below summarizes the current webMethods business services.

Methods	Integrated Applications	Deloitte's Approach Enables System Integration
Enterprise Application Submission	COMPASS	Enterprise service which receives translates and routes applications for benefits and renewals to target systems within DPW. This service also supports the real-time retrieval of renewal information to pre-populate screens for reapplication/renewal of benefits
Enterprise Correspondence	eCIS, COMPASS, PELICAN, PACSES	Enterprise service which orchestrates the creation, storage and monitoring of correspondence and notice generation.



Methods	Integrated Applications	Deloitte's Approach Enables System Integration
Enterprise Notifications	MCI.NET, eCIS, HCSIS, PELICAN, CAPS	Enterprise service which routes notices from MCI.NET (Client Updates, Change Requests, Rejection Notices, Citizenship/Identity Verification Notices) to target systems that know of the individual
Enterprise Rate Service	HCSIS, PROMISe	The Enterprise Rate Service allows PROMISe to send real-time notifications of changes to negotiated service rates to keep HCSIS synchronized
SIS Assessment Service	HCSIS	This service facilitates the submission of completed support intensity scale (SIS) assessments to the external federal vendor for reporting and aggregation
ELN-PDE Interface	PELICAN	This service retrieves information about PDE staff for inclusion in the department's Early Learning Network (ELN) repository

Figure 6.9-179. Interface Description.

Deloitte's supports the design and coding of new webMethods packages, as well as the troubleshooting and monitoring of ongoing operations of the current environment. The team prepares installation guides for each new package and is prepared to support the server team in deploying to the Production environment. Deloitte team will continue to support the ongoing operations and maintenance functions of DPW's webMethods environment, as they are already familiar with it and have experience with the department's processes and standards. Our team members understand DPW beyond its technology, and are able to assess and communicate the business aspect and technical impact of each webMethods initiative.

To determine that the solutions meet business requirements and technical expectations, design analysis and architecture reviews are performed prior to development initiation. Once development is completed, we propose a peer code review with your team, to determine that the created solutions adhere to the established DPW's coding standards and industry best practices. Developed solutions are fully documented, including code comments, and implement detailed logging and exception handling using the DPW webMethods Framework. This confirms full traceability and reduces troubleshooting efforts after go-live.

Through the design process, our team will identify opportunities to enhance the DPW webMethods Framework. This could include solutions to implement a more concise logging routine or to improve visibility into service operations, etc. Deloitte understands the complexity of DPW's technical environment and recognizes that webMethods plays a central role in the enterprise service environment within the department. As such, the team will continue to work with DPW to design, build and support a webMethods Health Model, which encompass health checks and notifications based on criteria identified by business and technical stakeholders.

Our team works closely with DPW to support the prioritization of middleware development initiatives and confirm that adequate time is allotted to complete quality



development. In order to provide architectural direction, the team will continue to coordinate closely with application architects to confirm that a consistent vision of the capabilities and future use of webMethods exists for the department.

Support WebMethods Platform Upgrades

IV

Page
IV-389

RFP Reference: Direct Technical Support Overview

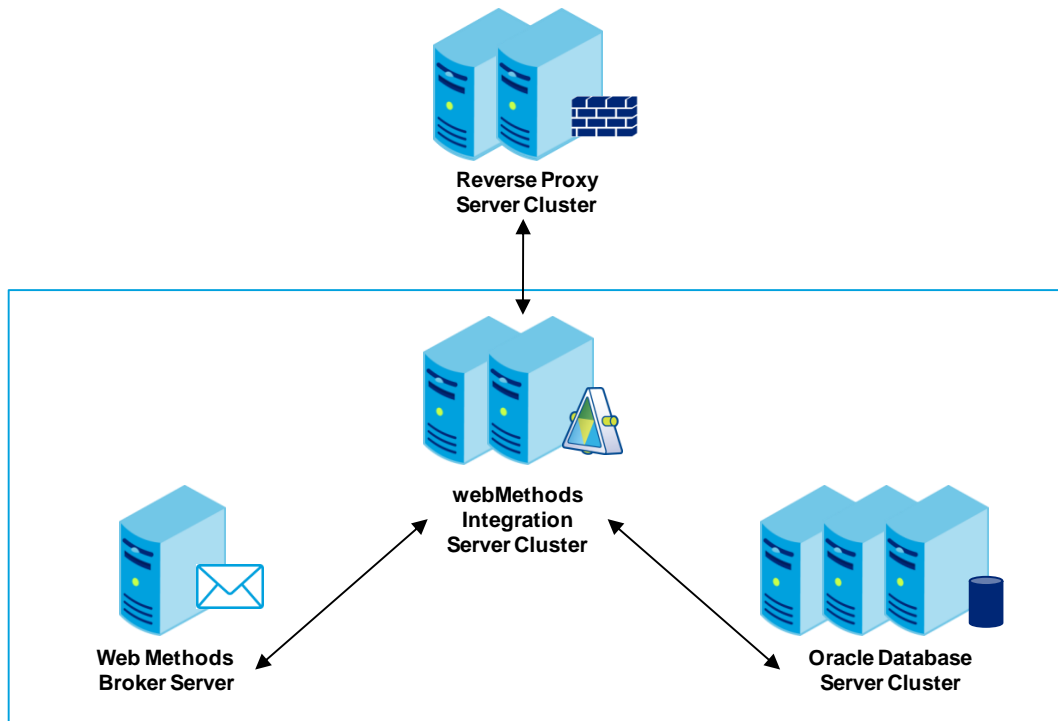
- Support the WebMethods platform upgrades.

Deloitte supports webMethods platform upgrades.

Deloitte realizes that the webMethods environment consists of an array of interconnected components – including multiple environments, configuration nuances, and a complex series of integrations with third-party tools and resources. The Deloitte team knows DPW’s webMethods environment, but also knows the dependencies and intricacies associated with upgrading webMethods solutions in DPW’s environment. Our resources have supported you in making the upgrade of webMethods from 6.5.2 to 7.1.2, and will continue to work with you to review the webMethods 8 version of the product.

We use our knowledge of the webMethods product, our strategic alliance with SoftwareAG and our understanding of your specific environment to make quality upgrade recommendations, implementation approaches and risk evaluations to support the upgrade process of the webMethods environment, shown below in Figure 6.9-180.

DPW webMethods Environment



PA_DPW-636

Figure 6.9-180. DPW webMethods Environment.

DPW's webMethods environment is composed of multiple clusters of servers carefully designed and optimized to host high-performance web services.

Our team understands that webMethods communicates with various systems, both within DPW and with external business partners. During an upgrade, it is these interfaces and software dependencies within the webMethods infrastructure which require the most attention, testing and insight to manage. Deloitte's team is well equipped to support an upgrade, as we have demonstrated experience with all of the adapters and components in use at DPW, as outlined in the table below.

Adapter Name	Vendor	Deloitte's Understanding of Middleware Specifics Benefits DPW
webMethods SAP Adapter	SoftwareAG	The SAP adapter allows real-time integration with SAP for retrieval and updates of data.
webMethods Microsoft .NET Adapter	SoftwareAG	The Microsoft .NET adapter allows webMethods to consume .NET assemblies and to call them as if they were coded in webMethods
webMethods JDBC Adapter	SoftwareAG	Provides connectivity to JDBC-compliant databases. Allows the use of dynamic SQL and stored procedures.
webMethods MSMQ Adapter	SoftwareAG	Provides send and receive capability of Microsoft Message Queuing (MSMQ). Allows for event-driven and scheduled functionality.
webMethods Enterprise JavaBean (EJB) Adapter	SoftwareAG	Allows webMethods to call JavaBeans as if they were built-in webMethods services



Adapter Name	Vendor	Deloitte's Understanding of Middleware Specifics Benefits DPW
OpenDTP for Java	Unisys	Provides real-time transactional access to the Unisys mainframe
Microsoft SQL Server JDBC Provider	Microsoft	Provides native access to the SQL Server database
Oracle 11g JDBC Provider	Oracle	Provides native access to the Oracle database
webMethods webSphere MQ Series Adapter	SoftwareAG	Provides transactional access to the webSphere message queuing (MQ) system

Figure 6.9-181. Experience with All of the Adapters and Components in Use at DPW.

Deloitte's team also has experience implementing Authentication and Authorization using SiteMinder and SOA Manager at DPW, and as such, we require no lead time to understand the tools and patterns involved in security platform changes within DPW's SOA environment.

As part of a code upgrade process, our team works to create proof of concepts to validate that code, the DPW webMethods Framework, and that all types of adapter connections continue to perform optimally. Our team supports you in working with the affected application stakeholders to identify packages suitable for upgrade and potential ones that might fit better in a different technology. Deloitte's approach to Service Technology Selection, as outlined within *Section 6.9.2.1* of this section, describes in detail our recommendations for selecting interface technologies at DPW.

Our team additionally supports DPW through thorough regression testing, including functional and load/performance testing activities of the whole webMethods stack (including adapters, code, infrastructure), and work with DPW to update any webMethods code that is required to make the upgrade successful.

Creation of BizTalk Standards, Processes, and Documentation

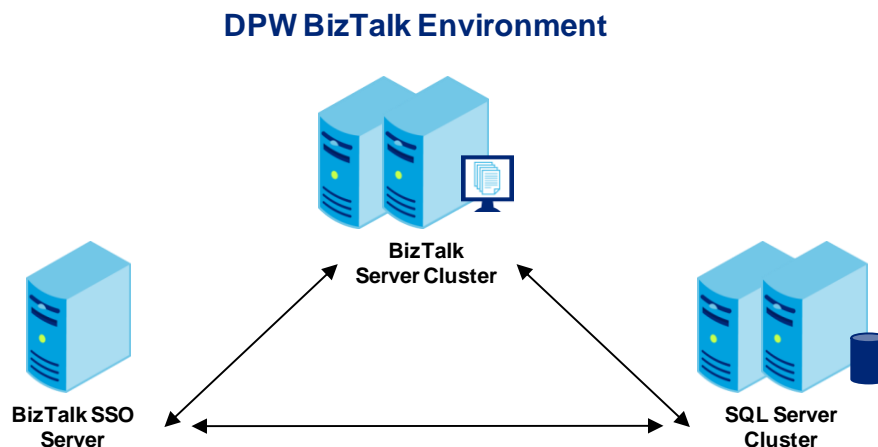
IV	Page IV-389	RFP Reference: Direct Technical Support Overview
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- Creation of BizTalk standards, processes, and related documentation to help integrate this platform with the Enterprise

Deloitte works with DPW to create standards, processes and guidelines for integrating the BizTalk platform into the DPW environment.

Deloitte's experience in product support and integration has given us insight into the challenges associated with introducing new technology in an already diverse system topology. These challenges include defining services for this technology, creating and documenting processes and standards, and integration with existing tools and technologies.

Our team is already familiar with DPW's BizTalk's environment, as depicted in the figure below:



PA_DPW-635

Figure 6.9-182. DPW BizTalk Server Environment.

DPW's BizTalk 2009 Production Environment is configured in a high-availability cluster, and supported by SQL Server 2008.

As shown in the figure above, Deloitte has worked with you to establish the BizTalk environment within DPW. It is a high-availability integration environment, with a dedicated SQL Server platform, and an SSO server to securely store database credentials and configuration data.

As Deloitte continues to work with DPW and demonstrate our experience, we document coding standards, testing approaches and version control processes to streamline BizTalk development across DPW. We will continue to work closely with you to establish and document BizTalk integration techniques with third-party technologies, including the COTS products and other technologies. Additionally, environmental factors, including the clustered environment will be considered in the creation of these standards.

In conjunction with DPW, Deloitte works with you to create a Build and Deployment approach for BizTalk software. This process is established to outline standardized automated build and testing activities using DPW's Team Foundation Server, as well as defining and documenting activities that are required for each deployment.

Additionally, we anticipate that, as the Department of Insurance is integrated into DPW's Community of Practice, the department's BizTalk platform will need to quickly absorb a significant set of services and integrations which have already been developed. During this process, Deloitte will continue to work with you to bring the best practices of these solutions forward into your environment, and to assist in sharing lessons learned and opportunities for potential improvements from the beginning of DPW's adoption of the BizTalk product.

Provide Open TI Support

IV

Page
IV-389

RFP Reference: Direct Technical Support Overview

- Provide Open TI support in support existing and prioritized initiatives

Deloitte provides OpenTI support for existing and prioritized initiatives.

Deloitte has supported DPW in implementing over 70 real-time interfaces between the CIS Mainframe platform and various open systems applications. Deloitte recognizes the importance of OpenTI as the real-time integration technology bridge between the mainframe and the open systems. We understand that as DPW's works to transition business functionality from mainframe to open systems platforms, OpenTI provides a bridge to link data and business logic hosted on the mainframe to the next generation of DPW's technologies.

We provide a team of resources that are familiar with the DPW OpenTI architecture and the mainframe and open systems platforms that OpenTI connects. Our experience working with you has afforded us the understanding of the two OpenTI paradigms present at DPW, as shown in Figure 6.9-183 and Figure 6.9-184 below.

DPW OpenTI Open Systems-initiated Communication Environment

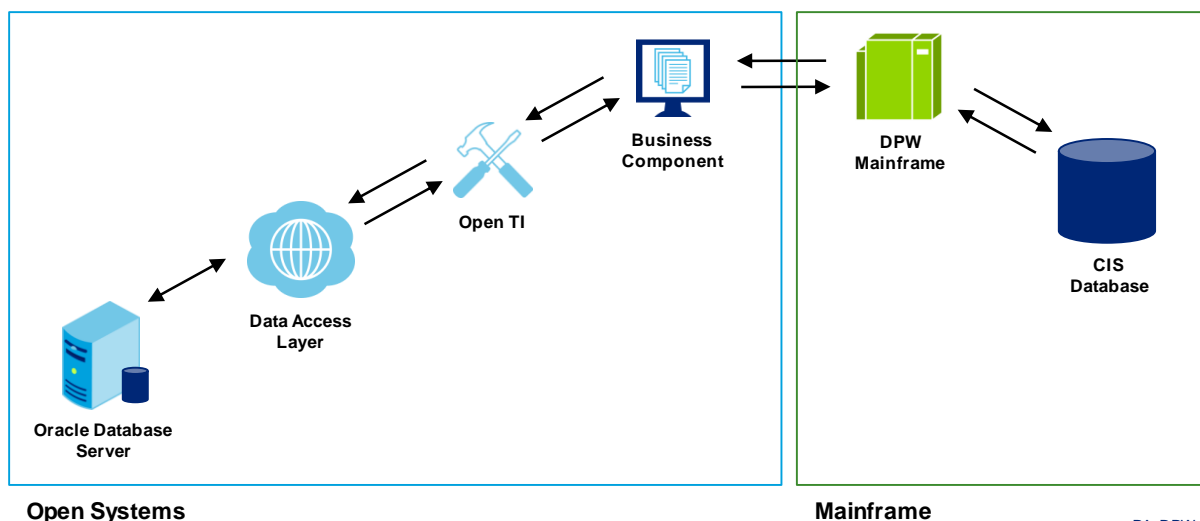


Figure 6.8-183. Open Systems Initiated OpenTI Calls.

DPW OpenTI Open Systems-initiated Communication Environment involves different layers across both Windows and mainframe environments.

PA_DPW-638

DPW OpenTI Mainframe-initiated Communication Environment

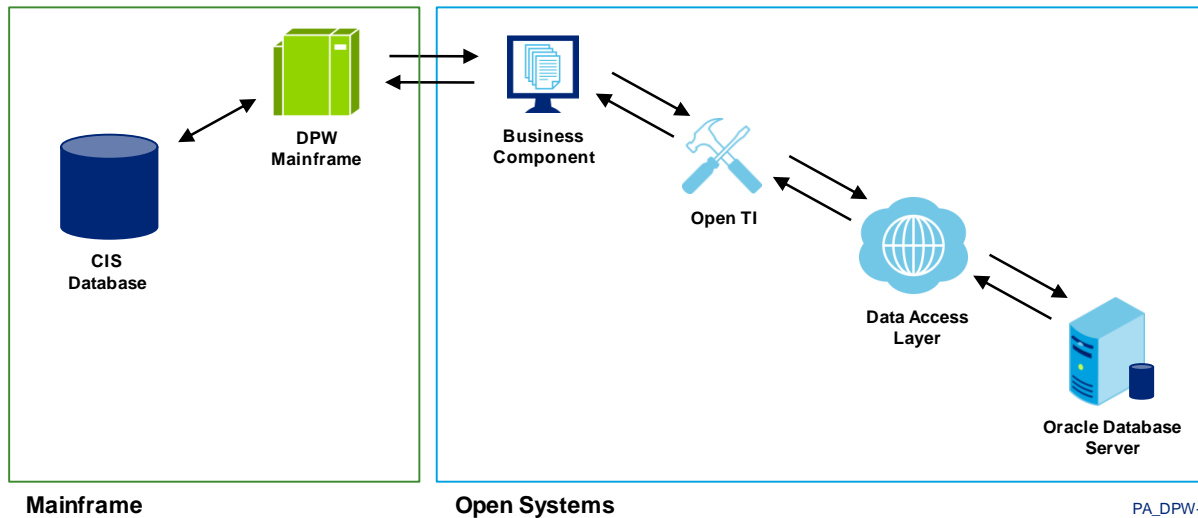


Figure 6.9-184. Mainframe Initiated OpenTI Calls.

DPW OpenTI Mainframe-initiated Communication Environment reverses the paradigm of data access.

As shown in the figures above, the data access patterns require a number of technologies and specializations to be completed including:

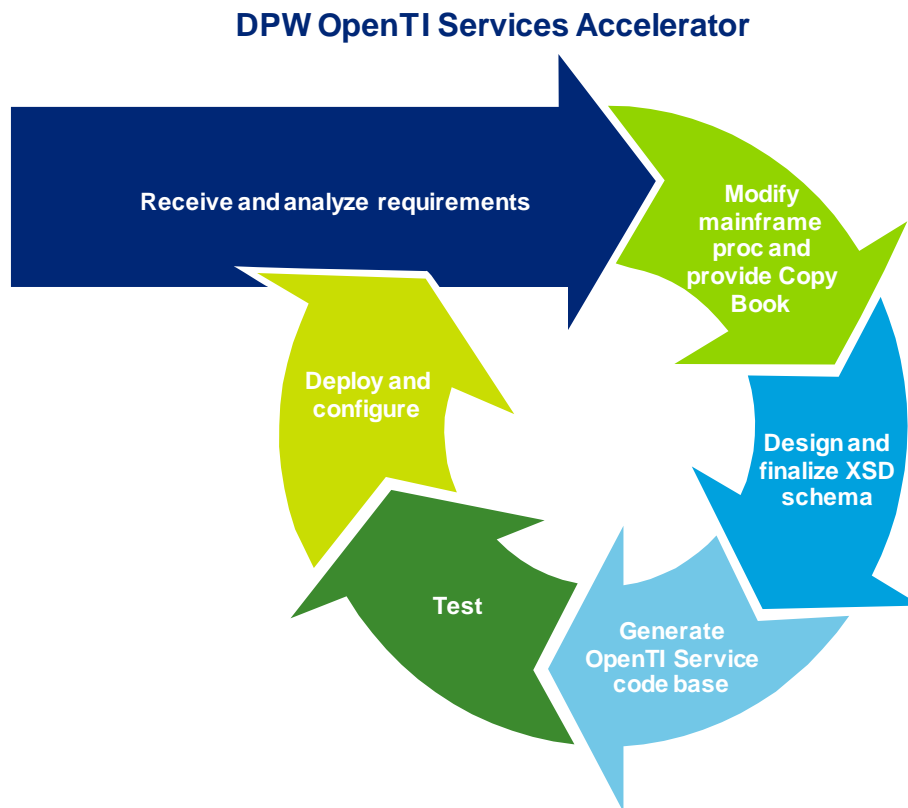
Technology	Deloitte’s Understanding of DPW OpenTI Implementation Characteristics
Visual Basic 6	The technology is no longer implemented; however, legacy OpenTI components were developed with VB6.
VB.NET	Currently, OpenTI component development is done using VB.NET.
WCF	WCF implementation enables OpenTI services to be consumed as web services.
XML	Allows for standardized communication approach between the Open Systems services and OpenTI.
XSD	XSD is the contract that defines and enforces the expected XML structure coming in and out of OpenTI components.
XSLT	Implemented when data transformation for particular service is required.
Windows Registry	Windows Registry is broadly used for storing OpenTI-related configuration settings
Copy Book	Copy Book is the contract that defines the expected input and output buffers between mainframe services and OpenTI.
.NET configuration file	Currently it is used to provide WCF OpenTI services configuration information

Figure 6.9-185. DPW OpenTI Implementation Role.

In our experience working with DPW, we have supported more than 70 different OpenTI connections. Our team understands these technologies and how they interact within DPW OpenTI architecture, and are able to provide architectural and implementation support.

We understand that OpenTI will continue to play a critical role within the enterprise as the system topology continues to evolve. The implementation of IR Phase IV-B will substantially increase the volume and criticality of OpenTI services and requires resources with a thorough knowledge of DPW systems, architectures and business practices to support.

To support this evolution, we provide insight and vision, such as the development of the OpenTI Services Accelerator framework. This framework reduces the complexity of the initial structure and setup of OpenTI components by generating common components automatically, thereby increasing accuracy, productivity and efficiency. We outline the framework in Figure 6.9-186 below.



PA_DPW-639

Figure 6.9-186. DPW OpenTI Services Accelerator Framework.

Our OpenTI Services Accelerator Framework allows DPW to minimize time spent on tactical coding and focus on modeling business rules and validation logic.

Our DPW Accelerator for OpenTI is comprised of technology, tools, documentation, guidelines and examples that assist all OpenTI developers to design and create quality solutions. Deloitte is transitioning this to DPW for enterprise consumption and implementation.



Develop Middleware Packages

IV	Page IV-389	RFP Reference: Direct Technical Support Overview
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- Develop middleware packages for prioritized initiatives

Deloitte develops middleware components for BizTalk, webMethods, Informatica and OpenTI in support of prioritized initiatives.

Deloitte works with DPW to implement quality middleware solutions that meet business needs as well as align with DPW’s strategic SOA vision. DPW has made great strides in adopting the SOA paradigm and has created the foundation of an Enterprise Service Bus that provides for loosely coupled service orchestration. Deloitte envisions that, during the next five years, DPW’s middleware environment will play a vital role in helping to meet significant program initiatives that will consume substantial middleware services, such as the ones indicated in Figure 6.9-187.

Major Upcoming Initiatives	Potential Technologies	Deloitte’s Approach Enables DPW to Evolve Their Middleware Capabilities
iCIS Incremental Renewal Phase V	BizTalk, webMethods, WCF, OpenTI	Exporting completely business functionality off the CIS mainframe to the open systems platform will provide for many new areas for services, such as eligibility, financials and fraud detection.
PACSES Mainframe-to-Server Conversion	BizTalk, webMethods, WCF, OpenTI	As PACSES reviews options to modernize their application suite, it is likely that an incremental renewal strategy will be executed, bringing data integration opportunities from the mainframe.
HIPAA 5010 transaction set conversions – HCSIS and CAPS	BizTalk	Adhere to Federal regulations by upgrading services to provide HIPAA 5010 compliant data by January 1, 2010
Insurance Department Integration with DPW	BizTalk, webMethods, WCF, OpenTI	Import BizTalk functionality from PID into DPW’s infrastructure
Department of Aging Integration with DPW	BizTalk, webMethods, WCF, OpenTI	As the Department of Aging consolidates systems into DPW’s Community of Practice, opportunities to integrate legacy systems and build cross-system interfaces will be present. For example, this may impact DPW through the expansion of enterprise provider search functions within COMPASS.

Figure 6.9-187. Middleware/SOA Opportunities.

Additionally, we anticipate significant middleware and SOA involvement during the iCIS Incremental Renewals Phase V and PACSES evolution to the open systems platform. Business logic, eligibility determination and case management functions provide prime candidates for development of enterprise services and data integrations that will be highly middleware centric.

Another major initiative is the HIPAA 5010 transaction set conversion, which allows for more granular and concise healthcare-related data to be transmitted in-between systems. To comply with regulations, DPW will undergo significant changes and implement BizTalk 2009 and its out-of-the-box HIPAA Adapter to process transaction sets. As the completion date for switching to HIPAA 5010 is January 1, 2012, affected services within DPW will need to undergo updates during FY10-11.

IT consolidation efforts, such as the Pennsylvania Insurance Department (PID) and Department of Aging, provide additional opportunities for integration and service development as their IT projects begin to use DPW's infrastructure. These include data consolidation and search opportunities, such as expansions to Enterprise Provider Search and Enterprise Notifications. PID will also bring existing BizTalk 2006 R2 packages and integrations which will require conversion to DPW's BizTalk 2009 platform, and ongoing maintenance.

Provide Knowledge Sharing and Mentoring to the Commonwealth

IV

Page
IV-389

RFP Reference: Direct Technical Support Overview

- Provide knowledge sharing and mentoring to the Commonwealth staff as directed by DPW management. This includes guidance and assistance required during initiatives.

Deloitte provides knowledge sharing and mentoring services to Commonwealth staff as directed by DPW management.

Deloitte shares industry vision, best practices and firm standard software development guidance with DPW staff as initiatives introduce new technology to the system topology.

To meet DPW's requirements, Deloitte works with DPW to discuss, prioritize and scope opportunities for knowledge sharing and mentoring initiatives. DPW considers current DPW skill set requirements, future project initiatives, and upcoming technologies in determining the priorities.

Deloitte coordinates with DPW to plan each knowledge sharing and mentoring initiative after the DPW establishes the priorities. The sessions consist of identifying team members within DPW that would participate in the knowledge sharing and mentoring activities, as well as desired outcomes. As available, Deloitte can bring its deep-bench of resources to

Key Staff Spotlight Philippe Truche



“It was gratifying to provide design and development knowledge sharing assistance to the DEA team working on modernizing MPI. I coached the team by leveraging my extensive experience and knowledge in design and implementation of large scale systems using Microsoft .NET frameworks with Windows Communication Foundation technology.”



assemble a team of technologists with needed experience in technology to augment the initiative.

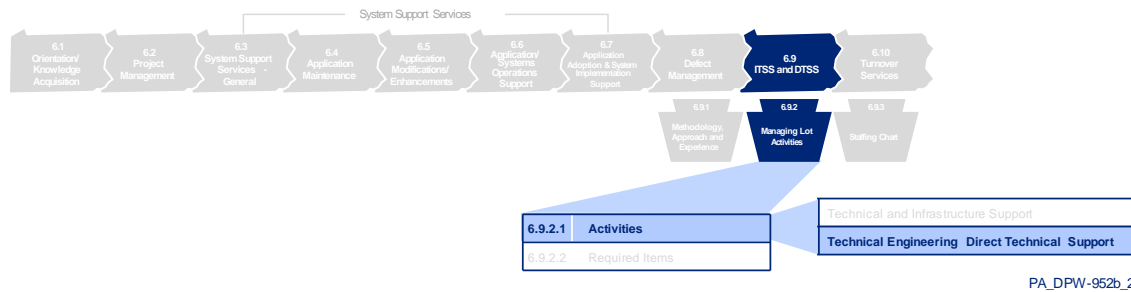
Following the identification of the need, scope and potential mentoring resource, Deloitte works with DPW to create a high-level knowledge sharing/mentoring plan that will cover the desired outcomes determined for that initiative. The team will also assess the expertise level of the identified participants to tailor the sessions to the appropriate level of understanding.

Deloitte will work with you to create session materials, such as presentation decks, coding labs, or sample code that make up the training materials. The team will also work with DPW to establish a schedule.





Technical Engineering Direct Technical Support Activities



PA_DPW-952b_2

IV Page IV-389 RFP Reference: Direct Technical Support Overview

The various types of Direct Technical support activities expected to be performed by the selected Offeror of **Lot # 7** for the in-scope applications include:

- Technical Engineering Direct Technical Support activities

As the premier system integrator in HHS and a leader in information technology strategy and implementation, Deloitte brings the breadth of staff, experience, and credentials to support the Division of Technology Engineering (DTE) Direct Technical Support activities specified in the RFP. Based on our understanding of the RFP, Deloitte resources will work based on the direction and priorities set by DTE managers as part the direct technical support activities outlined in this section. DTE managers will consider the enterprise strategic and tactical priorities and resources assigned as part of the direct technical support activities in the prioritization process.

Our approach toward providing DTE Direct Technical Support services, or DTE Services, provides DPW with access to a large pool of experts on a broad set of topics using both dedicated and on-demand resource models. Our staff has in-depth experience on a wide range of topics, such as DPW-specific business and technology domains as well as emerging technologies relevant to HHS, EA-SOA strategy, ITIL and CMMI adoption best practices, and many others as depicted in Figure 6.9-188.



Enterprise Architecture Strategy	Security	Configuration Management	Database Administration
<ul style="list-style-type: none"> Enterprise Strategy IT Strategy Operations Excellence Enterprise/Service-based Operations Program Leadership Performance Management 	<ul style="list-style-type: none"> Enterprise Security Risk Assessment Framework Automated User Provisioning IAM Infrastructure Planning and Implementation SIEM RSA enVision Support and Enhancements Network Security Security Vulnerability Testing and Assessment Security Disaster Recovery and Back-up Virtual Server Technology Software Upgrade Support 	<ul style="list-style-type: none"> Open System Server Performance Infrastructure Documentation Development and Maintenance CM Technology Evaluation Hardware Investment/ROI Improvement Upgrade Planning Support Migration Planning and Support CM Solutions to Support SOA 	<ul style="list-style-type: none"> Information Lifecycle Strategies Performance Tuning Adherence to Standards/Best Practices Batch Process Optimization Open System Database Back-up/Recovery Process Optimization Logical/Physical Database Design Reviews Database Upgrades Database Maintenance/Support Tasks
<h2 style="margin: 0;">Deloitte's Support for DTE</h2>			
Middleware Architecture	Enterprise Knowledge Management	Technology Strategy/ Alternative Solutions	CMMI/ITIL Strategy
<ul style="list-style-type: none"> WebMethods Upgrade Support Biztalk Planning, Prototyping, Implementation Support ESB Planning and Implementation Support 	<ul style="list-style-type: none"> Business Intelligence Support Cognos, Information Support EKMS/BI Architecture and Infrastructure Planning and Support 	<ul style="list-style-type: none"> Strategy and Planning Support EKMS Assistance ITIL Adoption Strategy and Support 	<ul style="list-style-type: none"> Refine and Expand CMMI/ITIL Adoption Model Maturity Strategy and Assessments Integrated QA in SDLC

PA_DPW-1311_4

Figure 6.9-188. Deloitte's Support for Technical Engineering Direct Technical Support Services.

We bring an experienced set of DTE support resources on a wide range of topics as part of a broad shared services model.

Our team includes both local Deloitte experts with specialized skill sets as well as experts from across the firm. We provide core technology, IT service management and HHS business leaders who have significant and detailed experience in their field of expertise. These leaders have successfully planned, implemented, and supported large transformation programs of similar size, scope and complexity. The combination of an experienced and knowledgeable DPW support team as well as technology and business leaders with a wealth of relevant experience will help DPW evolve its business and technical infrastructure to the next level of maturity.

Security

IV

Page
IV-389

RFP Reference: Direct Technical Support Overview

- Enterprise Risk Management
- Automate User Provisioning
- IAM and Infrastructure Enhancements
- SIEM RSA envision Support and Enhancements
- Network Assessment
- Provide Security Vulnerability Testing Assessment Assistance
- DR & Backup
- Virtual Server Technology
- Software Upgrade Support

Safeguarding citizen's privacy and information is one of DPW's core strategic goals. Today's Internet based IT infrastructure exists in an environment that is under increasing threat of unauthorized access or disclosure of sensitive data and attacks originating from cyber-criminal groups and hackers. The dynamic evolution of the program landscape with the introduction of Health Care reform, HITECH Act and the electronic medical records mandates is increasing DPW's risk profile. Deloitte has demonstrated capabilities to assist DPW in managing its security and privacy program to better serve the needs of business partners and citizens. DTE security domain manager will prioritize the activities outlined as part of this section based on enterprise needs and resources available as part of the direct technical support services.

Change and Complexity is Imminent. As the federal government invests billions in health care as part of the Health Care Reform, the traditional landscape and scope for protecting enterprise data will be entering a new era. Whether it is the broader purview of the Health Insurance Portability and Accountability Act (HIPAA), the widespread adoption and use of Health Information Technologies (HIT) under the HITECH Act, or the implementation of state-level, electronic exchanges for health information, there will be new and significant pressure to meet these ever-mounting security and privacy challenges.

Further compounding this environment is the urgent need to address cyber security in order to mitigate the threat of disruption to State government operations and

Key Staff Spotlight

Srini Subramanian



Project Executive and Security SME

"DPW is a leader in the adoption of modern security technologies and risk management processes. I am privileged to have been part of DPW's methodical transformation to a services based enterprise, protected by a robust security infrastructure, tools and processes. I look forward to contributing to the elevation of the DPW Enterprise Architecture, Shared Services and Security program to new heights."



services. Citizen and business partner information, critical cyber infrastructure, and even national security can be compromised by deliberate attacks, inadvertent security lapses, and new vulnerabilities.

Tackling Challenging Security and Privacy

Problems. Deloitte has a long-standing, successful working relationship with the DPW through a number of projects that have created measurable value for the Department. Throughout this relationship, we have amassed substantial knowledge-capital of your operating environment, compliance requirements, and technical infrastructure. This rare knowledge-capital, lends to our view that DPW is heading into a period of massive change with new programs while taking on the additional security challenges as part of its IT portfolio.

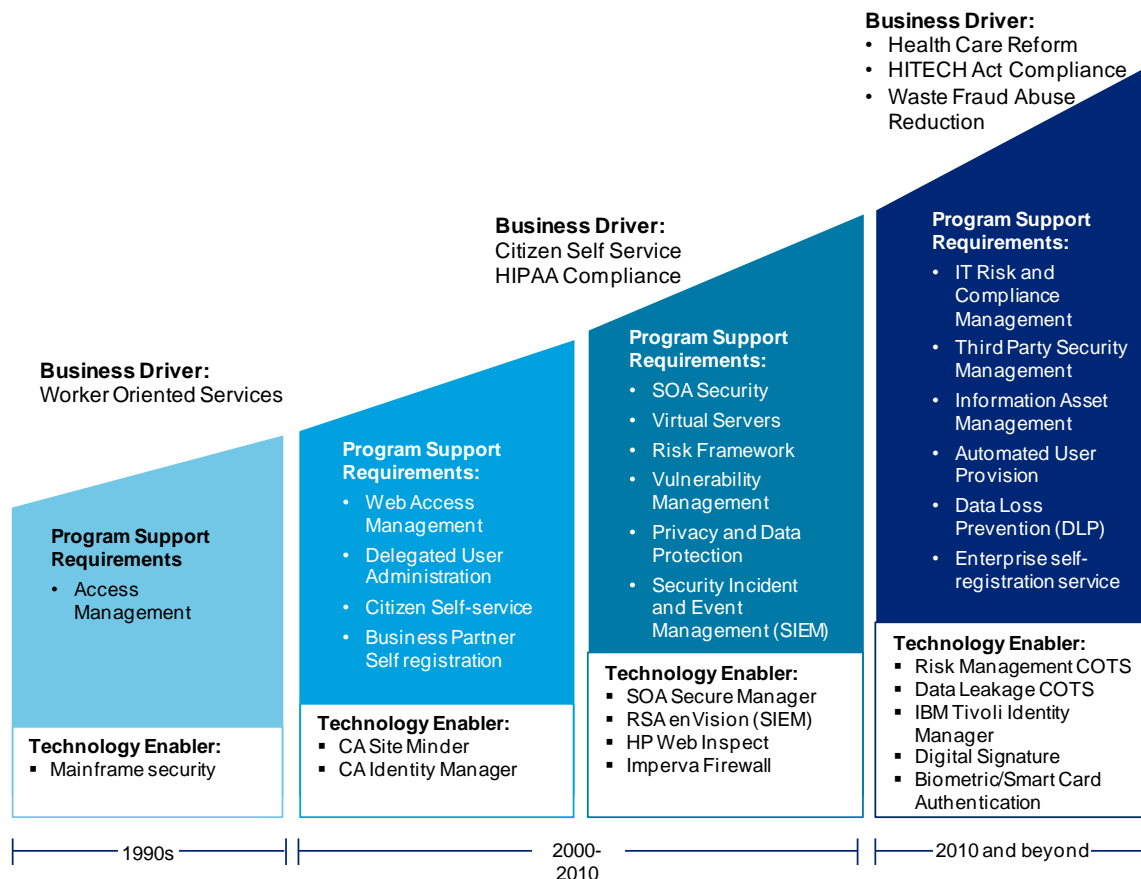
Deloitte will help DPW orchestrate the people, process, and technology components resulting in a cohesive approach for security, privacy, and risk and compliance management. Over the last 10 years we have seen the security and privacy function play a greater role at DPW resulting in a tremendous growth trajectory in capabilities earning accolades and national recognition. The following graphic illustrates DPW's security and privacy evolution over the past 10 years. Deloitte is proud to have been part of this evolution.

As illustrated in Figure 6.9-189, the Security and Privacy-related business drivers continue to fuel demand for the strategic, tactical and operational security measures. More importantly, the future assures additional changes, complex programs and demands that DPW needs to proactively respond to in order to maintain its leadership in maintaining client privacy.

Benefits to DPW

Deloitte brings:

- Certified security professionals with a combined 27 years of hands-on DPW security experience, thus equipped with a deep knowledge of the intricacies of the complex DPW security infrastructure
- The industry leading Security and Risk Consulting Practice providing the best security solutions and practices to support DPW's rapidly evolving program demands such as Health Care Reform, EA-SOA, and regulatory requirements
- On-demand access to recognized leaders in Information Security and IT Risk Management
 - 700 Certified Information Systems Security Professionals (CISSP)
 - 120 Certified Information Privacy Professionals (CIPP)



PA_DPW-948_2

Figure 6.9-189. Drivers and DPW's Security and Privacy Evolution.

Deloitte is associated with DPW as part of its Security and Privacy evolution and looks forward to maintain the momentum.

Maturing DPW's Security and Privacy Capabilities. As DPW's program offerings and technology diversity evolve, so too will the demands placed on DPW's enterprise security program. With a view to the future, our perspective is the security and privacy function will continue to enhance its risk management capabilities enabling it to make effective, risk-based decisions and improve DPW's compliance posture. The following are examples of these emerging trends which are relevant to DPW's future security program and infrastructure:

- Physical Security Convergence with Strong Authentication Mechanisms.** Access control is a classic example of convergence paying dividends. By combining building access and network access into one system, DPW can save money, improve efficiency and create a single view into both physical threats (illegal entry) and digital ones (illegal network access). Further, the convergence presents opportunities in terms of using the smart card and biometric-based access mechanisms as strong authentication to IT systems, enhancing the access control and logging of worker access to critical application systems. DPW has the necessary Identity and Access Management (IAM) foundation to enable such a transformation that not only makes critical transactions secure and workers accountable for their actions, but further assists the workers to get user friendly and seamless access to multiple applications.



- **Cloud Computing and Virtualization.** Cloud computing by definition presents new issues of risk management and internal control that must be formalized. DPW should be concerned about the security impacts of cloud computing, not only as the Commonwealth adopts it, but as its business partners move sensitive applications and data to the cloud. Additionally, enterprise private and hybrid clouds should be engineered to meet important business and regulatory requirements for protecting sensitive data.

Virtual servers provide enterprises and IT with relief from numerous pain points, but introduce new threats to the environment. For one, virtual environments lack the extra security layers of physical environments, where data center, network and Web site administrators control access to data, which apply separate technologies and practices to secure the infrastructure. A sound strategy for patching virtual servers, deploying access controls and monitoring traffic is necessary to manage threats and vulnerabilities.

- **Enterprise Services and Data Loss Prevention (DLP).** DPW continues to further evolve its technology infrastructure to successfully become service enabled, customer centric and a flexible service provider that responds in real time to deliver business solutions while retaining high economic efficiency, quality and security. Enterprise services may potentially achieve significant business and operational gains for the enterprise. A broad view of security is required, including secure interoperability across the enterprise, to address enterprise IT security management challenges and risk profiles. For enterprise services that impact systems containing sensitive data and information, effective DLP is a necessary requirement in order to prevent deliberate and accidental leakages of citizen, business partner, and employee personal information.

Forrester recognizes Deloitte as a leader in the Security and Risk Consulting Services, as depicted in Figure 6.9-190. Our global security practice provides extensive leadership, vision and guidance to the industry. We are happy to bring that experience and leadership to DPW.

“Deloitte’s vision of becoming the client’s trusted advisor, coupled with its extensive list of services and technical and business experience separates it from the rest of the pack.”

“In Forrester’s 75-criteria evaluation of information security and risk consulting service providers, we [Forrester] found that Deloitte led the pack because of its maniacal customer focus and deep technical expertise”

Khalid Kark
Forrester Wave™: Information Security and Risk Consulting, Q3 2010

Figure 3 Forrester Wave™: Information Security And Risk Consulting, Q3 '10



Deloitte's vision of becoming the client's trusted partner, coupled with its extensive list of services and technical and business experience, separates it from the rest of the pack. Information security, privacy, and IT risk remain top corporate priorities for Deloitte, and this is evident in the company's recent investments. It has an excellent customer support structure. Client references pointed to flexibility, project management, and quality of relationships as areas of strength and contract terms and limited services in certain geographies as areas of potential improvement.

-Forrester Wave™: Information Security and Risk Consulting, Q3 2010", Khalid Kark

Deloitte also attracts a more mature client base and excels in solving complex problems while consistently producing high-quality deliverables for its clients. If you have a large and complex environment and are dealing with complex issues that require an understanding of the business process and deep technical capabilities, you should look to Deloitte.

-Forrester Wave™: Information Security and Risk Consulting, Q3 2010", Khalid Kark

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Figure 6.9-190. Analyst Recognition – Forrester Wave™ Report Q3 – 2010. Forrester recognizes Deloitte as the Leader in Information Security and Risk Consulting Services.

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Deloitte – Recognized as a Leader in Security and Risk Consulting Services

Highly Qualified and Certified Practitioners Ready to Serve Your Needs. Deloitte has over 1,000 Security and Privacy Services professionals, including 700 professionals with the Certified Information Security Services Professional (CISSP) designation, and 120 with the Certified Information Privacy Professional (CIPP) designation. We leverage our large pool of highly qualified security professionals to bring the right skill set, just in time to meet your needs. Deloitte serves DPW with a team of highly experienced and accomplished security professionals.

Figure 6.9-191 highlights one example of Deloitte's history in leveraging its deep pool of talented resources to address DPW's emerging needs, in this case for the risk assessment framework.

Our proposed DTSS/ITSS security specialists have the following certifications:

- Five CISSPs
- Two Certified Ethical Hackers (CEH)
- Three Project Management Professionals (PMP)
- Two CIPPs
- One CISM
- Five ITIL v3 Foundation



Security Domain	DPW's Emerging Need	Deloitte's Response
Risk and Compliance Management	<ul style="list-style-type: none"> Mechanism for identifying, assessing and prioritizing risk to cyber assets. Managing compliance to a myriad of requirements (IRS 1075, SSA, HIPAA) 	<ul style="list-style-type: none"> Deloitte brought in the following resources to help DPW address this challenge: <ul style="list-style-type: none"> Jeff Ricor, Senior Manager and part of Deloitte Center of Excellence, provided insights into the Deloitte Risk Catalog approach Jason Lininger, Senior Manager, assisted in development and implementation of a Security Risk Framework aligned to compliance requirements, bringing the experience of having implemented in other Public Sector clients Husam Brohi, Manager, to assist institutionalize the Risk Framework and transfer the requisite skill-sets and knowledge to sustain

Figure 6.9-191. An Example of Leveraging Deloitte's Large Pool of Qualified Resources coming in to Add Value for DPW.

Over the past 10 years, Deloitte has worked with DPW on assisting in the security vulnerability testing, privacy standards, establishing and enhancing the IAM program.

Deloitte brings specialists from across the security and privacy space to share the most sought-after insights and perspectives with DPW. A few of these leaders include:

- **Mark Ford**, Principal, is ranked as the 27th most influential IT security professionals by IT Security.com and currently serves as the Quality Assurance Partner for Deloitte's security services for DPW
- **Lt. General Harry Raduege, Jr., USAF (Ret.)**, chairman of the Deloitte Center for Network Innovation, visited the Commonwealth to provide his perspective on today's increasing need for cyber security. General Raduege co-chairs the Commission on Cybersecurity for the 44th Presidency.
- **Rena Mears**, Principal, serves on several industry Advisory Boards and is the Global leader in Deloitte's Privacy and Data Protection area. Rena has provided her insights on Privacy and Data Protection on two separate occasions at the Commonwealth during the last two years.
- **Srini Subramanian**, Program Executive, leads Deloitte's Security and Privacy service offering for the State Government sector and in this capacity brings the leading practices and perspectives from other states to DPW. Srini and Gen. Raduege are featured in a Deloitte Insights Podcast on [The Cyber Savvy State Government](#).

Focus Both on Thought Leadership and Solution Delivery. We continually monitor the evolving marketplace trends and, through our Center for Security & Privacy Solutions, we integrate new, emerging services into our portfolios, enabling us to remain in the forefront of security and privacy capabilities. We are committed to valuable research and interactive forums for knowledge sharing as demonstrated by our numerous 'Point of View' publications, as shown in Figure 6.9-192.



PA_DPW-2047

Figure 6.9-192. Deloitte’s commitment to Thought Leadership.
Deloitte builds eminence in the marketplace through research publications and point-of-views.

Additionally, Deloitte facilitates the collection and maturing of Public Sector security solutions nationwide. Deloitte teamed with the National Association of State Chief Information Officers (NASCIO) to conduct a national cyber security survey - with 49 of the 50 states participating. NASCIO has planned publication of this survey report in September 2010.

Alliances and Technology Partners

Deloitte has alliances with many of the key security product vendors. This provides Deloitte the ability to leverage these relationships for providing benefits to DPW that includes priority support and access to internal troubleshooting information. In addition, our practitioners are testing and assisting the product vendors test and improve beta versions of their products, giving us an advantage on these emerging releases and tools. Figure 6.9-193 is a snapshot of the vendor alliances that Deloitte has in the Security space.

Benefits of our alliance to DPW

- Ability to integrate disparate technologies within client’s environment
- Ability to bring forth the best of breed solutions
- Accelerated delivery capabilities
- Solution blue-prints
- Pre-sales and post-sales vendor technical support
- Dedicated vendor product support during implementations
- Product training and certifications

Key Alliances



PA_DPW-2046

Figure 6.9-193. Deloitte’s key security alliances

Deloitte brings the strength of its key product alliances to DPW, while maintaining its product independence.

Our Approach

We have organized this section into **nine** specific responses to the requirements outlined in the RFP. Figure 6.9-194 provides a navigation map to facilitate ease of review.

Section	Deloitte Addresses RFP Requirements	RFP Reference
Enterprise Risk Assessment	<ul style="list-style-type: none"> • Enterprise Security Risk Assessment Framework • Enhance Role Based Access Control (RBAC) 	RFP Part IV, Page IV-389
Automate User Provisioning	<ul style="list-style-type: none"> • Support the Generic Self -registration service and password Services • Implement the generic self-registration service to provide user account registration features for use by applications across the DPW 	RFP Part IV, Page IV-389
IAM and Infrastructure Enhancements	<ul style="list-style-type: none"> • Provide ongoing IAM infrastructure support and enhancement services 	RFP Part IV, Page IV-390
SIEM RSA envision Support and Enhancements	<ul style="list-style-type: none"> • Enhance the RSA enVision implementation by defining processes and procedures to monitor Key Performance Indicators (KPI) 	RFP Part IV, Page IV-391
Network Assessment	<ul style="list-style-type: none"> • Conduct network vulnerability assessment and penetration testing assessment • Create detailed reports for each vulnerability identified with mitigation steps 	RFP Part IV, Page IV-391



Section	Deloitte Addresses RFP Requirements	RFP Reference
Provide Security Vulnerability Testing Assessment Assistance	<ul style="list-style-type: none"> Assist BIS to identify security vulnerabilities within the web applications and environment Improve the security team's request tracking System 	RFP Part IV, Page IV-391
DR and Backup	<ul style="list-style-type: none"> Define backup and recovery improvement opportunities within the security infrastructure 	RFP Part IV, Page IV-391
Virtual Server Technology	<ul style="list-style-type: none"> Assess and Incorporate virtual server technology within the Security infrastructure 	RFP Part IV, Page IV-392
Security Software Support	<ul style="list-style-type: none"> Support upgrades to the CA SiteMinder and CA Identity Manager software 	RFP Part IV, Page IV-389

Figure 6.9-194. RFP Requirement Addressed.

Security – Enterprise Risk Assessment

IV	Page IV-389	RFP Reference: Direct Technical Support Overview
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Security – Enterprise Risk Assessment

- Enterprise Security Risk Assessment Framework
- Develop a framework for information security risk assessments within DPW. The framework will assist the Chief Security Officer in making security related decisions for the applications and infrastructure.
- Enhance RBAC (Role Based Access Control)
- Define and implement role management processes and enterprise level role-based model for the applicable Program offices. Define process to refine, optimize, and adapt role definitions to business changes. Define process to set quality targets and processes to fix privileges exceptions and flawed role definitions. Define process to recertify privileges changes and role updates with business managers. Define process to automate testing of privileges and roles against business process rules and policies such as segregation of duty.

Enterprise Security Risk (Assessment) Framework

Deloitte works with DPW to create an Enterprise Security Risk Framework that supports an enterprise strategy for managing security risks. Our joint focus is to implement a Security Risk Framework and technology solution to standardize and automate the various risk and compliance processes.

Proactive Risk Management. To manage DPW IT operations, the Chief Information Security Officer (CISO) needs to understand and monitor the level of security, privacy and compliance risk for which DPW is exposed to and, at the same time, have a proactive strategy available to respond. The management and execution of a risk assessment is a critical responsibility of the DPW security team and enables the Department to act proactively to avoid or mitigate risk. The risk framework enables DPW to assess and prioritize security, privacy and compliance risks, and then identify the appropriate risk response strategy (e.g. reducing risk through controls, accepting risk etc.) to sufficiently protect the enterprise.

Have you heard? 

Deloitte is working with DPW in the Risk Framework effort: Rationalized 147, unique, authoritative sources and 3,426 individual requirements from Federal regulations, PA code, and cyber security standards into 380 integrated security requirements.



Our understanding of DPW’s suite of enterprise applications enables us to effectively align the Enterprise Risk Assessment (Enterprise Risk Framework and Role Based Access Control) with the design and operations of the applications to proactively plan for and mitigate risk. Figure 6.9.195 highlights some unique security characteristics that our team is positioned to manage.

Applications	Deloitte’s Understanding of Application characteristics for Enterprise Risk Assessment
iCIS	<p>CIS, IEVS and TPL(“CIS Mainframe”)</p> <ul style="list-style-type: none"> • CIS Mainframe should meet the requirements of Federal regulations such as IRS 1075 and SSA • CIS mainframe audit logs* and transaction logs should integrate with DPW SIEM system to monitor violation to SSA and IRS 1075 requirements. <p>eCIS</p> <ul style="list-style-type: none"> • eCIS application security audit logs are integrated with DPW SIEM system to monitor and report violations to SSA security requirements • eCIS requires an IAM infrastructure to support more than 395,000 user authentications and more than 50 million user authorizations on a monthly basis • eCIS requires efficient mapping of the application user role and business user role during role creation/maintenance process <p>COMPASS</p> <ul style="list-style-type: none"> • COMPASS applicable contains application user roles for more than 110,000 Citizen users (myCOMPASSAccount), business partner users and Commonwealth users • COMPASS requires community partner delegated administration, user self registration and password self-service managed through CA Identity Manager for more than 110,000 Citizen users, Community Partners (Business Partners) and Commonwealth staff
HCSIS	<ul style="list-style-type: none"> • HCSIS requires to meet the requirements of HIPAA and HITECH • HCSIS requires an IAM infrastructure to supports more than 426,362 user authentications and more than 19 million user authorizations on a monthly basis with over 230 user roles
PACSES	<p>PACSES Mainframe</p> <ul style="list-style-type: none"> • PACSES Mainframe requires to meet the requirements of Internal Revenue Service (IRS) 1075 publication and SSA • PACSES mainframe audit logs and transaction logs should integrate with DPW SIEM system to monitor violation to SSA and IRS 1075 requirements
PELICAN	<ul style="list-style-type: none"> • Maintains DPW IAM infrastructure that supports more than 546,070 user authentications, more than 36 million user authorizations on a monthly basis with over a 100 user roles • PELICAN application needs to meet the requirements of HIPAA, HITECH and Federal/State child care regulations
Child Welfare	<ul style="list-style-type: none"> • Child Welfare application requires reporting and monitoring techniques to meet the requirements of Federal regulations such as Adoption and Foster Care Analysis and Reporting System (AFCARS), HIPAA and HITECH
Enterprise Services	<ul style="list-style-type: none"> • Enterprise Services application needs to meet the requirements of HIPAA, IRS 1075 and SSA regulations

Applications	Deloitte's Understanding of Application characteristics for Enterprise Risk Assessment
Promise	<ul style="list-style-type: none"> • Promise application needs to meet the requirements of HIPAA and IRS 1075 regulations
AdoptPAKids	<ul style="list-style-type: none"> • AdoptPAKids application requires reporting and monitoring techniques to meet the requirements of Federal regulations such as Adoption and Foster Care Analysis and Reporting System (AFCARS), HIPAA and HITECH

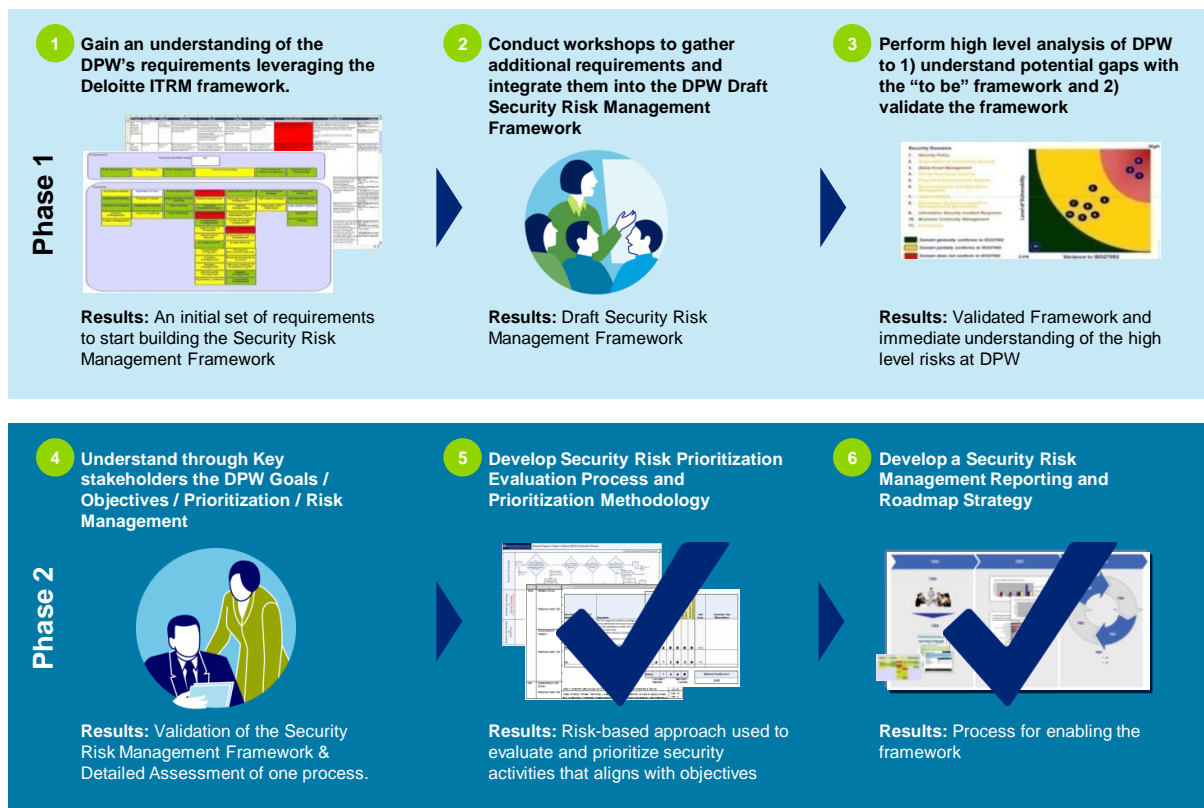
Figure 6.9-195. Our understanding of DPW Applications to provide Enterprise Risk Framework and Role Based Access Control.

* For purposes of this project, the term “audit logs” or “auditing” refers to the implemented system’s ability to track and record specified activities in a log or repository. It does not refer to any third-party opinion on the adequacy of the design or operating effectiveness of internal controls.

Approach to Implementing Security Risk Framework

Defining the Risk Framework

The Security Risk Framework follows a systematic, methodical, repeatable process with tangible deliverables. In Figure 6.9-196 below, we illustrate our approach to creating the risk framework:



PA_DPW-2049

Figure 6.9-196. Deloitte’s Demonstrated Approach to Developing the Risk Framework for DPW.

Deloitte assists DPW on a multi-phased security risk assessment framework implementation.

For DPW, the Security Risk Framework can help the CISO to identify critical assets, conduct periodic risk assessments, select treatment options and monitor the

effectiveness of mitigation techniques and support annual reporting for Federal and Commonwealth compliance requirements.

Implementing the Risk Framework

As DPW begins to implement its Security Risk Framework and the supporting processes across the enterprise, we will work with the Department to mature the process by focusing on the following opportunities:

- Standardizing the risk and control assessment platform to facilitate strategic control decisions
- Establishing clear definition of controls, test procedures and evidence collection requirements
- Facilitating linkage between control enabling technologies and automated controls
- Integrating issue and corrective action monitoring
- Managing the remediation process to mitigate risk
- Monitoring and report on risks for management
- Implementing capabilities for early awareness of high risk areas for management

Deloitte is now working closely with the DPW CISO to address these opportunities through our structured and standards aligned approach to implementing the Security Risk Framework. Figure 6.9-197 portrays our end-to-end implementation approach:

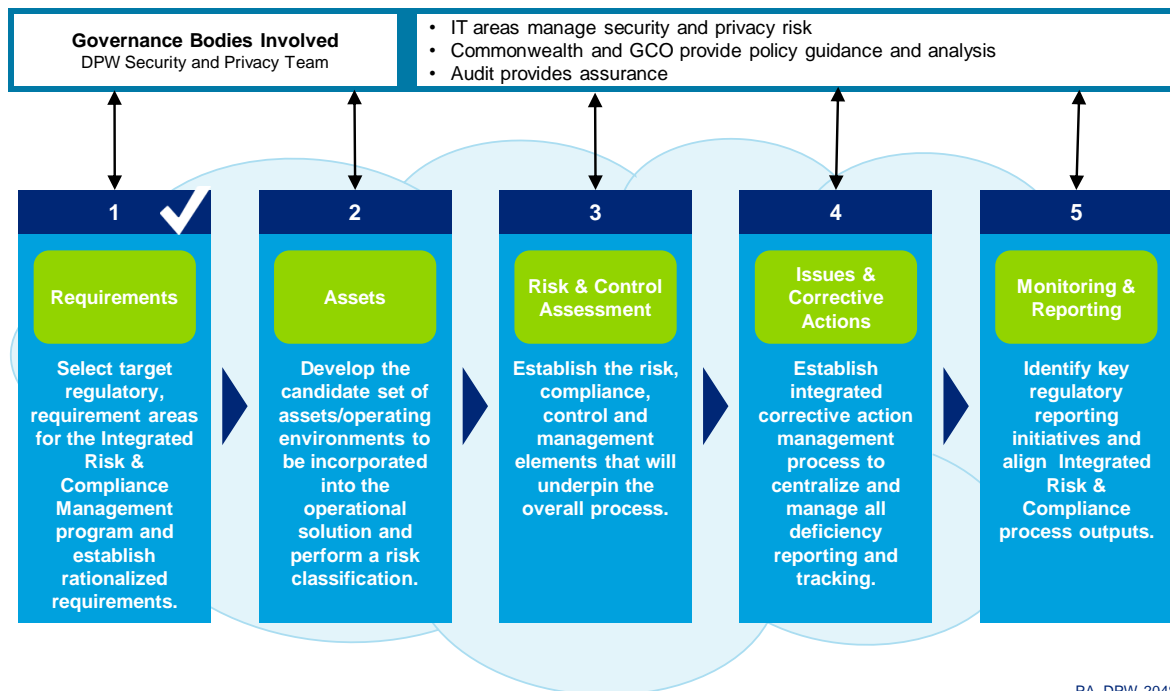


Figure 6.9-197. Deloitte’s Approach to Implement the DPW’s Enterprise Security Risk Framework.
Deloitte works closely with the DPW CISO using our demonstrated approach to implement the DPW’s Security Risk Framework.



Automated Risk and Compliance Management

A Case for Automation. The DPW Security Risk Framework is an extensive and detailed Excel based tool. This contains more than 3400 individual security and privacy requirements and associated controls. The manually intensive task of maintaining the Security Risk Framework, such as keeping the library of rationalized requirements current, tracking open compliance issues and generating assessment templates, can be an onerous and time-consuming activity. In addition, conducting risk assessments and generating reports can be cumbersome.

An automated risk management platform helps to alleviate many of these manual tasks by streamlining processes to enable DPW to perform repeatable, consistent assessments in a timely fashion and that accurately follow DPW and OA/OIT directives. Additionally, an automated solution improves the adoption and scalability of the risk assessment and management process across the enterprise.

Deloitte is currently assisting DPW in identifying and evaluating a Commercially Off-the-shelf (COTS) Risk Management solution to help automate the DPW Risk Framework. The automated tool selected by DPW will help:

- Maintain the library of rationalized security and privacy requirements
- Develop risk profiles for critical assets
- Document technical controls and link them to authoritative sources
- Perform continuous risk and compliance monitoring and report assessment results
- Monitor remediation activities to mitigate gaps and audit findings



We recognize that technology accelerators such as an automated Risk Management tool, results in significant savings in both costs and time to DPW and include some of the following benefits* as depicted in Figure 6.9-198 below:

Potential Benefits to DPW from Deloitte’s approach to Risk Management Solution

- 20 - 25 percent reduction is estimated in costs relating to compliance management as a result of integrated assessment process
- 42 percent reduction in report reconciliation effort due to increased quality and confidence in reporting results through control baselines and clear definition of testing procedures
- 30 percent reduction in overall reporting by removing non essential reports, integrating and normalizing the results of various operational and security risk management efforts
- 5 to 1 reduction in overlapping assessments and testing effort
- 8 to 1 reduction in control matrices and standardization of control baselines
- Ability to coordinate silo programs for regulations such as IRS, SSA and internal compliance testing using a common process and common data
- Consolidated risk assessment, risk response and assessment processes that satisfy the various external and internal requirements (e.g., IRS, HIPAA, SSA)
- Integrated the hand-off points between planning, engineering, operations and compliance to reduce conflicts and build new systems right the first time
- Single integrated view of requirements and traceability from requirement to control decisions

*The actual benefits realized depend on the solution implemented as well as how the organization manages risk and compliance.

Figure 6.9-198. Typical Benefits of Automated Risk Management Solutions.

As stated, we are currently assisting DPW to identify and select a COTS product for implementing and automating the DPW Enterprise Security Risk Framework. Figure 6.9-199 describes the seven steps in the Product Evaluation/Selection Process.

Steps in the COTS Evaluation/Selection Process	Deloitte’s Activities Results in COTS Selection for DPW
1. Business Feasibility & Research Phase	<ul style="list-style-type: none"> • Define business needs, requirements, and Charter; identify plausible solution alternatives.
2. Solicitation Phase	<ul style="list-style-type: none"> • Inquire vendors and solicit information via RFI , direct contact, or other means
3. Preliminary Evaluation/ Selection Phase	<ul style="list-style-type: none"> • Perform an initial review and narrow the field indentifying the leading potential candidates.
4. Detailed Evaluation/ Selection Phase	<ul style="list-style-type: none"> • Perform a detailed review and assessment of the final solution alternatives using the predefined weighted matrix and engaging the vendors in formal but structured product demonstrations.
5. Assess and Recommend Phase	<ul style="list-style-type: none"> • Perform the comparative analysis, summarize results, and rank vendors.
6. Approval and Authorization Phase:	<ul style="list-style-type: none"> • Present final Executive Summary Document to program sponsors/executive management and legal for their review and approval to move forward with final recommendations.



Steps in the COTS Evaluation/Selection Process	Deloitte's Activities Results in COTS Selection for DPW
7. Procurement and Implementation Phase	<ul style="list-style-type: none">• Outline a detailed implementation plan to procure and then implement the DPW's acknowledged solution

Figure 6.9-199. DPW's COTS Product Evaluation/Selection Process.

Role Based Access Control (RBAC)

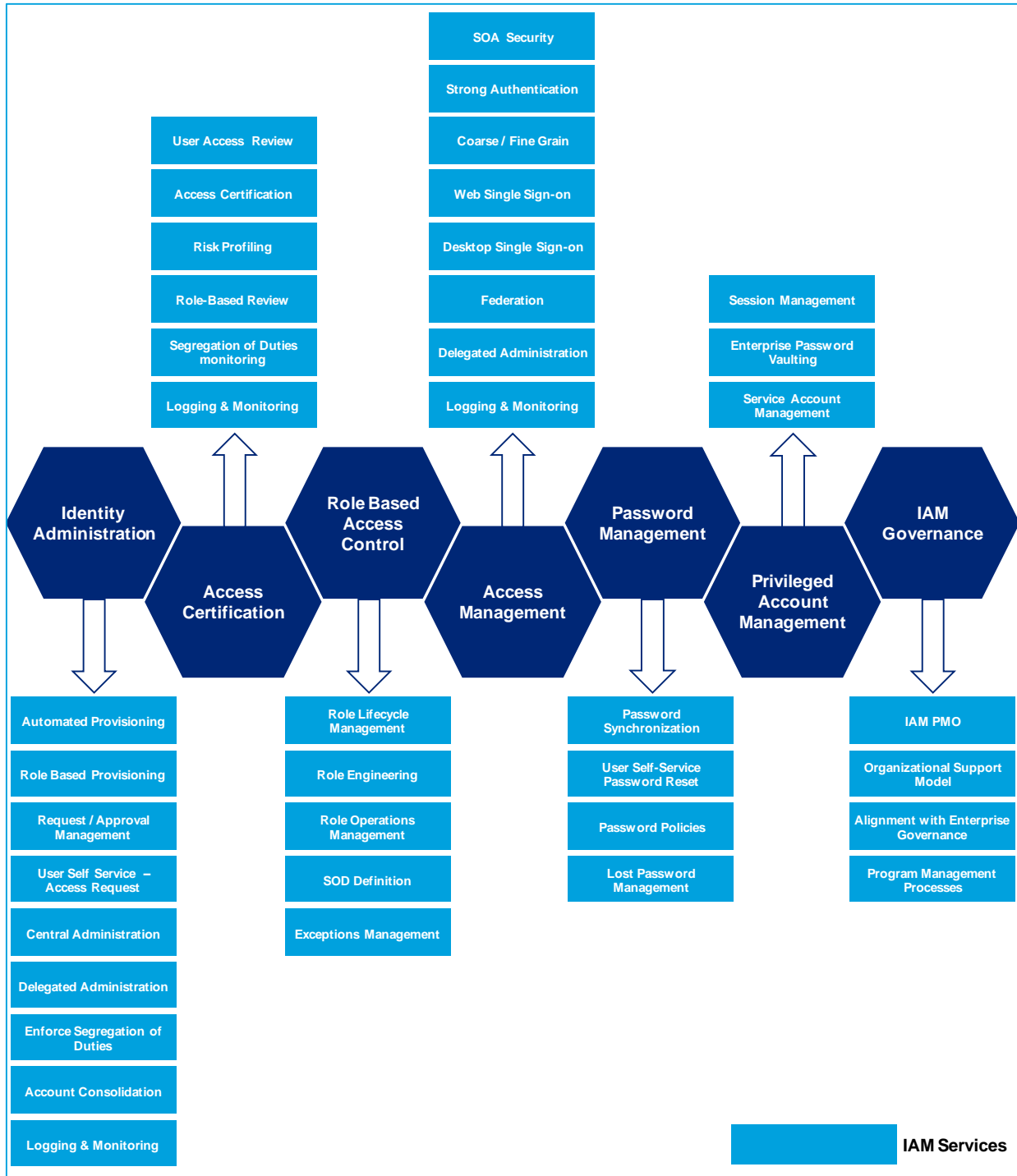
We support DPW's goal to realize a higher level of maturity in Identity and Access Management (IAM) by enhancing existing RBAC processes and technologies to manage and simplify access management for the vast number of DPW users and large-scale applications.

We have been part of the RBAC evolution at DPW from using application specific roles to enterprise roles and appreciate the vision of further efficiency and automation using provisioning solutions. We continue to bring our breadth and depth of experience and use leading industry practices in defining and supporting an enhanced RBAC model to assist DPW with further growth in this IAM service area. As part of this IAM effort, we use key components from our Identity and Access Management Framework.

Deloitte's IAM Framework

Deloitte's IAM framework includes a collection of services implemented through an integrated set of solutions that help manage and secure users' access to enterprise applications and support enterprise goals of enhancing compliance, improving operational efficiency and improving user experience.

We have illustrated Deloitte's seven core IAM service areas in Figure 6.9-200 below.



PA_DPW-2057_2

Figure 6.9-200. Deloitte's IAM Framework.

Deloitte's IAM framework includes a collection of services implemented through an integrated set of solutions that help manage and secure users' access to DPW's enterprise applications.



We have described each of Deloitte’s IAM seven core areas in Figure 6.9-201 below.

Deloitte’s IAM Service Area	Deloitte’s Experience Benefits DPW
Identity Administration	<p>Identity Administration refers to management of user identities (user ID) and their privileges across systems. Commonly referred to as provisioning/de-provisioning</p> <p>This would also include any tools or utilities used to manage groups or other administration areas. DPW utilizes the ITIM and CA Identity Manager solutions for identity administration.</p>
Access Certification (“User Recertification”)	<p>Integrated reporting around user access (who has access to what with approvals) including certification of that access with actionable steps to resolve identified access issues.</p> <p>DPW currently does not use an access certification solution.</p>
RBAC	<p>RBAC is a recognized industry standard approach that defines, manages, and enforces access control privileges through the use of roles between the end user and permission assignments.</p> <p>DPW uses a manual process for role mining and plans to use ITIM for role based provisioning.</p>
Access Management	<p>Access Management refers to tools and technologies used to enable or limit access to systems and applications.</p> <p>DPW uses CA SiteMinder for web access management.</p>
Password Management	<p>Automation of password management with features such as self-service password reset, password synchronization, forgot password etc.</p> <p>DPW plans to use ITIM for password management. Some password management capabilities are available using CA Identity Manager.</p>
Privileged User Management	<p>Management of user identities such as system or service accounts with elevated access rights in platforms or applications. An example of this would be “root” access on UNIX servers, “Administrator” on Windows servers, or “SYSTEM SPECIAL” on mainframes.</p> <p>DPW does not use a solution for privileged user management.</p>
Identity and Access Management Governance	<p>Governance helps organizations focus on establishing the elements necessary to effectively achieve IAM program vision through the alignment and coordination of disparate teams and activities.</p>

Figure 6.9-201. Definition of IAM Core Service Areas.

RBAC is an IAM service area that is geared towards providing a simplified “business-centric” approach to requesting, acknowledging, certifying* and reporting access using roles. DPW has used application roles and has evolved to RBAC in some program offices and continues to seek further improvements. Our approach to enhance RBAC at DPW includes the following activities:

- Define and implement Enterprise Level Role Management Model
- Refine, Optimize and Adapt DPW’s RBAC model to support business process changes
- Establish and Achieve Quality Targets
- Develop and Implement User Recertification Process
- Conduct Automated Testing of User Privileges Based on Business Requirements

* For purposes of this project, the term “certification” or “attestation” refers to the confirmation of a user’s system access to their job role. It does not refer to any third-party opinion on the adequacy of the design or operating effectiveness of internal controls.

We have described each RBAC activity below.

Define and Implement Enterprise Level Role Management Model

In the current security model, DPW has adopted a role model that is application centric, often requiring a trial and error approach to provide the user with access to the needed application functionality. With the large number of DPW applications, the complexity of defining and managing roles has significantly increased. This results in several challenges. For example:

- DPW currently has over 800 application roles that add to the complexity of role management
- Increased risk of unauthorized access could result in audit and compliance issues by providing access to users using application roles
- Significant loss of user productivity as it takes on average of three to four days to set up the users with the correct roles

Key Staff Spotlight Piyush Pandey



Chief Security Architect

“DPW’s enterprise Identity and Access Management infrastructure has a large number of security software components, carefully configured, tuned and integrated in the DPW enterprise security infrastructure to support over 40 applications. I am excited to be part of the DPW team assisting in maintaining, enhancing and continually improving the mission critical security technology, process and people components.”

- Disjointed role management process resulting in duplicate roles, inaccurate user provisioning, and more help desk calls/trouble tickets

To address these challenges, Deloitte worked with DPW to perform an RBAC assessment. The result is a refined RBAC approach and an actionable phased plan to address the above mentioned challenges.

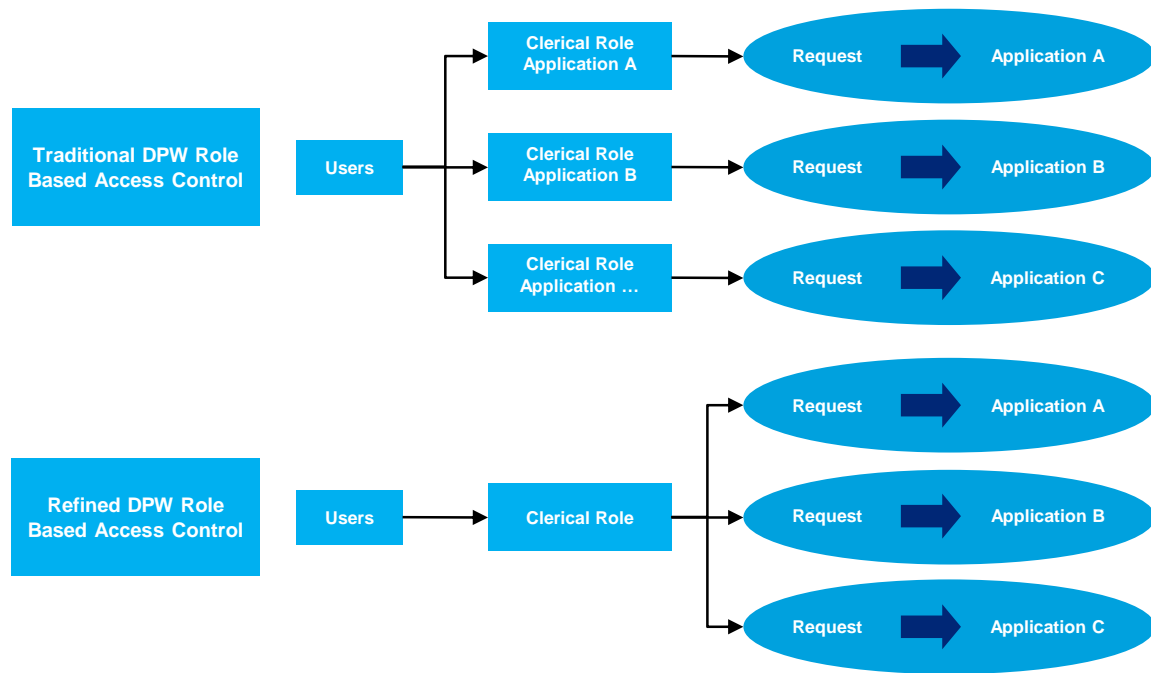
Deloitte worked with DPW to perform the initial assessment on DPW's RBAC model which includes the three phases to set up the foundation and conduct a pilot implementation of the enhanced role model:

- Phase I – Establish a standard set of Role Life cycle Management Processes
 - Define Role request process
 - Defined Role analysis procedure
 - Established Role definition template
 - Defined Role approval process
- Phase II – Establish Program Office Job Based and Functional Roles
 - Define job and functional roles for Office of Income Management (OIM), Office of Child Development and Early Learning (OCDEL), Office of Child Youth and Families (OCYF), Office of Medical Assistance Programs (OMAP) and Office of Developmental Programs (ODP)
- Phase III – Standardize and automate the Access Request Process to ease user administration

The primary outcome of this assessment is a refined role model as shown in Figure 6.9-202 below that shifted the RBAC direction from an application level role to an enterprise role defined at the Program Office level.

Have you
heard? 

With an established RBAC proposed by Deloitte, DPW was able to consolidate the access provided to 8,000 CAO users to only 6 roles.



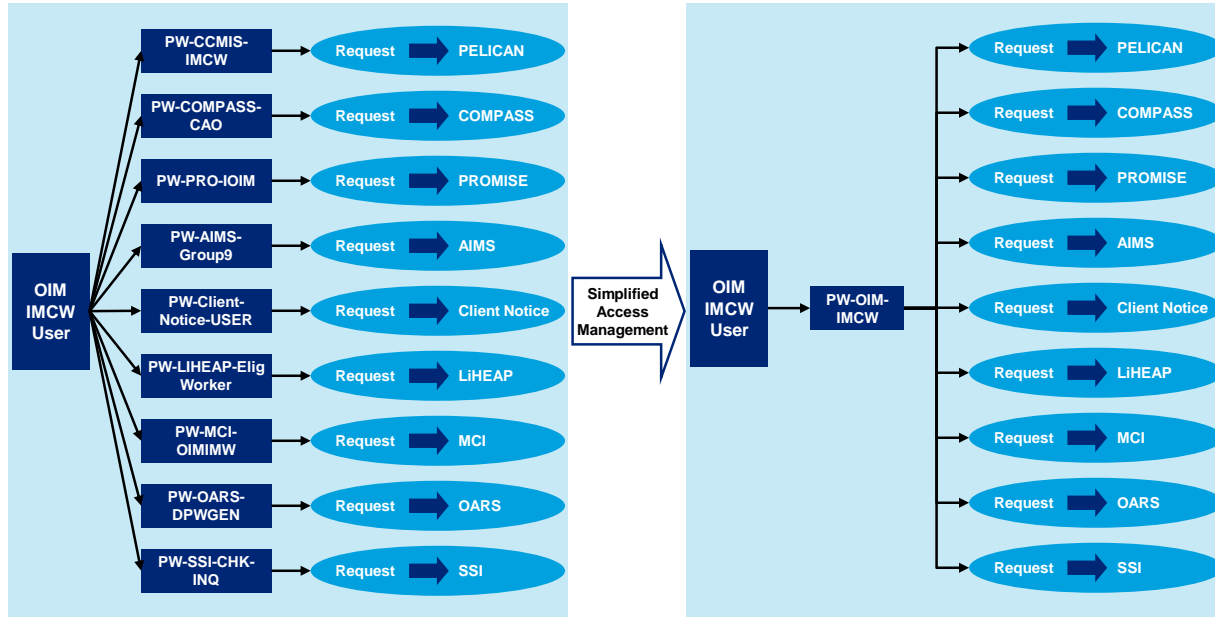
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Figure 6.9-202. DPW's RBAC Model.

Deloitte works with DPW to enhance RBAC by defining enterprise roles at the DPW Program Office level.

As part of establishing the role level model, Deloitte continues to assist DPW in establishing the foundational elements required for an efficient role based provisioning process:

- **Role Governance Process.** DPW has a defined role governance process consisting of industry leading procedures used to define new roles, manage changes to roles, approve roles, manage exceptions to roles and retire roles. This process has been used extensively to develop roles for the OIM.
- **Role Consolidation.** DPW has defined six distinct roles based on job functions for the 8000 County Assistance Office (CAO) users in the OIM program office. We assisted DPW to consolidate multiple application user roles into a single OIM job function role (Business role), as illustrated in Figure 6.9-203.



PA_DPW-2060

Figure 6.9-203. Role Consolidation for OIM CAO Users.

Deloitte assists DPW to consolidate roles for 8,000 CAO users in the OIM program office to six distinct roles based on job functions.

- **Role Definition.** DPW has defined base roles for OCDEL, OCYF, Bureau of Hearing and Appeals (BHA) and ODP
- **Pilot RBAC Assessment.** DPW is in the process of conducting a pilot deployment of the defined roles for three CAO offices. In addition, DPW is identifying the effort and benefits of rolling out the new job function roles for the remaining CAOs

Refine, Optimize and Adapt DPW's RBAC model to support business process changes

We continue to support DPW with the remaining activities defined for Phase II and Phase III. These activities involve creating additional job and functional roles and integrating them with the standardized access request process. We illustrate in Figure 6.9-204, the project phases, key activities and work products for implementing RBAC for each Program Office.



Project Phases	Assessment	Design	Integrate
Key Activities	<ul style="list-style-type: none"> Assess access control practices in existing systems and applications for the selected Program Office Review existing documentation related to access control practices Interview relevant personnel involved in access control practices Observe access control practices Analyze and evaluate access control practices for fit into RBAC model 	<ul style="list-style-type: none"> Design role based provisioning implementation plan for the Program Office Build roles for the selected Program Office Review and adjust built roles using the role review process Finalize roles with appropriate individuals and groups. Obtain role approval Design end-user communication and training material 	<ul style="list-style-type: none"> Integrate roles with provisioning solution Test role integration for the selected Program Office Deploy communication and training to users on role implementation Deploy role based provisioning solution Gather metrics/KPIs and measure the benefits of implementing the role model for the Program Office
Work Products	<ul style="list-style-type: none"> Current state access control assessment Preliminary business case of RBAC 	<ul style="list-style-type: none"> RBAC implementation plan Roles defined and approved for the selected Program Office and loaded into role technology solution Training and communication plan and material 	<ul style="list-style-type: none"> RBAC implementation plan Roles defined and approved for the selected Program Office and loaded into role technology solution Training and communication plan and material

PA_DPW-2063

Figure 6.9-204. Our Approach for Future Role Definition and Provisioning.

Deloitte works with DPW to provide role definition and provisioning for supporting business process changes.

Proposed RBAC Initiatives. In addition to the previously defined phases, we support DPW with further enhancement of RBAC through the following initiatives,

- Evaluate commercially available RBAC solutions that can simplify the role mining and role management processes. A commercially available solution reduces the time required for the role definition and management activities. Furthermore, DPW can benefit with the recertification capabilities offered by many of these solutions.
- Reduce the paper trail and manual tracking resulting from activities such as role definitions, approvals or maintenance with a RBAC solution that supports electronic management of roles.
- Integrate the RBAC solution with ITIM to provide the end-user with a near real-time view of the roles available for provisioning once DPW approves the user roles.
- Further enhance the role governance processes lessons learned during the implementation. For example, if new application development leads to a large number of exceptions to roles, we may have to review the process used to create the roles and modify the process to reduce the exceptions. Similar changes may be required if a number of versions are required for a particular role leading us to revisit the role maintenance process.

With the above initiatives, DPW can expect to benefit from the integrated IAM solution. For example, integration of RBAC solution and the provisioning solution offers the ability to automatically process the results of the certifications.

Establish and Achieve Quality Targets

We use Key Performance Indicators (KPIs) to periodically measure the success of DPW's RBAC implementation. For example, KPIs may include the following:

- Number of user roles per application/system
- Number of users per role
- Change in the number of user roles per application/system
- Improper role assignments leading to privilege escalations
- Incorrect user definitions
- Number of user role modifications submitted within an application release or business initiative and
- Number of times new user roles are removed during the forthcoming release

We share these KPIs with the DPW CISO on a periodic basis during the monthly security and privacy steering team meeting.

Develop and Implement User Recertification Process

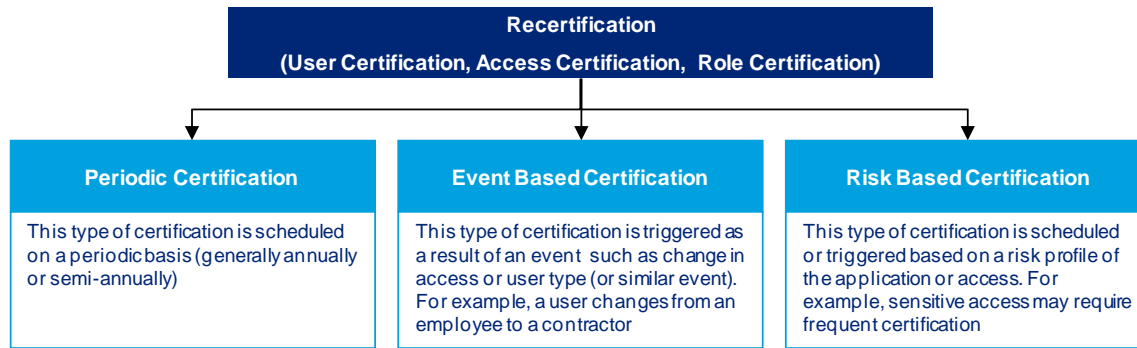
User recertification is the process to periodically assess user access privileges and certify users with actionable steps for resolving access violations or excess access. An efficient user recertification solution can serve as an invaluable tool to enhance auditing and compliance.

Currently, DPW uses a manual recertification process wherein an approved certifier approves user access. This process is in use at the Montour, Northampton and Westmoreland counties. The certification results are paper-based and not stored electronically.

User recertification provides DPW with the necessary capabilities to demonstrate compliance with regulations. We recommend that DPW consider the following initiatives to develop maturity in this core IAM service area.

- Identify standard recertification processes that are repeatable
- Evaluate commercially available certification solutions to assist with the electronic processing of certification requests and provide the efficiencies required as the certification capabilities are extended to other Program Offices
- Integrate the recertification solution/processes with ITIM to provide an automated way to process recertification results

We are working with DPW to enhance the recertification model to include risk or event based recertification in addition to any periodic (annual) recertification. Figure 6.9-205 illustrates the three types of user certification models configurable using a certification solution.

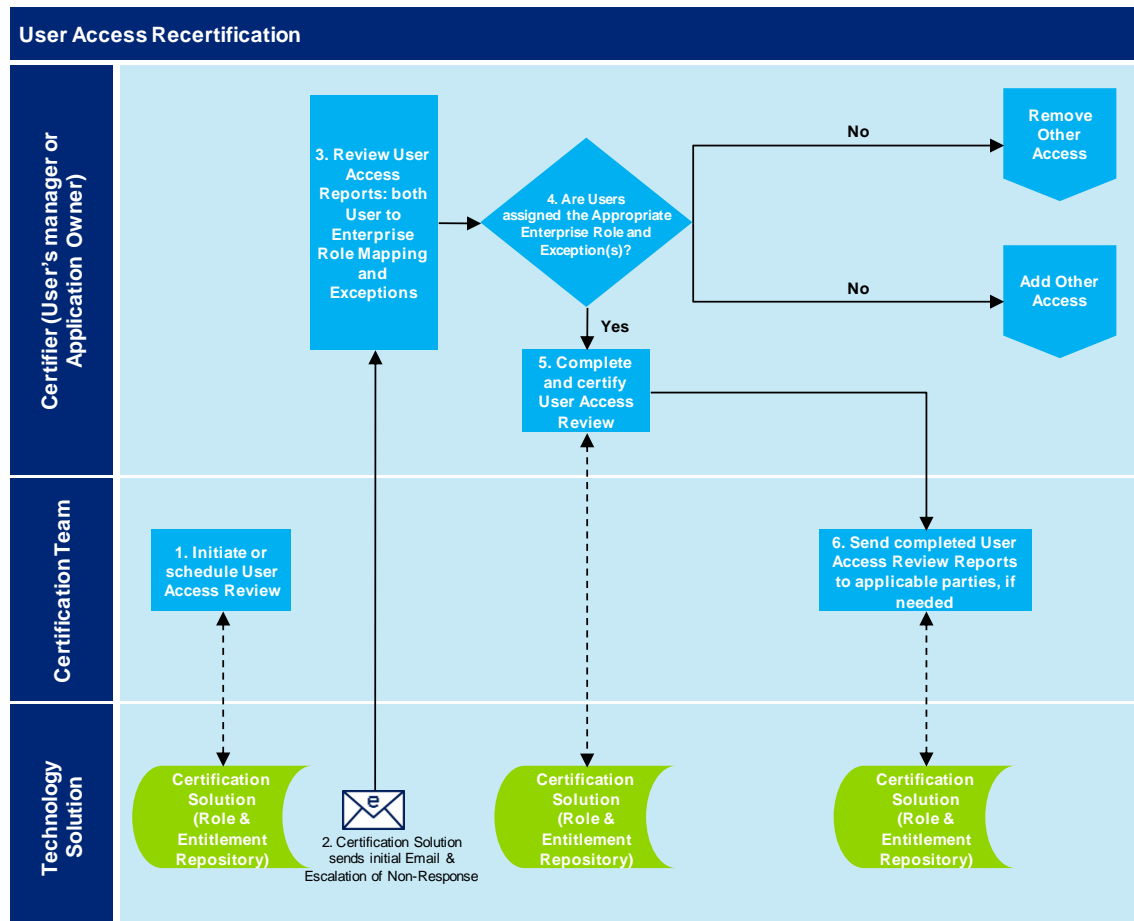


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Figure 6.9-205. User Recertification Models.

Deloitte works with DPW to implement the appropriate user recertification process.

Additionally, we currently assist DPW to define the requirements, design and implementation of user recertification processes that satisfy DPW's recertification requirements. For example, Figure 6.9-206 depicts a process to recertify the roles provided to the user.



PA_DPW-2068

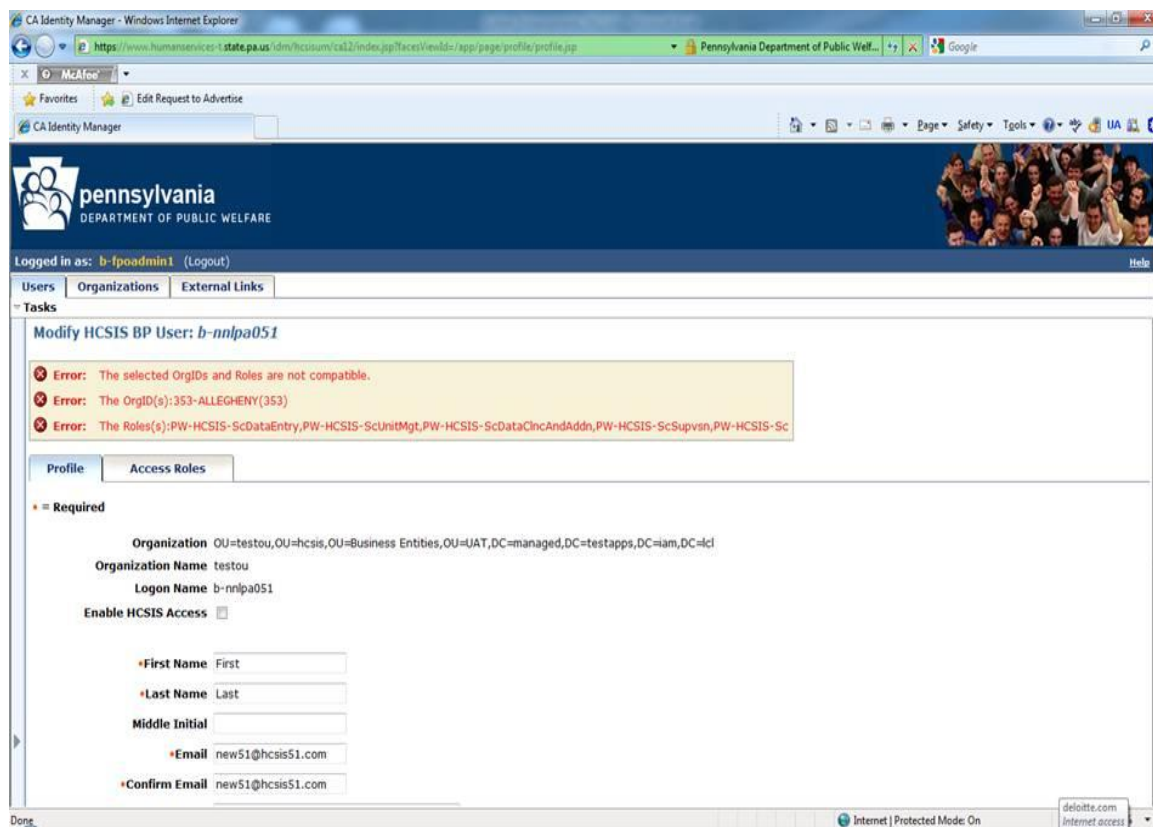
Figure 6.9-206. Sample User Access Recertification Process.

Deloitte assists DPW to define the requirements, design and implementation of user recertification processes.

Conduct Automated Testing of User Privileges Based on Business Requirements

Segregation of Duties (SOD) policies provides the ability to exclude users from having access rights that create a business conflict. For example, a user with a clerical role in a CAO cannot enter benefits payment information and approve the same with the role of a supervisor. Upon assigning or requesting access, SOD policies can detect and prevent access violations from occurring.

DPW performs limited SOD verification for limited applications at the application role level. CA Identity Manager stores and enforces the SOD policy. Figure 6.9-207 below depicts a role violation scenario during the creation of a new user.

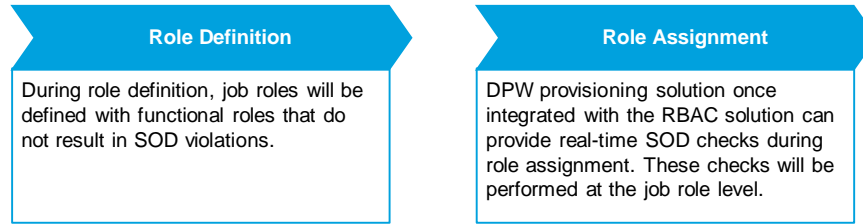


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Figure 6.9-207. Role Violation Detection for HCSIS Application.

DPW performs limited SOD verification at the application role level, using CA Identity Manager.

As discussed earlier in the section, DPW's RBAC approach is shifting towards using enterprise roles (using job function and functional roles). We further enhance SOD capabilities using the enterprise role model. Our approach involves identifying SOD violations in two instances as show in the Figure 6.9-208 below.



PA_DPW-2067

Figure 6.9-208. Identifying SOD Violations.

Deloitte assists DPW to further enhance SOD capabilities using the enterprise RBAC model.

We support DPW in identifying these SOD policies/rules during role definition and configuring the provisioning and RBAC solutions to enforce these checks during role assignment.

Security – Automate User Provisioning

IV

Page
IV-390

RFP Reference: Direct Technical Support Overview

Security – Automate User Provisioning

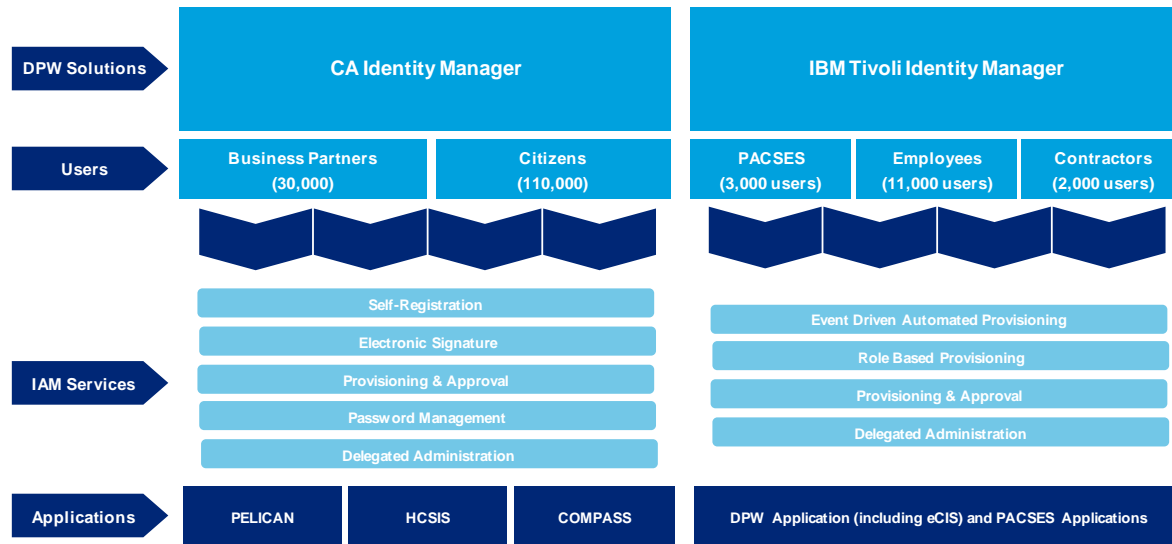
- Assess existing integrated identity management and provisioning solution to enable the potential to automate the creation, modification, and deletion of user identities and their access and entitlements to range of DPW's enterprise systems, from mainframe to web applications. Design and implement standard processes for On-boarding, Transfer, Periodic Access Review, and Off-boarding of all DPW employees. Design and implement discretionary or request driven access process flow for Functional Roles (for DPW employees). Define a process to periodically audit provisioning policies. Identify technical resources (provisioning targets) that will leverage the IBM TIM Provisioning solution. Define use cases and policies to be enforced by the TIM Provisioning solution. Define procedures for periodic user access reviews. Enhance self-service password services using GINA technology. Design and implement eSignature based MD205.34 user agreement collection process. Provide ongoing support for the TIM Infrastructure.
- Support the Generic Self -registration service and password Services (Implementation and Rollout).
- Implement the generic self-registration service to provide user account registration features for use by applications across the DPW.

We support DPW's mission of expanding the footprint of automated user provisioning thereby providing its users with secure and efficient methods for granting access to the Department's applications.

DPW has a highly complex provisioning landscape that supports employees, contractors, business partners and citizens. DPW also supports a large number of applications. Figure 6.9-209 provides an overview of DPW's provisioning landscape and the services that are offered currently by ITIM (IBM Tivoli Identity Manager) and CA Identity Manager IAM solutions.

Have you
heard? 

As one of the largest footprints in the Commonwealth, DPW's identity and access management solutions supports over 30,000 business partners, 110,000 citizens and over 16,000 DPW employees and contractors.



PA_DPW-2070

Figure 6.9-209. DPW's User Provisioning Landscape.

Deloitte supports DPW's mission for productivity improvements and efficiency through the automation of user provisioning.

We provide below our understanding of DPW's application characteristics for Automated User Provisioning in Figure 6.9-210.

Applications	Deloitte's Understanding of DPW Applications Helps in Automating IAM User Provisioning
iCIS	<p>CIS, IEVS and TPL ("CIS Mainframe")</p> <ul style="list-style-type: none"> Requires appropriate integration of the Mainframe user management with CA Identity Manager for user provisioning <p>eCIS</p> <ul style="list-style-type: none"> eCIS requires efficient synchronization between the application based Fine Grained Access Controls and SiteMinder provided Coarse Grained Access (page level/Role based) leaving no room for error eCIS requires business user maintenance in addition to application user maintenance <p>COMPASS</p> <ul style="list-style-type: none"> COMPASS requires community partner delegated administration, user self registration and password self-service managed through CA Identity Manager for more than 110,000 Citizen users, Community Partners (Business Partners) and Commonwealth staff COMPASS requires user self-service – user self password management and e-signature based user acknowledgement collection
HCSIS	<ul style="list-style-type: none"> HCSIS Business partners require CA Identity Manager to perform delegated administration, user self-registration and password self-service
PACSES	<ul style="list-style-type: none"> PACSES requires PACSES End-User Initiated Registration self services
PELICAN	<ul style="list-style-type: none"> PELICAN needs business partner user management by delegated administrators, user self-registration (Provider Self Service) and password self service using CA Identity Manager
Child Welfare	<ul style="list-style-type: none"> Child Welfare requires self-service – user self-registration service, user self-password management and e-signature based user acknowledgement collection



Applications	Deloitte's Understanding of DPW Applications Helps in Automating IAM User Provisioning
Enterprise Services	<ul style="list-style-type: none"> Enterprise Services require protection using CA SOA Security Manager, integrated with WebMethods services
Promise	<ul style="list-style-type: none"> Promise requires self-service – user self-registration service, user self-password management and e-signature based user acknowledgement collection
Consumer Directive Module (CDM)	<ul style="list-style-type: none"> CDM requires self-service – user self-registration service, user self-password management and e-signature based user acknowledgement collection
AdoptPAKids	<ul style="list-style-type: none"> AdoptPAKids requires user self-service – user self-registration service, user self-password management and e-signature based user acknowledgement collection

Figure 6.9-210. Our Understanding of DPW Applications to Provide Automated User Provisioning.

Our User Provisioning Implementation Experience at DPW. Deloitte has assisted DPW in realizing several process improvements in the area of user provisioning by focusing on business benefits and configuring the appropriate solutions to achieve those benefits.

Deloitte's Activities for User Provisioning	Technology Used
<p>Defined and implemented over 10 self service processes for Business Partners access to PELICAN, COMPASS and HCSIS applications. These processes include:</p> <ul style="list-style-type: none"> Electronic registration by Business Partner Organizations (self-service by Representatives) Electronic registration by Business Partner Users (Self-service) E-signature of Data Release Agreement and User Agreement Request based provisioning – Add or Modify Access (Self-service) Reset password (Self-service, Delegated Administrator) Retrieve user ID (Self-service) Workflow based approvals by Program Office or Delegated Administrator Delegated Administration model Deactivate/Remove Access 	CA Identity Manager
<p>Defined and implemented self registration processes for Citizen access to the COMPASS application. These processes include:</p> <ul style="list-style-type: none"> Registration by end-user (Self-service) Reset password (Self-service, Delegated Administrator) 	CA Identity Manager



Deloitte's Activities for User Provisioning	Technology Used
<p>Defined provisioning processes for users requiring access to PACSES applications, including BCSES, DRS, PACSETI, OCSE, SCDU and Project Staff users. These processes include:</p> <ul style="list-style-type: none"> • Registration by End-User (Self-service) • Registration by Delegated Administrator • Request Based Provisioning – Add or Modify Access (Self-service) • Request Based Provisioning – Disable or Remove Access (Self-service) • Approval, Reminder and Escalation • Change Network Password (GINA and Self-service) • Change Mainframe Password (GINA and Self-service) • Name Change • Transfer • Separation Process for DRS Users 	ITIM
<p>Defined automated provisioning processes for DPW employees and non-employees. These processes include:</p> <ul style="list-style-type: none"> • New hire process • Job transfer process • Name change process • Separation process • Leave of absence process 	ITIM

Figure 6.9-211. DPW's User Provisioning Accomplishments.

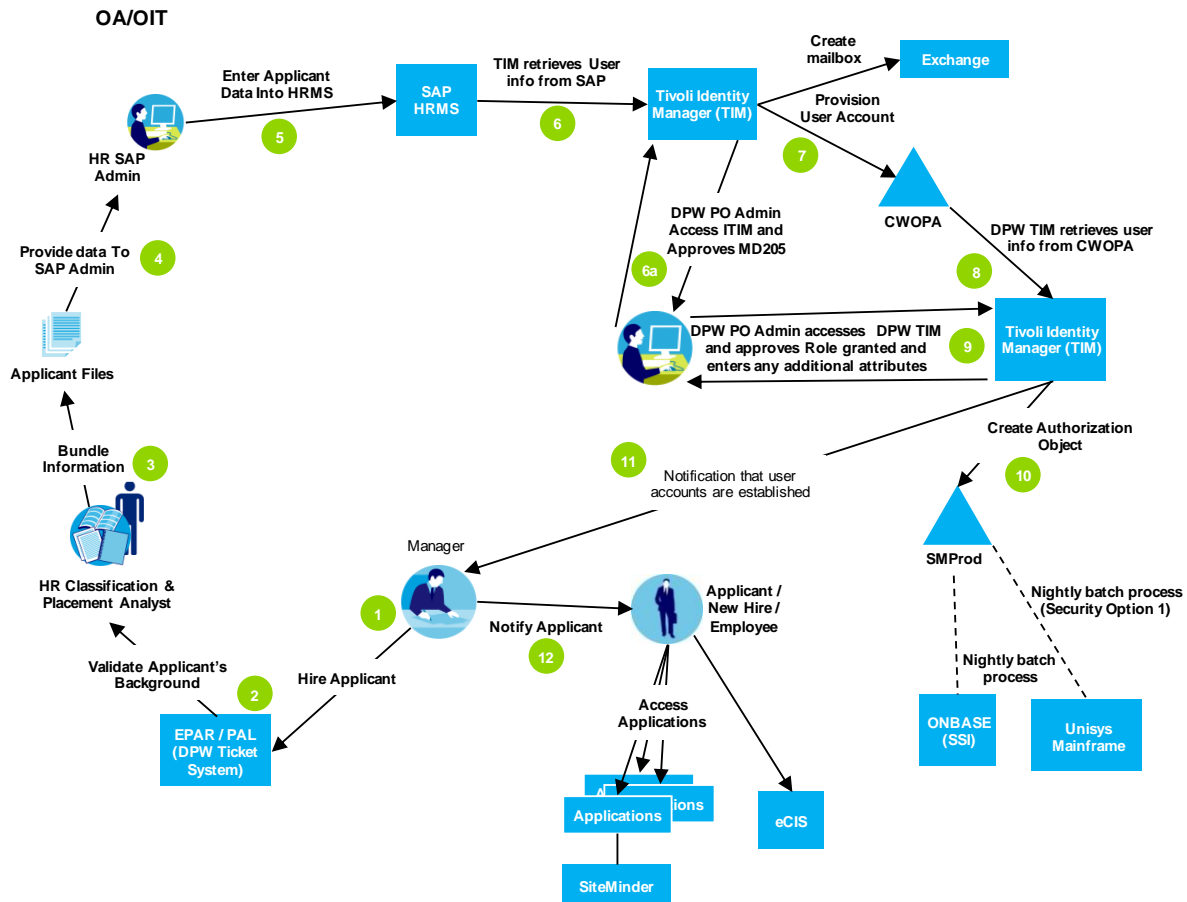
Automated User Provisioning Process

Automated user provisioning refers to systematically and securely providing users with access to business applications thereby reducing manual efforts required during the process.

Automated provisioning offers direct business benefits which include increase in operational efficiency, reduction of manual provisioning costs and improvement of end-user productivity. For example, as shown in the Figure 6.9-212 below, an automated provisioning request can be triggered using self-registration or from a data source such as a SAP Human Resources Management System (HRMS). This request uses a workflow based approach to provide the necessary access.

We use a business focused approach in developing use cases for automated provisioning that provides DPW with the information required for selection and prioritization of the use cases.

We realize that successfully enabling processes, controls, and technologies requires the integration of various DPW IAM systems and may require additional integration with IAM systems of other agencies. For example, the DPW new hire process shown in Figure 6.9-213 depicts the endpoints of the user new hire on boarding process.



PA_DPW-2075

Figure 6.9-213. OA/OIT and DPW ITIM Integration.

Deloitte assists DPW to automate user provisioning process for employees and contractors using ITIM.

During the **Requirements Gathering and Design Phases**, we consider integration options to provide DPW with a solution that can leverage the benefits of integration to meet the provisioning objectives. In addition, we identify DPW’s enterprise applications for which provisioning can be automated using Commonwealth standard tool IBM Tivoli Identity Manager (ITIM). As we assist DPW to integrate DPW’s ITIM user provisioning solution with more applications, it is necessary to manage the provisioning policies configured within ITIM for each application. We establish the periodic analysis process to monitor compliance with DPW user entitlements rules. We generate periodic reports of provisioning and access policies from ITIM and work with DPW CISO to recertify the implemented provisioning policies.



Privileged User Account Management. Another aspect of provisioning design must address the management life cycle of accounts with elevated privileges. For example, DPW uses privileged accounts to authenticate to a web service. The sensitivity of these accounts requires more stringent account management processes with approvals, certifications and monitoring. We assist DPW in managing these identities by leveraging the ITIM infrastructure used for DPW employees and contractors. We define business processes specific to privileged account management and assist DPW with the design and implementation of these processes.

Figure 6.9-214 below provides the list of initiatives that we support for the enhancement of DPW’s automated user provisioning process. We will continue to work with DPW to further refine these initiatives to meet the business objectives.

Automation Opportunity by IAM Service Area	Deloitte’s Activities Promote IAM User Provisioning Automation
Identity Administration	<ul style="list-style-type: none"> • Extend the existing ITIM solution to provide automated provisioning to the range of DPW's enterprise systems, from mainframe to web applications. • Develop use cases, and design the ITIM solution to support discretionary or request driven access process using a combination of job and functional roles • Define a process to periodically audit provisioning policies. • Identify opportunities of technical integration of the ITIM solution with other DPW applications • Define procedures for periodic user access reviews. • Design and implement an enterprise wide solution to collect e-Signature of new and existing DPW users on MD205.34 – Commonwealth Acceptable Use Policy. • Extend the e-Signature solution for MD205.34 to receive acknowledgement from users on additional DPW user agreements such as MD245.18 IT Administrator Acceptable Use, Auditing and Monitoring, Incident Notification, and Response Policies and Procedures. • Leverage SIEM to integrate the audit report. Automate the generation of the audit report and submit to BIS.
Privileged Account Management	<ul style="list-style-type: none"> • Develop and implement processes to manage the life cycle of privileged accounts (system or service accounts).
Password Management	<ul style="list-style-type: none"> • Conduct an assessment for extending the DPW self-service password services for desktop based Graphical Identification and Authentication (GINA technology). • Design and implement a password self-service solution to support desktop based GINA technology. • Assist BIS for the enterprise wide implementation of generic user self-registration service and password self-services including business partner users.



Automation Opportunity by IAM Service Area	Deloitte's Activities Promote IAM User Provisioning Automation
Access Certification	<ul style="list-style-type: none"> • Develop a certification processes that offers event based certifications of user access privileges. • Integrate access certification and provisioning to provide a “closed loop” certification process that processes certification actions.
RBAC	<ul style="list-style-type: none"> • Conduct an analysis for extending role based provisioning to other DPW Program Offices. • Perform role mining and development for selected DPW Program Offices and configure the provisioning solution to use roles for requesting access.

Figure 6.9-214. Proposed Initiatives to Enhance Automated Provisioning at DPW.

We will continue to work with DPW to achieve automated provisioning for employees, contractors, and PACSES business partners by performing the following activities:

- Implement automated provisioning processes using ITIM for DPW employees and contractors for over 18,000 users
- Implement automated provisioning for over 3000 users to the approximately 40 PACSES applications
- Implement the process to capture e-signatures of management directives for the 18,000 DPW users

Enhance User Self-Service

We provide enhancements to DPW’s catalog of user self-services through the following services:

- User self password management
- Electronic Signature (E-Signature) based user acknowledgement collection
- PACSES End-User Initiated Registration.

User Self Password Management. We assist DPW to design and implement user self password management using Graphical Identification and Authentication (GINA) technology and ITIM. Figure 6.9-215 illustrates our proposed “user self service reset password” process using GINA technology and ITIM for PACSES business partners, DPW employees and contractors.

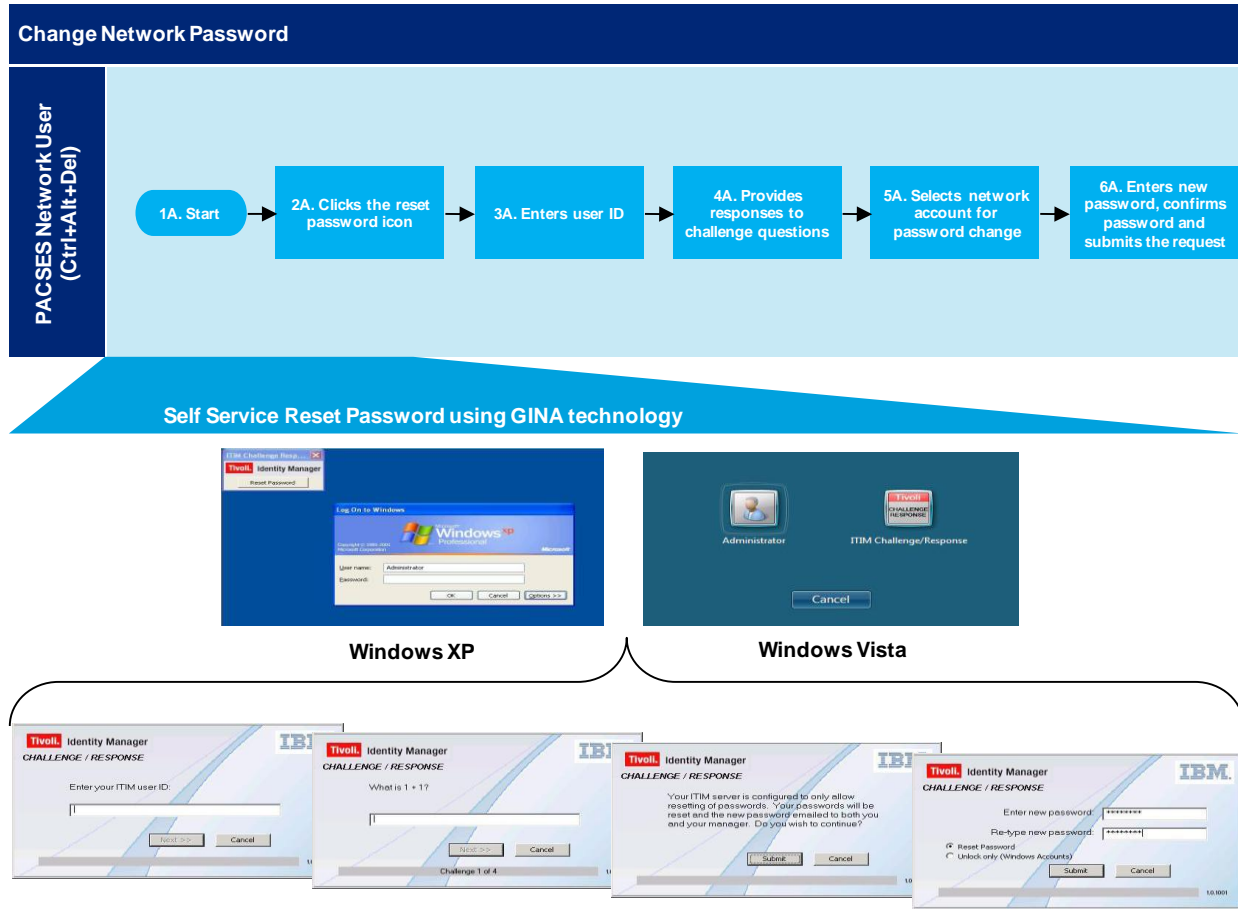
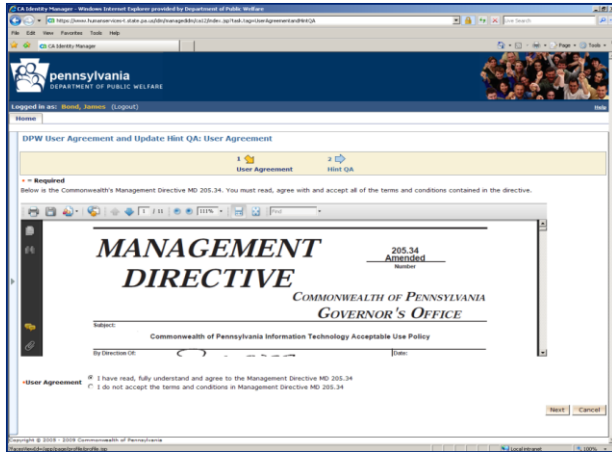
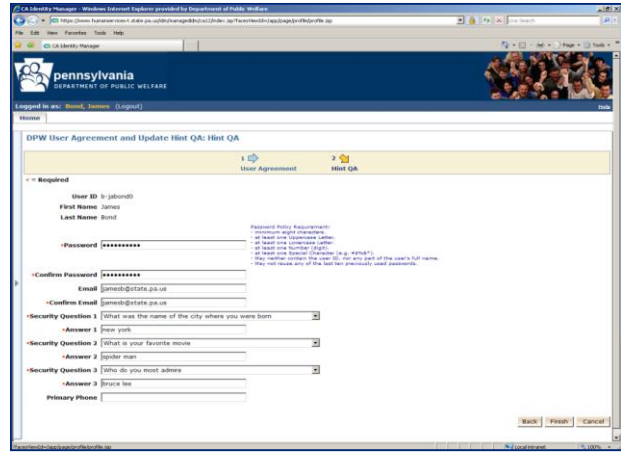


Figure 6.9-215. Password Services using ITIM and GINA Technology.
Deloitte assists DPW to design user self-password management services for PACSES business partners using IBM Tivoli Identity Manager. PA_DPW-2071

E-Signature Based User Acknowledgement Collection. We are assisting DPW to design and implement user self-service to collect E-Signature Based Acknowledgements user agreements. This helps reduce the effort involved paper based collection process. Figure 6.9-216 illustrates the process to collect electronic signatures of user agreements for Commonwealth Acceptable Use Policy Agreement (Commonwealth Management Directive MD 205.34) acknowledgement collection when a new business partner user registers to DPW applications.



End-user agreement during self registration



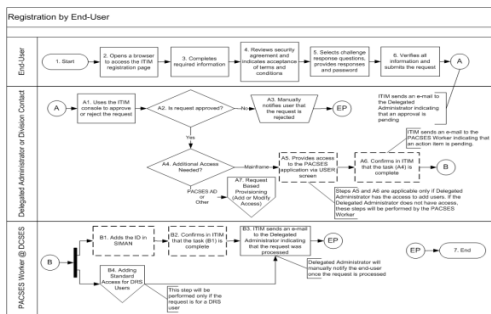
Self-registration required information

PA_DPW-2072

Figure 6.9-216. E-Signature Acknowledgement Collection for Commonwealth Management Directive MD-205.34.

Deloitte assists DPW to design and implement user-self service to collect E-Signature based acknowledgements for user agreements, eliminating a paper based process.

PACSES End-User Initiated Registration. We assist DPW to design and implement user self-service for PACSES end-user self registration, illustrated through Figure 6.9-217.



Benefits

Self-Service Registration Process for PACSES

- End-user reviews and signs the security agreements during the registration process and prior to receiving access.
- End-user selects challenge questions, provides responses and sets password during the registration process. Therefore, once the user receives confirmation that the request was processed, the user can use the selected passwords to access the requested application(s).
- The process provides end-to-end audit trail from registration to the standard access received after successful registration and approval. ITIM system will provide the ability to log automated and manual actions (approvals, tasks, etc) taken in the process.
- Improves the quality of data entered with validation of data entered during registration.
- The process provides automated notification of events.

PA_DPW-2074

Figure 6.9-217. Proposed PACSES End-User Initiated User Self-Registration Process.

Deloitte assists DPW to design and implement the PACSES end-user self registration process.



Security – IAM and Infrastructure Enhancements

IV	Page IV-390	RFP Reference: Direct Technical Support Overview
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Security – IAM Infrastructure and Enhancements (IBM Tivoli Identity Manager, CA Identity Manager, CA Siteminder, Radiant Logic VDS and CA SOA Security Manager)

- Provide ongoing IAM infrastructure (IBM Tivoli Identity Manager, CA Identity Manager, CA Siteminder, Radiant Logic VDS and CA SOA Security Manager) support and enhancement services i.e. defining the security approach, architecture direction, application integration standards and ongoing maintenance activities. Implement identity-based web services security solution to secure access to the DPW web services by inspecting the security information contained in the XML documents submitted by web service consumers.

We recognize the significance of DPW’s requirement for providing support to IAM infrastructure and enhancements. As DPW continues to enhance its IAM services, it is necessary to maintain a technical infrastructure that can support the availability of the new offerings. We provide DPW with the support and enhancement services to design, architect and maintain an IAM solution that can host new capabilities introduced in the solution. Based on DPW’s priorities, we divide our effort to support and enhance IAM infrastructure into:

Have you heard?

DPW’s CA SiteMinder implementation supports over 70,000 authentication and 5,000,000 authorization requests per day.

- Support IAM infrastructure enhancements
- Implement Identity-based web services security solution (CA SOA Security Manager).

Figure 6.9-218 describes our understanding of DPW application characteristics to provide IAM support and enhancements.

Applications	Deloitte’s Understanding of DPW Applications Helps in AM infrastructure support and enhancements
iCIS	CIS, IEVS and TPL (“CIS Mainframe”) <ul style="list-style-type: none"> • Requires appropriate integration of the Mainframe user management with CA Identity Manager for user provisioning • CIS Unisys Mainframe requires maintaining an integrated user authentication with Commonwealth (CWOPA) Active Directory (AD).
	eCIS <ul style="list-style-type: none"> • eCIS requires an IAM infrastructure to support more than 395,000 user authentications and more than 50 million user authorizations on a monthly basis • eCIS uses web services protected with SOA security
	COMPASS <ul style="list-style-type: none"> • COMPASS requires community partner delegated administration, user self registration and password self-service managed through CA Identity Manager for more than 110,000 Citizen users, Community Partners (Business Partners) and Commonwealth staff

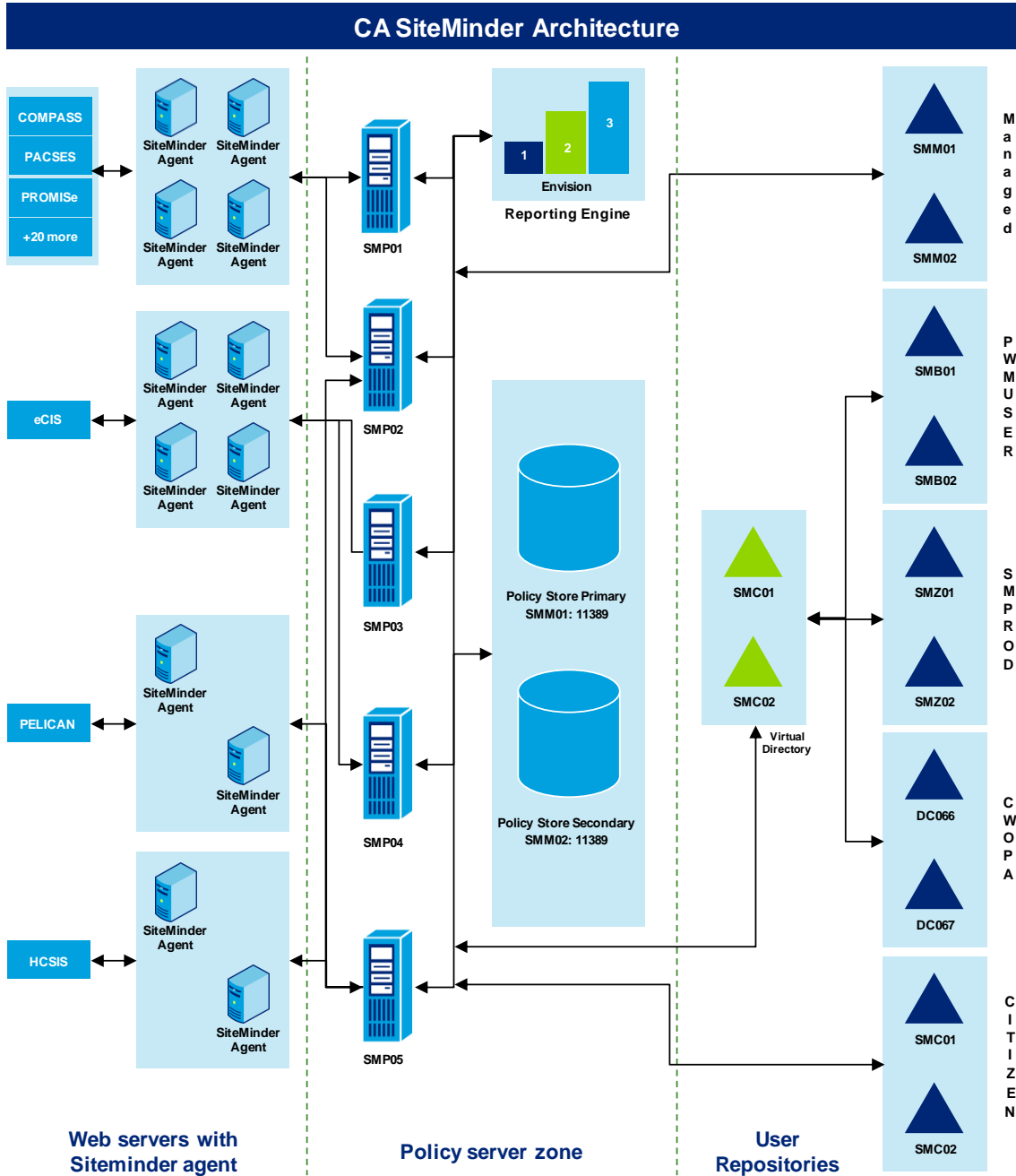


Applications	Deloitte's Understanding of DPW Applications Helps in AM infrastructure support and enhancements
HCSIS	<ul style="list-style-type: none"> • HCSIS requires an IAM infrastructure to supports more than 426,362 user authentications and more than 19 million user authorizations on a monthly basis with over 230 user roles • eCIS uses web services protected with SOA security
PACSES	<ul style="list-style-type: none"> • PACSES requires DRS End-User Initiated Registration self services using ITIM • PACSES Home Page (PHP) application uses BEA Aqualogic Platform and hosted on the OIT's web servers. DPW IAM infrastructure establishes SSO with this externally (non-DPW) hosted Web site and performs user authentication/authorization based on CWOPA and PACSES domains.
PELICAN	<ul style="list-style-type: none"> • Maintains DPW IAM infrastructure that supports more than 546,070 user authentications, more than 36 million user authorizations on a monthly basis with over a 100 user roles • PELICAN requires CA SOA security manager to secure it is web services • PELICAN needs business partner user management by delegated administrators, user self-registration (Provider Self Service) and password self service using CA Identity Manager
Child Welfare	<ul style="list-style-type: none"> • Child welfare requires self-service – user self-registration service, user self-password management and e-signature based user acknowledgement collection.
Enterprise Services	<ul style="list-style-type: none"> • Enterprise Services require protection using CA SOA Security Manager, integrated with WebMethods services
Promise	<ul style="list-style-type: none"> • Promise requires self-service – user self-registration service, user self-password management and e-signature based user acknowledgement collection.
Consumer Directive Module (CDM)	<ul style="list-style-type: none"> • CDM requires self-service – user self-registration service, user self-password management and e-signature based user acknowledgement collection.
AdoptPAKids	<ul style="list-style-type: none"> • AdoptPAKids requires user self-service – user self-registration service, user self-password management and e-signature based user acknowledgement collection.

Figure 6.9-218. Our Understanding of DPW Applications to Provide IAM Support and Enhancements.

Support IAM Infrastructure Enhancements

We support DPW's architecture with its various IAM solutions to provide user access management services to over 200,000 users across 27 systems. For example, we assisted DPW with the design and implementation of the CA SiteMinder access management solution. DPW's CA SiteMinder implementation supports high volume of over 70,000 user authentications and five million authorization requests per day. We have illustrated our understanding of the complex DPW's production architecture for CA SiteMinder in Figure 6.9-219 below.



PA_DPW-2082

Figure 6.9-219. DPW CA SiteMinder Production Architecture.

DPW IAM production infrastructure supports over 200,000 users performing more than five million authorizations every day.

As DPW introduces new capabilities, we continue to assess these requirements and use our experience and understanding of the solutions to determine if the underlying technical architecture and infrastructure can support these capabilities. We document the results from our assessment our assessment and when necessary recommend changes to the infrastructure based on factual data and metrics gathered during the different stages of the implementation prior to production release.



Figure 6.9-220 describes our IAM Infrastructure Support and Enhancement Services for DPW.

IAM Infrastructure Support & Enhancement Service	Deloitte's Activities support IAM infrastructure enhancements
<p>Define security approach</p>	<ul style="list-style-type: none"> • Design and develop IAM solutions that follow leading industry practices and support compliance with the State and Federal IT regulations • Collaborate with other COPA agencies like DLI and PennDOT to provide an integrated solution where required • Implement efficient self and delegated user management processes using CA Identity Manager and IBM Tivoli Identity Manager • Implement coarse and fine grained access control using access management tools like CA Site Minder and CA SOA Security Manager and application level FGAC module • Adopt RBAC and defined role life cycle management processes based on leading industry practices • Confirm SSO between applications and implemented Desktop SSO for internal network users. • Provide self password management capability to efficient password management and reduce helpdesk calls. • Improve compliance by defining a security approach towards user and access recertification that utilizes a combination of periodic, event based and risk based certification models. • Improve compliance by outlining a security approach to identify, manage and resolve SOD violations using the capabilities of the RBAC/SOD solution. • Enhance web services security by enhancing SOA security with “identity-based” web-services (identity based auditing). • Improve compliance and enhance security by defining a security approach to manage the life cycle of privileged (elevated access) IDs.



IAM Infrastructure Support & Enhancement Service	Deloitte's Activities support IAM infrastructure enhancements
<p>Architecture direction</p>	<ul style="list-style-type: none"> • Maintain high availability of the applications by configuring failover and load balanced architecture for CA Site Minder and CA SOA Security Manager • Implement Radiant Logic Virtual Directory Server (VDS) to provide a combined view of the authentication and authorization information of employees • Design enterprise MANAGED directory for Business Partners to confirm efficient identity management of business partners across agencies and across applications • Develop a generic self registration application for business partners to reduce the usage of high maintenance application specific implementations of CA Identity Manager TEWS (Task Enabled Web Services) • Design a solution with CA Identity Manager that supports high availability, through a load balanced and failover configuration. • Streamline role life cycle management, enhance user experience and improve compliance using role based certification through the design and implementation of RBAC solution. • Upgrade virtual directory environment from VDS Proxy to Context to provide a database view of user information to the consuming application to simplify the integration and impact of VDS configuration changes on the integrate applications. • Extend ITIM integration with other DPW and PACSES applications to support automated and self-service provisioning models resulting in increased compliance and operational efficiency.
<p>Application integration standards</p>	<ul style="list-style-type: none"> • Develop integration to guide developers. Includes guidance on role definition and fine/coarse grained authorization • Define and developed standards based web services architecture to secure communication between applications (consumers) and the web services. • Develop application integration standards to simplify and secure application integration with the user and access recertification solution. For example, entitlement glossary definition, entitlement import approach and format, etc. • Develop application integration standards to simplify and secure application integration of DPW and PACSES applications with ITIM. For example, baseline connector configuration, security considerations etc. • Enhance web services security by configuring CA SOA SM to support "identity-based" web services security for applications that need to maintain the user's security context throughout the web services chain for authentication and authorization.



IAM Infrastructure Support & Enhancement Service	Deloitte's Activities support IAM infrastructure enhancements
<p>On-going maintenance activities</p>	<ul style="list-style-type: none"> • Migration of over 30,000 business partner users from agency specific business partner directory to enterprise directory. • Support application teams during the security design for their application and assist with the migration of the integration with CA SiteMinder through go live and provide post production support. • Plan and support the upgrade of the CA SiteMinder from release R6 to release R12 prior to end of support in year 2011. Release 12 provides DPW with additional features such as migration tools that simplify the migration process. • Plan and support the upgrade of CA Identity Manager from release R8-SP2 to release R12 prior to end of support in year 2011. • Support and maintain the ITIM implementation and its integration with the various DPW and PACSES applications. Streamline the application integration process with ITIM and provide troubleshooting skill for user provisioning issues.

Figure 6.9-220. Deloitte's IAM Infrastructure Support and Enhancement Services Provided to DPW.

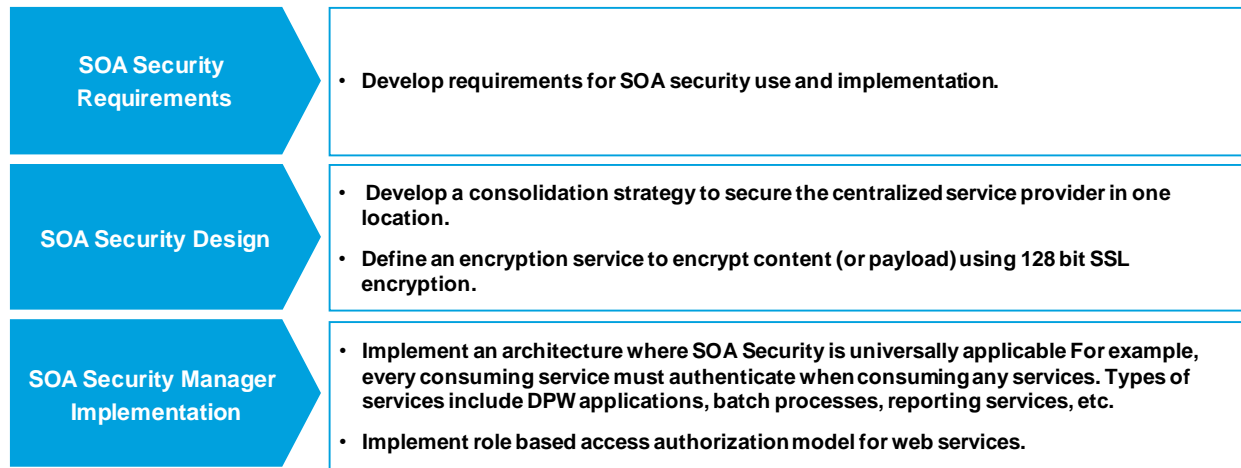
Implement Identity-based Web Services Security Solution (CA SOA Security Manager)

Identity-based web service refers to the scenario where the web-service provider trusts the consumer's identity thereby providing end-to-end security. For example, a user might want to retrieve their benefits information from the benefits application. The application may invoke a web services call to the file server to retrieve the user's information from the file server that houses this information. In this situation, the provider (web service that retrieves information from the file server) may need to authenticate and authorize the user prior to providing the requested information. This would require "identity-based" web services solution to secure access.

We support DPW's objective to secure web services through DPW's implementation of the CA SOA Security Manager; DPW protects over 50 web services currently using the SOA Security Manager.

The SOA Security Manager Architecture

We understand the importance of security services in the DPW infrastructure. We have hands-on experience in the complex DPW SOA Security Manager environment because of our involvement in the requirements, design and implementation of the SOA Security Manager solution. Figure 6.9-221 illustrates activities we performed working with the Department.



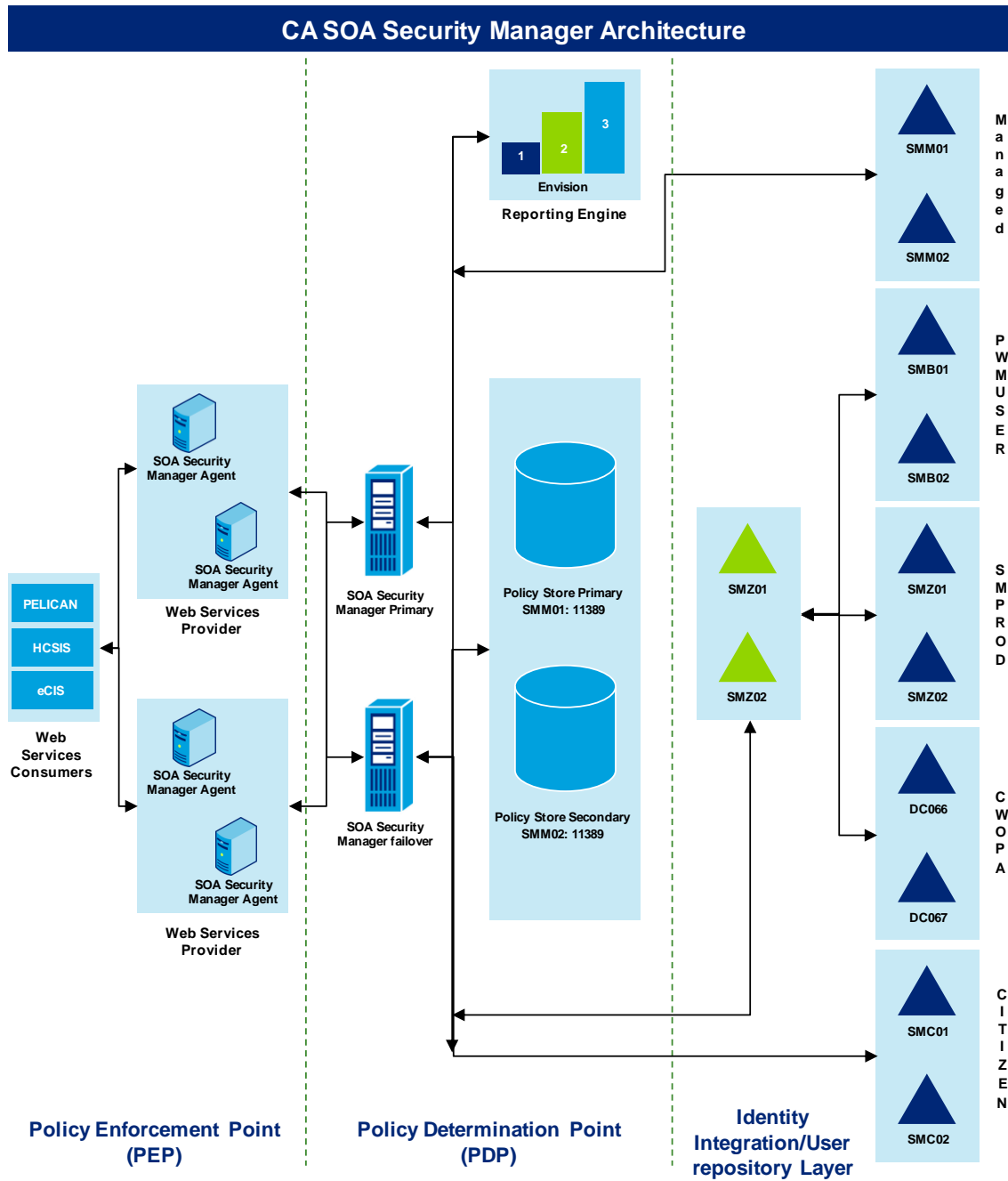
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Figure 6.9-221. Our Services Pertaining to Design and Implementation of SOA Security Manager.
DPW's SOA Security Manager protects over 50 web services serving DPW applications.

Through assessment of the current state requirements, we developed the architecture for secure SOA services and integrated it with the enterprise IAM solution. This architecture follows SOA security and privacy principles and comprises of the following key modules:

- **Authentication.** CA SOA Security Manager plug-in provides security token and WS authentication models.
- **Authorization.** CA SiteMinder policy engine provides SOA access control (Role, Rule and Attribute based authorizations).
- **User Management.** CA Identity Manager provides user administration functionalities, whereas account and password policies are implemented at the directory level.
- **Enterprise User Repositories.** Multiple user repositories support user bases such as Employees, Contractors, Business Partners and Citizens.
- **Audit Logging.** CA SiteMinder audit logging feature logs user authentication and authorization events.

Figure 6.9-222 below illustrates the DPW's CA SOA architecture.



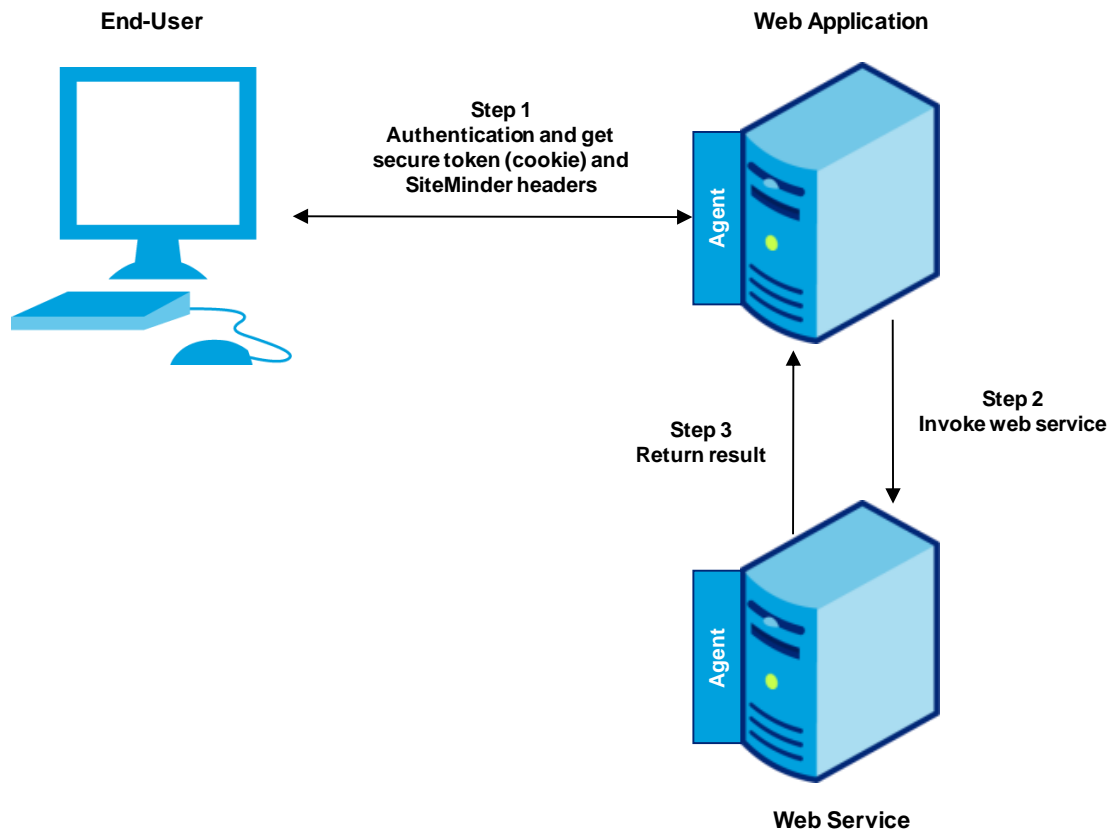
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Figure 6.9-222. DPW Production SOA Architecture.

DPW's secure SOA implementation provides Authentication, Authorization, User Management, Enterprise User Repositories and Audit Logging.

The design of the CA SOA architecture supports the following authentication scenarios:

Single Sign-On (SSO) Between Web Application and Chained Web Services. In this scenario, depicted in Figure 6.9-223, a web service consumer (an application) invokes a service to a web service provider on behalf of an end user. The “Identity Token” of the end user propagates to the web services provider for seamless authentication and authorization, providing SSO.



PA_DPW-2079

Figure 6.9-223. SSO Between Web Application and Chained Web Services.

DPW's secure SOA implementation provides seamless user authentication and authorization through propagation of “Identity Token” to the web services provider.

Using a Secure Token Service (STS). As we illustrate in Figure 6.9-224, the consumer application uses the Secured Token Service (STS) to generate an Identity token when an end-user challenge/response cannot generate an Identity Token. The solution provides SSO capability across end users, web service consumers, Web Service providers and Enterprise Service Bus (ESB).

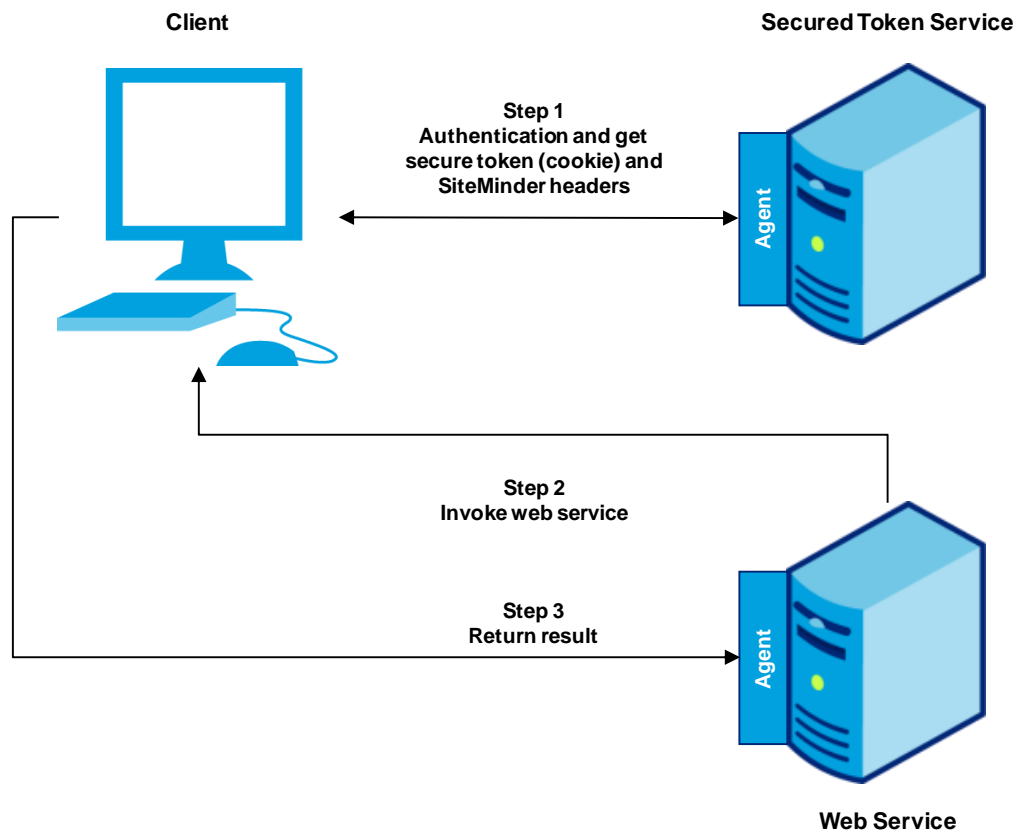


Figure 6.9-224. Steps Involved in Using a Secure Token Service.

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DPW's secure SOA implementation uses Secure Token Service (STS) to provides Single Sign-On capability for end users, web service consumers, web Service providers and Enterprise Service Bus (ESB).

These authentication models described **integrate with the WebMethods enterprise service bus** to direct the web services call. As the web services security product does not integrate with WebMethods out of the box, we configured a reverse proxy server to proxy the WebMethods call. We assisted DPW to implement SOA security at the reverse proxy level which authenticates and authorizes each service call using one of the implementation models described above.

We understand the importance of the "identity-based" web services security approach and we enhanced the DPW SOA Identity Manager to implement a standards based model to trust and maintain the user's security context required for access using web services.

We use the capabilities of CA SOA to further enhance the web services authentication model. CA SOA supports this through trust relationships which are enforced and enabled by standards based tokens embedded in standardized message formats. CA SOA and its agents facilitate this by acting as an intermediary between the consumer and the provider by issuing and verifying the token. Additionally, CA SOA can support an authorization model that supports fine-grained authorization.



Security – SIEM RSA envision Support and Enhancements

IV

Page
IV-391

RFP Reference: Direct Technical Support Overview

Security - SIEM RSA enVision Support and Enhancements

- Enhance the RSA enVision implementation by defining processes and procedures to monitor Key Performance Indicators (KPI). Provide support to existing envision implementation. Integrate devices with enVision. Assist with keeping enVision infrastructure up to date with patches, hot fixes, etc.

Deloitte assists DPW in its ongoing efforts to enhance the configuration and management of the Security Incident Event Monitoring (SIEM) system, EMC/RSA enVision. As part of this, we provide the following support activities for SIEM:

- Enhance the RSA enVision implementation by defining processes and procedures to monitor Key Performance Indicators (KPI) by using industry leading practices such as National Institute of Standards and Technology (NIST) guidelines
- Provide support to existing envision implementation, by real time monitoring of SIEM usage, extracting reports, incident response and forensics
- Integrate devices with enVision, by using Deloitte’s SIEM implementation framework
- Assist in software upgrades to DPW SIEM such as patches and hot fixes

Figure 6.9-225 describes our understanding of DPW application characteristics to provide SIEM support and enhancements.

Applications	Deloitte’s Understanding of DPW Applications supports DPW’s SIEM Requirements
iCIS	<p>CIS, IEVS and TPL (“CIS Mainframe”)</p> <ul style="list-style-type: none"> • CIS mainframe audit logs and transaction logs requires integration with SIEM solution, RSA enVision, to identify violation to HIPAA, HITECH, SSA and Internal Revenue Service (IRS 1075) requirements through real-time monitoring and periodic reporting <p>eCIS</p> <ul style="list-style-type: none"> • eCIS application security audit logs are integrated with SIEM solution, RSA enVision to monitor and report violations to SSA security requirements <p>COMPASS</p> <ul style="list-style-type: none"> • COMPASS RIA services are integrated with SIEM to identify security exceptions, violations and respond quickly to security incidents
HCSIS	<ul style="list-style-type: none"> • HCSIS requires an IAM infrastructure to supports more than 426,362 user authentications and more than 19 million user authorizations on a monthly basis with over 230 user roles • Each HCSIS user in the Active Directory requires appropriately synchronized with application users present in the Database (FGA) for unique “HCSIS key”. HCSIS application manages more than 230 application user roles
PACSES	<p>PACSES Mainframe</p> <ul style="list-style-type: none"> • PACSES Mainframe requires to comply with the requirements of HIPAA, SSA and Internal Revenue Service (IRS) 1075 publication • PACSES Mainframe Transaction logs are currently being integrated with DPW SIEM



Applications	Deloitte's Understanding of DPW Applications supports DPW's SIEM Requirements
PELICAN	<ul style="list-style-type: none"> • PELICAN requires application security audit logs to be integrated with DPW SIEM
Child Welfare	<ul style="list-style-type: none"> • Child Welfare application requires reporting and monitoring techniques to meet the requirements of Federal regulations such as Adoption and Foster Care Analysis and Reporting System (AFCARS), HIPAA and HITECH.
Enterprise Services	<ul style="list-style-type: none"> • Enterprise Services audit logs to be integrated with DPW SIEM to monitor for violations to compliance requirements such as HIPAA, SSA and IRS 1075
Promise	<ul style="list-style-type: none"> • Promise application requires integration of application security audit logs with SIEM to monitor violations to regulatory compliance such as HIPAA and IRS 1075.

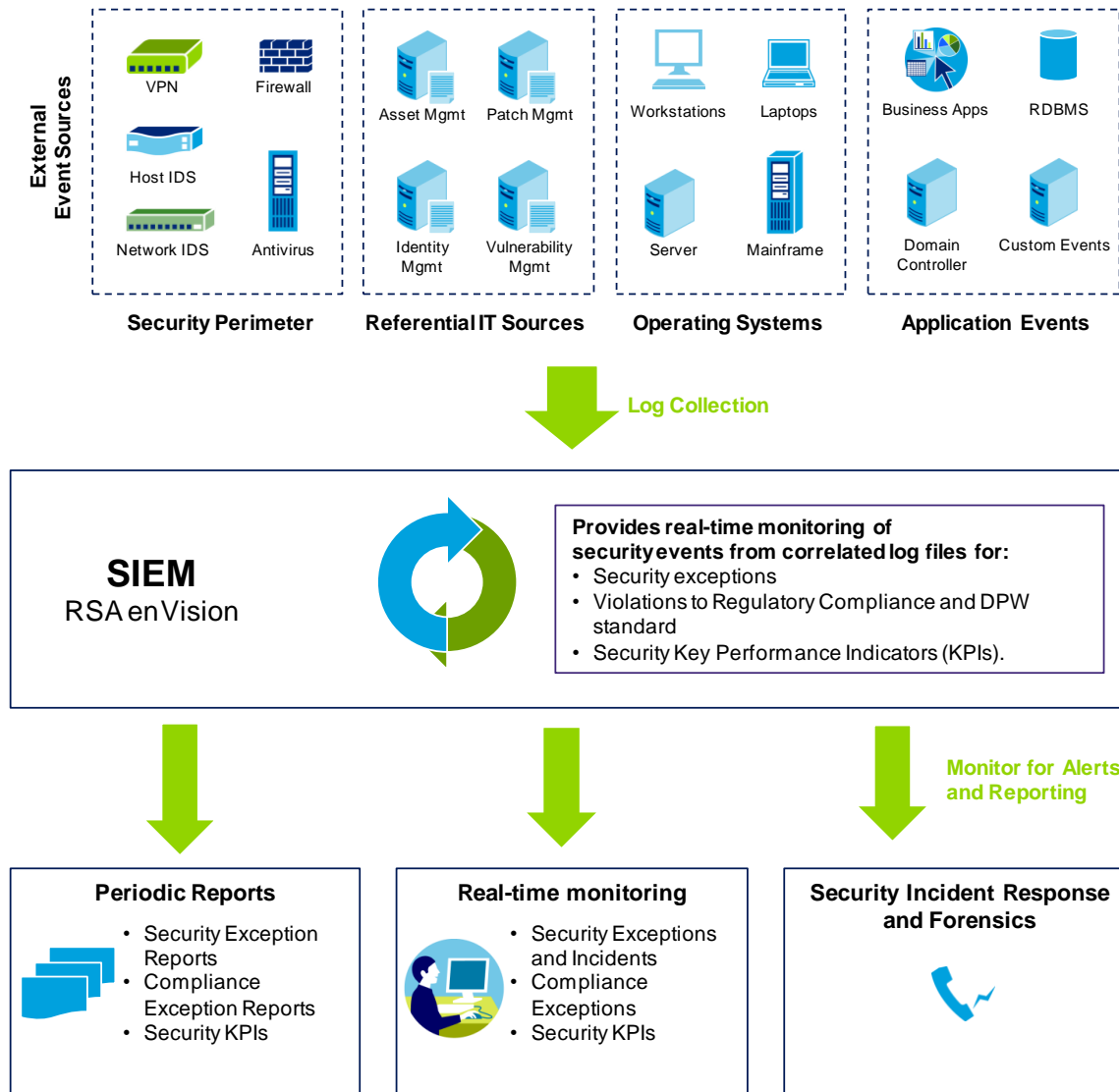
Figure 6.9-225. Our understanding of DPW Applications to provide SIEM support and enhancements.

We understand and support DPW's vision to leverage SIEM as a scalable distributed platform for appropriately aggregating data for central analysis and action that helps to:

- Develop and maintain RSA enVision as a single point for collection of audit logs
- View real-time events, correlate events across device types
- Maintain digital chain of custody with unaltered log data for data retention and forensic requirements
- Help maintain compliance with legal/regulatory requirements for auditing

DPW SIEM system correlates about 15,000 events/sec and the need continues to grow. DPW SIEM system generates periodic reports and real-time alerts for compliance and security exception.

Figure 6.9-226 illustrates a conceptual architecture of the DPW SIEM system. The DPW SIEM system collects audit logs and events from various disparate systems including perimeter security devices, mainframe systems, IAM infrastructure, servers and workstations. SIEM consolidates and correlates this data collected to alert the SIEM administrator for events such as security exceptions and incidents and violations regulatory compliance. DPW SIEM system provides periodic and ad hoc reports to monitor security Key Performance Indicators (KPIs), forensics, real-time monitoring and reporting of security incidents.



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Figure 6.9-226. DPW SIEM Conceptual Architecture.
Deloitte assisted DPW to configure and implement SIEM system, EMC/RSA envisions.

Enhance the RSA enVision Implementation by Defining Processes and Procedures to Monitor Key Performance Indicators (KPI)

Security KPIs provide a measure of performance of DPW security infrastructure components such as IAM systems and perimeter devices based on defined business, functional and technical requirements. KPIs help DPW to define and evaluate how successfully it is progressing towards its long-term and near-term organizational goals.

We assist DPW to define and monitor security KPIs. We use the periodic and the ad hoc reports extracted from the SIEM system to monitor Security KPIs such as the operational metrics of DPW’s IAM systems.



Defining KPIs. We leverage leading industry standards such as National Institute of Standards and Technology (NIST) Performance Measurement Guide for Information Security (NIST 800-55 rev1) for defining KPIs.

KPI Domains. We work with DPW to identify and define KPIs to align the applicable security domains of NIST 800-53 (Recommended Security Controls for Federal Information Systems):

- Access Control
- Audit and Accounting
- Configuration Management
- Identification and Authentication
- Incident Response
- System and Communication Protection
- System and Information Integrity

We integrate the existing KPIs that DPW monitor with their applicable KPI domains. For each KPI identified in the above domains, we work DPW to identify the permissible performance threshold values. These threshold values are determined based on the business, technical and regulatory requirements. For example, the permissible threshold for number of Security Incidents is zero.

Sample Security KPIs created and monitored through the SIEM system for the Access Control domain includes:

- Number of user account lockouts per application/system
- Number of failed user authorizations per application/system
- Number of SiteMinder policy changes.

KPI Dashboard. We assist DPW to extract reports from the DPW SIEM system reporting engine for periodic and real-time reporting. We present the security KPIs (Security KPI Dashboard) during the Monthly Security and Privacy Steering Team meeting. Figure 6.9-227 illustrates a sample Security KPI dashboard.



DPW Security KPI Dashboard

Domain	Key Indicator	Month 1	Month 2	Month 3	Threshold		
Identity and Authentication Access Control	Availability ¹	-100%	99.21%	-100%	< 99%	< 99.8%	> 99.8%
	Change in user base ¹	1.23%	1.46%	-3.2%	+ 10%	+ 5%	+ 3%
	User Authentications ¹	-6.78%	-4.77%	-1.25%	+ 10%	+ 5%	+ 3%
	User Authorizations ¹	-6.75%	-7.78%	8.11%	+ 10%	+ 5%	+ 3%
	Account Lockouts	~1000	~1000	~1000			
	Number of Help Desk Calls (HCSIS)	3,217	3,007	6,005	+ 10%	+ 5%	< 5%
	OMAP Service Requests	1,361	1,096	1,638	+ 10%	+ 5%	< 5%
	IAM ACD Calls	1,650	1,378	2875	?	?	?
	IAM VHD Tickets	449	558	695	?	?	?
Incident Management	Reported security incidents ²	0	0	0	2+	1	0
	External network intrusions ⁴	0	0	0	2+	1	0
Certification, Accreditation and Security Assessment	Identified in Production	0	8	0	1+	N/A	0
	Server Security Patch Compliance	98.08%	94.56%	94.01%	< 80%	80-90%	> 90%
	Desktop Security Patch Compliance	94.72%	91.16%	81.00%	< 80%	80-90%	> 90%
Configuration Management	Firewall rule changes	28	29	34	>30	20-30	<20
	Avg. Time to onboard new user ⁶	35	38	36	?	?	?
	Avg. Time to revoke access ⁶	60	45	52	>45	25-45	<25

Source: 1 – enVision SIEM; 2 – Security Incident Report; 3 – Production Interruption Report; 4 – Audit Reports; 5 – Vulnerability Test Report; 6 – User onboard/exit process.

PA_DPW-1304

Figure 6.9-227. Sample Security KPI Dashboard.

Deloitte provides Security KPI dashboard that are leveraged during DPW monthly security and privacy steering team meetings.

We assist DPW to define the threshold values indicated as “?” in the figure above. In addition, we assist DPW to annually review and update the Security KPI threshold values.

Provide Support to Existing EMC/RSA enVision Implementation

We assist DPW to providing support for the existing DPW SIEM system. As part of this effort, we monitor the DPW SIEM systems periodically to review their performance, disk space usage and capacity requirements. In addition, we configure and maintain security alerts and perform data archival (in accordance with DPW standards)

Reporting. We assist DPW in configuring and extracting periodic and ad hoc reports from the DPW SIEM system for the following categories:

- **Business Metrics Reporting** provides periodic and ad hoc reports to better support the needs of the business stakeholders, such as the number of mainframe transactions performed within a certain period
- **Operation Metrics Reporting** provides periodic reports to measure the performance of the security infrastructure such as IAM systems against defined thresholds

- **Regulatory Compliance Monitoring** for real-time and periodic reporting of violations to DPW standards, Commonwealth ITBs and Federal regulations such as HIPAA, SSA and IRS 1075
- **Incident Monitoring and Reporting** for monitoring and reporting security exceptions/violations leading to security incidents that may prompt appropriate incident response
- **Trend Analysis and Monitoring** for detecting patterns in security infrastructure operations, performance and security exceptions over a period of time such as Quarterly trends

Figure 6.9-228 illustrates a sample trend analysis of user authentication attempts from CA SiteMinder logs over a period of three months.

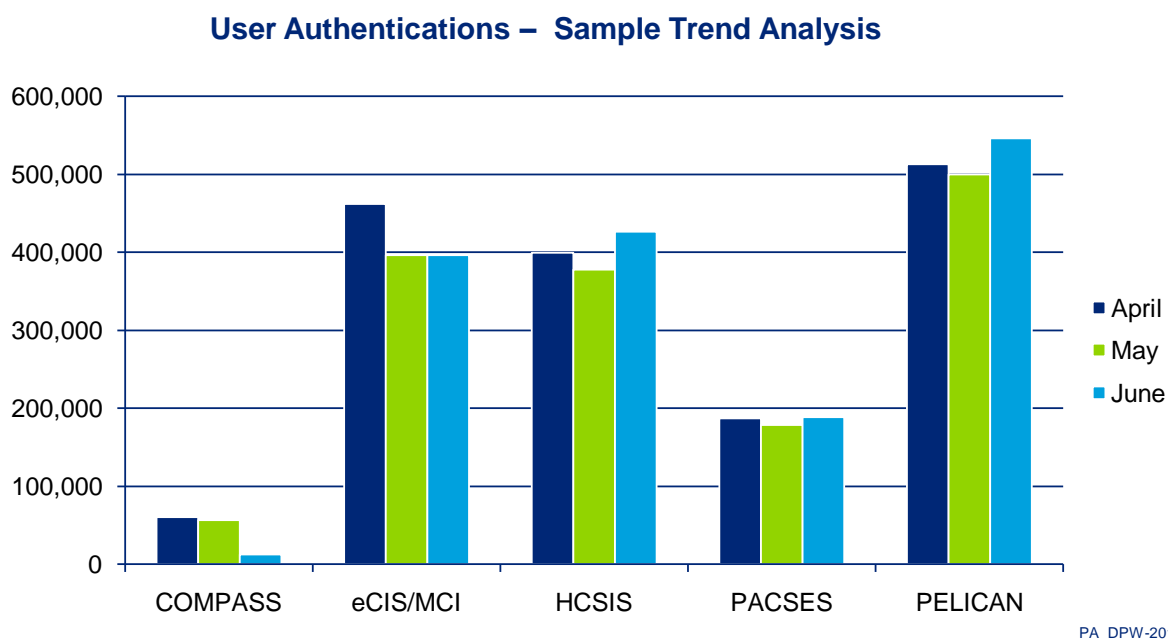


Figure 6.9-228. DPW IAM System User Authentication Trend Analysis.
Monitoring User Authentication Attempts Helps Understand the Application Usage Trends and Forecast Security Infrastructure Capacity Requirements.

Support for Compliance Monitoring. In addition, we assist DPW performing periodic analysis of the SIEM reports to identify violations to DPW security policies and regulatory requirements such as SSA and IRS 1075.

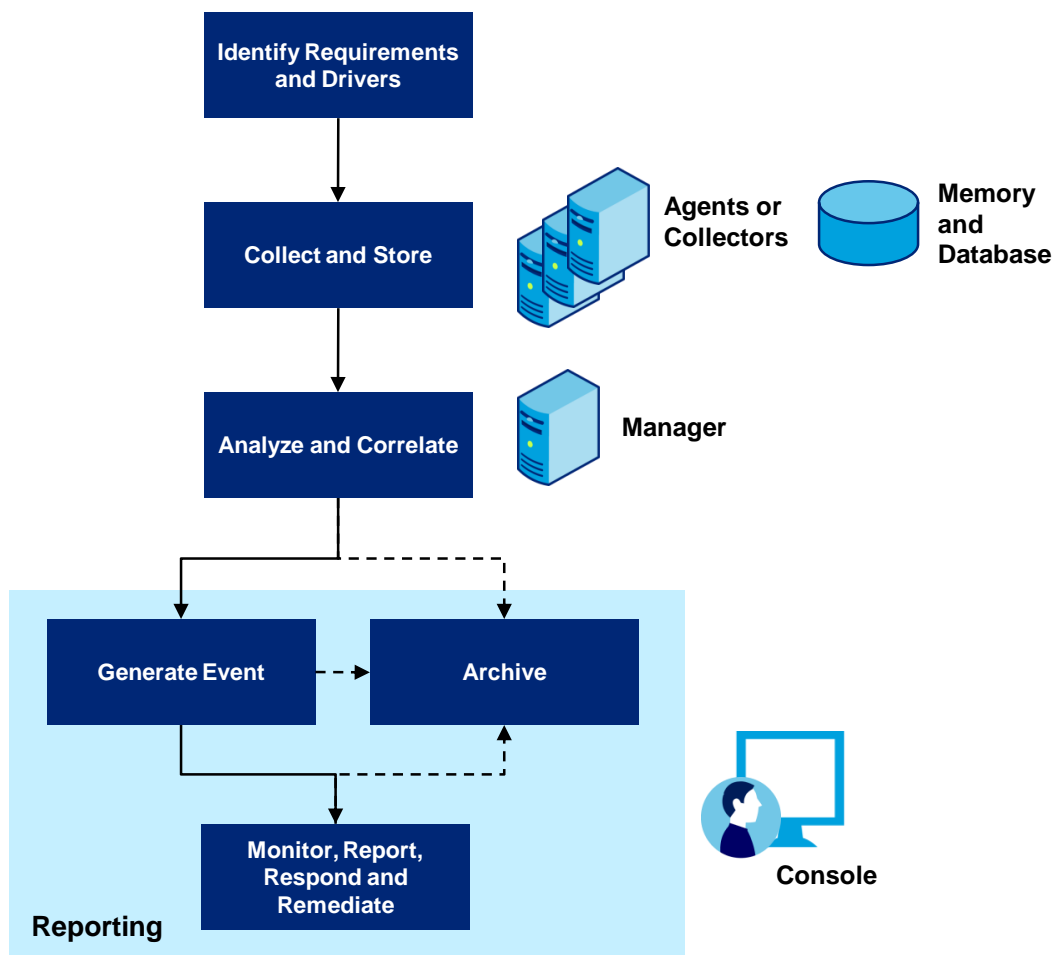
Support for Incident Response and Forensics. We recognize that the Department may use the SIEM system to alert for security incidents and forensic analysis of system logs (including workstations). We work with DPW to help configure security incident reports and analyze the security incidents from SIEM for incident response and forensic analysis.

Integrate Devices with enVision

We worked with DPW to successfully integrate and correlate security events from the audit logs of following devices:

- CA SiteMinder
- Microsoft Internet Information Systems (IIS) server
- CIS Mainframe
- DPW Firewall
- DPW Intrusion Prevention System (IPS)

We use our four phases of our SIEM implementation framework to configure additional devices to DPW's SIEM system. Figure 6.9-229 illustrates Deloitte's SIEM integration framework.



PA_DPW-2020

Figure 6.9-229. Deloitte's Framework for SIEM Implementation.

Deloitte assisted DPW to implement SIEM system. The DPW SIEM records and correlates to more than 15,000 events/sec.



Figure 6.9-230 describes the four phases of our SIEM integration framework.

SIEM Implementation Phases	Deloitte's Tasks Supporting Integration of Additional Devices with DPW SIEM System
Identify requirements and Drivers	<ul style="list-style-type: none"> • Work with DPW to identify the appropriate regulatory, operational and business requirements for integrating additional devices to DPW SIEM system.
Collect and Store	<ul style="list-style-type: none"> • Configure the SIEM agents to interface to the identified devices to retrieve (in real-time) systems audit logs and event logs including: <ul style="list-style-type: none"> - Application security audit logs - CIS and PACSES Mainframe Audit Logs and Transaction Logs - Database audit logs and user monitoring logs - User workstations security event logs including local security event logs - Critical servers audit logs including local security event logs - CA IAM Tools – SiteMinder, Identity Manager and SOA Security Manager - IBM Tivoli Identity Manager audit logs - New software and infrastructure procured by the department during the course of this project. • Develop custom SIEM agent configurations if default SIEM agent configuration does not support the DPW devices.
Analyze	<ul style="list-style-type: none"> • Design log/event correlation techniques used to monitor security KPIs in the following domains <ul style="list-style-type: none"> - Access Control - Audit and Accountability - Configuration Management - Identification and Authentication - Incident Response - System and Communication Protection - System and Information Integrity.
Reporting	<p>Configure the DPW SIEM system's reporting engine to generate periodic and ad hoc reports based for the following reporting categories:</p> <ul style="list-style-type: none"> • Business Metrics Reporting • Operation Metrics Reporting • Regulatory Compliance Monitoring • Trend Analysis and Monitoring • Incident Monitoring and Reporting.

Figure 6.9-230. SIEM Integration Framework – Tasks.



Assist in Software Upgrades to DPW SIEM such as Patches and Hot Fixes

We assist DPW in maintaining the DPW SIEM infrastructure. We perform the following activities to support DPW’s SIEM software upgrades:

- Periodically check for product patches and upgrades
- Identify and mitigate SIEM compatibility errors
- Monitor and mitigate SIEM agent communication errors with the various devices integrated with SIEM system
- Identify the cause of DPW SIEM system communications failures and restore the SIEM agent connectivity
- Plan for upcoming technology upgrades and develop a supporting communication plan

Figure 6.9-231 outlines our approach to supporting DPW SIEM software upgrades. We work with DPW to follow this process based on applicability of the SIEM system upgrade type.

SIEM System upgrade type	Deloitte’s Approach to Support SIEM System Upgrade					
	Identify Upgrade Requirement	Business Impact Analysis and Release Plan	Support Proof of Concept	Release Coordination Management	Testing and Issue Management	Implementation Support
Patches	Yes	Yes	No	Yes	Yes	Yes
Hot Fix	Yes	Yes	No	Yes	Yes	Yes
Software new version/ Hardware upgrade	Yes	Yes	Yes	Yes	Yes	Yes
Custom developed module (Example – Custom reports)	Yes	Yes	Yes	Yes	Yes	Yes

Figure 6.9-231. Deloitte’s Process to Support SIEM Software Upgrades.

Security – Network Assessment

IV

Page
IV-391

RFP Reference: Direct Technical Support Overview

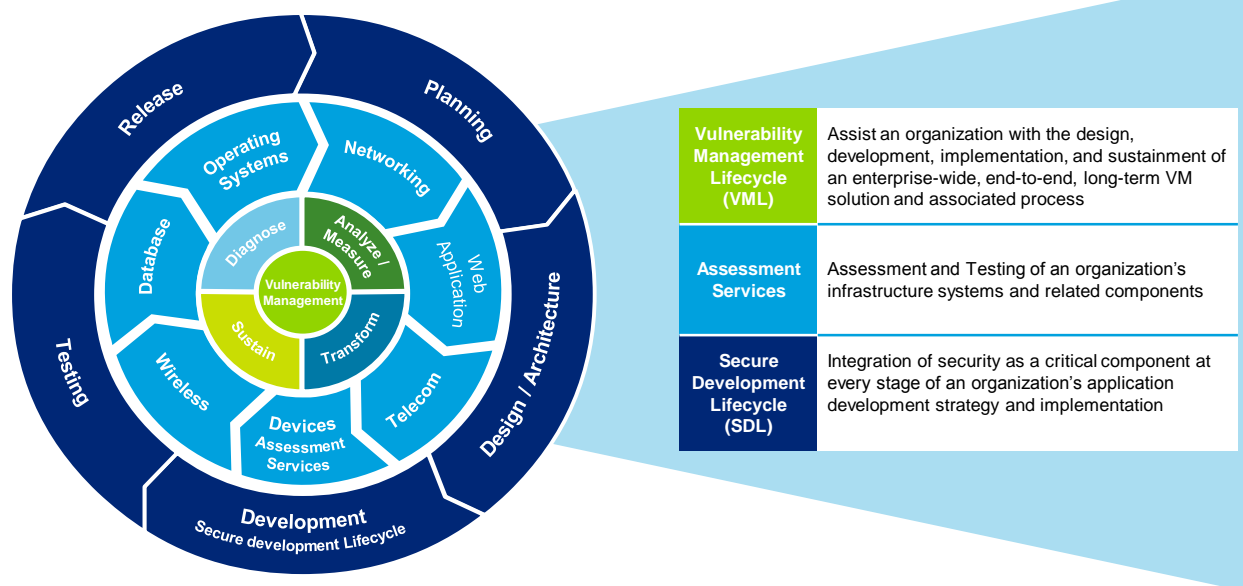
Security – Network Security Assessment

- Conduct network vulnerability assessment and penetration testing assessment using automated tools like Nmap, Nikto, Nessus, GFI Languard, Ethereal, Snort, Kismet, Airshark, MIBWalk. Conduct a manual analysis of the network devices and architecture. Perform configuration review of the network devices. Compare against security leading practices for network security and architecture and identify gaps.
- Create a detailed report for the identified vulnerabilities and appropriate mitigation steps. Assist business owners to determine business impact and business risks of each identified vulnerability. Assist DPW to formalize remediation plan for mitigation of the vulnerabilities identified. This activity will require a separate vulnerability test agreement terms to be agreed to prior to scheduling a resource to assist

We understand and support DPW's vision for a proactive approach to managing security vulnerabilities in today's constantly changing IT environment and prevalence of cyber threats. Through our detailed and demonstrated Vulnerability Management framework, Deloitte helps DPW in performing security vulnerability assessments, configuration reviews and secure architecture designs.

As shown in Figure 6.9-232, **Deloitte's Vulnerability Management Framework** consists of three concentric components:

- Vulnerability Management Life cycle (VML), which provides services to assist an organization with the design, development, implementation and sustainment of an enterprise-wide Vulnerability Management solution
- Assessment Services which provides assessment and testing of an organization's infrastructure systems and related components
- Secure Development Life cycle (SDL) which provides integration of security principles and practices at each stage of an organization's software development life cycle



PA_DPW-2050

Figure 6.9-232. Deloitte's Vulnerability Management Framework.

Deloitte's demonstrated vulnerability management framework consists of three concentric components – VML, Assessment Services and SDL.

Using our Vulnerability Management Framework, we perform network assessments and provide detailed reports to our clients. We have used our vulnerability management framework to perform similar network assessments at DPW.

Our Experience Performing Network Vulnerability Assessments at DPW. We have worked with DPW to perform network vulnerability scanning and network device configuration reviews. This experience provides us with the knowledge of DPW's practices related to network assessments, device configurations and accepted tools/techniques. Our network vulnerability assessment approach includes the following components:

- Network Vulnerability Assessment and Penetration Testing
- Reporting and Remediation.

Network Vulnerability Assessment and Penetration Testing

Our approach network vulnerability assessment and penetration testing consists of the following four phases:

- Conduct Network Vulnerability Scanning
- Perform Manual Analysis of Network Devices and Architecture
- Perform Network Devices Configuration Review and
- Benchmark DPW's network security architecture with leading security practices

The primary purpose of this assessment is to identify network or system vulnerabilities. We performed the network vulnerability assessment using DPW approved tools and



techniques while attempting to gain unauthorized access to the network. We describe each of the network vulnerability assessment and penetration testing activities below:

Network Vulnerability Scanning. We work with DPW to identify the target network ranges for conducting the vulnerability scans. We use DPW standard network vulnerability assessment tools such as Nmap, Nikto, Nessus, GFILanguard, Ethereal, Snort, Kismet and MIBWalk to conduct controlled vulnerability scans on the identified target. Figure 6.9-233 describes Deloitte’s demonstrated activities to perform network vulnerability scanning.

Network Vulnerability Scanning Activities	Deloitte’s Tasks to Support Network Vulnerability Scanning
Scope and Plan	Work with DPW to identify the target network ranges.
Gather Intelligence	Gather information of the target network ranges to characterize and map the boundaries of the network. Some of the specific tasks that we execute includes: <ul style="list-style-type: none"> • Trace IP and ICMP packets to the routers, servers and firewall to determine the network topology • Query DNS servers to determine the version of DNS running on the servers, their configuration, the number and locations of Internet mail servers, and whether a zone transfer can be executed and internal DNS information obtained • Depict graphically the external view of the “Target Environment” or Internet point of presence(s) as seen by an outside entity • Use a “ping sweep” on the available network segments to determine the list of available devices.
Conduct vulnerability scanning	Conduct an assessment to evaluate the security posture of the external network segment, by passively and actively testing the connection points of the network hosts within the identified 10 class C subnets ranges to identify potential vulnerabilities: <ul style="list-style-type: none"> • Detection of live hosts: Use port scanning software to identify open ports or services on the network devices and servers (“live hosts”) • Fingerprint live hosts: Use TCP or UDP network utilities to connect with “live hosts” for determining the type of operating system, firewall and network service versions • Automated vulnerability Scanning: Leverage vulnerability testing tools provided by DPW such as Nessus to identify vulnerabilities or exposure points on the identified “live hosts” • Vulnerability Scanning Tools. We use the DPW standard network assessment tools such as Nmap, Nikto, Nessus, GFILanguard, Ethereal, Snort, Kismet, MIBWalk for performing the infrastructure vulnerability tests.



Network Vulnerability Scanning Activities	Deloitte's Tasks to Support Network Vulnerability Scanning
Perform Vulnerability Analysis and Correlation	Vulnerability Analysis <ul style="list-style-type: none"> • Conduct a manual validation and verification of the vulnerabilities identified through vulnerability scanning to filter the false positives. Vulnerability Correlation <ul style="list-style-type: none"> • Identify vulnerabilities present in related systems within the same trusted zone • Correlate vulnerabilities identified against publically available vulnerability databases such as National Vulnerability Database (NVD) and Common Vulnerabilities and Exposures (CVE) to assess the potential exposures presented by the identified vulnerabilities.
Recommend and Rationalize	Document the results as part of network vulnerability assessment report including: <ul style="list-style-type: none"> • Description of the vulnerability, vulnerable instances and its security severity • Remediation steps. • Analyze the identified vulnerabilities with the Commonwealth key stakeholders

Figure 6.9-233. Tasks Performed to Support Network Vulnerability Scanning Activities.

Manual Analysis of the Network Devices and Architecture. Automated vulnerability scans provide a reasonable security baseline but we recognize that automated tests generate considerable false positives. We conduct an analysis of the target network devices using manual techniques to filter false positives and correlate the vulnerabilities identified. We perform the vulnerability correlation based on impacts of other vulnerable instances identified within the same trust zone and vulnerabilities identified during previous assessments.

We perform a review of the network architecture and design based on the vulnerabilities identified to help better determine the susceptibility of other DPW network assets.

Network Devices Configuration Review. We perform a security configuration review of network devices as prioritized by DPW. The focus of the review is on the implemented security configuration of the devices, the device configuration management, policy enforcement mechanisms and the effectiveness of DPW baseline hardening procedures. We perform the following activities as outlined in Figure 6.9-234 below:

Network Devices Configuration Review Activities	Deloitte's Tasks to Perform Network Devices Configuration Review
Scope and Plan	Work with DPW to identify the network devices for performing the security configuration review.
Understand current state	<ul style="list-style-type: none"> • Obtain the current security policy and recommended Commonwealth configuration baselines of the identified network devices • Provide a questionnaire to the key stakeholders for evaluating the current configuration of the identified systems and systems



Network Devices Configuration Review Activities	Deloitte's Tasks to Perform Network Devices Configuration Review
Review Firewall and IDS/IPS Configuration	<p>Analyze the identified firewall and IDS runtime configurations to evaluate, at a minimum:</p> <ul style="list-style-type: none">• Access control lists (ACLs)• Rules definitions (e.g., allowed and denied IP address and services, denied and logged IP address and services, custom services configuration)• Rules management• Rule logging and auditing policies, including alerts, review and storage• Configuration management• Software integrity management• Rule effectiveness review using packet and protocol analysis tools, depending on the type of firewall (packet filtering versus state full inspection or proxy)• Operating system version, firmware, patch level• Physical security controls.
Review Internet Router and Bastion Host	<p>Perform a configuration review of the routers and/or bastion hosts to assess, at a minimum:</p> <ul style="list-style-type: none">• ACLs• Controls over super user passwords (e.g., ENABLE passwords on Cisco routers)• Use of strong encryption over super user passwords (e.g., ENABLE SECRET on Cisco routers)• Controls over remote maintenance dial-in ports (if appropriate)• O/S, firmware and patch level updates that may mitigate known vulnerabilities.
Review Router, Switch and Load-Balancer	<p>Review the runtime configurations of the identified routers, switches and load balancers to assess, at a minimum::</p> <ul style="list-style-type: none">• ACLs• Controls over authentication tokens• Authentication configuration and architecture (e.g., AAA)• Routing or load-balancing configuration• Management, monitoring and logging configuration• Control over remote maintenance dial-in ports• Operating system version, firmware, patch level• Configuration management



Network Devices Configuration Review Activities	Deloitte's Tasks to Perform Network Devices Configuration Review
Review Server Configuration	Perform a server configuration review to identify the sufficiency of the following controls: <ul style="list-style-type: none"> • Users and groups • File permissions • Password composition • Key configuration files • Startup files • Trust relationships • Network connections • Running processes • Kernel configuration • Suspicious files • Integrity of existing files
Conduct manual configuration review	Analyze, verify, reprioritize and reexamine the tools' results for applicability – Automated tools often provide results that are voluminous, inaccurate and laden with false-positive reports
Recommend and Rationalize	Document the results as part of network vulnerability assessment report <ul style="list-style-type: none"> • Description of the vulnerability and its potential security severity • Remediation steps. • Analyze the identified vulnerabilities with the Commonwealth key stakeholders.

Our Tasks to Perform Security Configuration Review Activities.

Benchmark DPW's Network Security Architecture with Leading Security Practices. We compare the identified vulnerabilities with DPW security configuration baseline standards and security leading practices such as National Institute for Standards and Technology (NIST) and Center for Internet Security (CIS). We document the gaps identified from this comparison in the network vulnerability assessment report and submitted to the DPW CISO.

Reporting and Remediation

We document the results of the network vulnerability assessment and penetration testing activities and submit the network vulnerability assessment report to the DPW CISO. We work with DPW and the infrastructure owners to develop a remediation plan. We use DPW's defect tracking tool, ATS, to record the identified vulnerabilities. This enables the DPW CISO to monitor the vulnerability remediation status on a continuous basis. As part of this effort, we perform the reporting and remediation process through the following three phases:

- Prepare detailed network vulnerability assessment reports
- Assist infrastructure owners to determine infrastructure and business impacts
- Develop remediation plan

We describe each phase of the remediation process below.

Prepare Detailed Network Vulnerability Assessment Reports

We prepare and submit a detailed network vulnerability assessment report that includes the outline described in Figure 6.9-235.

Network Vulnerability Assessment Report Sections	Deloitte's Activities Addresses Network Vulnerability Assessment Details	Stakeholder	Tools/Techniques
Security Vulnerability Description	<ul style="list-style-type: none"> • Describes the identified security vulnerability, vulnerability location(s), number of instances where identified and vulnerability severity (high, medium and low) • Provide the suggested vulnerability mitigation upon analyzing the root cause • Map each vulnerability identified to a system specific vulnerability ID, to track root cause and reemergence of vulnerabilities • Benchmarks the vulnerabilities identified with leading industry practices for network security and architecture. 	<ul style="list-style-type: none"> • Deloitte Vulnerability test specialist. 	<ul style="list-style-type: none"> • Network Vulnerability Scanning • Manual Analysis of the Network Devices and Architecture • Network Devices Configuration Review • Comparison against security leading practices for network security and architecture and identify gaps.
Vulnerability Categorization/Business Impact	<ul style="list-style-type: none"> • Describes the infrastructure and business criticality of the security vulnerabilities identified and user groups impacted 	<ul style="list-style-type: none"> • DPW CISO, Infrastructure Stakeholders/ Owners. 	<ul style="list-style-type: none"> • Application Business Impact Analysis
Mitigation timeline	<ul style="list-style-type: none"> • Provides the PCRs recorded for each vulnerability identified to monitor for mitigation during SAT phase of SDM • Helps to track the mitigation status when submitted to the DPW CISO. 	<ul style="list-style-type: none"> • DPW CISO, Infrastructure Stakeholders/ Owners. 	<ul style="list-style-type: none"> • Automated Tracking System (ATS)

Figure 6.9-235. Network Vulnerability Assessment Report Outline.

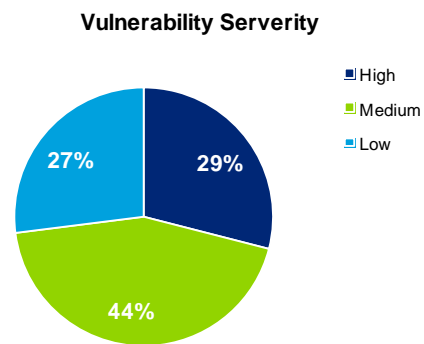
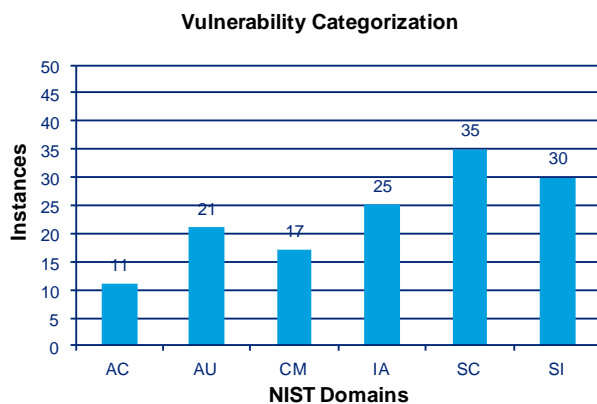
Figure 6.9-236 illustrates a sample vulnerability assessment dashboard provided as part of the report. This dashboard provides a graphical representation of the vulnerability severity identified on the network and the measure against industry benchmarks.

Network Vulnerability Assessment Report Dashboard

NIST Benchmark - Applicable Domains	Severity Ratings	
AC - Access Control	Security	Description
AU - Audit and Accountability	High	Inaction could result in or will continue to allow serious negative impact to the system(s) or other systems on the network. The Significant risk issues are those that management should promptly address, as the reasonable complexity and significant potential impact of the issue increases the likelihood that malicious activities could be performed against the system(s) and cause damage.
CM - Configuration Management		
IA - Identification and Authentication		
SC - System and Communication Protection	Medium	Inaction could result in or will continue to allow for mid-level impact to the system(s) system(s) or other systems on the network. The Moderate risk issues are those that alone may cause some damage, require an additional knowledge to abuse, or combined with other weaknesses could lead to a high level of exposure such that management should mitigate them in the near term.
SI - System and Information Integrity		
	Low/	Inaction could result in marginally negative impact to the system(s) system(s) or other systems on the network. The Minor risk weaknesses are those that may provide information for further malicious activities, or combined with other weaknesses could create an exposure to the system(s). The Minor risk vulnerabilities should become part of management's intermediate-term plans to eliminate or mitigate issues or inappropriately configured systems.

NIST Domains	Instances
AC	11
AU	21
CM	17
IA	25
SC	35
SI	30

Severity	Instances
High	40
Medium	62
Low	37
Total	139



PA_DPW-1290

Figure 6.9-236. Sample Network Vulnerability Assessment Dashboard.

Deloitte provides a consolidated view of the vulnerabilities identified during the assessment benchmarked against industry leading standards.



Assist DPW Infrastructure Team in Determining Infrastructure and Business Impacts. We work with DPW and the infrastructure owners to determine the infrastructure and business impacts from the identified vulnerabilities including:

- Security, regulatory, operational and performance risks for each vulnerable instance
- Infrastructure and business criticality for the vulnerable instances based on the risks identified
- Effort required to mitigate the vulnerability
- Remediation time frame.

Develop Remediation Plan. We work with DPW CISO and the infrastructure owners to develop a remediation plan and help prioritize remediation efforts. We use DPW's defect tracking tool, ATS, to record the identified vulnerabilities. This enables the DPW CISO to monitor the vulnerability remediation status on a continuous basis.

Network Vulnerability Assessment Coordination with DPW's "Trusted Agent"

In the past, we have worked with DPW to conduct network vulnerability scans. In the future, any similar vulnerability scans requires the completion of a testing agreement in order to conduct these scans. We perform the Network Vulnerability Assessment after carefully planning and controlling, and executing in close coordination with Commonwealth personnel. The Commonwealth identifies at least one staff member to serve as a "trusted agent" and is responsible for:

- Make decisions to proceed with applicable testing,
- Participate in the testing activity,
- Identify mission critical systems of DPW, Commonwealth, partners or affiliates, and third parties, as applicable.

The "trusted agent" coordinates and authorizes Deloitte access to DPW's identified information technology components for vulnerability testing. In order to avoid interruptions, we recommend running many of the assessment tasks during non-business hours. At DPW's direction, we execute as many of these tasks as practical during non-business hours.

Security – Provide Security Vulnerability Testing Assessment Assistance

IV

Page
IV-391

RFP Reference: Direct Technical Support Overview

Security - Provide security vulnerability testing assessment assistance

- The security testing consultant will assist BIS to identify security vulnerabilities within the web applications and environment, prioritized for testing by BIS. This assessment will include manual testing and tests conducted with the help of automated web application/web service vulnerability assessment tools that DPW has, such as HP Web Inspect.
- Improve the security team's request tracking System to support the USEC Change Request process.

DPW's enterprise web applications and services form the backbone of the communication with business partners and citizens for providing efficient access to the Department's services. We believe that it is critical to proactively identify and mitigate security vulnerabilities within the web applications and web services which, when left unresolved, could lead to potential data breaches. We perform security vulnerability testing to help DPW in identify and mitigate security vulnerabilities before they happen.

Our approach to assisting DPW's security vulnerability testing efforts include the following activities:

- **Web Application Security Vulnerability Testing:** We assist DPW to identify security vulnerabilities within the web applications and environments prioritized for testing. We conduct a controlled web application vulnerability test in accordance with DPW Security Vulnerability Scanning Policy (STD-ENSS020) using automated tools and manual techniques
- **Improve Security Team's Request Tracking System** we work with DPW to improve the security team's request tracking system supporting the security change request process.

Figure 6.9-237 describes our understanding of DPW application characteristics for providing security vulnerability testing assistance.

Have you
heard? 

Deloitte's proactive vulnerability testing resulted in cost avoidance of approximately \$6.8 million over a one-year period (FY'09) from credit monitoring services alone if the vulnerabilities were exploited by a malicious attacker.



Applications	Deloitte's understanding of DPW Applications supports Security Vulnerability Testing
iCIS	<ul style="list-style-type: none"> • eCIS – Automated testing is performed in synchronized parts based on the user role and number of pages. eCIS uses Microsoft WCF framework for its services which requires manual testing and analysis. • COMPASS - Provides the possibility of experienced attackers and cyber criminals posing as applicants to access sensitive Citizen information. COMPASS requires extensive manual vulnerability testing to help identify vulnerabilities in both technological and the business process • COMPASS – Requires usage of HP SwfScan for testing Adobe Flash. COMPASS requires detailed manual testing on public web services and data handling techniques.
HCSIS	<ul style="list-style-type: none"> • HCSIS – Requires manual testing to detect vulnerabilities in Oracle FGA user authorization • HCSIS - Requires detailed analysis of HTTP ONLY cookies to identify vulnerabilities leading to privilege escalation or unauthorized access to data.
PACSES	<ul style="list-style-type: none"> • PACSES Forms – Uses Adobe Life cycle, a COTS product as the basis of the application. This requires additional manual testing on the COTS product, monitoring for new vulnerabilities from vendor announcements and security forums such as CERT.
PELICAN	<ul style="list-style-type: none"> • PELICAN web services – Requires manual analysis to understand the responses to multiple disparate requests – if unauthorized access to data can be obtained. • ELN services – exchange information to external systems. This requires an analysis of the data protection techniques employed.
Child Welfare	<ul style="list-style-type: none"> • Child welfare – Allows any public user to create, submit and access their benefits application. This exposure increases the possibility of attack from a potentially large user base requiring automated and a detailed manual assessment.
Enterprise Services	<ul style="list-style-type: none"> • Enterprise services are tested using SOAPUI (manual techniques) and HP WebInspect. Each of its end points requires a manual analysis to identify potential unauthorized access to services (in turn data) and data handling techniques.
Promise	<ul style="list-style-type: none"> • Promise application – Requires security vulnerability baseline testing which includes detailed manual testing
Consumer Directive Module (CDM)	<ul style="list-style-type: none"> • CDM – Requires detailed manual testing to identify vulnerabilities application controlled access control and improper parameter validations leading to SQL injection
AdoptPAKids	<ul style="list-style-type: none"> • AdoptPAKids – is a public application that hosts children information for adoption and foster care service. It is essential to perform a detailed manual test to identify unauthorized privilege access to the Admin Portal. Administrators can use the Admin portal of the application to view and modify sensitive child information.

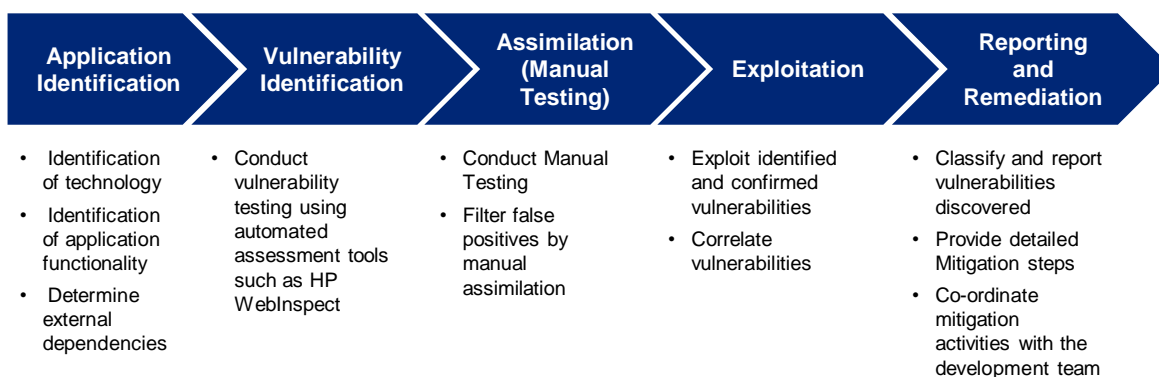
Figure 6.9-237. Our understanding of DPW Applications to provide Security Vulnerability Testing Assistance.

Web Application Security Vulnerability Testing

We use our demonstrated and efficient vulnerability testing process to conduct vulnerability tests on the prioritized web applications. Vulnerability tests help identify security vulnerabilities that may impact the Confidentiality, Integrity or Availability of DPW data leading to an inadvertent exposure of information to unauthorized users.

Deloitte's Demonstrated Security Vulnerability Testing Process

Deloitte has extensive experience in performing application security vulnerability testing. In fact, we assisted DPW to establish the Web Application Vulnerability Scanning Standard (STD-ENSS020) and have conducted vulnerability assessments for DPW applications since May 2008. Figure 6.9-238 illustrates the demonstrated security vulnerability testing process we use at DPW.



PA_DPW-2021

Figure 6.9-238. Deloitte's Demonstrated Security Vulnerability Assessment Process.

Deloitte uses the five phase process to perform vulnerability testing on DPW applications since July 2007.

Our security vulnerability testing process includes the following five phases:

- **Application Identification.** We work with the application stakeholders to understand the architecture, business logic/functionality, external dependencies, user roles and privileges within the application
- **Vulnerability Identification.** We perform vulnerability tests using automated vulnerability scanning tools such as HP WebInspect
- **Assimilation (Manual Testing).** We perform a manual review of the tool results to filter false positives. We use a series of manual tests to provide a more detailed profile of the web application
- **Exploitation.** We attempt to exploit the identified vulnerabilities with the approval of DPW and co-relate the identified vulnerabilities

Have you heard?

Since the implementation of this standard, Deloitte has performed more than 1000 vulnerability scans.



- **Reporting and Remediation.** We assist the application stakeholders and DPW to identify the “root causes” and mitigation measures for the identified security vulnerabilities

We perform the vulnerability tests using the DPW standard automated scanning tool, HP WebInspect and also manual testing techniques. As described in *Section 6.9.2.1, Security, Vulnerability Testing*, we use our demonstrated vulnerability testing techniques and submit vulnerability testing report to the DPW CISO. In addition, we help the application stakeholders identify business impacts and remediation controls.

Improve Security Team’s Request Tracking System

We follow the ITIL Request Management process model for identifying improvement areas for Security Team’s Request Tracking System. Based on our experience at DPW, we have identified the key improvement areas for the current request tracking system (ATS) used by the Security Team and as depicted in Figure 6.9-239. We manage security change requests using ATS for each of the application environments.

Improvement Areas	Improvement Opportunities for ITIL aligned Request Management Process
Define Service Levels for Request Categories	<ul style="list-style-type: none"> • Work with DPW to develop appropriate service level response times for PCR requests based on criticality and environment.
Improve PCR Change/Creation Notification	<ul style="list-style-type: none"> • Integrate email alerting mechanism into the DPW’s defect tracking system for conditions such as: <ul style="list-style-type: none"> - PCR creation - PCR status change - PCR Assignment - PCR close date.
Proactive monitoring of requests for Quality Assurance	<ul style="list-style-type: none"> • Support the QA process performed by the ITSS Security Domain point of contact • Analyze PCR for completeness of the PCR acted upon by the security team member • Develop and integrate functionality into ATS to alert the appropriate security team member if the PCR two days (or as required by the Department) prior to requested close date.
Develop a Proactive defect tracking model	<ul style="list-style-type: none"> • Design and integrate functionality to ATS for a Proactive Defect Tracking Model to monitoring the progress of PCRs on a continuous basis • Alert the appropriate PCR owner and the assigned security team member on the status of the open PCRs
Improve PCR Monitoring and Reporting	<ul style="list-style-type: none"> • Provide periodic PCR status reports to the Security Section Leads and the DPW CISO • Provide alerts to the Security Section Leads if a PCR request has open for more than two weeks (or as defined by the Department)

Figure 6.9-239. Suggested ITIL Request Management Process based improvement areas for Security Team’s Request Tracking System.



Deloitte can assist DPW in the selection process the Department prioritizes the identification and implementation of a solution for security request management.

Security – DR and Backup

IV

Page
IV-389

RFP Reference: Direct Technical Support Overview

Security – DR and Backup

- Define backup and recovery improvement opportunities within the security infrastructure to support more effective and efficient DR processes

We work with DPW to conduct a current state assessment of existing recovery and backup processes, catalog and benchmark them against the security infrastructure DR requirements and identify opportunities for improvement.

DPW’s security infrastructure needs to be highly available for sustaining both internal and external business operations without disruption or delay. The successful implementation of a disaster recovery plan is contingent upon the effectiveness of the approach. Our holistic approach to DR helps DPW balance risk mitigation investments between avoidance, recovery, and risk transfer helps.

To define a reliable backup and recovery process, it is imperative to obtain a detailed understanding of current processes. Deloitte assists DPW in assessing current backup/recovery capabilities. We apply a defense-in-depth focus to the DR assessment and planning process. This helps confirm that leading practices for security are not overshadowed or even worse, ignored during recovery operations. Our **defense-in-depth** focus for DR of the security infrastructure touches on the following areas:

- Perimeter defenses
- IDS network and host based
- IAM Infrastructure
- Virus protection
- Patches and host configurations
- Vulnerability surveillance

Benchmarking and improvement recommendations cover the key disaster recovery and data backup topics described in Figure 6.9-240:

Disaster Recovery Topics	Data Backup Topics
<ul style="list-style-type: none"> • Recovery Time Objective (RTO), Recovery Point Objective (RPO) etc. 	<ul style="list-style-type: none"> • Selection of backup technology – inline or tape backup
<ul style="list-style-type: none"> • Single Point of Failure (SPOF) 	<ul style="list-style-type: none"> • Frequency criteria based on risk – incremental, differential and/or full backup
<ul style="list-style-type: none"> • Information and Asset Lists with criticality ratings 	<ul style="list-style-type: none"> • Data retention requirements for security logs and configurations



Disaster Recovery Topics	Data Backup Topics
<ul style="list-style-type: none"> • DR Test Scripts • Monitoring and reporting 	<ul style="list-style-type: none"> • Data replication procedures • Data Backup procedures and mechanisms

Figure 6.9-240. Key Disaster Recovery and Data Backup Topics to Identify Improvement Opportunities for DPW.

We consider the following systems, in Figure 6.9-241, for the current state assessment of DPW’s data backup and recovery procedures:

DPW Security Infrastructure covered under DR and Data Backup	Deloitte’s understanding of Impacted Areas
Perimeter Security: Imperva Web Application Firewall , Checkpoint (Transport Layer) Firewall, Intrusion Prevention Systems (IPS), Bluecoat Device	<ul style="list-style-type: none"> • Audit log database • System configuration • Security policies • Custom Report configurations • Product License
CA SiteMinder, SOA Security Manager	<ul style="list-style-type: none"> • Security Policies • Product License
CA SiteMinder, CA Identity Manager, CA SOA Security Manager, IBM Tivoli Identity Manager (TIM), Radiant Logic and RadiantONE virtual directory server	<ul style="list-style-type: none"> • IAM infrastructure configuration • Product License
Managed, SMPROD, SMTEST, SRPROD, PWMUser	<ul style="list-style-type: none"> • User Repository
RSA enVision	<ul style="list-style-type: none"> • Configuration and audit log database • Custom alerts and report configuration • Product License
HP WebInspect , HP DevInspect	<ul style="list-style-type: none"> • Security vulnerability test reports • Vulnerability testing policy • Product License
Risk Framework	<ul style="list-style-type: none"> • Requirements Library • Critical Asset Lists • Risk Assessment Results • Corrective Action Plans

Figure 6.9-241. Key Systems Considered for the Current State Assessment of DPW’s Data Backup and Recovery Procedures.

Security – Virtual Server Technology

IV

Page
IV-392

RFP Reference: Direct Technical Support Overview

Security – Virtual Server Technology

- Assess and Incorporate virtual server technology within the Security infrastructure to facilitate improved management of hardware cost and resources.

We support DPW's requirement to leverage virtual server technology within the Security infrastructure to facilitate improved management of hardware and resources. Virtual server technology helps provide the system resources required to meet the DPW's anticipated growth in the IAM space at a lower cost. The key benefits that DPW realizes from use of virtual server technology include:

- **Quick scalability.** Unlike physical hardware, the scaling of a virtual infrastructure can be done more quickly, efficiently and cost-effectively
- **High availability.** Better performance and reliability at the same time reducing the cost and maintenance with fewer physical servers
- **Faster restoration.** A virtual server can be restored to previous working image (backed up) quickly
- Supports fast and simple configuration changes.

Current State Assessment. We conduct current state assessment to identify the virtual server requirements for the security infrastructure. As part of this assessment, we work with DPW to identify the following key components:

- Architectural, user scalability and capacity requirements for the next two years using quarterly the capacity plan
- Virtual server infrastructure required to support existing physical and virtual environments
- DPW's disaster recovery key parameters necessary to design the security environments

This assessment helps us understand the expected security infrastructure capacity requirements for upcoming application releases and to design the infrastructure using that virtual server technology to meet those needs.

DPW Current IAM Virtual Architecture. We assist DPW with establishing and maintaining the shared IAM security environments. We recognize that DPW leverages virtual server technology to support lower environments – Development, SAT, Training and TFP environments. DPW's physical IAM infrastructure includes **over 35 servers** to supports its SMTEST, PTEST and SMPROD environments. Specifically the infrastructure includes:

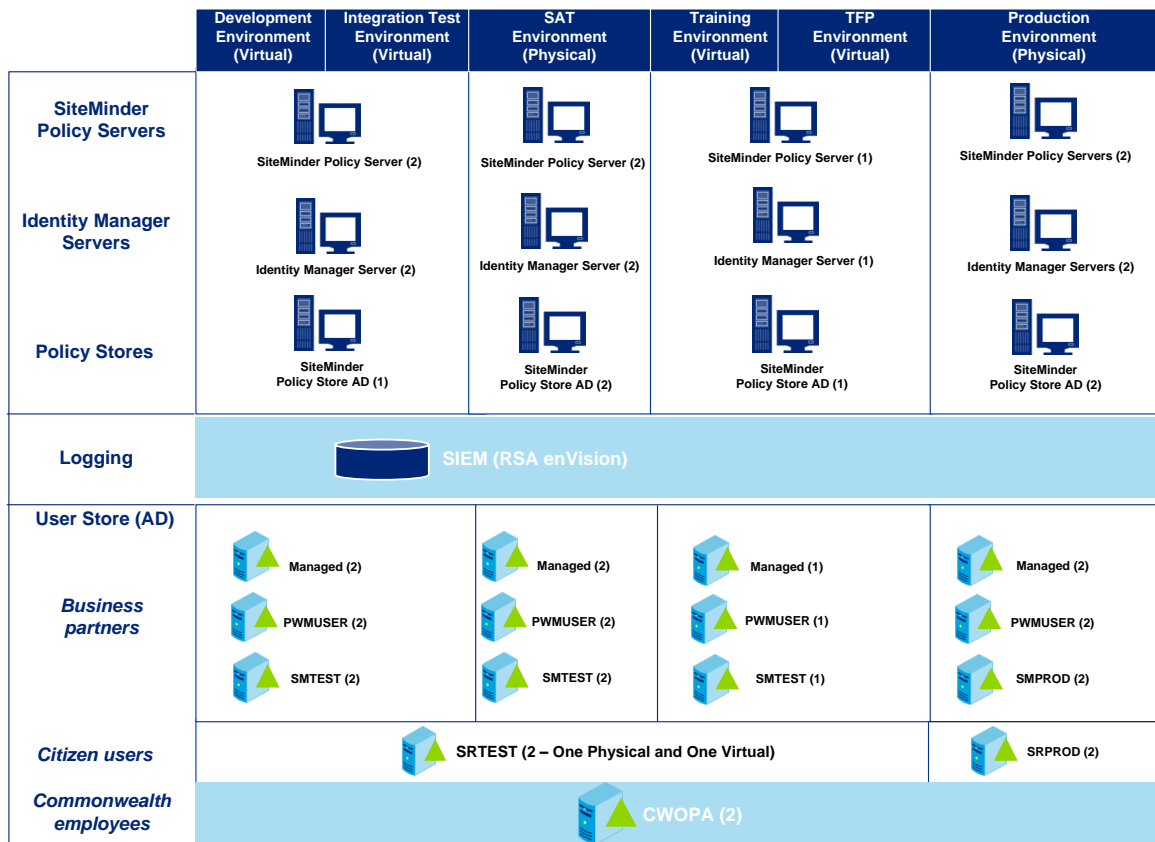
- Over 15 physical servers to support directory infrastructure.

- Over 15 physical servers to support CA Identity Manager and CA SiteMinder components.
- Over 10 servers to support the ITIM components in the PTEST and SMPROD environments.

As DPW extends its IAM infrastructure to integrate with DPW applications, it is important to have a dedicated sandbox environment that provides the flexibility needed for development efforts without compromising the integrity of the SMTEST environment.

In lower environments, several application test activities such as integration, load and user acceptance may occur simultaneously. These test activities lead to CA SiteMinder experiencing heavy load in the lower environments leading to a degradation of performance. It is essential, therefore, to leverage virtual server technology to increase the number of environments and meet these growing scalability requirements.

Proposed Sample Virtual Server Environment: From our experience supporting DPW’s security infrastructure, in Figure 6.9-242, we illustrate a sample conceptual IAM architecture by leveraging the virtual server technology.



Note: The number indicated in parenthesis, like SMTEST(2), indicates the number of servers implemented for redundancy.

PA_DPW-1303

Figure 6.9-242. DPW’s Proposed IAM Environment with Virtualization.

Deloitte assists DPW to leverage virtual server technology to facilitate improved management of hardware cost and resources.



The failover IAM servers in the Production environment will be physical servers. In disaster scenarios, the SAT (physical) environment becomes the failover environment.

The virtual servers that support Training and TFP environments help application teams train end users with limited impact from the security infrastructure activities in lower environments. The new (physical) servers in SAT environment help DPW simulate production-like volumes. Figure 6.9-243 describes the proposed IAM architecture using both physical and virtual environments to obtain a sufficiently resilient security infrastructure. We further discuss with DPW to receive input, refine and implement based on priorities assigned by DPW.

Application Environments	Current Architecture		To –Be Architecture	
	CA Site Minder	CA Identity Manager	CA SiteMinder	CA Identity Manager
Development and Integration	2 (Virtual)	2 (Virtual)	2 (Virtual)	1 (Virtual)
SAT	1 (Virtual)	1 (Virtual)	2 (Physical)	2 (Physical)
Training			1 (Virtual)	1 (Virtual)
TFP				
Production	2 (Physical)	2 (Physical)	2 (Physical)	2 (Physical)
Sandbox	N/A	N/A	2 (Physical and Virtual)	2 (Physical and Virtual)

Figure 6.9-243. DPW IAM Systems – Current Architecture and the Proposed IAM Architecture for Discussion.

IAM Sandbox Environment. Apart from the above considerations, DPW might consider installing a sandbox environment for the security team’s testing purposes. This will help in testing security solutions on virtual and physical server groups (to monitor performance). This sandbox environment remains isolated from other application groups and will not affect the applications in the production environment. The sandbox environment will help effectively use a practitioner’s time and effort, avoiding the risks that may occur from the security infrastructure in lower environments.

Security – Software Upgrade Support

IV

Page
IV-392

RFP Reference: Direct Technical Support Overview

Security – Software Upgrade Support

- Support upgrades to the SiteMinder and IdentityManager software.

Technology infrastructure or software requires periodic maintenance and upgrades as part of overall systems management to improve overall performance and stability. We support the CA SiteMinder and CA Identity Manager Security software upgrades as prioritized by the Department and application stakeholders.

DPW's IAM infrastructure is a complex security implementation that supports more than 75,000 user authentication and over five million user authorization requests daily protecting more than 27 DPW systems. This necessitates an effective planning, coordination and rigorous testing for technology upgrades, before integrating with DPW applications.

Have you
heard? 

Deloitte assisted DPW to upgrade the enterprise Single Sign On (SSO) Solution from the early phases of Netegrity to the current SiteMinder R8 SP2.

Deloitte assisted DPW to upgrade CA IdentityManager to R12.

Our Experience in Performing IAM Component Upgrade. We support DPW for implementing upgrades to IAM tools including CA SiteMinder and CA Identity Manager. We assisted DPW to successfully upgrade CA SiteMinder R8 SP1 to SP2. We support DPW with the upcoming CA SiteMinder and CA Identity Manager upgrade to Release 12 (R12).

- **CA Identity Manager Upgrade Support.** Deloitte helped DPW to perform the CA Identity Manager software upgrade from the early stages of Delegated Management System (DMS) to the current version CA Identity Manager R12 (Release 12) through intermediate stages of CA Identity Minder.
- **CA SiteMinder Upgrade Support.** Deloitte helped DPW to perform the CA Identity Manager software upgrade from the early stages of Netegrity to the current version CA SiteMinder R12 through intermediate stages of CA SiteMinder R5, R8 SP1 and R8 SP2.

The technology upgrade types that we support include product patches, product hot fixes, software new release/new version, new security products and custom components developed by the DPW security team and used by DPW applications. Figure 6.9-244 describes our understanding of DPW application characteristics to support Security IAM Software upgrade.



Applications	Deloitte's Understanding of DPW System-Specific Characteristics for Security Software Upgrade
<p>iCIS</p>	<p>CIS, IEVS and TPL (“CIS Mainframe”)</p> <ul style="list-style-type: none"> Requires appropriate integration of the Mainframe user management with CA Identity Manager for user provisioning <p>eCIS</p> <ul style="list-style-type: none"> eCIS requires an IAM infrastructure to support more than 395,000 user authentications and more than 50 million user authorizations on a monthly basis eCIS requires efficient synchronization between the application based Fine Grained Access Controls and SiteMinder provided Coarse Grained Access (page level/Role based) leaving no room for error. eCIS requires Desktop SSO for intranet users and Web-based SSO for Internet users <p>COMPASS</p> <ul style="list-style-type: none"> COMPASS requires CA SiteMinder based Transparent Single Sign On (SSO) for seamless user navigation multiple simultaneous technology platforms – Adobe Flex and Microsoft .NET Framework COMPASS requires community partner delegated administration, user self registration and password self-service managed through CA Identity Manager for more than 110,000 Citizen users, Community Partners (Business Partners) and Commonwealth staff.
<p>HCSIS</p>	<ul style="list-style-type: none"> HCSIS requires an IAM infrastructure to supports more than 426,362 user authentications and more than 19 million user authorizations on a monthly basis with over 230 user roles Each HCSIS user in the Active Directory requires appropriately synchronization with application users present in the Database (FGA) for unique “HCSIS key”. HCSIS application manages more than 230 application user roles
<p>PACSES</p>	<ul style="list-style-type: none"> PACSES Home Page (PHP) application uses BEA Aqualogic Platform and hosted on the OIT's web servers. DPW IAM infrastructure establishes SSO with this externally (non-DPW) hosted Web site and performs user authentication/authorization based on CWOPA and PACSES domains. Paternity Tracking System (PTS) requires Desktop SSO solution for intranet based users and Web-based SSO for Internet users.
<p>PELICAN</p>	<ul style="list-style-type: none"> Maintains DPW IAM infrastructure that supports more than 546,070 user authentications, more than 36 million user authorizations on a monthly basis with over a 100 user roles PELICAN requires use of CA SiteMinder Security Object v1 PELICAN needs business partner user management by delegated administrators, user self-registration (Provider Self Service) and password self service using CA Identity Manager PELICAN requires integration of application based FGA with CA SiteMinder based Coarse Grained Access Controls (Page level/Role based). PELICAN Microsoft .NET based web applications leverage services extensively PPCS web services for the SmartClient interface requires protection through a custom user authentication and authorization LDAP call to the Microsoft Active Directory,
<p>Child Welfare</p>	<ul style="list-style-type: none"> Child Welfare application and services require integration with the DPW IAM security infrastructure.

Applications	Deloitte's Understanding of DPW System-Specific Characteristics for Security Software Upgrade
Enterprise Services	<ul style="list-style-type: none"> Enterprise Services require protection using CA SOA Security Manager, integrated with WebMethods services
Promise	<ul style="list-style-type: none"> Promise application requires efficient service authentication and authentication using CA SOA Security manager when transmitting sensitive Rate and client information to external systems
Consumer Directive Module (CDM)	<ul style="list-style-type: none"> CDM requires efficient integration of CA SiteMinder provided userIDs with the application generated userIDs
AdoptPAKids	<ul style="list-style-type: none"> AdoptPAKids requires SSO for the Admin portal which contains sensitive children information.

Figure 6.9-244. Key Characteristics to Support IAM Software Upgrade.

Approach To Support Security Software Upgrades

Figure 6.9-245 below illustrates our approach to support security software upgrades. We describe each of the processes involved in this approach below.



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Figure 6.9-245. Security Software Upgrade Support Process.

Deloitte's process for supporting security software upgrades involves coordinated scheduling, testing, and implementation support.

Identify Upgrade Requirement. We work with DPW and application stakeholders to identify the business drivers to introduce upgrades to DPW security software. In addition, we proactively monitor vendor vulnerability updates for release of patches and hot fixes. From our experience in supporting security software upgrades for large-scale implementation projects, we categorize the business drivers for the security upgrades as:

- Keeping product versions current (Example: Vendor support for CA SiteMinder R8 and Identity Manager R6 is discontinued by December 2011)
- New business initiatives and requirements requiring additional security features not supported by the current security software (Example: IBM Tivoli Identity Manager)
- Dependency from other components supporting the security infrastructure
- DPW Annual Technology Planning Process.

Develop Release Plan and Perform Business Impact Analysis. When DPW prioritizes a security software upgrade, we assist the Department to identify the



business impacts for the change. We assist with the application stakeholders to develop and plan for upcoming application releases to introduce the security upgrade.

Perform Proof of Concept. We work with DPW to plan, conduct, test, and document the results of the Proof of Concept (POC) implementations. We perform the proof of concept implementation as mandated by the DPW guideline GDL-EASS011, “Proof of Concept – Pilot Guideline”

We leverage DPW guidelines to outline key components and considerations for planning, executing, evaluating, and governing a proof of concept or pilot project initiative. We perform the activities for Proof of Concept implementation in four phases, described through Figure 6.9-246.

Proof of Concept Phases	Deloitte’s Activities to Support Proof of Concept Needs
Plan	<ul style="list-style-type: none"> • Assist DPW to define and document the scope, objectives, evaluation and testing approach for the POC implementation • Develop a detailed work plan to describe the roles and responsibilities of the POC implementation team, schedule, milestones, communications plan, quality management plan and change management • Identify and document the systems, technology used and resource requirements for POC implementation • Work with DPW to identify the stages for incremental rollout to impacted systems.
Conduct	<ul style="list-style-type: none"> • Define POC measurement mechanism and evaluation criteria • Develop quality acceptance process • Develop and document assumptions, system design and data flow/workflow • Conduct outreach session with POC participants to convey the intended objectives and outcome of the POC • Install the appropriate hardware and the software for the POC • Customize POC solution (software and hardware) based on the established design and workflow • Monitor and document the POC implementation outcomes and configuration changes performed.



Proof of Concept Phases	Deloitte's Activities to Support Proof of Concept Needs
Test	<ul style="list-style-type: none"> • Work with DPW to develop/obtain use cases to test the POC solution • Define Test evaluation matrix and worksheets • Define pass and failure criteria for the test • Assess the POC implementation's applicable hardware, software and interface components based on the use cases and additional business/functional requirements • Identify potential impacts to the DPW application/security infrastructure. • Analyze the results of the test with business, technical and performance requirements • Identify mitigate gaps in the POC implementation based on set objectives and goals. Track defects through DPW defect tracking system • Work with DPW to prioritize remediation plan • Identify and implement remediation controls • Conduct the test again with the defined use cases until we obtain the desired results.
Document and Submit Results	<ul style="list-style-type: none"> • Document the results of the POC implementation including: <ul style="list-style-type: none"> - Objectives of the POC implementation and evaluation criteria - Configuration changes to the software, hardware and interface components - Use cases - Initial gaps identified and the mitigation controls - Outcome of tests on the POC implementation. • Submit the results to the DPW CISO.

Figure 6.9-246. Activities Conducted to Perform Proof of Concept for Security Software Upgrade.

Release Coordination Management. Deloitte assists DPW with building a deployment plan, regression testing and vulnerability testing of the security software upgrade within the impacted application test environment. Our support includes facilitating recurring meetings with application stakeholders to coordinate required testing activities review and mitigating technical issues identified. Once the application stakeholders acknowledge the deployment, we submit the plan to DPW's Change Management Board (CMB) for approval.

Testing and Issue Management. We work with the application teams to develop security-related regression testing scenarios for testing system changes. During testing, we work with DPW to assess the security software upgrades by creating a list of applicable test scenarios that cover a certain prioritized portion of the application functionality We perform the tests using the regression and vulnerability tests. We track any issues through the PCR process.

Implementation Support. Once analyzed in the lower environments, we work with DPW to obtain the required approvals and deploy the security software upgrade into the production environment. If additional application modifications or security software



configuration changes are required, we coordinate with DPW and application teams to incorporate the changes in a prioritized release.

In addition, we support DPW to identify and select new security software during the course of this project. We leverage the DPW standard STD – EASS006, “COTS, Transfer Technologies and Emerging Technology Evaluation & Selection” to help DPW for evaluation and selection process.

Figure 6.9-247 summarizes our process followed for supporting upgrades to security software. We work with DPW to follow this process based on applicability of the SIEM system upgrade type.

Technology Upgrade Type	Deloitte's Process for Supporting Security IAM Software Upgrade					
	Identify Upgrade Requirement	Business Impact Analysis and Release Plan	Support Proof of Concept	Release Coordination Management	Testing and Issue Management	Implementation Support
Software Patches	No	Yes	No	Yes	Yes	Yes
Software Hot Fix	No	Yes	No	Yes	Yes	Yes
Software new release/version	Yes	Yes	Yes	Yes	Yes	Yes
New Security Software	Yes	Yes	Yes	Yes	Yes	Yes
Custom developed Security Software Upgrade	Yes	Yes	Yes	Yes	Yes	Yes

Figure 6.9-247. Deloitte's Process to Support Security IAM Software Upgrades.

Configuration Management

IV

Page
IV-392

RFP Reference: Direct Technical Support Overview

Configuration Management

- Leverage our understanding of the Enterprise Applications (HCSIS, PELICAN, iCIS, etc.) architecture, design, and operations to identify opportunities and to assist in improving Open System server performance. This includes enhance caching solutions, use of Microsoft solutions such as Web Gardening or, Monitor Server performance using tools.
- Create and maintain infrastructure documentation (system blueprints, etc.).
- Evaluate new technology, tools and best practices to mature our configuration management processes – including configuration file encryption, improved automated deployments methodologies, etc.
- Identify solutions to maximize ROI on hardware investment (web gardens, splitting the application and presentation layer, etc.) by fully using the existing capacity.
- Support upgrade planning (Windows 2008, etc.) and execution.
- Support migration of test environments to Selinsgrove to support alternative DR solutions.
- Provide configuration management solutions to best support DPW's vision of SOA and service management.

Deloitte provides demonstrated configuration management support based on our knowledge of the current technology environment to suggest performance tuning opportunities, create and maintain infrastructure documentation, use new technology to mature the configuration management process, and facilitate DPW's realization of ROI on hardware. Additionally, the Deloitte team supports software upgrade planning and execution, migration of test environments for disaster recovery, and alignment of configuration management solutions with DPW's vision of SOA and service management.

DTE will prioritize the activities outlined below as part of this section based on enterprise needs and resources available as part of the direct technical support services:

- **Open Systems Performance Improvement.** By using our knowledge of performance monitoring tools to identify performance improvement opportunities and determining architectural changes to increase that performance.
- **Create and Maintain Infrastructure Documentation.** Assisting DPW in the mapping and documenting of the various environments and updating the blueprints each time a change is introduced.
- **Evaluate New Technology, Tools and Processes.** Working with DPW to determine ways to elevate the maturity of the configuration management process for increased automation and scalability.

Key Staff Spotlight Vinod Kesavan



System Architect

"I am honored to have been part of DPW's technology transformation over the past eight years. It is rewarding to troubleshoot complicated technology issues and, more importantly, effecting process improvements to prevent them from occurring again."



- **Maximize ROI on Hardware Investments.** Providing insight into the latest technology trends and best practices to achieve more efficient utilization of hardware components.
- **Support Upgrade Planning and Execution.** Creating a DPW Product Life cycle map to increase visibility into COTS product release dates and align them with milestones of the CIO Runway.
- **Support Migration of Test Environments.** Supporting the coordination and planning of test environment migrations by accounting for key considerations to make the transition transparent to in-flight testing efforts.
- **Configuration Management Solutions that Support DPW’s SOA Vision.** Assisting in the decoupling of web services from applications to increase the flexibility and agility of service deployment.

Benefits to DPW

Deloitte brings:

- Knowledgeable Configuration Management Team with DPW system-specific experience developed over 10 years, thus equipped with a deep knowledge of the intricacies of the complex DPW infrastructure.
- Knowledge of using DPW standard standards, tools and processes.
- Demonstrated use of automation in health checks, alerts and techniques that reduce troubleshooting time, enhance quality, and support new ITIL aligned configuration management process development.

Figure 6.9-248 highlights our understanding of the key components of providing configuration support to DPW.

Applications	Deloitte’s Understanding of System Specifics for Configuration Management
iCIS	<p>CIS, TPL, IEVS – Migrations for CIS are typically performed for online transactions during the batch window and during downtime for batch transactions to reduce downtime for the system</p> <p>COMPASS – Deployments for COMPASS depend on coordination with eCIS, CIS, HCSIS, PELICAN and CAPS that processes application collected via the self-service portal</p> <p>eCIS – The eCIS application depends on nearly 100 real-time mainframe interfaces that must be validated and deployed for any platform migrations</p>
HCSIS	HCSIS deployments require additional planning and coordination for testing and validation, as application functionality differs greatly based on the 230 unique security contexts that exist within the application
PACSES	<p>PACSES Mainframe – Follows an independent configuration management process as approved by BIS and DACSES stakeholders</p> <p>PACSES Open Systems – The PACSES Homepage is hosted outside of DPW’s infrastructure at OA/OIT’s datacenter, requiring additional coordination and testing</p>
PELICAN	PELICAN PPCS migrations are performed to both servers in the DPH in Harrisburg, as well as on to tablet PCs in distributed locations throughout Pennsylvania at the same time
Child Welfare	ChildLine is a thick client application which requires deployment to multiple desktop PCs and a centralized database



Applications	Deloitte’s Understanding of System Specifics for Configuration Management
Enterprise Services	MCI.NET and ELN are able to take advantage of new service hosting technologies present in Windows Server 2008 R2 and IIS 7.5 to increase availability and performance

Table 6.9-248. Key System Characteristics Specific to Configuration Management.

Open Systems Performance Improvement

Deloitte identifies opportunities for Open Systems performance improvements based on our understanding of DPW’s Enterprise Applications,.

Monitoring open systems application performance begins with our deep knowledge of the tools used by the Department to analyze server performance and identify improvement opportunities. These tools include:

- **SightLine.** Used to collect, analyze and correlate system performance counters, such as CPU utilization, memory, and disk I/O and network performance. These counters are tracked and recorded.
- **BMC AppSight.** Used to perform deep-dive analysis into system issues, including instrumentation of code and tracing from the user’s desktop, to the web servers and through the technology stack to databases or service calls
- **Concord.** Used to monitor network utilization, and end-user experience, including server, network and client response times during production testing
- **Microsoft PAL (Performance Analysis of Logs).** Used to analyze server performance in relation to the active requests within the IIS web server at a point in time

DPW regularly reviews the results gathered using these tools. During this review, we work with DPW to investigate the root causes of any anomalies that may be impacting performance. We recognize that some items may require an application code change to correct, and for these we work with DPW to file non-functional PCRs to document and prioritize maintenance activities to address any necessary application software changes.

Implement Architectural Changes to Increase Performance

Deloitte works with DPW to assess the applicability of architectural changes that could improve that performance when performance opportunities are identified. Support for assessing these technologies is based on DPW priorities and may include proof-of-concept efforts, standing up additional versions of the application to test, or applying changes to servers currently hosting the environments. Deloitte is prepared to work with DPW to apply architecture changes as described in Figure 6.9-249 below.



DPW Solution	Deloitte's Approach Increases System Performance
Application/Distributed Caching	Implements in-memory or out-of-process caches to store data that is being used for user processing. This reduces the amount of time needed to retrieve records from the database, as well as the number of connections and the workload of the database or web services providing data to application systems
Static Content Caching	Static Content Caching tunes the web server to ask web browsers, such as Internet Explorer, to retain items in their local cache that do not change frequently, such as in-page images, cascading style sheets, and JavaScript or Flash objects. By caching these items for a period of time, the number of requests to the server, and the associated network impact for transmitting these resources is reduced
HTTP Compression	By using IIS, it is possible to identify resources that can be transparently compressed prior to their transmission over the network. This compression can happen on-the-fly, and can reduce the transmission time and network consumption. Although this would reduce network utilization, the trade-off is that the compression activity occurs on the web servers, and may require additional CPU cycles
SSL Offloading	DPW's ACE load balancers support the use of SSL offloading, which moves the processing requirements of securing and encrypting the requests and responses off of the web servers and to dedicated hardware appliances. This reduces CPU and memory requirements on the web servers and can free resources for additional request processing
Web Gardening	Web Gardening runs multiple parallel copies of an ASP.NET web application within a server. This launches multiple .NET application pools, which allow each process to use up to 2GB of memory, and to maintain their own resource connection pools, such as connections to the database. Within DPW's enterprise servers, web gardening can, in some cases, provide the most efficient use of large, multi-core and high-memory servers

Figure 6.9-249. Deloitte's Understanding of Potential Architectural Changes to Improve Performance.

After applying these changes, our team works with DPW to perform detailed monitoring, as described above and helps to analyze the impact of these changes on the DPW systems.

Create and Maintain Infrastructure Documentation

Deloitte creates and maintains business system blueprint documentation to provide details of the relationships between systems, servers and applications, which constitute the backbone of DPW's information technology platform.

To support the wide variety of business needs and functional requirements of DPW's program areas, the technical infrastructure requires an equally wide variety of servers, databases and software products. This documentation is a very important tool in performing design and issue and problem resolution activities while supporting DPW's infrastructure composed of a number of applications, external business partners, and a growing set of enterprise services.

As part of our overall design and development approach, Deloitte maintains system blueprint documentation, works with DPW to review and validate changes, and proposes, finalizes and communicates the updated version to stakeholders through the Architecture Review Board process. Deloitte's process for maintaining system blueprint documentation is depicted in Figure 6.9-250 below.



PA_DPW-967

Figure 6.9-250. Systems Blueprint Maintenance Process.

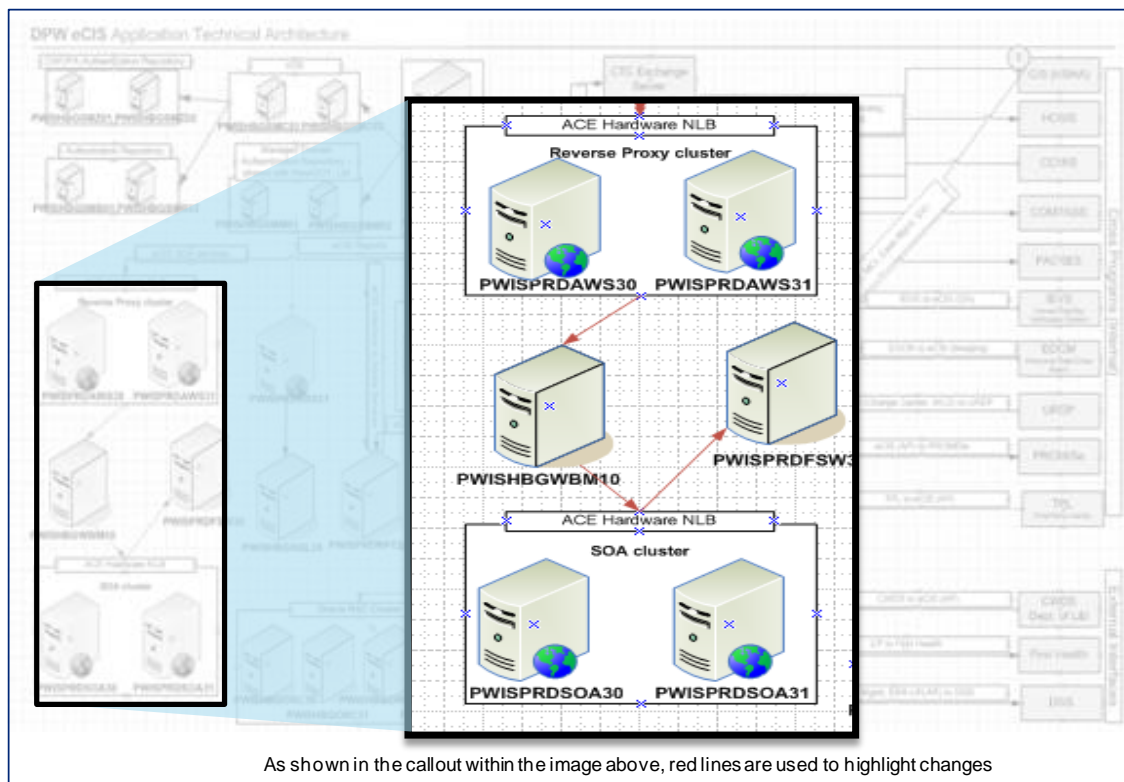
Deloitte maintains Architecture and Infrastructure systems blueprints for all in-scope systems using our Systems Blueprint Maintenance Process, in alignment with DPW's Architecture Review Board.

During each release, Deloitte maintains the system blueprint using the following steps:

- **Identify Blueprint Changes.** During the detailed system design (DSD) phase of each release, our architects work with DPW to determine any required changes to application interfaces, external data sources, servers or network topology and include them in the design documentation.
- **Update Architecture and Infrastructure Blueprints.** Once design details have been collected, Deloitte reviews the relevant blueprints and make any needed updates.
- **Review Blueprints at ARB II.** The draft blueprints are presented and reviewed during the ARB II during the DSD phase of the release.
- **Present Final Blueprints at ARB IV.** After incorporating any comments from the ARB II, and finalizing and executing the approach to deliver the release, the final system blueprints are presented as part of the ARB IV meeting with DPW.
- **Identify Blueprint Changes.** During design, any architectural changes which need to be reflected in the blueprints are identified and communicated to stakeholders at DPW. Changes depicted in the blueprint include:
 - Changes to servers, storage or other hardware
 - Any new or changed COTS products consumed by the application
 - Network topology changes, including new switches, routers, or load balancing devices
 - Service and interface calls, including messaging, web services or significant file transfers
 - Any identified changes are included in design documentation as well as the systems blueprints
- **Update Architecture and Infrastructure Blueprints.** We work with BIS to confirm and modify the blueprint documentation after potential changes to the blueprint are

identified. Communication of proposed changes occurs during stakeholder communication meetings with each affected domain. If needed, additional required meetings or review sessions are scheduled.

- **Review Blueprints at ARB II.** Deloitte presents the Architecture and Infrastructure blueprint diagrams to DPW during the ARB II meeting, which occurs during the DSD phase of the software development life cycle. For the review, we highlight all new applications, interfaces and infrastructure components and walk through these proposed changes in detail. Figure 6.9-251 below is a sample of the Architecture blueprint for the eCIS application.



PA_DPW-1330_2

Figure 6.9-251. Sample Application Technical Architecture Blueprint.

During the ARB II meeting, the Architecture and Infrastructure blueprints are presented and reviewed in detail. The raised highlight shows detail of a section that has changed as part of a release.

In this case, new interfaces and service calls between the security, middleware and SOA servers were added as part of this release. These proposed interfaces are reviewed with DPW stakeholders and comments are accepted for inclusion during development and testing during the ARB II meeting.

Present Final Blueprint at ARB IV. Deloitte works with DPW to confirm the systems blueprint diagrams during the ARB IV. During this review, we also confirm that we follow standards and accurately depict them in the blueprint documentation. The final versions of these drawings are stored and versioned within DPW's documentation repository, Docushare.



Evaluate New Technology, Tools, and Processes

Deloitte uses our global resources to evaluate new technologies, tools and best practices for maturing the configuration management processes at DPW.

The DPW technology environment continues to grow in size to accommodate the increased demands on the enterprise. The current solution of having a user execute an automated script for deploying code to each application server followed by exhaustive manual testing to validate that configuration settings are correct is beginning to strain the CM personnel due to the sheer number of servers involved in an application release. Additionally, the configuration management processes that support your infrastructure must scale to maintain consistent system performance. Two ways to accomplish this are through configuration file encryption and increased automation in application deployments.

Configuration File Encryption

Microsoft's .NET Framework 2.0 and higher versions provide a robust encryption and key generation facility to securely sign and encrypt credentials within configuration files. Using this mechanism, configuration information is encrypted using a machine-specific private key, which is stored in a protected location within the operating system. These keys are automatically used by .NET to decrypt information when needed to establish connections or to use credentials, but protects these credentials from staff with access to read configuration files. In addition, this same configuration can be used across batch, web, .NET, and COTS products seamlessly.

Image-Based Deployments

Deloitte recognizes the significant investments DPW has made in virtualization of the open systems environment. In the past two years DPW has increased the footprint of VMWare. Deloitte has helped the Department to use image-based creation of new machines, significantly reducing the time required to provision and configure new servers during load testing and proof of concept efforts. VMWare can also offer similar benefits for deploying application releases.

We view the next evolution of DPW's configuration management methodologies as the exploration of image-based application deployments. Instead of pushing software changes to each different server, as done currently, image based deployments allow for the creation and distribution of a single deployment image that contains all configuration parameters, software, libraries, and dependencies required for a particular release. An additional benefit is that DPW can create a master deployment image to validate in advance with one or more temporary virtual servers. This approach has the industry-proven potential to significantly reduce a migration's complexity and elapsed time as compared to the current model.



Identify Solutions to Maximize ROI on Hardware

Deloitte assists DPW in identifying solutions that maximize ROI on hardware investments, and strategies to fully use existing capacity by using our technical expertise of DPW's systems and applications.

We recognize that building an infrastructure as complex and diverse as the one at DPW requires a significant investment in hardware. These components serve as the foundation for providing service delivery across the enterprise. DPW derive the full value from these investments by maximizing the efficient use of the resources on servers, databases, and other components. Deloitte can help DPW reduce the amount of hardware needed to support end users and drive down the costs of hardware overhead by using the solutions described in Table 6.9-252 to accomplish this goal:

DPW Solution	Deloitte's Approach Increases System Performance
Server virtualization	Allows for more efficient mapping of resources to application needs by dividing the overall capabilities of a single physical server across multiple virtual machines
Web gardening	Standard functionality of Microsoft Internet Information Service (IIS) that allows for launching multiple application pools, which increase concurrency and balance resources, such as connection pools, over a larger surface area of the machine
Cloud computing	Allows for rapid adjustments in server footprint to accommodate unexpected or seasonal business demand. For example, a mass rate change could require additional processing power to generate hundreds of thousands of correspondences in a single weekend, but such a need only arises a few times a year. By using a public cloud, a set of resources can temporarily be leased and assigned to the mass rate change, and then released back into the cloud after the completion of the activity
Server centralization	Opportunities for server centralization bring county functionality to a central machine, reducing operational, infrastructure, and licensing costs
Localization of processing	This solution primarily applies to batch processing and uses Windows Management Instrumentation (WMI) calls to distribute batch execution across different servers in the fashion of a hub and spoke architecture
Information life cycle management (ILM)	ILM practices allow storage to more efficiently use different tiers of hardware to manage overall operation costs. Mission critical, real-time data is stored on higher performance hard disks while less frequently accessed data is transferred to slower, less expensive drives
Rich Internet Applications (RIA)	RIA applications transfer workload from the DPW servers to the client machines accessing them through technologies such as Adobe Flash. A server sends a flash file only once, and the remainder of communication is simple data transfer. In this way, RIA allows one server to handle more concurrent usage
Caching	Improves the response time of DPW servers and databases by storing frequently requested pages or data sets in memory, freeing database resources to perform more complex tasks



DPW Solution	Deloitte's Approach Increases System Performance
Splitting of application and presentation layers	Although this solution may require additional investments in hardware and application redesign, the long term benefit of splitting the application and presentation layers is a much more scalable platform to deliver content to end users that may reduce application maintenance overhead. In addition to splitting layers, the same type of paradigm applies to distributed caching platforms such as Microsoft AppFabric, which provide efficient, out of process cache to reduce database and web server processing requirements

Figure 6.9-252. Deloitte's Approach Helps DPW Reduce Hardware Needs and Drive Down the Costs.

Deloitte assists in an evaluation of the potential impacts to the applications and if the current infrastructure can support the proposed change prior to undertaking any of these solutions within DPW. Additionally, we use Deloitte research and experience to identify any new products and changes to existing products that may provide an increased ROI on hardware investments. Deloitte works with DPW to standardize an implementation approach.

Support Upgrade Planning and Execution

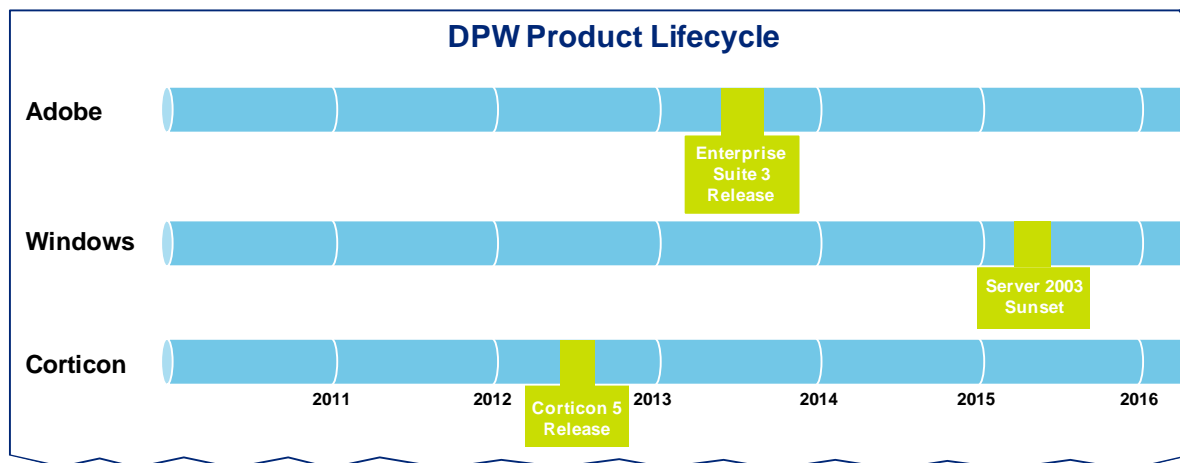
Deloitte provides effective support during the planning and execution of upgrades to the operating system, including Windows Server 2008.

We recognize the need for DPW to plan for upgrades to software and operating systems as new features are released and products approach their end-of-life dates. Our team collaborates with DPW to identify operating systems and COTS product upgrades, assists in the analysis of upcoming changes and releases, including defining the impact to in-scope systems, and to create an upgrade deployment strategy that aligns with application deployment target dates.

Configuration Management Upgrade Planning

Deloitte's upgrade planning approach for operating systems and COTS software considers the entire life cycle of the product. New releases bring additional features that can potentially enhance or automate business processes. Windows 2008 is an example of such a release and allows for a transition from 32-bit servers to 64-bit architecture for servers where the hardware is able to support this configuration. A 64-bit server configuration allows .NET applications to use additional system memory to maximize the contribution that each server makes in supporting the workload of end users.

After the initial release, intermediate releases (e.g., service packs) and patches are deployed over the course of a product's lifespan. Finally, a product experiences its "sunset," or end-of-life, at which time vendor support ends, requiring some kind of software update. Our first step to define an effective upgrade strategy is to understand all the vendors that supply software to DPW and create a roadmap that illustrates the lifecycles for each vendor's products. Figure 6.9-253 below shows a representative sample of the roadmap we provide:



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Figure 6.9-253. DPW Product Life Cycle.

Understanding the upcoming release schedule for each of DPW's third-party software vendors allows for proactive upgrade strategy planning for implementing an upgrade or retiring an out of support product.

We provide a simple way to understand how product lifecycles affect the development of DPW systems by visualizing the life cycle timelines for each vendor. This diagram, which is aligned with the CIO Runway, allows for gathering key stakeholders well in advance of a product release or retirement and to make any necessary changes to system design requirements. We also provide planning assistance to understand and mitigate any potential risks that may arise from multiple concurrent changes or upgrades to COTS products.

Integrating with the CIO Runway

Planning support for operating systems upgrades begins with DPW's annual planning and prioritization process. During this time, scoping and high-level timelines are determined for the upgrade effort by aligning the CIO Runway with the Product Roadmap. Deloitte assists in thoroughly understanding the changes and/or new features contained in the new release before the implementation of any software upgrades into the DPW environment,. This includes potential impacts to the applications and if the current infrastructure supports the proposed change. Based on the outcome of our analysis, DPW can choose to:

- **Adopt the New or Changed Product.** The request is prioritized for inclusion with a planned release through the non-functional PCR process, or
- **Pass or Defer to a Later Version.** Not every product upgrade has features that provide enough value to outweigh the effort of implementation.

At the request of DPW, Deloitte conducts proof of concepts to determine the value a solution brings to your organization. Once the stakeholders approve, we update the ALM baseline for each application to reflect the product version required for compliance. We then work with DPW to standardize an implementation approach across in-scope systems, if possible.



We work with DPW to review each application's baseline release schedule and coordinate the upgrade timeline within the schedule once DPW prioritizes the upgrade. Deloitte significantly reduces the amount of testing required for upgrade execution by aligning an upgrade timeline with application development efforts.

Support Migration of Test Environments

The Deloitte team provides support for the migration of DPW test environments to Selinsgrove as an alternative disaster recovery (DR) solution.

Having a disaster recovery solution in place provides for business continuity in the event that normal operations are significantly disrupted in Harrisburg. A second, off-site environment that closely mirrors the current production environment provides the capability to continue serving end users while restoring the primary infrastructure. Currently, a third party vendor, Sungard, in Philadelphia provides the DPW DR solution. We understand your desire to reduce costs by migrating test environments to Selinsgrove and managing disaster recovery in-house. Should the need arise, savings are realized by moving the Systems Acceptance Testing (SAT) environment, which runs on a platform capable of production-level support, offsite and having it serve as the DR environment. DPW eliminates the overhead of maintaining an entirely separate infrastructure that remains idle outside of recovery scenarios by having the test environments serve this dual purpose.

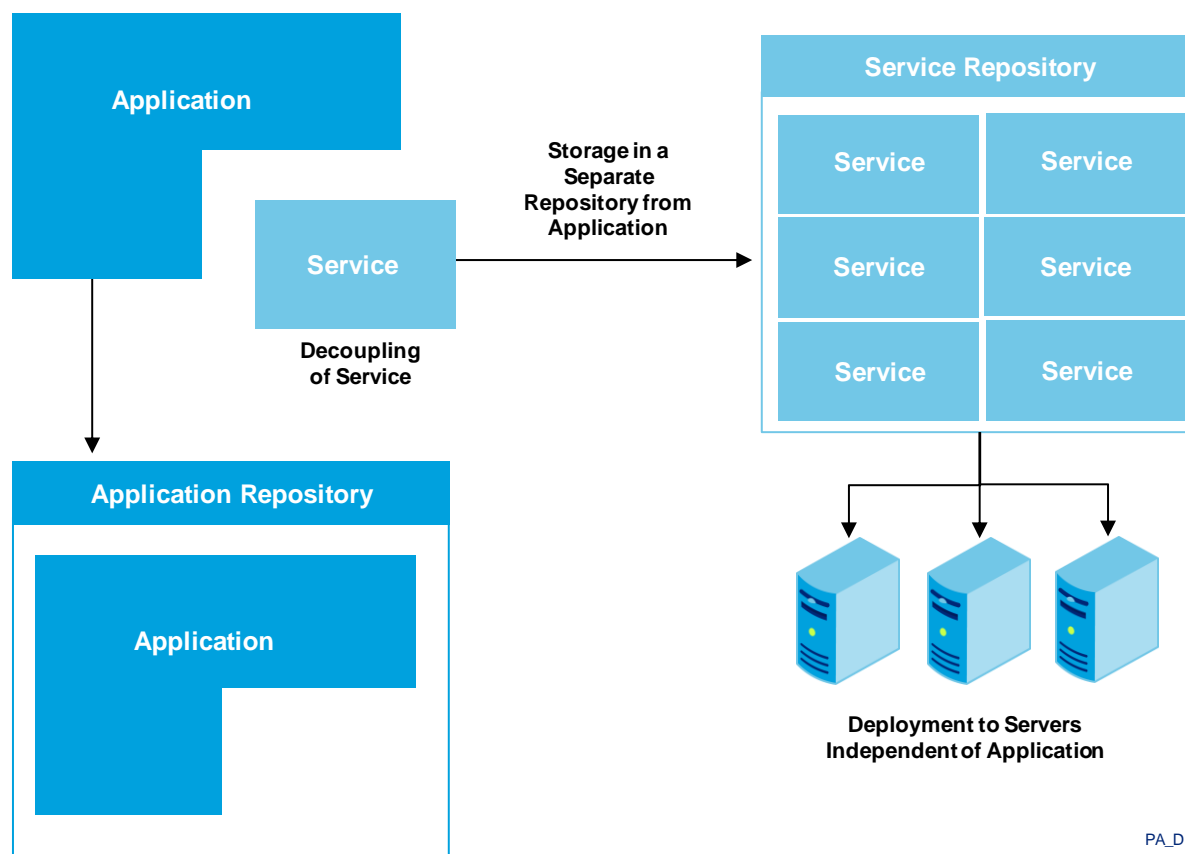
Our team participates in the planning and coordination of test environment migrations by working with DPW to form a strategy that minimizes adverse impact to in-flight initiatives based around the following key considerations:

- **Network Capacity Testing.** Moving the test environment infrastructure to another physical location introduces the possibility of a change in application responsiveness due to increased network hops or outside traffic interference.
- **Communication with External Partners.** Many testing scenarios depend on the exchange with test data with external agencies into and out of non-production environments. Any changes to server IP addresses for both the test environments and the new DR environment need to be communicated to business partners and updated in DPW tools for secure file transfer, such as MoveIT and eGOV.
- **Environment Stability.** Thorough testing is required to provide confirmation that all components function seamlessly in a stable fashion before any test environment cutovers. For ongoing stability, DPW needs to determine how to address infrastructure issues, such as hardware failures, at a remote location in such a way as to minimize the impact on testing efforts.
- **Environment Cutover.** Establish temporary parallel environments while the Selinsgrove infrastructure is set up in order to provide for uninterrupted testing of initiatives. In doing so, the environment cutover becomes transparent to testers.

Provide Configuration Management Solutions

Deloitte provides effective configuration management solutions to best support DPW's vision of SOA and service management.

The modular nature of service oriented architecture enables businesses to use standardized, reusable discrete business functions across the enterprise. Deloitte offers insight into improving the flexibility and agility of configuration management as DPW continues to progress toward the goal of becoming an industrial, SOA-centric organization. As depicted in Figure 6.9-254 below, the process of deploying changes to a service becomes much more efficient by decoupling a business function from an application.



PA_DPW-1343

Figure 6.9-254. SOA Configuration Management Solution.

Separating technical and business services from the overall application is the highlight of the modular nature of SOA and allows service-based deployments to occur independently of application deployments.

- **Decoupling of Service.** Deloitte follows the Application Review Board (ARB) process to identify any application functionality that can serve as a candidate for transformation into an enterprise service, following the SOA principle of using preexisting services to satisfy mission needs rather than creating different ones for each system. This functionality is carved out of the application to serve the enterprise as a “black box” service, meaning that no customization or special configuration is needed for consumption.



- **Storage in a Separate Source Code Repository.** Once a service is exposed to the entire enterprise, it no longer exists as part of the parent system's codebase. The establishment of a separate repository in a product such as TFS allows for centralized management of all enterprise services by a single team.
- **Independent Deployment to Servers.** Service testing and deployments can also occur separately from an application release because the enterprise services exist as separate logical and physical entities from the code base, and applications that consume them.

To take full advantage of new services, Deloitte assists DPW in the configuration of server Internet Information Service (IIS) as a high-availability environment by using tools available at DPW, such as web gardening, load balancing, and server clustering.

Deloitte has developed a collective understanding about how to configure and support high-availability services in the DPW environment while working with DPW to implement your first set of enterprise services. For example, we understand the need to modify the default configuration of each service-hosting application pool in IIS, to proactively prevent them from entering an idle state and causing interruptions to systems consuming web services.



Database Administration

IV

Page
IV-392

RFP Reference: Direct Technical Support Overview

Database Administration

- Assist in researching, defining, and implementing an Information Life Cycle Strategy.
- Perform OLTP Query Performance tuning.
- Perform PL/SQL Code reviews to ensure code is efficient and adheres to best practices.
- Review and optimize Open Systems Batch queries and processes.
- Assist in the Open Systems Database Backup/Recovery and Disaster Recovery processes.
- Review logical and physical database designs.
- Monitor database performance; identify and implement tuning opportunities.
- Provide application deployment support.
- Apply database software patches and upgrades.
- Develop database related maintenance processes and/or utilities.
- Assist in developing database related standards and best practices.
- Research and resolve issues related to the Database and/or application interaction with the Database.

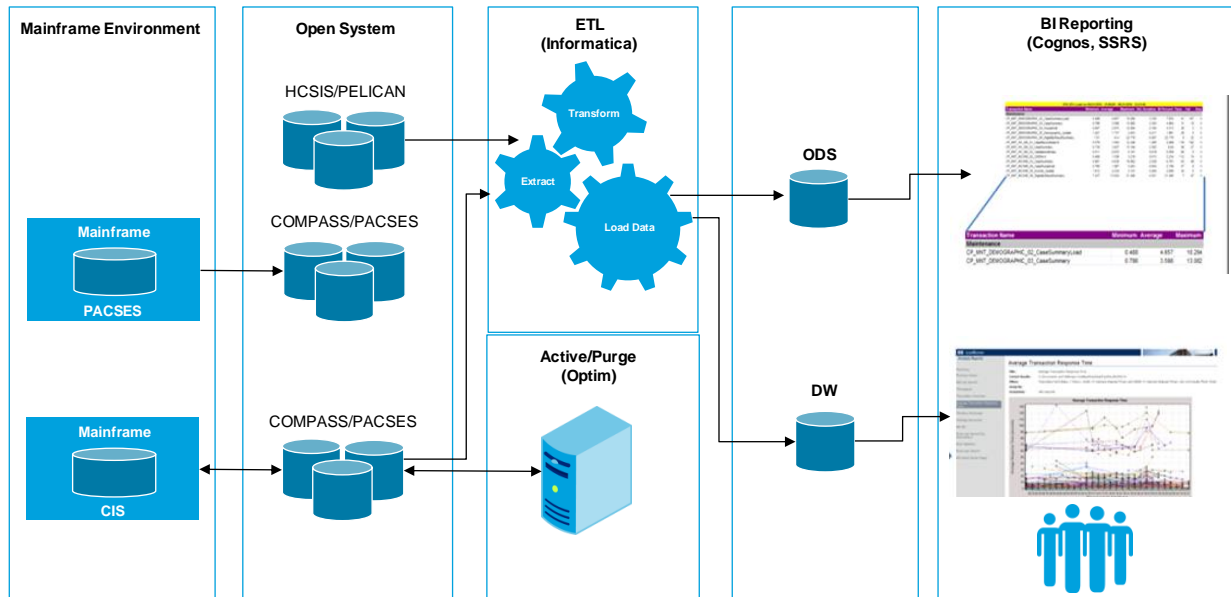
Deloitte's DTSS resources provide effective database support through our demonstrated approach to database design, administration and tuning. Our team provides strategic Information Life cycle Management implementations and standards based code reviews that play a pivotal role in helping DPW maintain an extendable, scalable and fault tolerant database infrastructure that meets the operational needs of the business. Our DTSS team works with DPW for proactive troubleshooting, performance tuning and batch query optimization activities that support DPW's need to process millions of transactions per day, store terabytes of critical enterprise data and safely secure and manage sensitive information.

DPW enterprise data infrastructure rests on multiple technical platforms, including Unisys DMS/RDMS, Oracle and SQL Server repositories. DPW enterprise databases numerous applications, through controlled access from application servers, batch servers and reporting components. Within the 'data layer', information is exchanged between platforms and reporting solutions as illustrated in Figure 6.9-255 below.

Key Staff Spotlight Ravinder Bhalla



"I am excited to be part of the DPW Database Team, assisting in keeping the complex database environment current with the latest in technology. It is rewarding to realize that DPW applications process millions of transactions every day that affect the lives of the people of Pennsylvania."



PA_DPW-1348

Figure 6.9-255. Overview of DPW Database Platform.

Deloitte has helped DPW create standard information management techniques for effective use of data storage assets, reporting and legacy data integration with open systems.

In addition to database design support, Deloitte’s DTSS team assists DPW in database resource planning execution, monitoring database performance, deployment support and software upgrades. Our team also assists the BIS database team in developing database related standards and best practices, database maintenance tools and utilities and researching issues pertaining to database interactions with applications.

Our DTSS team has vast experience supporting the DPW enterprise systems and understands the unique support considerations of each, including:

Benefits to DPW

Deloitte brings:

- Access to Deloitte’s technology practice and product alliances with Oracle, IBM and Unisys to bring in best practices for DPW.
- Best practice database design approaches and models from similar HHS systems in other states for enhanced design efficiency and quality.

Application	Deloitte’s Understanding of In Scope System Database Characteristics
iCIS	The e-CIS and COMPASS solutions use Oracle’s Advanced Queue and XML data type respectively to support business operations. This requires enhanced knowledge of Oracle’s database infrastructure to manage.
PACES	PACES makes extensive use of batch ETL process to load critical data from the mainframe to the Open System suite of applications. This process must remain highly tuned to meet business availability and performance expectations.
HCSIS	HCSIS uses Oracle’s Fine Grained Access Control which dynamically appends search criteria to operational queries. FGA must be fully understood to provide strategic and tactical support to the HCSIS user community.



Application	Deloitte's Understanding of In Scope System Database Characteristics
PELICAN	Pelican Provider Certification uses disconnected processing to support the electronic collection of provider certification data. The table PC's use a local SQL Server database that must be closely managed and supported to verify data is passed to the central system accurately.
Child Welfare	The Child Welfare suite of applications uses multiple databases technologies that are opportunities to align with DPW standards. Specifically, the current Child Welfare applications support SQL Server database and a number of instances of ACCESS database.
Enterprise Services	DPW's suite of Enterprise Services is built primarily on Oracle technologies that must scale to meet the needs of multiple enterprise class applications. This includes critical monitoring and tuning in the production environment to verify availability and scalability.

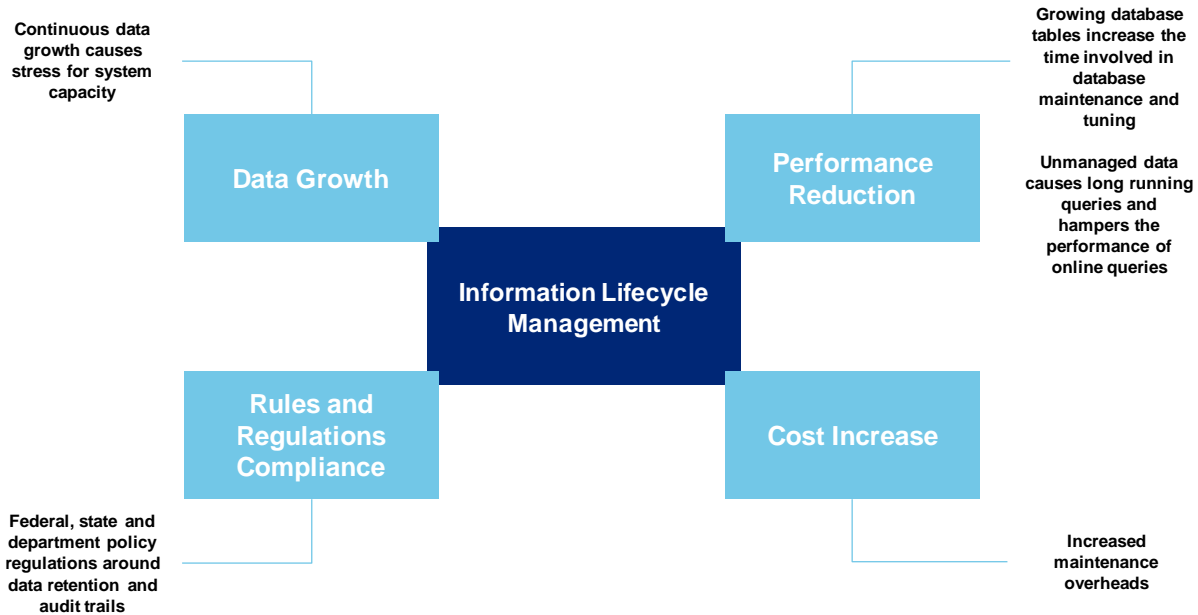
Figure 6.9-256. Deloitte Understands Key System Characteristics That Require Specialized Database Support.

Deloitte's DTSS team works with DPW to effectively manage the various aspects of Open Systems database administration activities. DTE will prioritize the activities outlined as part of this section based on enterprise database needs and resources available as part of the direct technical support services:

- Assist in researching, defining, and implementing an Information Life cycle Strategy
- Perform OLTP query performance tuning
- Perform PL/SQL code reviews to confirm code is efficient and adheres to best practices
- Review and optimize open systems batch queries and processes
- Assist in the open systems database backup/recovery and DR processes
- Review logical and physical database designs
- Monitor database performance; identify and implement tuning opportunities
- Provide application deployment support
- Apply database software patches and upgrades
- Develop database related maintenance processes and/or utilities
- Assist in developing database related standards and best practices
- Research and resolve issues related to the database and/or application interaction with the database

Assist in Researching, Defining, and Implementing an Information Life Cycle Strategy

Information Life cycle Management (ILM), illustrated below in Figure 6.9-257, is systematic control of recorded information from the time information is created until it is disposed.



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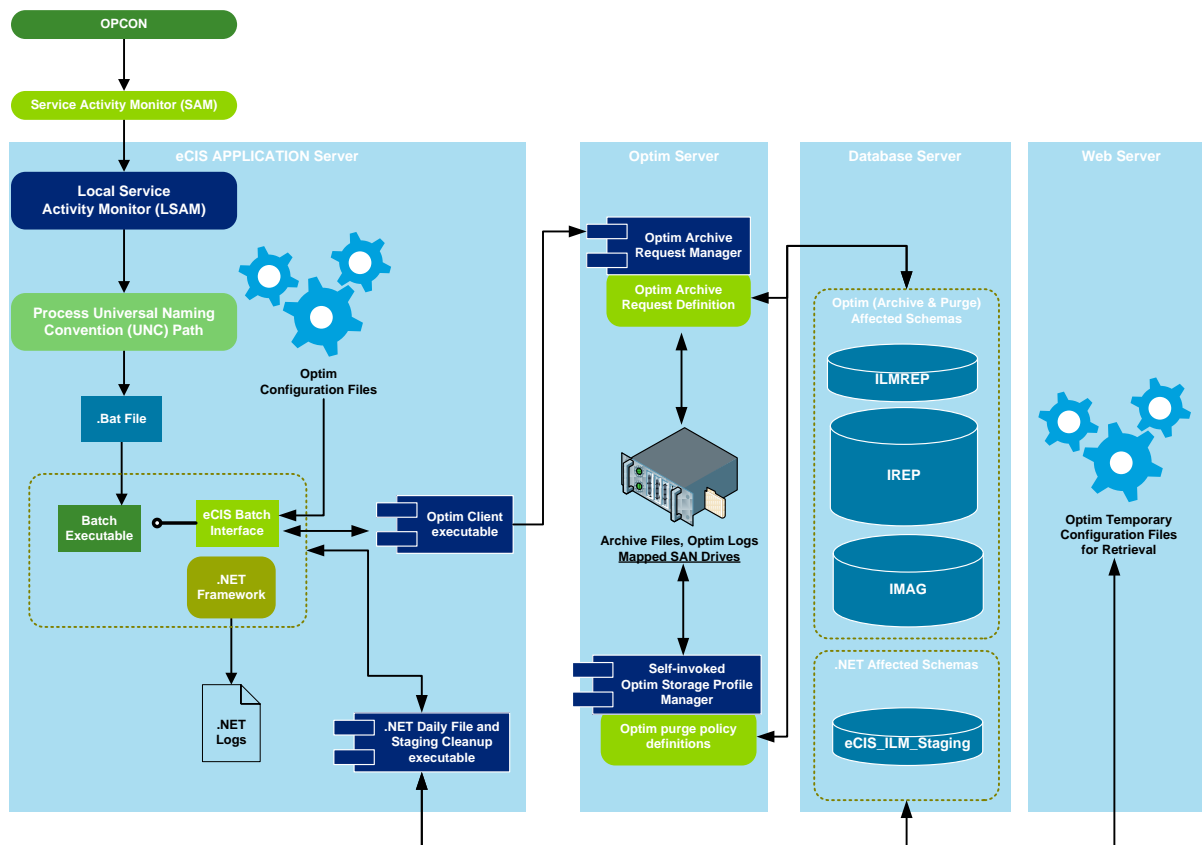
Figure 6.9-257. Deloitte Understands the Factors That Drive Effective Information Life cycle Management.

Deloitte has helped DPW create their Information Life cycle Management (ILM) strategy for effective use of data storage assets and enterprise infrastructure.

The DPW ILM strategy facilitates the move of infrequently used documents and data from premium high speed storage to a lower cost archival medium. This approach maximizes the hardware investment by using the fastest, most expensive disk for most frequently data. Infrequently accessed data can be stored on cheaper disk that provides vast amounts of capacity for the storage dollar.

The Architectural Review Board process considers the ILM aspects of an initiative. Initiatives that need to address advanced data management for transactional data as part of their ILM requirements use the DPW standard tool of choice, IBM's Optim. Deloitte has experience managing ILM initiatives within DPW. Our implementation of the Imaging archive solution, highlighted in Figure 6.9-258, was DPW's first production solution to use Optim.

As part of Deloitte's DTSS activities, we work with DPW to identify opportunities to mature the ILM solution with DPW and to expand the volume of data managed through the ILM process.



PA_DPW-1347

Figure 6.9-258. ILM Implementation Architecture.

Deloitte's DTSS team possesses an in-depth understanding of your technology infrastructure that helps DPW with implementing advanced ILM strategies that maximize both software and hardware infrastructure capabilities.

The Deloitte DTSS team works with the development team throughout the database design activities to identify opportunities for maximizing data storage and strategizing different types of ILM strategies. We help DPW with the administration of ILM COTS products such as Optim across environments by performing activities such as:

- Archiving file monitoring and management
- Configuring Optim instances across all environments
- Managing software upgrades and patch deployments for Optim servers
- Performing ad hoc queries using Optim studio based on requests received by BIS
- Monitoring production ILM batch logs generated within Optim
- Performing tiered storage management within the Optim administrative console to help DPW minimize disk usage costs

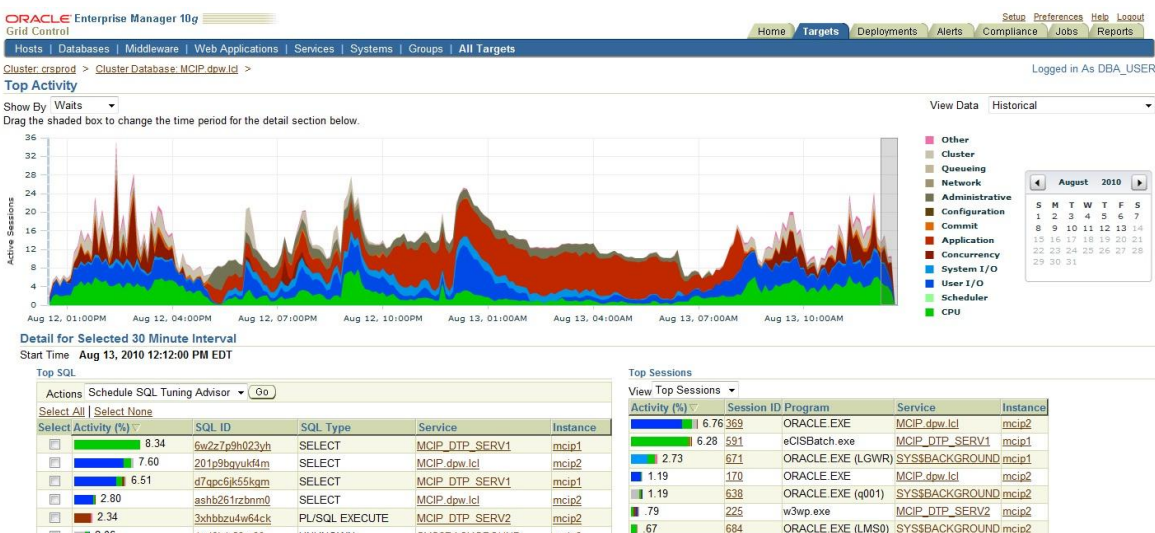
Perform OLTP Query Performance Tuning

The Deloitte team works proactively to identify performance tuning opportunities. The proactive monitoring and tuning of OLTP queries is crucial to maintain the needs of the

business and to extend the hardware investment. Our DTSS DBA's work to maintain strong operational performance by:

- Performing periodic health checks in production.
- Monitoring and identifying production database queries for performance degradation and determining a solution to address.
- Reviewing query performance reports with BIS DBA management for escalation to ITSS DBA's for review.
- Reviewing submitted or defining new database design and tuning solutions in support of project initiatives.
- Verifying design and tuning solutions adhere to DPW standards and strategic vision
- Reviewing and Verifying load testing approaches, execution and results in preparation for production deployments.
- Assisting DPW in reviewing and implementing deployment strategies for performance fixes.

As displayed in Figure 6.9-259 below, the DTSS team monitors the overall database health and performs trend analysis using Oracle Enterprise Manager, a key tool used by the DTSS team.



PA_DPW-1229

Figure 6.9-259. Oracle Enterprise Manager Grid Control Performance Page.

Deloitte's DTSS team monitors the overall database health using OEM to view performance statistics over a period of time for trend analysis.

Perform PL/SQL Code Reviews

DTSS DBA's perform PL/SQL Code reviews for code efficiency and adherence standards and best practices. As part of this code review, Deloitte's DTSS team focuses on the following:

- Proper naming of packages and stored procedures
- Appropriate database users having package execute privileges
- Declaration of parameters and variables in PL/SQL code
- Completeness of exception and error handling scenarios within the code
- Alignment and readability of code
- Appropriate joins conditions and where clause conditions
- Appropriate use of table aliases
- Appropriate comments for major PL/SQL code change
- Appropriate comments to track the change history
- Appropriate coding techniques within statements

As part of the tool based review of the PL/SQL code, the DTSS DBA's verify an explain plan to identify performance bottlenecks. They use tools such as Transient Kernel Profiler (TKPROF). The results from these reviews are discussed in detail with the application team for potential code alteration to proactively address potential performance concerns.

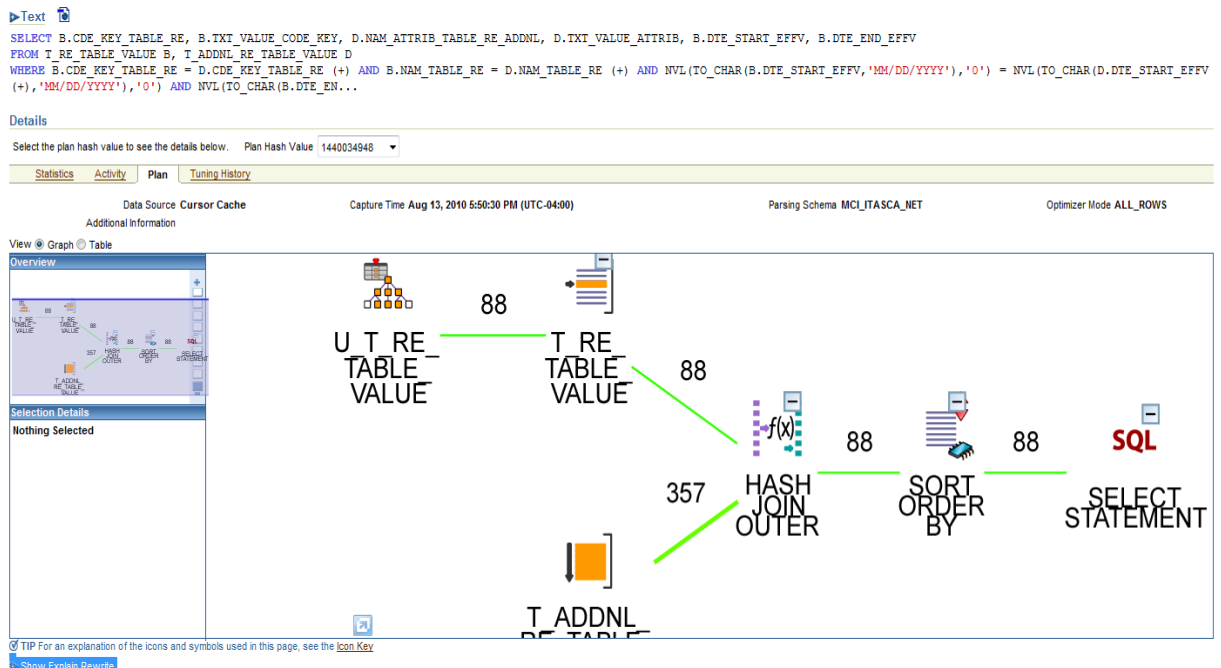


Figure 6.9-260. Sample Explain Plan.
Deloitte DTSS team utilizes TKPROF to review explain plans for PL/SQL code.

Review and Optimize Batch Queries and Processes

Deloitte DTSS DBA's review PL/SQL batch queries as part of the code review processes. As illustrated in Figure 6.9-261 below, DPW uses the Oracle Enterprise Manager Utilities to identify performance trends and tuning opportunities on existing batch queries as part of execution against large data volumes. As data volume

processed by batch increases over a period of time, the DTSS DBA's are able to identify tuning needs. Additional optimization potential is identified through the further analysis using explain plans. For details on how the identification and optimization process works for those, please refer to database support performance tuning process.

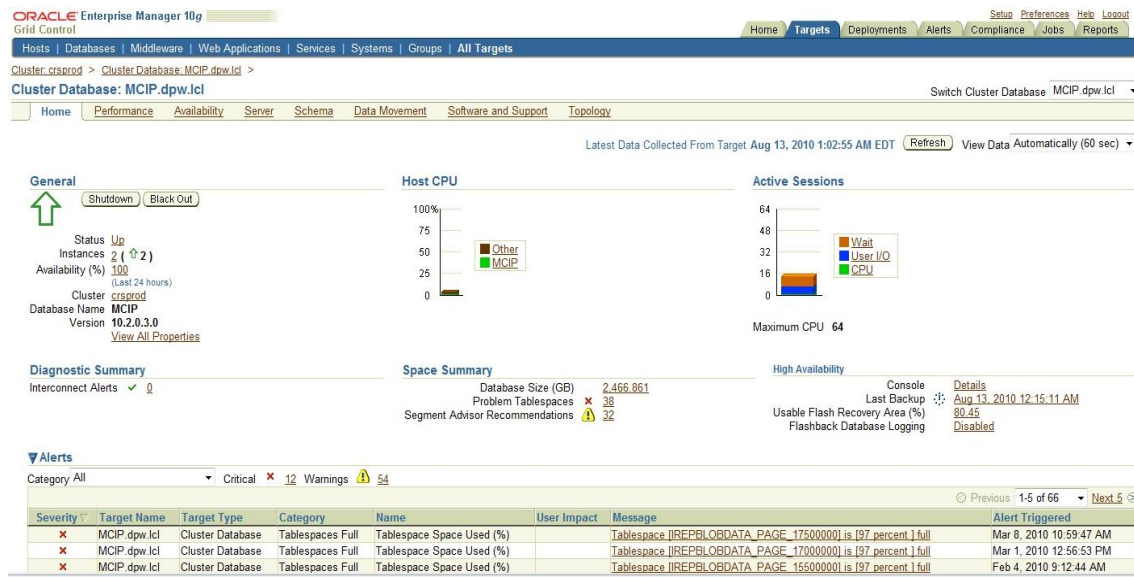


Figure 6.9-261. Oracle Enterprise Manager Batch Query Monitoring.
Deloitte DTSS team monitors production database to identify performance degradation during batch window.

The specific activities that a DTSS DBA performs for batch query performance tuning are:

- Perform periodic health checks in production
- Monitor production database queries for performance degradation and identify problematic queries
- Review query performance reports with DPW and application teams
- Review design for performance tuning fixes with DPW and application teams
- Help DPW review data volume testing results around batch queries
- Help DPW in reviewing and implementing deployment strategies for performance fixes

Assist in Database Backup/Recovery Process

The Deloitte DTSS DBA's perform backup and recovery tasks in accordance with the DPW Enterprise data backup and recovery guidelines. DPW utilizes the Veritas network backup solution. The Deloitte DTSS team assists DPW in configuring backup solutions and recovery mechanisms based on business criticality, application complexity and disaster recovery requirements.

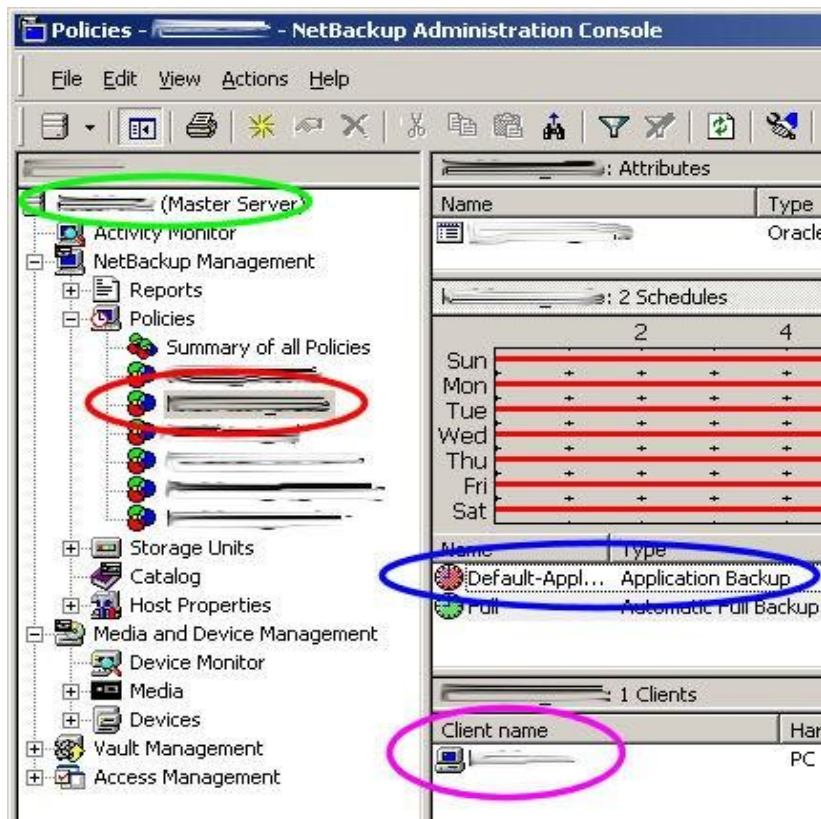


Figure 6.9-262. Veritas Network Backup.
The Deloitte DTSS team uses the Veritas backup manager to review and manage backup reports and schedules.

Database backup strategies are crucial to support business continuity, data loss and audit regulations. The Deloitte DTSS team works with BIS to configure Oracle 'Data Pump' based logical backups that consist of exports and imports of the database. Deloitte's DTSS DBA's work with DPW to manage two types of backups:

- **Online** backups allow data backup of the database while end users are actively working in the system
- **Offline** backups are a backup of the database while it is not running.

The backup files generated using RMAN are archived using Veritas.

Review Logical and Physical Database Designs

The database design activities pertaining to Logical Data Models (LDM) and Physical Data Models (PDM) span through GSD through Development phases. These data models are a culmination of inputs such as new requirements, business rules and workflow, user interface needs, transaction design, Information Life cycle Management (ILM) considerations and leveraging data models from similar systems in other states.

The Deloitte DTSS DBA's review the LDM for information that comprehensively represents relationships between the various business entities along with a complete list of business attributes. Similarly, they review the PDM, which represents database

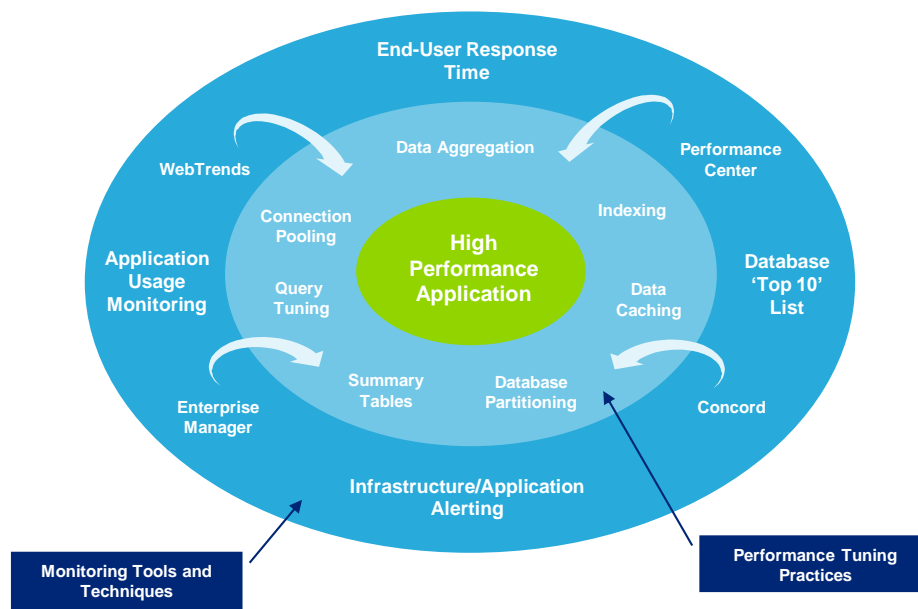
details from an implementation standpoint such as the database design's adherence to naming standards, database implementation standards around keys, indexes, constraints and permissions. Below is a list of considerations that DTSS DBA's review the LDM and PDM designs for:

- Normalization strategies
- Partitioning strategies
- Data retention and growth analysis for tables
- Data volume and index design for tables
- Data consistency strategies
- Business rules
- Entities and attributes
- Relationships between entities
- Logical design
- Naming standards
- Physical design
- Schema layout

Monitor Database Performance

During the past few years, DPW has experienced a tremendous increase in end user needs for automation resulting in additional business services offered to the end users and people of the Commonwealth. This dramatic increase in service offerings has also placed increased demands on the technical infrastructure and DPW staff. To support continued growth, DTSS DBA's work at the direction of BIS staff to assist in the environment management and monitoring process. The monitoring process also naturally feeds into our performance tuning effort further defined in the database support section.

Our team is well versed in BIS processes, standards and toolsets used to monitor the infrastructure. We use this knowledge to assist BIS to constantly examine the operation and execution of individual applications, as well as the overall environment, to identify and implement performance tuning initiatives. The following Figure 6.9-263 outlines our approach to system monitoring to identify performance tuning opportunities. This proactive approach to system growth and management has allowed us to support the implementation of new business functionality and support additional users while maintaining performance and availability service level objectives.



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Figure 6.9-263. DPW Performance Tuning and Monitoring Approach.

Deloitte's DTSS team plays an integral part of the Performance Tuning and System Monitoring Methodology and helps DPW maintain high performance amongst supported applications.

To prevent system performance degradation and potential system failure, this approach identifies long running processes, and tracking historical performance of individual processes over time. A sign of maturing applications is the increase of volume of data over time, added functionality through application releases, increases in the number of users with application roll-outs or hardware/software changes to the infrastructure. Through the proactive efforts outlined, DPW is able to better manage the growth in resource consumption over a long term short term bursts of cyclical or specific program based need.

We understand that the database plays a crucial piece to the overall performance of the system. Our DTSS team works closely with DPW in database environments to perform proactive monitoring using the following techniques:

Database “Top 10” List. A list of the top “10” queries that consume the most database and open system resources including, for example, “buffer gets”, high hard parsing ratios, high CPU cycle consumption, high I/O rates and extended execution time. Deloitte’s DTSS review this information on a weekly basis via database analysis. After initial review, DBA’s make the necessary recommendations to the application team to feed the PCR process. PCR’s are then created, prioritized and tracked to their production deployment.

Infrastructure/Application Alerting. Various tools are available that facilitate automated alerting when system/application thresholds are met. This could include server CPU or memory utilization, number of active processes, etc. This information allows for timely action that may avoid performance issues or system outages. Oracle



OEM tools are used to provide information on database memory, processor and disk utilization as well as query processing time and efficiency.

Application Load Testing. Our team has extensive knowledge of HP's Performance Center tool. DPW uses the reports from this tool to pro-actively monitor code under production load by simulation. By using this tool in the testing environment, we are able to monitor how it will react on day one after a deployment and verify that the performance is the same or better than previously experienced.

Our approach to testing application objects in a repeatable fashion early in the development effort is critical in reducing performance issues that arise in later SDLC phases. It allows us to tune the application on an ongoing basis. Our operational procedures executed after the application is in production provides for continuous improvement and proactive monitoring. Using the data collected through monitoring, the Deloitte team works to implement the performance improvements.

Apply Database Software Patches and Upgrades

Deloitte works closely with DPW to support the identified and prioritized necessary software upgrades. We describe below a few examples:

- Deloitte helped DPW with the last major upgrade of the database environments from 9i to Oracle 10g and are prepared to support the planned upgrade to 11g in calendar year 2011.
- DTSS DBA's, at the direction of BIS management, execute the patch installation in a secure environment that does not impact development activities. The DBA's then exercise the database to determine if there are any issues with the installation in the DPW topography.
- The Deloitte DTSS team works closely with the ITSS team to coordinate the implementation of patches and upgrades. Once coordinated, DTSS DBA's execute the upgrade through the test and production environments.
- DTSS DBA's proactively monitor industry trends and patch announcements to understand the patch offering and how it benefits DPW.

In addition to task coordination, the Deloitte DTSS team researches and develops proof of concepts to demonstrate compatibility and support for key functionality over and above standard database structures. Some of these areas are:

Advanced Queue. The eCIS application extensively utilizes Oracle Advanced Queue for the Workload Dashboard subsystem, which is the backbone of their business operations.

XML and User-Defined Data Types. Various applications in DPW use XML data types (eCIS, COMPASS, HCSIS, PELICAN) and user-defined data types (eCIS Phase IV-B initiative).



Oracle Fine Grained Access. Since HCSIS extensively utilizes Oracle FGA, we will continue to work with BIS staff as part of the Oracle 11G upgrade planning and analysis to perform detailed compatibility analysis.

We work with DPW to identify compatibility issues and opportunities for leveraging new features throughout our application's custom development modules as well as COTS products. Our strong relationships with Oracle help BIS get timely resolution and coordination from Oracle Support as DPW moves to the next generation database platform.

The Deloitte DTSS team utilizes Oracle Patch Utility for performing major upgrades for the Oracle database platform. However, for minor fixes to the platform, they use the command console based OPATCH utility. As part of performing these upgrades, the Deloitte team performs the following set of steps:

- Review software patches and upgrades
- Provide feedback to BIS database administration group and seek approval
- Work with application teams to prepare and publish implementation schedule
- Apply patches in all environments along and coordinate corresponding testing efforts
- Identify any potential issues due to upgrade/patch and document them

Provide Application Deployment Support

The Deloitte DTSS team helps BIS implement database deployment activities across all environments. The Deloitte DTSS team assists initiative deployment activities by:

- Executing object creation scripts in TFP and Production environments
- Verifying automated deployment success of database packages in the TFP and Production environment
- Implementing new database instances to support project initiatives
- Performing database client software installations across environments
- Managing table space allocations and partitions
- Setup for user and roles permissions for database access

As part of deployment support, the Deloitte DTSS team helps BIS perform health checks and data fixes on deployment days. All of these activities are done using DPW standard tools and processes in close collaboration with DPW staff.

Develop Database Related Maintenance Processes and/or Utilities

The Deloitte DTSS DBA's help DPW proactively monitor the database environments for maintenance needs. To effectively support this activity, DTSS DBA's create utilities and processes to proactively and efficiently support database maintenance and standards compliance. This includes scripts that verify for columns in the database have been defined in the data dictionary, processes that support expedited data copying and



obfuscation to lower environments or scripts that support expedited import/export when performing deployment/patching activities.

The Deloitte DTSS team also helps DPW enhance processes pertaining to design, monitoring and performance by looking for improvement opportunities based on their involvement in review activities, deployments and upgrades.

Our Deloitte DTSS DBA's have extensive knowledge of the Oracle platform. Deloitte and Oracle Corporation have a solid relationship built on a joint desire to deliver outstanding business services and solutions to our industry leading clients. Armed with the power of Oracle solutions, our DTSS team brings our extensive integration experience, education and training capabilities, complementary tools, and methodologies to make each DPW business transformation seamless.

Assist in Developing Database Related Standards

To progress the growth of, and to comply with, DPW standards and reusable solutions, our DTSS team works closely with the BIS database team to incorporate required processes as well as our own practices into the database design and development life cycle. The processes serve as "checks and balances" to help verify our teams ongoing compliance of the enterprise DPW database administration standards including naming conventions, PL/SQL coding and database deployment standards.

Our team works with DPW to identify new areas for database solutions or processes that are candidates for reuse across the Enterprise. When we find an opportunity, our team proactively performs the technical analysis to determine if it is a viable solution, adheres to DPW standards and adds quantifiable value to the Enterprise. Once performed, we document the business case, including pros and cons, and present to the respective BIS leads. If approved, the Deloitte DTSS team reviews the design within the champion application to make it extensible enough that it supports other teams. Our Deloitte DTSS team strives to meet DPW's goal in eliminating stovepipes in the overall architecture including database and works toward a model where an enterprise solution is a norm and accepted behavior.

The Deloitte DTSS team works with the BIS database group to develop and refine standards for effective database code, PL/SQL as per current industry standards consistent with the requirements and existing architecture. When a standard is being refined, we work with BIS to identify the changes for improvement, analyze the potential impact and assist as required in documenting the changes. BIS finalizes the standard, takes it through the standards approval process and publishes it. We continue to assist the application teams to use the published standards.

Research and Resolve Issues Related to the Database

The DTSS DBA's help DPW proactively monitor all environment databases including production.



- Collect basic information about the issue, potential system impacts and business criticality
- Notify BIS with the information collected and engage appropriate application teams to research the issue by setting up necessary meetings
- Following the meetings, the Deloitte DTSS team works with the application teams to research the issue and identify the root cause
- Upon determination of the root cause, the Deloitte DTSS team works with the application teams to design the appropriate solution to fix the issue
- BIS reviews and approves the approach. Upon approval the solution, the application teams prepare the implementation schedule, which is reviewed by the Deloitte DTSS team and BIS database group. Upon consensus from all groups, the fix is prioritized for implementation through lower environments up to Production.

If a solution calls for involving third party vendors (e.g. an eCIS Phase IV-B issue that required a patch from Oracle around a known Oracle bug), the Deloitte DTSS team works with BIS to manage communications with vendors.





Middleware Architecture Support

IV

Page
IV-393

RFP Reference: Direct Technical Support Overview

Middleware Architecture Support

- WebMethods upgrade support including installation, configuration, testing and analysis.
- Biztalk support installation, configuration and prototyping of solutions to introduce this platform into the DPW architecture.
- Enterprise Architecture support to configure, analyze and prototype solutions to support the Enterprise Service Business concept.

Deloitte provides Middleware architecture support, including webMethods upgrade support, BizTalk installation, configuration and prototyping, and overall Enterprise Architecture support to assist DPW as they continue to develop and build their Enterprise Service Bus.

DTE will prioritize the activities outlined as part of this section based on enterprise middleware needs and resources available as part of the direct technical support services:

- **webMethods Upgrade Support.** Assisting DPW with analyzing, planning and executing a potential upgrade of the webMethods server platform to a future version
- **BizTalk Installation and Configuration Support.** Working with DPW to install, configure, and support proof of concept activities while integrating BizTalk into their enterprise architecture
- **Enterprise Architecture and ESB Support.** Providing overall design, development and governance strategy as we work with DPW to develop and enhance your collection of Enterprise Services

We discuss each of these areas in the sections below.

webMethods Upgrade Support

Deloitte's team understands that software product installation or upgrades involve significantly more effort than just creating a work plan or running an installation file. Our team is equipped to help DPW evaluate the complexities in your environment, and to identify and plan for pitfalls that may arise during the process as DPW evaluates options for migrating their webMethods platform from the current 7.1.2 version to the webMethods 8.0 platform. The following table is a brief summary of the components within our understanding of DPW's webMethods environment.

Benefits to DPW

Deloitte brings:

- Knowledgeable Middleware Team with DPW system-specific experience developed over 10 years, thus equipped with a deep knowledge of the intricacies of the complex DPW infrastructure.
- Knowledge of using DPW standard standards, middleware tools such as webMethods, BizTalk, and OpenTI and processes for effective data integration between various DPW's technologies.
- Industry leading practices and solutions such as "Services Thinking", to support DPW's SOA vision of orchestrated, loosely coupled services that support multiple lines of business while consolidating business processes into one solution.



webMethods Technology	Component	Deloitte's Understanding of webMethods Capabilities
Core	Integration Server 7.1.2	Administration and hosting of webMethods services and orchestrations Hosting of SOAP web service, and adapter services
	Broker 7.1.2	Provides queuing and guaranteed delivery of messages within webMethods services. Used by all multi-step processes to govern and monitor processing during each step of a workflow
	myWebMethods Server 7.1	Provides real-time monitoring of the webMethods environment
Adapters	JDBC Adapter	Connectivity to Oracle and SQL Server databases within DPW
	MSMQ Adapter	Provides asynchronous messaging between applications and webMethods. Allows for the creation of queues to manage workload on systems
	MQ Series Adapter	Allows connectivity to JNET via the IBM WebSphere MQ Series protocol
	EJB Adapter	Provides real-time connectivity to the DPW mainframe systems allowing the reuse of existing CIS transactions
	Unisys OpenDTP Adapter for Java	Allows the webMethods platform to call and reuse services natively on the DPW mainframe environment
Infrastructure	Apache Web Servers	Works in conjunction with SOA Security Manager and DPW's security architecture to provide identity and access management to web services hosted in webMethods
	JBoss Application Server	Hosts the OpenDTP Adapter to allow real-time calls to the mainframe
	SOA Security Manager	Works in conjunction with the Apache web server and DPW's security architecture to provide identity and access management to web services hosted in webMethods
	SQL Server JDBC Adapter	Provides native access to the Department's SQL Server databases
	Oracle 11g JDBC Adapter	Provides native access to the Department's Oracle databases

Figure 6.9-264. Brief Summary of the Components Within Our Understanding of DPW's webMethods Environment.

As shown in Figure 6.9-264 above, DPW's webMethods environment includes a significant number of adapters, connectors, and dependencies due to the complex nature of integrating across the number of active technology platforms within the Commonwealth. For example, webMethods is able to connect to DPW's Unisys mainframe using a separate installation of the Java runtime, an additional JBoss application server, the Unisys OpenDTP JCA Adapter, and the OpenDTP server software on the mainframe.



Deloitte’s team is ready to help you evaluate which versions of each product will be compatible and optimal for the DPW environment when considering upgrades or the overall platform architecture, Deloitte has the product knowledge to help test the versions, validate that the environment is ready, and deploy the solution to support DPW’s Production needs.

BizTalk Installation and Configuration Support

Deloitte’s expertise will help the Department to take advantage of the features of BizTalk as DPW looks to add new services and modernize existing legacy solutions onto this platform. We have a deep understanding of the BizTalk platform and the tools that DPW has available and the scenarios that would be candidates for their use, as outlined in Figure 6.9-265 below.

BizTalk Technology	Component	Deloitte’s Understanding of BizTalk Capabilities
Core	BizTalk 2009 Runtime	<ul style="list-style-type: none"> Administration and hosting of BizTalk orchestrations Hosting of send/receive ports and adapter solutions Use of file polling to initiate workflows
	EDI Engine	Provides support for translating data into X12 and HIPAA-compliant (such as 4010 and 5010) transaction sets
	Rules Engine	BizTalk’s Business Rules Engine can be used to support deterministic services, such as screening or eligibility checks
	BizTalk 2009 SSO Server	Securely stores credentials used while consuming databases and services
Adapters	Adapter Pack 2.0	Provides connectivity to Oracle and SQL Server databases, as well as other systems, such as IBM mainframe, JD Edwards and TIBCO, which are not currently in use at DPW
Accelerators	2009 Accelerator Pack	Provides support for RosettaNet, SWIFT and other interface types. These types interfaces are currently implemented in DPW Middleware
Infrastructure	Internet Information Services (IIS)	Hosting of WCF and web services provided as entry points by BizTalk orchestrations
	SQL Server	Provides storage for configuration, and stores data during processing in the MessageBox. The MessageBox would be used by all BizTalk orchestrations at DPW

Figure 6.9-265. BizTalk Technology.

BizTalk orchestrations center on the use of adapters and ports, which allow the use of XML consistently as a common format across all sections. Having a clear understanding of the business entities and modeling the data correctly are key to the design of BizTalk orchestrations. Our team has demonstrated knowledge of the DPW business entities – clients, cases, consumers, providers, agencies, and benefits. Additionally, our

resources have experience with DPW's BizTalk tools needed to lead design efforts -- Visual Studio 2008, BizTalk Developer and XML Spy.

Deloitte's team has experience, within Pennsylvania, in configuring and maintaining high-availability BizTalk environments, including the use server clustering, load-balancing, and also integrating the Microsoft IIS platform with the Department's web service security platform, CA's SOA Security Manager. We are prepared to lead design, testing and prototyping of solutions, such as the upgrade of HIPPA transaction sets, construction of new services, and to provide a foundation for the modernization of legacy batch transactions and data synchronization services using the BizTalk platform.

Enterprise Architecture and ESB Support

Deloitte's team has a deep, demonstrated knowledge of the different integration technology options available at DPW. Our architecture direction will address the following key activities, highlighted in Figure 6.9-266 below, as DPW continues to mature their business and technical services, and prepares to build and grow their Enterprise Service Bus (ESB),:

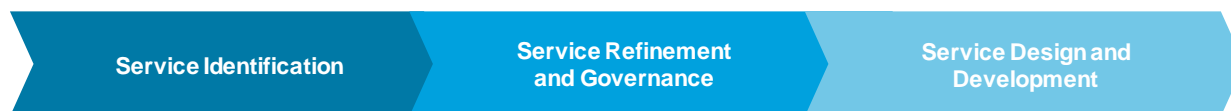


Figure 6.9-266. Enterprise Service Support for DPW.

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Within our Enterprise Service Support approach for DPW, Deloitte focuses on identifying potential services, refining and governing the list of services at DPW, and designing and developing each enterprise service using the appropriate technology.

The following areas define our framework for providing architecture support for DPW's enterprise services:

- **Service Identification.** Identifying candidates to build and promote reusable services, which can provide measurable results to DPW
- **Service Refinement and Governance.** Determining ownership of each service, aligning the service with the Department's requirements, and defining metrics and performance expectations for each service. It also includes strategies for monitoring the achievement of service metrics.
- **Service Design and Development.** Service design and development focuses on recommending the right architecture for DPW services, and choosing the technology stack that will provide the best performance
- **Service Identification.** One of the challenges to SOA adoption is identifying those reusable business service processes. An unusable service is too broad or encompasses too much aggregated

Have you
heard? 

Working with DPW, Deloitte has identified and developed numerous new enterprise services in the last two years, such as Correspondence, Provider Search, Application Submission, Notifications, Citizenship and Identity Verification, and FSWS. Together, these services handle more than 4.5 million requests each business day contributing to significant use across program areas.



functionality. In contrast, a service which is too narrow, or provides too small of a building block, may contribute additional latency, as multiple touch points within the infrastructure are required for each service call.

Deloitte's approach to identifying functionality that is a strong candidate for a service construction depends upon the likelihood of reuse. The definition of a reusable service is a "black box" or a self-contained unit of work. Deloitte architects collaborate with the DPW team to assess the future use of proposed services and align service usage with the long-term strategy for the Department through the Architecture Review Board and by collaborating with key stakeholders on the Technology Engineering and Middleware teams.

Service Refinement and Governance. Each service undergoes detailed design and has its operations and data elements defined during this task. Deloitte works with DPW staff to understand the anticipated consumption of the service, and how the Department will measure the service metrics. For this effort, service metrics represent a logical, completed measurable unit of work. Examples of metrics are: time to process a claim or update a budget or issue a payment. These business metrics will become key performance indicators (KPIs), and are also especially important in designing and testing for performance and scalability. We discuss these later in this section.

Service Design and Development. Service Development includes service design, build and test. As DPW has a variety of service platforms available, selection of the technology providing the best fit can be challenging. Based upon our understanding of DPW's environment, we propose the Service Architecture Approach for DPW, which categorizes the available technologies at DPW, and the recommended criteria for selecting a technology for service development. We describe this approach in detail in *Section 6.9.2.1* of our response.

Deloitte is ready to continue the momentum that we have built together in supporting the Department's transition into a SOA-centric organization through this approach and by continuing to work with DPW to identify, refine and develop additional services.



Enterprise Knowledge Management

IV

Page
IV-393

RFP Reference: Direct Technical Support Overview

Enterprise Knowledge Management

- Provide Business Intelligence – Cognos and Informatica support
- Assist with Cognos troubleshooting related to application issues and ETL Informatica issues related to application issues.
- Assist with Cognos Query Performance tuning for optimal results.
- Assist in Cognos configuration reviews to ensure infrastructure is efficient and adheres to best practices.
- Assist in developing Cognos and DW related performance monitoring procedures, standards, and best practices.
- Research and resolve issues related to the Cognos and/or Informatica installations and application interaction with EKMS.

Deloitte provides Enterprise Knowledge Management support through our demonstrated approach to support data warehouse implementations for DPW. Our particular focus is on providing strategy, design, development, and implementation services that deliver solutions. By converting historical source system data into information, these solutions allow DPW to correctly understand and react in a timely manner to performance thereby directly affecting the quality of services provided to the citizens of Pennsylvania. We use our Enterprise Information Management (EIM) method and alliances with vendors to effectively assist with the various aspects of data warehouse development and support. Our best practices approach to Cognos and Informatica implementations play an important role in helping DPW provide a single point of access to its information through EKMS. We collaborate with BIS and DPW to provide effective assistance around all areas of data warehouse development and implementation.

DTE will prioritize the activities outlined as part of this section based on enterprise needs and resources available as part of the direct technical support services:

Benefits to DPW

Deloitte brings:

- Extensive Enterprise Information Management (EIM) experience to assist DPW in executing the EIM strategy.
- Leading practices, approaches and models for Cognos and Informatica from similar Business Intelligence and Data Warehouse projects for enhanced design efficiency and quality.
- Enterprise Information Management method and key alliances with vendors to assist DPW with data warehouse development, implementation and support.



Figure 6.9-267 outlines our work on DPW data warehouse projects, and our understanding specific to the applications.

Application	Deloitte's Understanding of Key System-Specific Characteristics for Knowledge Management
<p>iCIS</p>	<p>The Office of Income Maintenance (OIM) relies on a BI/DW solution to monitor the timely completion of work items and activities performed by County Assistance Offices and Change Centers across the Commonwealth. The BI/DW solution consists of the following:</p> <p>Reporting Functionality: Cognos</p> <ul style="list-style-type: none"> • Executive Dashboard (1) • Analytical Reports (14) <p>Extract Transform and Load (ETL) Functionality:</p> <ul style="list-style-type: none"> • Informatica is used to refresh the Enterprise Data Warehouse daily <p>Database Architecture:</p> <ul style="list-style-type: none"> • Source Data: eCIS Workload Dashboard application • The target environment is an Enterprise Data Warehouse
<p>HCSIS</p>	<p>The Office of Developmental Programs (ODP), the Office of Long Term Living (OLTL) and the Office of Child Development and Early Learning (OCDEL) are three program offices that support a diverse user base. In addition to the multiple users having a mix of Business Intelligence needs, the BI/DW solution consists of the following:</p> <p>Reporting Functionality: Cognos</p> <ul style="list-style-type: none"> • Cubes (61) • Reports (98) • Executive Dashboards (1) <p>SSRS</p> <ul style="list-style-type: none"> • Reports (57) <p>Extract Transform and Load (ETL) Functionality:</p> <ul style="list-style-type: none"> • Informatica is used to refresh the ODS daily and the EDW monthly. <p>Database Architecture:</p> <ul style="list-style-type: none"> • Source Data: HCSIS (primary), PELICAN ELN Master Repository, CIS and the Department of Aging • The target environment is an Enterprise Data Warehouse and Operational Data Store



Application	Deloitte's Understanding of Key System-Specific Characteristics for Knowledge Management
<p>PACSES</p>	<p>The PACSES (Pennsylvania Child Support Enforcement System) data warehouse provides valuable business intelligence to a broad group of Child Support stakeholders, from county-level case workers, to program office policy makers and executives. The Directors' Dashboard provides county DRS Directors with a high-level, executive view of critical information about their county operations to help improve performance.</p> <p>Reporting Functionality:</p> <p>Cognos</p> <ul style="list-style-type: none"> • Cubes (45) • Reports (213) • Executive Dashboard (1) <p>SSRS</p> <ul style="list-style-type: none"> • Reports (153) <p>Extract Transform and Load (ETL) Functionality:</p> <ul style="list-style-type: none"> • Monthly extracts from the mainframe using COBOL • Data transfer using FTP • Monthly refreshes of the DW using Informatica <p>Database Architecture:</p> <ul style="list-style-type: none"> • The target environment is an Enterprise Data Warehouse
<p>PELICAN</p>	<p>The PELICAN data warehouse solution provides the Office of Child Development and Early Learning (OCDEL) the ability to analyze child, staff and provider related information to forecast funding needs, evaluate impact of operational and program decisions over time and monitor outcome of various programs to help OCDEL improve the efficiency of child care programs.</p> <p>Reporting Functionality:</p> <p>Cognos</p> <ul style="list-style-type: none"> • Cubes (55) • Reports (85) • Executive Dashboard (1) <p>SSRS</p> <ul style="list-style-type: none"> • Operational reports (137) <p>Extract Transform and Load (ETL) Functionality:</p> <ul style="list-style-type: none"> • Informatica is used to refresh the EDW monthly <p>Database Architecture:</p> <ul style="list-style-type: none"> • The target environment is an Enterprise Data Warehouse
<p>Enterprise Services</p>	<p>Data from MPI and MCI are loaded into the EDW on a recurring basis. In September, this information will also be loaded into the ODS to allow for this information to be used across initiatives to minimize the duplication of client and provider data.</p>

Figure 6.9-267. Key System Characteristics Specific to Enterprise Knowledge Management.

Deloitte has demonstrated Business Intelligence/Data Warehouse experience, DPW and Public Sector experience and deep relationships with Cognos and Informatica.

Since the inception of our alliance with Cognos over 10 years ago, we have completed more than 200 Cognos implementations. Our relationship with Cognos has resulted in the following distinctions:

- Platinum Global Consulting Partner
- Cognos Global Alliance Partner of the Year for 2008
- Cognos Global Systems Integrator of the Year for 2005
- Cognos Accredited Services Partner – based on Certified Cognos practitioners:
- Access to dedicated IBM executive resources that support the success of our relationship and projects at no cost to Deloitte or our clients
- Participation in beta implementations of new software releases and collaboration with IBM development to help customize solutions to meet our clients' needs

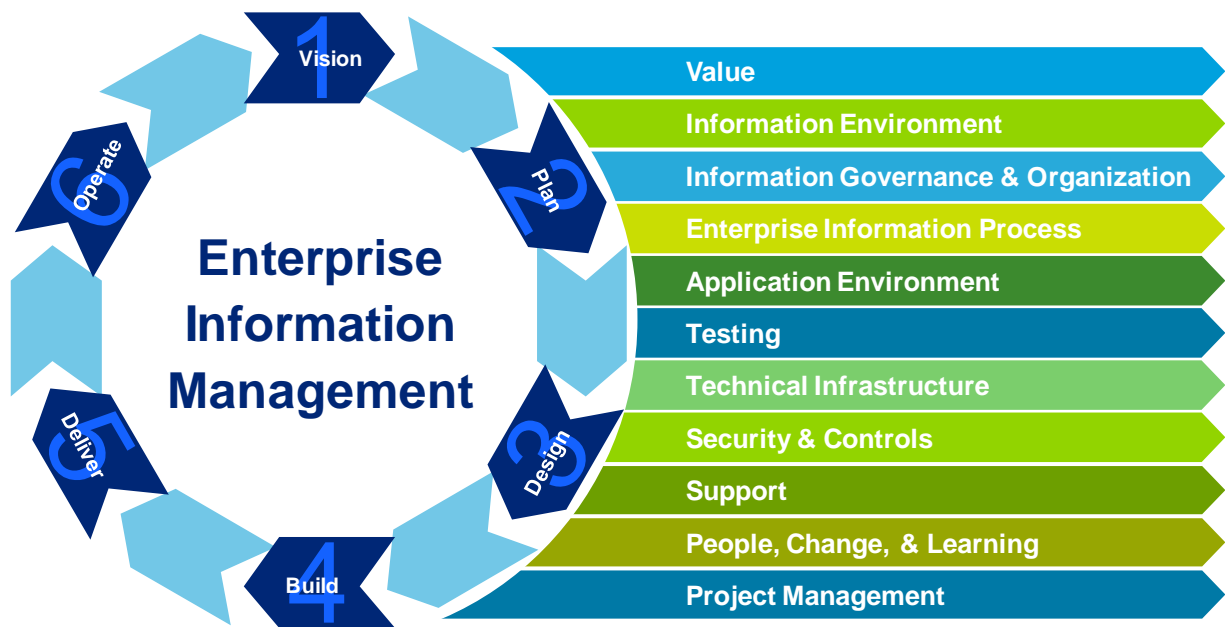


We have established an Enterprise Information Management Center of Excellence (CoE) that provides our practitioners with the latest product information and accelerators in Cognos, Informatica, lessons learned and industry best practices.

Enterprise Information Management Methodology

Deloitte uses a comprehensive approach to initiatives, built on the foundation of our Enterprise Information Management™ (EIM) methodology. The EIM methodology provides a structured approach to delivering these key disciplines during the EIM project life cycle. The life cycle consists of multiple initiatives, such as Enterprise Information Model and Standards, Information Governance, Master Data Management, Business Intelligence and Data Warehousing, Business Performance Management, and Data Quality Management. It is an integrated set of processes and supporting assets for delivering high-quality information management solutions. We work to tailor our EIM Method to suit the needs of the client. We use the pertinent methods, templates and accelerators from our EIM Method as well as the work we have completed with other state as we work with the EKMS group here at DPW.

Figure 6.9-268 provides a visual of the EIM methodology as described above.



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Figure 6.9-268. Enterprise Information Management.

The EIM method details Deloitte's proven approach for structuring, managing, and delivering EIM strategy and implementation services

Deloitte works with DPW to assist with the multiple facets of data warehouse development and implementation including the following:

- **Provide Business Intelligence Support.** Employing best practices and our EIM methodology to support Cognos and Informatica development and implementation
- **Assist with Cognos Troubleshooting.** Creating a monitor-analyze-communicate-implement cycle to proactively and reactively combat issues, and using vendor relationships to access the latest troubleshooting techniques
- **Assist with Cognos Query Tuning.** Creating a Cognos-database-communication-performance tracking approach to query tuning and collaboration with BIS to review the Cognos BI Tool
- **Assist in Cognos Configuration Reviews.** Working with DPW to examine the Cognos Web Server setup, design of the DPW Ad Hoc Package, and the design of the EDW tables
- **Assist with Developing DW Related Procedures.** Taking a proactive approach to performance monitoring and drawing from the Cognos and Informatica Centers of Excellence for strategies around data warehouse monitoring best practices
- **Research and Resolve DW Issues.** Deloitte has a long history with top tier Business Intelligence vendors. For example, our Global alliance relationship allows our resources to have a one-on-one relationship with the staff at Cognos and Informatica

As concerns arise, not only do we have the expertise on the Deloitte staff, we are just a phone call away from involving other vendors as needed.

Enterprise Knowledge Management - Cognos and Informatica Support

IV

Page
IV-393

RFP Reference: Direct Technical Support Overview

Enterprise Knowledge Management

- Provide Business Intelligence – Cognos and Informatica support

While working closely with DPW and several other Public Sector clients, Deloitte has developed a comprehensive process for providing business intelligence support, specifically with regards to Cognos and Informatica. Our team brings the experience and knowledge needed to deliver high quality support.

We base our Business Intelligence approach on industry best practices and our EIM Methodology for supporting such tools as Cognos and Informatica. We conduct reviews of core requirements and existing capabilities to arrive at a model optimized to satisfy DPW's business intelligence needs. This strategy and implementation method provides a framework to delivering key disciplines during the EIM project life cycle. We organize the EIM method according to Thread and Project Phase. Each Thread groups a common theme and expertise that horizontally "cuts across" the project phases. A support thread exists that addresses the Business Intelligence support needs of EKMS.

Our Approach to the EIM Support Thread

The objective of the support thread is to design and create an organization chartered to maintain the technologies of enterprise information management.

Deloitte leads Informatica and Cognos based projects for Public Sector clients across the US. Our experience with planning and implementing Business Intelligence strategies spans eight states including Pennsylvania, Michigan, Virginia and Texas, where we use our expertise to support every step of Informatica and Cognos implementations. We empower these states to maintain relevant and trustworthy data used to glean statistics and reports to support critical policy decisions.

Deloitte positions itself in three key areas from a data perspective by integrating our proven approach with our Cognos and Informatica technical expertise. These key areas include:

- **Data Integrity.** We understand that data reporting ability is directly related to data quality, we only load appropriately cleansed and accurate data into the warehouse and prevent potential negative downstream effects that could severely impact the integrity of future reports and statistics pulled from the system.
- **Ability to Report on Data.** We implement standardized data governance practices to combat issues surrounding data integrity and confirm the quality of information that rests in the data warehouse. We then support ad hoc reporting abilities, helping users



pull data in the way they want to see it and tailor data outputs to facilitate key decision making.

- **Utilization of Data Across Networks.** In cases with multiple sub-systems feeding into the same data warehouse, there is often trouble interfacing between the various networks and pulling data across all subsystems. Improved integration of these networks allows us to better track an individual across networks. We maintain our Framework Manager Model to avoid the aforementioned issues through the implementation of best practices and using our Centers of Excellence in the Information Management space.

Enterprise Knowledge Management – Cognos & Informatica Troubleshooting Assistance

IV

Page
IV-393

RFP Reference: Direct Technical Support Overview

Enterprise Knowledge Management

- Assist with Cognos troubleshooting related to application issues and ETL Informatica issues related to application issues.

Deloitte assists with Cognos troubleshooting related to application issues, along with resolving Extract Transformation Load (ETL) and Informatica issues. We take a proactive and reactive approach to troubleshooting processes. Proactive steps include monitoring and anticipating potential issues during the design and development process, while our reactive approach includes resolving issues as they arise, and addressing change requests. We use the Cognos and Informatica Centers of Excellence as well as our strong alliances with these vendors. As members of the Centers of Excellence, our Deloitte professionals specialize in best practices around Cognos strategies and implementations, as well as ETL technologies and troubleshooting guidelines. Our alliances with Cognos and Informatica gives us exclusive access to the latest troubleshooting best practices, to trainings in specific areas and allows us to use key thought ware.

Our strategy towards continuous, proactive troubleshooting is to follow a cyclical pattern whereby we actively monitor the data warehouse, analyze and research issues that arise, communicate recommended solutions to the client and implement the desired solution. This constant cycle allows us to remain ahead of the curve when it comes to troubleshooting any problems that may arise.

By maintaining this cycle of constantly monitoring the system, we are able to quickly identify issues, analyze them to determine a solution, communicate this to DPW and then implement the recommended solution.



Table 6.9-269 below illustrates our troubleshooting approach:

Tool	Deloitte's Approach to Troubleshooting
Informatica	<ul style="list-style-type: none"> • Proactively monitor ETL processes by running validation scripts after ETL procedures have completed • Monitor Informatica processes using Informatica Workflow Monitor and use workflow and session logs to debug issues when they arise • Research issues in Informatica Knowledge Base to find resolutions and open tickets if needed • Continue to apply required fixes, patches or upgrades per Informatica recommendations • Communicate advisory messages to business and developer communities in cases where issues occur that necessitate such outages
Cognos Cubes and Reports	<ul style="list-style-type: none"> • Examine SQL generated by Cognos to determine whether the expected join paths have been used • Examine the Framework Manager model for circular join paths and potential Cartesian products • Monitor cube build process and cube size in order to identify issues and proactively determine when cube partitioning may be needed • Research issues in IBM Knowledge Base to find resolutions and open tickets if needed • Continue to apply required fixes, patches or upgrades per IBM recommendations • Communicate advisory messages to business and developer communities in cases where issues occur that necessitate such outages

Figure 6.9-269. Troubleshooting Best Practices based on the EIM Method.

In addition to our hands-on experience with troubleshooting Informatica and Cognos related issues described in the table above, we employ best practices for support based on the EIM method to actively identify and mitigate problems as depicted in Figure 6.9-270 below:

Application	Deloitte's Activities Support DPW Business Intelligence Needs
Monitor	Closely monitor the Production environment and Cognos cube size, and implement measures for swift and efficient logging of errors
Analyze	Analyze issues to determine the root cause and research all potential solutions
Communicate	Provide a detailed report of findings and recommendations to BIS and key business users to gain their input
Implement	Identify and implement the optimal solution confirming that all steps are documented so as to avoid similar issues in the future

Figure 6.9-270. Key System Characteristics Specific to Business Intelligence Support.

Enterprise Knowledge Management – Cognos Performance Tuning Assistance

IV

Page
IV-393

RFP Reference: Direct Technical Support Overview

Enterprise Knowledge Management

- Assist with Cognos Query Performance tuning for optimal results.

Deloitte’s knowledge management professionals assist with Cognos query performance tuning to deliver optimal results. Deloitte’s Business Intelligence approach is rooted in a proven methodology for Cognos Query performance tuning due to our strong vendor alliances and vast repository of knowledge in the Cognos and ETL Centers of Excellence. The Deloitte approach involves collaborating with BIS to review the Cognos BI Tool. Our joint team validates that we follow DPW standards and Deloitte best practices.

We explain our Cognos Query performance tuning approach:

- **Identify and Explore.** We measure the current query performance to establish a baseline. Going forward, we maintain a Report Tracking document to record the query time for all reports. This provides a holistic view of the report performance, and allows us to hone in on the problematic areas and quickly identify opportunities for improvement.
- **Plan and Test.** After we identify a defect, Deloitte starts query tuning by isolating the problem and running the queries individually in Report Studio. Once we find the individual queries, we generate the code and open the query in a database tool. Running the query directly on the database allows us to test whether the issue lies in Cognos or at the database level.
- **Implement and Communicate.** After we identify the root cause, the Deloitte team implements a solution to address the issues and we communicate these changes to DPW.

Regular communication memos are prepared to concisely communicate schedule expectations, findings, news of reports in the tuning process, and tuned reports. This communication keeps EKMS, stakeholders, and the Cognos users informed. We use documentation to track issues, resolutions, and level of effort required to accomplish the enhancement.

- **Track and Monitor.** We track the report tuning efforts that we initiate based on DPW’s satisfaction of the report performance in production. Deloitte keeps a log of issues and solutions allowing our team to incorporate previous experiences when designing and tuning queries. We use the following documents to track reporting performance:
- **Report Performance Defect Tracking.** We create a non-functional Program Change Request (PCR) each time we log an issue. We use the PCR to track the issue through



resolution. We use this recorded information as a repository to help us quickly identify and resolve future issues.

- **Report Tracking Document.** We use this document to time all of the reports for a holistic view of the report performance.

Figure 6.9-271 below provides a detailed view of a number of issues we carefully examine when tuning query performance at the Cognos level:

Cognos Performance Considerations

Query Type	Possible Issues	Deloitte's Approach Addresses Cognos Performance
Report Queries	Detail in Report Design	Often times, report performance is impacted because they may contain too much detail. This is likely for reports that join multiple fact tables, or for reports displaying master detail relationships. These types of reports are slow because they complete full table scans of large tables. The Deloitte solution is to break up the report, often by creating drill-through reporting functionality so that high-level data is retrieved by default, and users have the option to drill down into the details.
	Multiple Objects in Report Design	Another common issue with report design is dealing with multiple objects on the same page such as lists, crosstabs and charts. If sourced by multiple queries, these setups can potentially hinder performance. Combining the common queries and splitting out non-common elements to other pages, or to drill-through, can effectively help performance. A best practice is to reuse as many queries as possible and reduce complexity by involving as few tables as possible. Another reporting environment issue to consider is how many rows will be the maximum returned on a canned or ad hoc report. We can alter this package with Framework Manager, or targeted to individual reports in Report Studio. With business users setting a maximum returned row limit, we can reduce strain on the server.
	Filtering	The business user defines report filtering in Cognos Reports. However, report authors should try to filter on codes instead of descriptions whenever possible. Also, whenever possible, we use equality tests instead of using functions such as "like."
	Reporting Joins and Unions	Reports that contain joins and unions within Report Studio will require additional processing at runtime. Deloitte could explore the option of pushing this work to other layers like Database, ETL, or Framework Manager. When it is necessary to perform joins and unions on a report, a best practice is for users to push their filters down to the lowest level possible. This will allow EKMS to join (or union) fewer records and save some processing time. More importantly, this will allow you to take advantage of the indexes on the database before the join.



Query Type	Possible Issues	Deloitte's Approach Addresses Cognos Performance
	Multiple "One-to-Many" Joins	<p>Generally, Cognos does not handle multiple "one-to-many" joins on a report very well. This is because the toolset assumes that the user is working within a star schema structure, and only using one fact table per query. Deloitte looks through the generated SQL to find the less efficient joins on the report. This issue is common when working within models which are ODS based, and can prove difficult to solve.</p> <p>There are ways to explicitly tell the reporting tool which joins to follow: create joins on the report, or create SQL based objects in the Report or in Framework Manager. Manual joins come with performance costs, as mentioned above. We maintain SQL based queries in SQL coding format. Outside of the reporting tool, it is possible to create views in Framework Manager or the database.</p>
	Cube Based Reports	<p>When building reports from a cube, a best practice is to bring individual members into the cube instead of bringing in the entire field and then adding a filter. Beyond pulling in the members, we use detail filters, slicers, and dimension functions like children or descendants.</p> <p>It is important to not let the report get too big, both in terms of nesting and rows. Cubes do offer performance gains with pre-aggregation; however, this can lead to over-aggressive report design. A best practice is to avoid the "role Values" and "Caption" functions when creating OLAP based reports in order to improve performance.</p>
Prompt Queries	Prompt Page Design	<p>The design of the prompt page usually has the greatest impact on performance for the user. It is important to select the most appropriate type of prompt for each parameter. As a best practice, "Search" and "Select" prompts should be used for large fields, "pick lists" for medium size fields, and radio buttons for small fields. When "Yes" or "No" prompts are required, it is recommended to use static choices for the prompt. Avoid pulling from a large table and performing a select distinct to populate the prompt page. Similarly, it is a good idea to create a table that contains codes, types and flags that are needed on prompt pages. Getting codes, types, and flags from large fact tables will eliminate the need for a select distinct on a large table.</p> <p>When prompt pages become too large it is usually best to split them up in order to reduce page load times. It is also possible to split the prompt page using a tabbed page.</p>
	Cached Queries	<p>Caching prompt queries is useful when prompt values do not change frequently and are not dependant on another prompt. Running a Job that executes the query and caches the values improves the performance.</p>
	Run Queries Concurrently	<p>Prompt queries that are highly dynamic can run concurrently. This function within the report studio activates the query and governs the report creation.</p>



Query Type	Possible Issues	Deloitte's Approach Addresses Cognos Performance
	Removing Select Distinct	By default, all prompt queries perform a select distinct when they join onto data tables. This process is inefficient when the prompt query already contains unique values. By changing "Auto Group and Summarize" to "No" you can avoid the extra step. We see this performance gain on the report run and not on the prompt load.
	Query Prioritization	Changing the "use for parameter info" box on the query properties improves performance. By default, all queries have the "use for parameter info" set to "yes". You can set the main report query to "No" if you do not want the parameters to reconcile with the filters on the main report. This is beneficial when the report query includes multiple joins and unions.
	Cascading Prompts	Cascading prompts can cause performance issues when there is no direct relationship between the two dimensions. A best practice is to use a third, and potentially large table, to join the cascading dimensions. When using indexes on cascades, the index is the key of the join.
	Batch Processing	Determine which Cognos reports that can be run in batch rather than real time. By moving the reports to batch, this will ease pressure on the system during peak hours.

Figure 6.9-271. Tuning Query Performance at the Cognos Level.

Figure 6.9-272 below highlights the key database performance considerations taken into account when performing query tuning.

Issue Area	Approach
Execution Plan	A database execution plan analyzes how the database finds or writes data. For example, it lays out which indexes will be used and what order the tables will be joined. This allows the user to see the "cost" of joining the tables in the query. Each database has its optimizers which will determine which order to join tables. It will generally have the first table be the one with the best filter (most unique). This reduces the number rows as the query joins more tables. The order of the joins can be altered by using hints but the tables are usually pretty close to being in the optimal order. Running the execution plan will show where costly Full Table Scans are in a query. A best practice is to avoid Full Table Scans when a small percentage of the rows in a table will be returned.
Indexes	<p>The fastest way to see performance improvements is to remove the number rows from the execution plan. Indexes are most suitable when you want to access a small percentage of data in a table. The basic rules on when to add an index are:</p> <ul style="list-style-type: none"> • Selectivity - Look for columns with high selectivity • Distinct Values - Avoid columns with few distinct values • Table Updates - The more a table is updated the greater the cost of the index <p>There are many options for indexing so the reporting developers should work alongside the DBAs to confirm their needs are met.</p>

Figure 6.9-272. Key Database Performance Considerations.

Enterprise Knowledge Management – Cognos Configuration Review

IV

Page
IV-393

RFP Reference: Direct Technical Support Overview

Enterprise Knowledge Management

- Assist in Cognos configuration reviews to ensure infrastructure is efficient and adheres to best practices.

Deloitte has experience with implementing optimal Cognos configurations for different environments and business needs. We use our global experience and vendor relationships to validate that the infrastructure is sufficient and adheres to best practices for short-term performance and long-term stability. Deloitte brings the value of our network to get the people and information needed to fine-tune the DPW configurations to enhance server performance.

Deloitte's Business Intelligence approach will continue to be rooted in our experience and a proven method for configuration review. Below, we outline our approach to Configuration reviews:

- **Examine Web Server Set up.** Our approach involves an examination of the Cognos Web Server set up, including the Web Server and the Application Server. Web Server Parameter settings to examine include Thread Limit, Server Limit, and Max Clients.
- **Examine Cognos Server Set up.** The next step in our approach is to examine the Cognos Server set up to use load balancer, if applicable. This involves setting up the Dispatcher and Other URI Settings.
- **Examine Application Server Settings.** To examine application server settings, we create JVMs to provide optimal performance, set the optimal default fonts for reports run in PDF, set the optimal database fetch buffer size, set the process time out and pool size parameters to their optimal settings, and set the Max Processors parameters to their optimal settings. All of these steps adhere to industry best practices.

Deloitte assisted DPW in a Cognos configuration review during FY10. The EKMS team engaged Deloitte practitioners with Cognos configuration, framework modeling and infrastructure expertise to investigate the current Cognos infrastructure and configuration settings. The goal was for Deloitte to provide recommendations to optimize performance, ease of maintenance, and usability.

Because of our prior experience working with DPW and EKMS, Deloitte understands DPW's current state and future needs. During our recent assessment we had worked with you to identify the following areas of improvement:

- **Infrastructure/Configuration.** These areas include an analysis of the existing hardware and software configuration settings for the IBM Cognos BI implementation at DPW and give recommendations for improving or fine tuning the performance of the system.
- **Framework Modeling.** Framework modeling includes analyzing the Framework Manager model of the DPW ad hoc packages for adherence to established Cognos

best practices. These points generally include checking for inconsistencies in the model in areas such as cardinalities, joins, loop joins, usage properties, and determinants. We believe that these improvements can be applied to other implemented Cognos packages.

- **Best Practices.** Best practices include recommendations and tips generally outside the scope of the above categories, but can still play a role in determining system performance.

Deloitte continues to work with EKMS to bring the right specialists to perform Cognos configuration reviews as required by BIS.

Enterprise Knowledge Management – Cognos and DW Performance monitoring standards and best practices

IV

Page
IV-393

RFP Reference: Direct Technical Support Overview

Enterprise Knowledge Management

- Assist in developing Cognos and DW related performance monitoring procedures, standards, and best practices.

As Deloitte works with EKMS on knowledge management initiatives, we continue to improve standards by incorporating feedback from our experience with the implementations of knowledge management initiatives for DPW projects and other Public Sector clients. We use our work with other clients, as well as our robust centers of excellence to identify and incorporate new standards, procedures and best practices.

As members of the Cognos and Informatica Centers of Excellence, our practitioners have an ear to the ground and are constantly identifying new industry trends. We use the white papers and information repositories they produce to bring new procedures to our clients and help them to institutionalize these procedures and convert them into standards. In this fashion we are able to keep our clients abreast of the latest standards in the industry.

The lack of appropriate performance monitoring can lead to inaccurate data entering the warehouse and has negative downstream effects on reports and other statistics extracted from the data warehouse. Missed requirements and unidentified defects are consequences of inadequate testing standards. Deloitte is working with the EKMS team to implement performance monitoring procedures and standards in an effort to prevent the issues mentioned above. We are extremely familiar with the DPW EIM strategy and information technology standards, and are well equipped to implement performance monitoring procedures based on these high standards.

We are also familiar with DPW's BI standards guidelines and best practices as documented in Figure 6.9-273 below.



DPW Standards	Deloitte's Understanding of Standards Results in EKM Consistency
Cognos Model Package Development.pdf	Lists DPW standards for Framework Manager models. These include naming conventions, package structure, and package design best practices
Cognos Reporting Development Standard.pdf	Lists standards for the creation of Cognos Report Studio reports
DW Life cycle Standards.doc	Describes DPW's vision for software development life cycle as it applies to BI initiatives
DW Mapping Design Optimization Standards.doc	Describes best practices to improve the performance of Informatica ETL jobs
DW System Landscape.doc	Describes physical architecture for EDW, Informatica and Cognos within DPW
Informatica Naming Conventions.doc	Lists naming conventions for Informatica mappings, workflows, and sessions

Figure 6.9-273. DPW's BI Standards Guidelines and Best Practices.

Deloitte has deep expertise in implementing optimal performance monitoring procedures and standards based on best practices. You can find our approach to enhancing existing standards, guidelines and best practices in the "Document Creation" portion of the Knowledge Management section of this response.

Enterprise Knowledge Management – Research and Resolve Issues

IV	Page IV-393	RFP Reference: Direct Technical Support Overview
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Enterprise Knowledge Management

- Research and resolve issues related to the Cognos and/or Informatica installations and application interaction with EKMS.

Deloitte researches and resolves issues related to Cognos and Informatica installations and application interaction with EKMS. Deloitte works with EKMS to test and validate the Cognos and Informatica configurations. We use internal Deloitte Cognos and Informatica expertise, as well as vendor alliances, to provide support as issues arise.

Our experience in projects involving large data warehouse implementations has given us a knowledge base of data warehouse issues that arise and appropriate mitigation around large-scale Cognos and Informatica implementations.

Figure 6.9-274 below highlights examples of data warehouse issues we have faced on other projects and the steps taken towards resolution.



EKM Challenge	Deloitte’s Approach Addresses EKMS Challenges
Scalability	<p>Challenges are faced when the hardware and server architecture are not adequately designed to meet the needs of the expected number of concurrent users, the volumes and complexity of reports and analytical queries, and the demand of high volume, high frequency data loads. Our approach to handling them include:</p> <ul style="list-style-type: none"> • Deloitte has experience of working in tandem with clients and vendors to architect solutions to manage 100TB plus databases. • This often takes the form of “appliances” that closely align hardware and software elements offering exceptional performance that scales in a linear fashion.
Security	<p>Securing complex applications is challenging, especially when faced with the multiple authentication protocols and integration systems found in the modern enterprise.</p> <ul style="list-style-type: none"> • Working in close collaboration with both the business end users and the client's own system security professionals, Deloitte has confirmed that the BI/DW platforms that we have deployed are fully secured, yet flexible enough to allow users to access their data when needed and be easily maintainable going forward. • Retrofitting security or applying application-level security ‘after the fact’ can severely compromise EDW performance, and so Deloitte works to implement security measures as the data warehouse is built
Architecture Strategy	<p>A clear architecture strategy is essential to any data warehouse implementation.</p> <ul style="list-style-type: none"> • Focusing on the Data Management layers of the architecture to the exclusion of the Business Access and Information Delivery layer. • Completing a Conceptual and Logical Information and Application Architecture Vision, before settling into a technical “picture”.
Real Time Solutions	<p>Often real time solutions are required to appropriately support the client’s needs.</p> <ul style="list-style-type: none"> • To support real time or near real time requirements it may be necessary to modify the architecture to more explicitly reflect the use of application integration and messaging technologies streaming of source data into the EDW • Distinct reference/master data management repositories or operational data stores to support the low-latency exchange of EDW integrated data with operational applications may be required.

Table 6.9-274. Examples of Data Warehouse Issues.

We garner information from the network of Deloitte Information Management specialists so that we can use it to combat data warehouse related issues at DPW. Figure 6.9-275 below provides examples of Deloitte using its widespread network to find the appropriate information required to solve a data warehouse issues.

DPW Technical Need	Deloitte’s Response and DPW Benefits
Dispatcher Configuration Settings	<p>Deloitte shared with EKMS knowledge of multiple server & dispatcher Cognos implementations. These implementations supported a large and diverse user base consisting of power users (Report Authoring Access) and standard users (Report Execution Access). The implementation was configured to dedicate one dispatcher to power users and one dispatcher to standard users. This approach alleviates report request bottlenecks that could prevent standard users from executing reports.</p>



DPW Technical Need	Deloitte's Response and DPW Benefits
Cognos Load testing	EKMS requested a load test of the new Cognos Server to evaluate changes in report response time and overall server performance. Deloitte was able to provide documentation on LoadRunner configuration changes that are necessary in order to support the load testing of Cognos. This documentation enabled us to successfully test the new Cognos server and multiple Cognos settings to find optimal performance for the new initiative the server would support.

Figure 6.9-275. Examples of how Deloitte has addressed DPW's technical needs

When encountered with complex issues, Deloitte is able to in to its large global pool of Information Management resources for relevant information. The above table provides two examples where we have reached out to our global network and helped resolve DPW challenges.





DPW Technology Strategy Assistance and Alternative Solutions Support

IV

Page
IV-393

RFP Reference: Direct Technical Support Overview

Provide specialist assistance for DPW technology strategy support for annual planning efforts and COTS, Cloud Computing, and Transfer Technology product support. Based on the request and priorities set by Contract Administrator and DTE, we will provide technology and process specialist support services. We will elaborate additional services in this category when DTE finalizes the priorities.

Deloitte recognizes that organizations such as DPW not only have the responsibility to provide mission critical operations support, but focus in tandem on strategic initiatives to progress continuous improvement and change across the enterprise. DPW is one of the leading states in the nation in the area of innovative IT service delivery. Through the current contract, you have implemented a shared services model that takes the concept of shared services well beyond 'server, email and infrastructure' consolidations – you have progressed to application shared services, allowing sharing across application and technology functions. Through this contract, you are planning to raise the shared service bar to the next level by introducing shared application delivery functions.

To help advance this leadership position, and to handle upcoming paradigm shifts and changes in overall IT strategy and approach, Deloitte provides specialist assistance and technology strategy support to DPW for annual planning efforts, COTS, Cloud Computing, and Transfer Technology Product Support, EKMS strategy, ITIL implementation, and CMMI support. As one of the largest IT strategy practices in the world, unlike IT staff augmentation or business process outsourcing focused firms, Deloitte draws from a deep pool of specialized expertise from across the country to assist DPW with addressing key technology strategic needs you have identified as well as to support additional needs you may not yet have identified. Our resources are aligned with strategic DPW IT initiatives in a direct support role or serve as ongoing strategic advisors providing program, technology and innovation assistance during the annual planning process, regular DPW IT strategy forums, or as members of the Project Advisory and Innovation Panel.

Our technology strategy assistance and alternative solutions support approach provides salient benefits to DPW, as outlined in Figure 6.9-276.



DPW Objectives	Deloitte's Approach	Benefits to DPW
Technology Strategy Assistance	<ul style="list-style-type: none"> • Deliver “Executable Strategy” - the creation of a strategy as well as the ability to execute on it • Provide more than just a strategy for employing new technologies; bring a spirit of continual innovation to DPW • Leverage our collective success in the past as the foundation for future DPW strategic initiatives 	<ul style="list-style-type: none"> • DPW-Deloitte relationship with innovative and achievable plan for moving the IT organization forward, not just a collection of resources to keep the lights on • Moves beyond the implementation of a new technology to the realization of meaningful, high-impact benefits to DPW's programs • Enables the continuation of DPW's heritage of progressive and award-winning strategic programs
Alternative Solutions Support	<ul style="list-style-type: none"> • Back real solutions with real services, such as the 25+ enterprise services we have worked with DPW to create • Maintain a technology agnostic posture that bases solution decisions on the client's requirement's and preferences 	<ul style="list-style-type: none"> • Moves DPW beyond the technology hype cycle quickly and into the technology benefit zone, where real results are achieved • Get the solution that meets your requirements and fits your architecture, not one that your solution partner needs to sell because it is theirs
EKMS Assistance	<ul style="list-style-type: none"> • Use our knowledge of HHS programs and DPW specific processes to identify business intelligence solutions to assist DPW decision makers • Bring to bear specialized EKMS resources with skills in data quality, master data management, ad hoc reporting, and predictive analytics on demand to address compelling DPW business intelligence needs 	<ul style="list-style-type: none"> • Solutions tailored to the challenges decisions makers face with DPW-specific programs, policies, and data • Pool of technical business intelligence experts at DPW's disposal to engage based upon needs identified by DPW decisions makers in work orders
ITIL Implementation	<ul style="list-style-type: none"> • Deliver our ITIL-experienced practitioners, including some of the authors of ITIL, to help DPW with their ITIL implementation • Team our ITSS and DTSS resources with DPW counterparts and work through ITIL as a team from certification through implementation 	<ul style="list-style-type: none"> • On site guidance and mentoring from a world-class team with a wealth of experience and knowledge of ITIL; not an off-site team or “do-it-yourself” approach • DPW creates an extended, enterprise-wide ITIL team avoiding a fragmented, throw it over the wall approach to IT operations

Figure 6.9-276. Deloitte Technology Strategy Assistance and Alternative Solutions Support Approach and Benefits.

DPW Technology Strategy Planning Process Assistance

Deloitte recognizes that the annual planning process at DPW is a time for aligning tactical initiatives with strategic organizational priorities and making critical decisions about the imperatives that receive support and funding and those to be deferred into the future. We support this planning process as well as the other DPW IT strategic planning activities that occur throughout the course of the contract. We have included in our proposal support for DPW in the strategic planning activities illustrated in Figure 6.9-277.

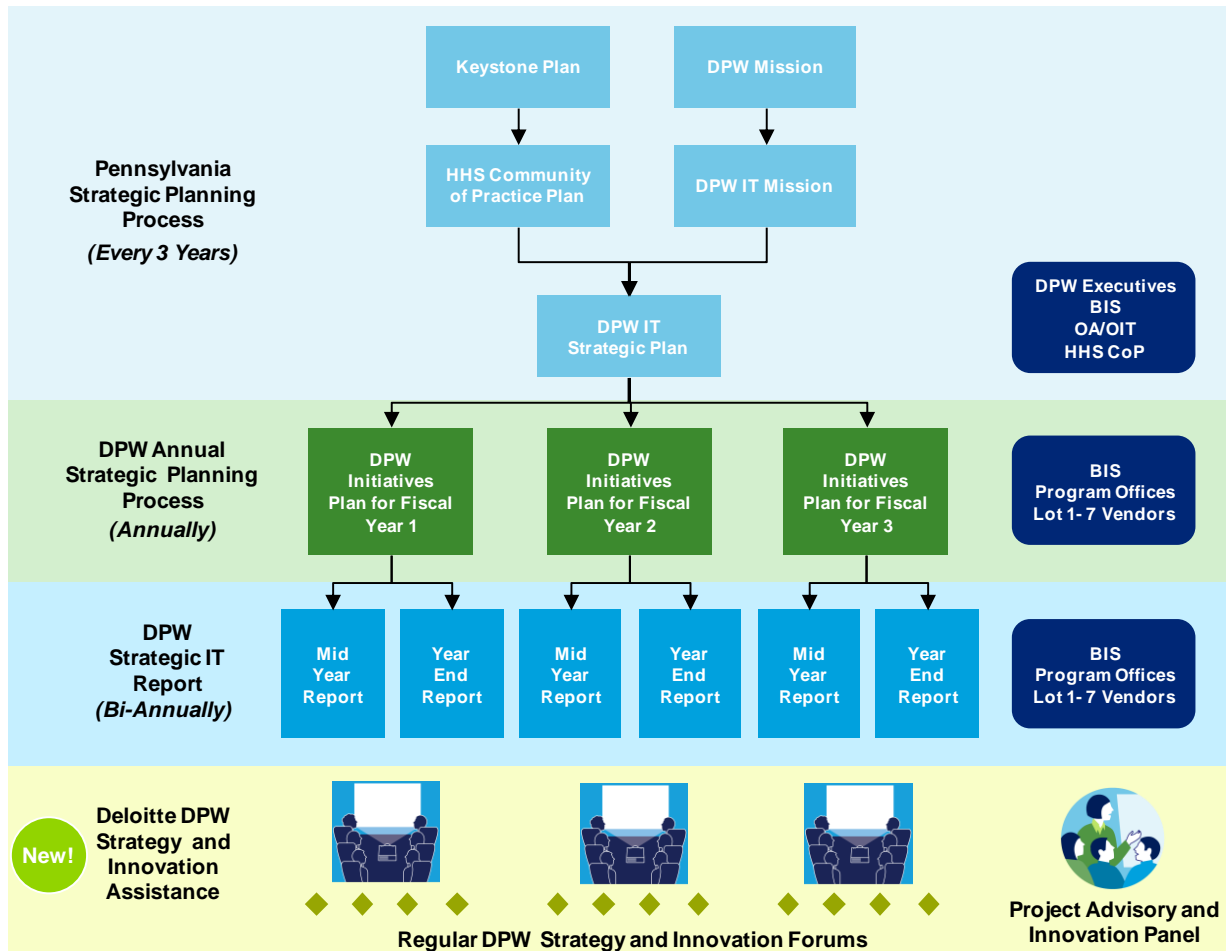


Figure 6.9-277. DPW Technology Strategy Planning Process.

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Deloitte provides DPW technology strategy assistance and alternative solutions support at each level of the DPW technology strategy planning process.

- DPW IT Strategic Plan (Every 3 years).** The creation of the DPW strategic represents the opportunity to set DPW’s IT strategic course for the next 3 years. The plan is broad, covering all areas of DPW’s IT organization, and is linked back strategically to DPW’s strategic business imperatives as well as HHS community of practice initiatives and goals. We support DPW in the creation of this strategic IT plan, including necessary preparation for the community of practice discussions.

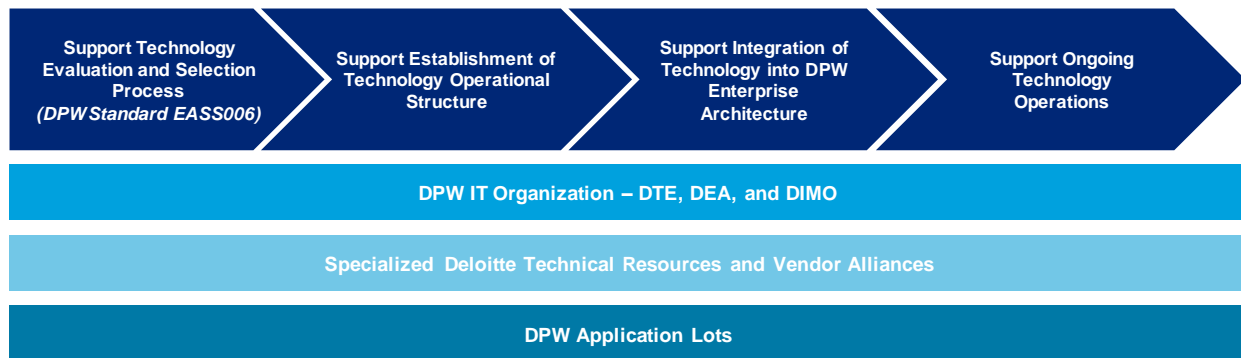


- **DPW Initiative Prioritization Process (Annual).** DPW's annual initiative prioritization process allows for the scoping, planning, prioritization, and initiation of DPW initiatives on an annual basis. Some of these initiatives represent tactical short term activities while others are pieces of larger, multi-year strategic efforts. As part of the planning process, we facilitate dialogs between the DPW program offices, DPW's IT organization, and other lot vendors and specifically identify initiatives where targeted technology support is required.
- **DPW's Bi-Annual IT Report (Bi-Annual).** DPW's bi-annual IT report is issued by the CIO to DPW stakeholders to report on the role of DPW's IT organization in the delivery of services across DPW's programs. This report enables DPW to reflect on the strategic role that IT plays in supporting service delivery as well as to provide status on ongoing strategic IT initiatives across the Department. We work with BIS, the program offices and other lot vendors to coordinate the creation of this report.
- **Deloitte DPW Strategy and Innovation Assistance.** We address DPW's requirement to provide strategic technology support as part of the annual planning process through two services that directly address DPW's needs:
 - **Regular DPW Strategy and Innovation Forums.** Meetings held 12 times annually that provide DPW an opportunity to engage technical and HHS domain specialists to understand how new technologies and methods can be used to support upcoming DPW initiatives.
 - **Project Advisory and Innovation Panel.** A group of rotating Deloitte specialists that focuses on the generation of innovative ways to address DPW business needs.

COTS, Cloud Computing, and Transfer Technology Product Support

Deloitte provides DPW COTS, Cloud Computing and Transfer Technology product support. Our product support picks up where the initial feasibility studies and evaluations of the technology ends, finalizing the evaluation and selection, establishing the necessary ongoing support structures and providing guidance on the integration of the applicable technology into the DPW enterprise architecture. Deloitte works with DPW to establish which technologies and products require support and, with DPW's input, prioritizes the support against other direct support activities.

Once the technology support is prioritized, resources are identified to provide the support. Based upon the skill set required, we may have existing resources in the DTSS team who can accommodate the request. If this is not the case, we engage Deloitte technical specialists from our pool of resources with COTS, cloud computing, and transfer technology specific skills to provide the support. Irrespective of the technology selected (COTS, Cloud Computing, or Transfer Technology) our support process has four phases. DPW prioritizes and engages available Deloitte technical resources at any phase in this process, which is represented in Figure 6.9-278.



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Figure 6.9-278. Process to Provide Support for COTS, Cloud Computing, and Transfer Technologies.

Deloitte's technology support process has four phases and involves communications across DPW stakeholders.

- **Support Technology Evaluation and Selection Process.** Deloitte uses the DPW standard process (STD – EASS006) for evaluating and selecting COTS products, transfer technologies or other alternative solutions. We work with DPW to coordinate involvement of the appropriate lot vendors and technical specialists and involve our vendor alliances at DPW's request to complete the 7 phases of the evaluation and selection process: (1) business feasibility and research; (2) solicitation; (3) preliminary evaluation and selection; (4) detailed evaluation and selection; (5) assessment and recommendations; (6) approval and authorization; and (7) procurement and implementation.
- **Support Establishment of Technology Operational Structure.** Deloitte provides continuity from the evaluation and selection process through the establishment of operational support for the new technology. As part of this step in the process, we support DPW in the creation of procedures and processes specific to the technology as well as the establishment of operational controls such as configuration management and monitoring processes specific to the technology. When this process is complete, we work with DPW to establish the appropriate technology environments so that the product can be integrated across DPW's applications.
- **Support Integration of Technology into DPW Enterprise Architecture.** We coordinate technology integration between DPW and the appropriate lot vendors, both with specialized technical resources and as part of the ARB review process. Both specialized technical resources and our vendor alliances can be of particular value here to help overcome integration challenges.
- **Support Ongoing Technology Operations.** We coordinate with DPW IT and other ITSS and DTSS functions to manage the ongoing operations of the technology. In particular, this involves working closely with the technology vendor to understand and evaluate upcoming releases of the technology and assess whether these releases should be adopted by DPW, weighing needs for new technology features against other conflicting priorities and timelines, and working with BIS and the lot vendors to establish a timeline for implementation of the new technology.



Deloitte's Strategic Support of DPW

In support of DPW's technology strategy planning process, Deloitte delivers the depth of technology strategy resources available across our Firm. These resources include our best and brightest IT strategy talent from around the globe as well as proprietary intellectual property that directly relates to DPW's IT strategic goals and initiatives, a collection of which is illustrated in Figure 6.9-279.

Deloitte works with DPW to identify the pertinent technology strategy resources and materials to support the technology planning process DPW is involved in. These resources are aligned with the planning process and engaged for targeted planning activities, facilitated workshops, or longer term engagements, based upon the availability of these resources and the needs of DPW. Although it is not possible to foresee all of DPW's technology strategy needs over the coming 3 – 5 years, we engage resources to begin collection of DPW-specific strategic points of view to plan for anticipated DPW business and technology needs as far ahead as possible.

Demystifying Clouds, Service Grids: The Missing Link in Web Services and Moving Information Technology Platforms to the Clouds
Exploring cloud architectures by the Deloitte Center for the Edge.

Services Thinking: A smart new approach to business execution
How Services Thinking, Deloitte's approach to SOA, enables more agility and delivers better value.

Data Governance: A Key to Effective Enterprise Data Management
EDM is the ability a company has to get the right information to people when, and how, they need it to do their jobs effectively.

Intelligent IT Spending in Today's down-turn Economy
The case for increasing IT investment during tough Times

The 6th Annual Global Security Survey
An annual global security survey which benchmarks Information Technology (IT) security and privacy in the financial services industry.

Maximizing Performance Through IT Strategy:
The results include responses from more than 450 directors of publicly-traded global companies with revenues of more than \$USD 1 billion. The Phase II report highlights "Eight Big Ideas" with respect to maximizing performance through IT strategy.

Depth Perception: A Dozen Technology trends shaping business and IT in 2010
A detailed look at the emerging enabler and disruptive deployment technology trends that have momentum and potential to impact your business in the coming year.

PA_DPW-1209

Figure 6.9-279. Deloitte Technology Strategy Intellectual Property.
Deloitte makes proprietary intellectual property available that directly relates to DPW's IT strategic goals.

Deloitte works with the DPW contract administrator and DTE leadership to identify the appropriate resources and engagement periods as technology strategy needs are identified during the planning process. We foresee several trends shaping the IT strategic landscape of DPW over the coming three to five years. We close out this introduction with a preview of these top five trends.

- **Impact of Health Care Reform Legislation on DPW Programs and Systems.** Early arrivers such as COMPASS Fair Care and HIPAA 5010/ICD-10 remediation demonstrate that the effects of health care reform are being felt DPW enterprise-wide and demand a new level of organizational agility.
- **Enabling DPW IT Operational Excellence Through ITIL.** The increasing number and complexity of DPW programs combined with the addition of new agencies under the DPW umbrella, such as Aging and Insurance, warrant a rigorous and disciplined approach to providing IT services across the DPW enterprise.
- **End User Application Configurability.** The introduction of the Corticon business rules engine into the DPW enterprise architecture was the first step towards greater application configurability. Adoption of Corticon increases over the next 3 – 5 years and the locus of control of application configuration shifts from developer to program office and ultimately to the end user.
- **Growing Business Intelligence Capabilities to Support DPW Policy and Predictive Analytic Requirements.** One of DPW's most important IT assets is the data it has collected across its programs for over 30 years. We expect that DPW executives and end users alike will place new demands on DPW's IT organization for access to and intelligence from these data assets.
- **Progressing the DPW EA-SOA Vision to Align with MITA.** The adoption of services within the DPE enterprise architecture accelerates over the next 3-5 years with the evolution of the MITA reference architecture driving DPW enterprise-wide adoption of services.

Have you heard?

Deloitte employs several strategic channels to deliver value to DPW including:

- Strategy practitioners from across Deloitte assist DPW with activities such as the SOA roadmap, EKMS roadmap, EA-MITA mapping, and ITIL pre-assessment.
- Strategic vendor relationships that enable us to engage vendors like Cognos when DPW needs critical production environment insight.
- Leading strategists like General Harry Raduege, Jane Griffin and Mark White bring new perspectives to DPW.
- Strategic eminence support helps DPW get recognition with NASCIO, APHSA, Computerworld, Gartner and other organizations for your strategic accomplishments.



DPW Technology Strategy Assistance – Technology Strategy Support

IV

Page
IV-393

RFP Reference: Direct Technical Support Overview

- Technology strategy support to establish a baseline for annual planning and scoping (Lot #6 and Lot #7)

Deloitte provides technology strategy support to establish a baseline for annual planning and scoping. We work with DPW throughout the year to support prospective initiatives that require specialist technology strategy support and to align specialized technology resources with these initiatives. As needed, to support initiatives, we engage technology strategy resources from the applicable DPW IT domain to support planning and scoping activities.

In Figure 6.9-280, we provide an overview of DPW's annual planning process. The figure illustrates the planning and scoping activities that occur in conjunction with the planning process. This process ultimately results in initiatives being grouped into one of three categories:

- **Enterprise Shared Services.** Category that encompasses three distinct types of shared services:
 - **IT Shared Services.** Describes IT support services provided by DPW's IT organization in support of the applications and falling under one of the DPW IT technology domains.
 - **Enterprise Business Services.** Atomic business applications or services that can be integrated within DPW's enterprise applications.
 - **Enterprise Architectural Services.** Foundational services that can be incorporated into composite services or used directly by DPW's enterprise applications.
- **Enterprise Level Initiatives.** Initiatives that impact more two or more of DPW's enterprise applications warranting additional communication, planning and design, and testing to accommodate multiple applications.
- **Project Specific Initiatives.** Initiatives that are localized to a specific project and system and are not expected to impact any of DPW's other enterprise applications.

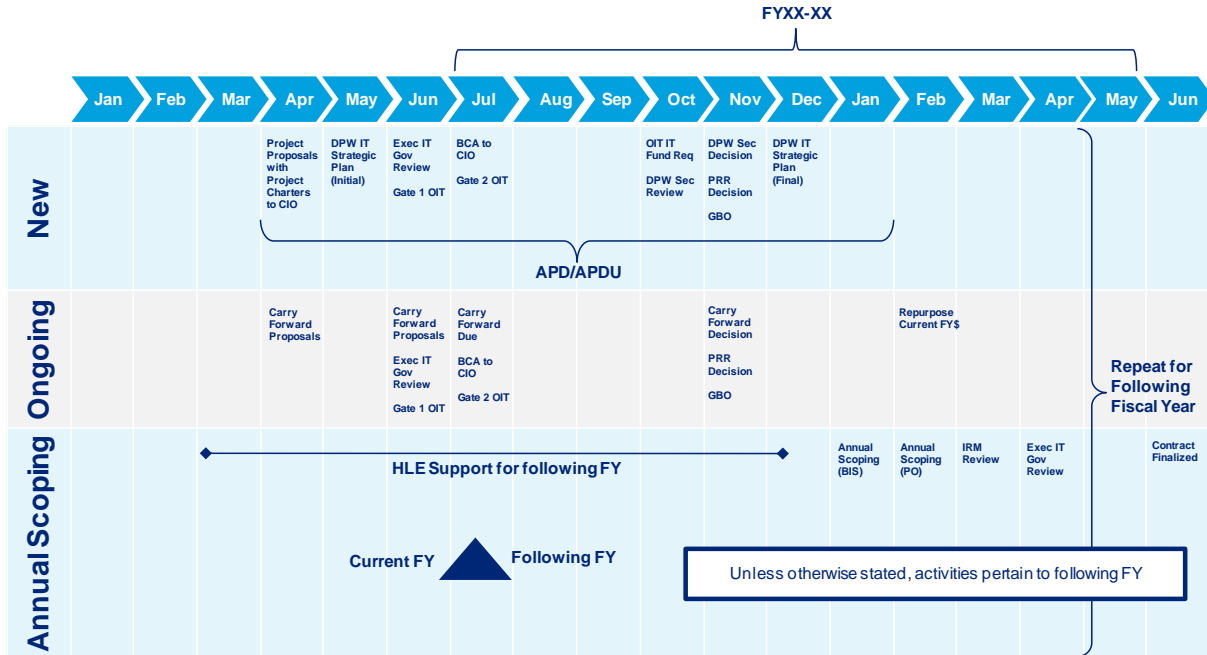


Figure 6.9-280. DPW Annual Planning Timeline.
The DPW annual planning timeline is followed for fiscal year-to-year initiative planning.

Deloitte anticipates that the highest level of technology strategy assistance is needed to support enterprise shared services and enterprise level initiatives with limited support required for project specific initiatives. We bring world-class technology strategy consulting capabilities to DPW. Deloitte employs an IT strategy approach we call “executable strategy” – a strategy we create and one that can be implemented.

We address DPW’s requirement to provide strategic technology support as part of the annual planning process through two services that directly address DPW’s needs:

- **Regular DPW Strategy and Innovation Forums.** DPW Strategy and Innovation Forums are held monthly, providing an opportunity to regularly engage specialized IT resources to help define the role of developing technologies in upcoming DPW initiatives. We engage our specialized technical resources from around the country, HHS leaders from other state organizations and other IT technology vendors to provide DPW IT leadership an overview of particular technologies and methodologies and the opportunity to understand how they can be used to support DPW.
- **Project Advisory and Innovation Panel.** A group of rotating Deloitte technical and HHS specialists from a cross-section of our projects that is engaged to advise DPW program office and IT decision makers on technology, process, and operations trends that will likely impact DPW’s businesses in the next 1 to 3 years. This group focuses on the generation of creative and innovative ideas to improve business processes and gain efficiencies that DPW can consider for inclusion during the annual prioritization process.

Deloitte's IT strategy practice instills the best practices with our technical practitioners, helping to facilitate smooth transition from strategy to doing a implementation. In the same way Deloitte is committed to delivering its technology core team to DPW, we are also committed to engaging our best and brightest strategic support to assist DPW during the annual planning effort and as other strategic activities are identified throughout the year.

DPW Technology Strategy Assistance – DTE EKMS Assistance

IV

Page
IV-394

RFP Reference: Direct Technical Support Overview

- DTE-Enterprise Knowledge Management Services Assistance (Lot # 7)

Deloitte provides DTE-Enterprise Knowledge Management Services Assistance in support of DPW technology related initiatives. We follow an approach that allows the engagement of a variety of technical EKMS resources based upon DTE needs and the needs of the application initiatives. Deloitte is able to fulfill DPW's EKMS needs with an industry leading Enterprise Knowledge Management (EKM) practice that numbers more than 500 information management specialists. Our team on the ground understands DPW's business, data needs, and technologies and provides tactical data warehouse and information management to the program offices. Our senior information management specialist coordinates cross-program information management efforts, manages strategic efforts and coordinates with the DPW EKMS team.

DPW, like many other large organizations, finds itself at the crossroads of the organization's information management journey. We work with DPW as the stewards of the organization's most important asset, its data. DPW manages this data and works with Deloitte and the program offices to create reports that allow leadership to derive meaning from the data, meet federal reporting requirements, and conduct some degree of predictive policy analysis and decision making. At the same time, there is a growing sense that much more is possible with the 30 years of data that DPW has been collecting for some of its programs.

Hindsight – Insight - Foresight

Deloitte observes a transformation occurring in the information management marketplace and across almost all enterprises, regardless of industry. At the heart of this shift is a fundamental change in the way data is being used – a shift from reactive to proactive. We describe data usage in three different contexts: Hindsight, Insight, and Foresight. We describe the difference below and illustrate in Figure 6.9-281.

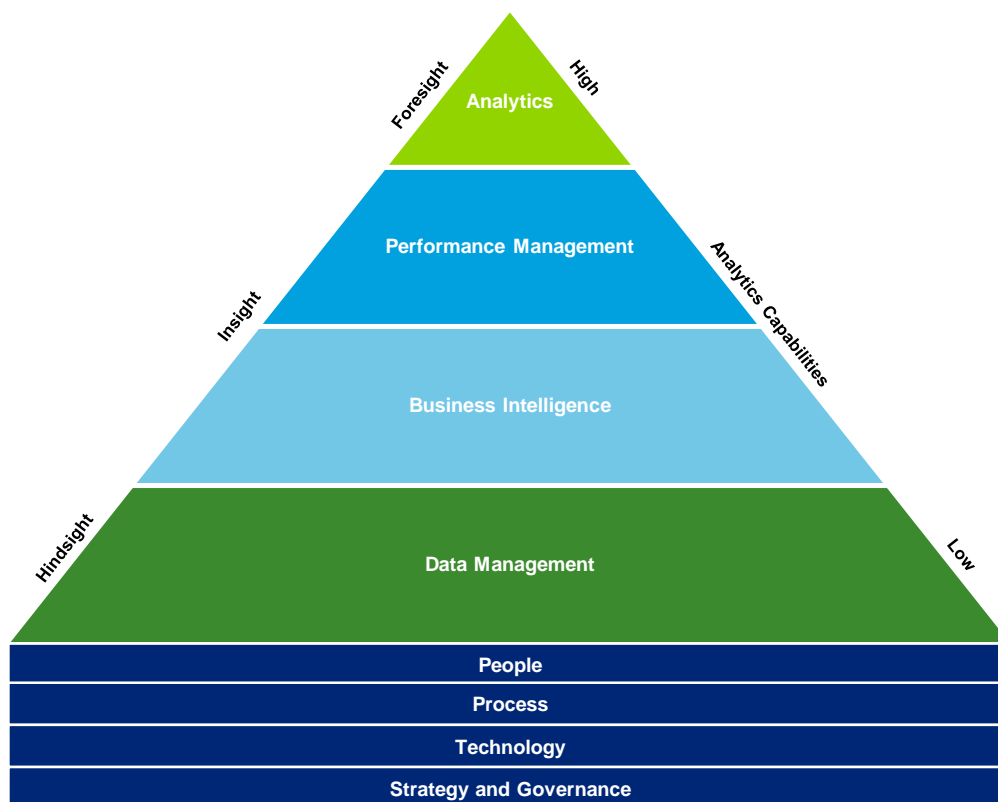
Key Staff Spotlight Sunnah Pasha



Senior BI/DW Specialist

“With over 30 years of data from their programs, DPW has an incredibly valuable asset. I'm excited about the opportunity to work with the Department and help realize new and powerful ways to use this data to support their programs and policies in making improved business decisions.”

- **Hindsight** refers to data management practices of the core business intelligence solutions as the industry has practiced for over 20 years.
- **Insight** relates to business intelligence solutions' ability to measure and gauge business based on goals and metrics.
- **Foresight** is the drive of the next generation of information management solutions, based upon business analytics and including predictive analytics and data mining solutions.



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Figure 6.9-281. Hindsight – Insight - Foresight.

A transformational shift is occurring in the way enterprises employ information management technologies, moving from a reactive to a proactive orientation.

The supporting business analytics capabilities, represented in the core of the pyramid in Figure 6.9-281, range from fundamentals like data management, business intelligence, and performance management to advanced processes involving predictive modeling, asset intelligence, and automated data mining. These capabilities are quickly moving from periphery technologies into the heart of the business, producing uncommon insights that drive smarter, faster decisions. This is the essence of deep analytics, and it is changing the path to performance in organizations around the world by allowing them to derive answers to some of their most difficult business questions:

- Which of these claims represents a possible case of fraud and abuse?
- Which children are the “in care” situations that is likely to be detrimental or dangerous?

- What mix of health and human service benefits will result in the best long-term educational outcome for this child?
- Are any of the parents in my cases in jeopardy of falling behind on their child support payments and what should I change to avoid this?
- Which licensed facility is more is most likely to fall out of compliance with regulations?

Business analytics is in demand across all the industries Deloitte serves with analytics projects often having the direct sponsorship of the senior-most executives at our clients. Our attached Deloitte Debate document *Business Analytics: Just Another Passing Fad?* sheds light on this hot technology trend.

Data Quality and Metadata Management

Deloitte anticipates that DPW will apply business analytics to a large number of business challenges in the future and will address new challenges even more rapidly. This drives DPW to act with foresight and instills a new problem solving mindset across the Department. Ultimately, as DPW begins to act with foresight and initiate positive decisions with confidence in their data, they ultimately drive better outcomes for their clients and programs.

These positive outcomes are predicated on high quality, well-managed data. Data quality and data conflict issues result in inaccurate predictions, which drive the loss of faith in program executives and policy makers in the underlying technologies. For this reason, Deloitte understands why DPW IT and EKMS team leadership feel there is such a compelling need to focus on the foundational elements of a well functioning analytics solution: data quality and metadata.

Data Quality

There are two dimensions of data quality that are of primary concern in the maintenance of an enterprise data warehouse. First, improving data quality at source to confirm that information flowing into the data warehouse is of sufficient quality. Second, since data warehouses typically manipulate, consolidate and aggregate data from multiple disparate sources, it is important to confirm that the integrity of source data is maintained throughout this process and is traceable.

Have you heard?

Deloitte supports PACSES enterprise knowledge management evolution from hindsight to insight and foresight.

- **Hindsight.** Operational reports meet PRWORA certification requirements and provide program management data.
- **Insight.** Federal reports produced out of the data warehouse enable the program to hone in on cases that need a specific action taken and identifying eligibility for closure. Pennsylvania is the only state in the country to exceed all federal performance measures.
- **Foresight.** Data analytics initiative enables proactive prevention using predictions of non-custodial parents likely to be in arrears in the future, enhancing existing child support enforcement and collections.



Deloitte's Data Quality Management methodology includes processes and tools for addressing errors and inconsistencies in the quality of the source and delivered data; providing a data audit and feedback loop that assign accountability for timely error resolution. Our proven methodology has been deployed for consulting projects ranging from enterprise data warehouse implementations to initiatives purely focusing on the improvement of enterprise data quality. The methodology provides the foundation for building, transforming, and sustaining the data quality throughout the data life cycle. Deloitte proposes applying this methodology to address data quality issues identified by DPW. The Data Quality process consists of three components:

- **Data Quality Audit.** Includes an analysis of the level of data quality within the source systems, specifically for those elements that have been identified as key. Includes recommendations to improve the quality of the data available.
- **Data Cleansing.** Component-based or custom coded modules created using the data cleansing tools are used to implement the data cleansing business rules.
- **Data Quality Monitoring.** Provides a mechanism for the continuous monitoring and managing of the processes within the data quality framework.

Metadata Management

Metadata exists at each stage in a business intelligence development life cycle and should be maintained at each point along the information supply chain. During the business requirements analysis phase, business definitions and business rules are identified. As part of the metadata management strategy implementation, templates are defined before the start of the project where this information is typically captured. These, in turn, should either be linked to or stored in the metadata repository.

Confirming data lineage is one of the key benefits of architecting a robust metadata repository with supporting standards and processes where all metadata artifacts are linked together. Data lineage provides the functionality to determine where data comes from, how it is transformed, and where it is going. The data lineage function provides a mechanism to connect the business with technical terms by attaching the business rules to the technical transformations performed along the processing. Deloitte's metadata management process covers key areas of metadata management:

- **Metadata Assets.** Establishing the assets (artifacts) that need to be inventoried and metadata to record for each asset is one of the first activities in establishing a metadata repository.
- **Data Ownership/Stewardship.** Assigning ownership and stewardship for metadata establishes accountability for changes to the metadata repository. Data governance processes further confirm the currency of metadata.
- **Impact Analysis.** Impact analysis records and traces the movement of data and data relationships. Once a sufficient amount of metadata artifacts are stored and linked in the metadata repository, the impact of changes to business rules can be determined through generating impact analysis reports from the metadata repository.



- **Version Control.** When designing the metadata repository architecture, provision should be made for version control and the storing of historical metadata. This enables business to review changes to business rules over time and the subsequent impact on data and reporting.

Deloitte as DPW's EKMS Strategic Advisor

The delivery of the next generation DPW analytics solution as well as the implementation of the underlying data quality and metadata management initiative that underlie analytics warrant a visionary advisor with the ability to execute.

There are several key factors that drive Deloitte's business intelligence and EKMS success with DPW and which make Deloitte the best fit to continue providing services to DPW:

- **Knowledge of DPW's Data and Programs.** The success of complex analytics solutions is more dependent on knowledge of the programs and the data than on the knowledge of the technology. Deloitte has been providing business intelligence data to DPW programs for 10 years and has built a deep understanding of both DPW's data and technologies.
- **Depth of Our EKM Practice.** Deloitte's enterprise knowledge management (EKM) practice is a leader in providing EKM solutions, with more than 500 completed engagements worldwide in the past three years. To provide the best solution to our clients' challenges, our multidisciplinary EKM practice comprises nearly 800 professionals serving 80 of the top 100 global organizations.
- **Leaders with Vision.** Our practice leadership and senior practitioners are highly experienced visionaries who bring experience and insight to our clients. This includes our practice leader, Jane Griffin, who is internationally eminent in information management, data warehousing and business intelligence and takes time to visit DPW periodically while remotely overseeing the other EKM activities Deloitte conducts at DPW.
- **Deloitte Information Management Center of Excellence.** Deloitte's Enterprise Knowledge Management Center of Excellence (EKM-CoE) is a strategic initiative that provides standards to successfully support the consistent deployment of EKM capabilities across our clients.
- **Vendor Relationships and Experience.** Deloitte has well-established relationships and delivery experience with the leading hardware and software vendors involved in information management improvements. These relationships and experience are summarized in Figure 6.9-283 and include, most notably: (1) Cognos, where we are a Platinum Global Consulting Partner and won the Global Alliance Partner of the Year in 2008; and (2) Informatica, where we have a global strategic alliance and over 350 EKM practitioners with Informatica experience.



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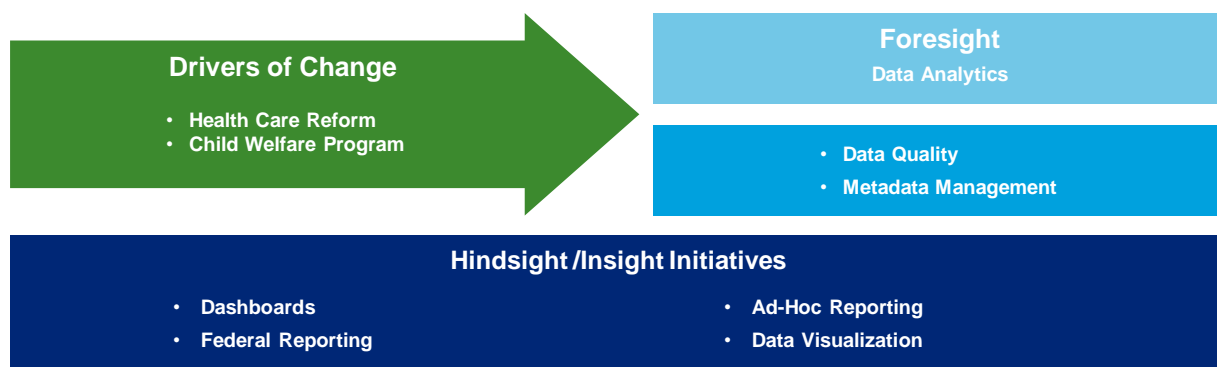
Figure 6.9-283. Deloitte EKM Vendor Relationships and Experience.

Our EKM relationships include, most importantly for DPW, very strong alliances with Cognos, Informatica, and Oracle.

Applying the EKMS Strategy to DPW

Deloitte is working with DPW to implement strategic data analytics efforts for some of the program offices. We understand DPW’s concerns around data quality and metadata management and can use these initiatives to bridge the way to more successful business analytic efforts. At the same time, we recognize that not all of DPW’s energies are focused on foresight – insight and hindsight are required to operate DPW’s programs.

Our EKM team engages DPW program offices and the EKMS team during the annual prioritization efforts and at strategic points throughout the year to determine the proper mix of foresight, insight, and hindsight to apply for a particular year, as illustrated in Figure 6.9-284.



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Figure 6.9-284. Mix of Foresight, Insight, and Hindsight Initiatives.

Foresight initiatives are based upon the execution of data quality and metadata management work and do not preclude ongoing hindsight and insight initiatives.

Based upon prioritization results, we engage additional specialized technical resources to assist the EKMS team and program offices prepare for new technologies and new initiatives. As necessary, this may include Deloitte EKM practice leadership and vendor alliances for strategic summits with DPW.

DPW Technology Strategy Assistance – Establish the ITIL Adoption Approach

IV

Page
IV-394

RFP Reference: Direct Technical Support Overview

- Establish the ITIL (IT Infrastructure Library) Adoption Approach (Lot # 7).

Deloitte provides ITIL (IT Infrastructure Library) adoption approach and guidance. We work with DPW to identify, design, transition, and operate IT services across the DPW IT domains. Deloitte has engaged the DPW IT organization in a pre-assessment of their ITIL readiness. This pre-assessment included the following activities:

- Overview of ITIL and implementation across similar organizations and ITIL future state visioning sessions.
- Discussion of the ITIL library and processes, including process deep dives and workshops that included DPW IT domain team assessments of current ITIL capabilities.
- Follow-up workshops to discuss the results of the pre-assessment and to prioritize ITIL capability focal points for the DPW IT organization.

DPW ITIL Pre-Assessment Results

The results of the pre-assessment Deloitte facilitated with DPW's IT organization can be found in Figure 6.9-285. The results indicate the pre-assessment evaluation of DPW's IT organization compared with a representative 2 year ITIL target goal for an organization with a size and operating structure comparable to DPW.

Our ITIL adoption approach addresses each stage of the *ITIL Version 3* life cycle based upon the ITIL stages starting with building the Continual Service Improvement foundation and then progressing to Service Operation, Service Design, Service Transition and Service Strategy. Within this approach, the capabilities are cumulative, with each stage building upon the previous stage. A focal point within each stage is addressing the primary operating risks that we worked with DPW to identify during the pre-assessment.

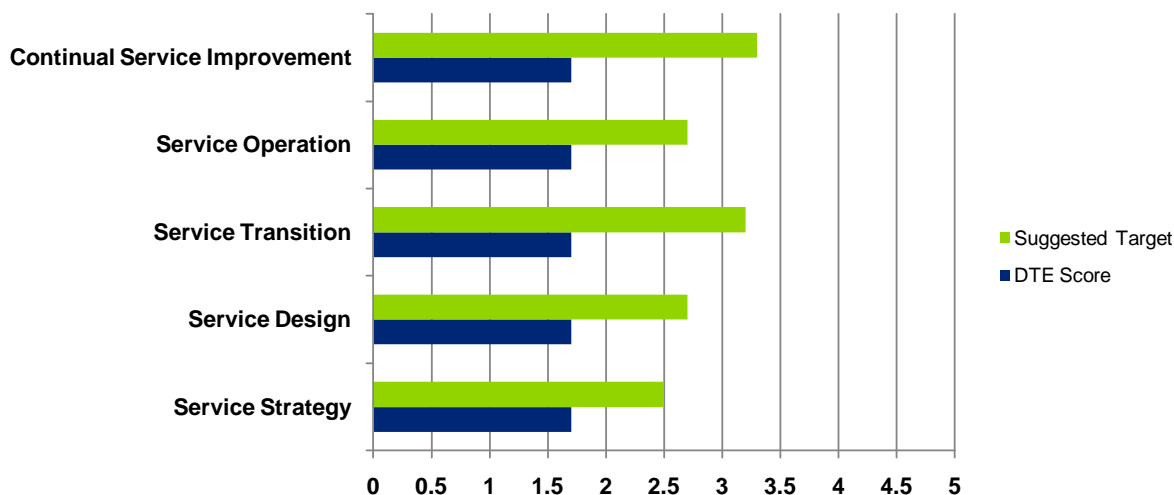
Key Staff Spotlight Randy Steinberg



ITIL Adoption Specialist

"DPW is making tremendous strides towards ITIL adoption and is already ahead of many other states. I really look forward to being part of the team that helps position DPW to become the gold standard in IT supporting the government services delivered to Pennsylvania's citizens"

DPW ITIL Pre-Assessment Results – By ITIL Lifecycle Phase



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Figure 6.9-285. DPW ITIL Pre-Assessment Results.

Deloitte worked with DPW to complete an ITIL pre-assessment and map the results against a 2 year “To Be” timeline.

DPW ITIL Implementation Plan

The DPW ITIL pre-assessment results and ITIL life cycle-based approach to implementation sets a solid foundation for the actual DPW ITIL adoption approach. Deloitte recognizes that the DPW IT organization has many competing priorities related to the fulfillment of their ongoing operational responsibilities and ITIL adoption, although a very important priority for the organization, needs to be planned in conjunction with the other ongoing business and technology initiatives of the Department. As part of the strategic planning process, Deloitte’s ITIL subject matter expert engages DPW in the ITIL adoption prioritization and planning process taking into account three important implementation aspects:

- Working with DPW to fit the ITIL adoption approach to the other competing needs of the organization and the available resources to support the adoption
- Including annual assessments to gauge the progress of the adoption
- Integrating the ITSS/DTSS organization into the implementation timeline, supporting the DPW “one team” approach.

Our ITIL implementation plan follows the approach based upon the DPW ITIL pre-assessment and follows the ITIL life cycle as stipulated above. The adoption effort quickly builds the needed foundational elements for process maturity improvement.

Have you
heard?

Deloitte conducted an ITIL pre-assessment and implementation prioritization meeting with DPW. Our team, led by Randy Steinberg, is ready-to-go and every Deloitte member of our ITSS team is ITIL v.3 certified. There is no ramp up time and cost for the ITIL implementation when you select Deloitte.



Deloitte then establishes cyclical Continual Service Improvement waves for implementing each ITIL Service Life cycle stage.

In the model organization case, each improvement wave runs approximately 3 months. We work with DPW to establish the actual cycle duration during the ITIL implementation planning meetings. Our approach is designed to directly address key ITIL implementation challenges that many IT organizations face when undergoing similar efforts. These include:

- Demonstrating measurable results at early stages of the project to build positive momentum
- Using stakeholder teams to obtain up front buy-in and leverage ITIL practices across a wide and diverse organization
- Integrating process solutions with supporting technologies and organizational roles and responsibilities
- Taking a well planned integrated transformation approach with checkpoints along the way to guide and steer ITIL implementation activities
- Some life cycle stages take several waves to complete. The proposed ITIL Implementation Plan is presented in Figure 6.9-286 with narratives for each of the major phases following the figure.

DPW ITIL Implementation Plan – 2 Year Horizon

Key Projects	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Build ITSM Foundation ITSM Vision, Architecture, Operating Model, Process Repository, Organization, Governance, Service Catalog, Service Definitions	█											
Build CSI Foundation CSI Process, Baseline Metrics, Dashboards, Service Targets, Key Performance Indicators		█										
Implement Service Operation Incident, Problem, Request Fulfillment, Event Mgt, Service Desk, Access Mgt		█	█	█								
Implement Service Transition Change, Release, Asset/Configuration, Testing, Knowledge Mgt, Transition Planning, Evaluation					█	█	█					
Implement Service Design Availability, Capacity, IT Service Continuity, Security Mgt, Supplier Mgt, Service Level Mgt								█	█	█		
Implement Service Strategy Service Portfolio, Financial Mgt, Demand Mgt, Service Strategy											█	█

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Figure 6.9-286. DPW ITIL Implementation Plan.

Our proposed implementation approach is based upon several waves of ITIL improvement initiatives. The order of the waves is based upon the DPW ITIL pre-assessment and the ITIL phases.

- **Build ITSM Foundation.** In the Build ITSM Foundation phase, we assist DPW with setting the ITSM vision, future state organization and operating model. We work with DPW to establish foundational items such as a service catalog and process repository that guides activities in the remaining phases.



- **Build CSI Foundation.** In the Build CSI Foundation phase, we assist DPW with setting up measurements and dashboards, and taking a baseline of the current state as a starting point. We begin the continual service improvement cycle, which operates in improvement waves that match the start and end of each phase.
- **Implement Service Operation.** In the Implement Service Operation phase, we work with DPW to formalize the ITIL V3 service operation processes such as incident, problem and request fulfillment. Each process is viewed in terms of process steps needed, supporting technologies, organizational roles and responsibilities and reporting governance. A continual service improvement checkpoint is then taken at the end of this phase to measure progress.
- **Implement Service Transition.** In the Implement Service Transition phase, we work with DPW formalize the ITIL V3 service transition processes such as change, release, asset and configuration management. Similar to the previous phase, a continual service improvement checkpoint is then taken at the end of this phase to measure progress.
- **Implement Service Design.** In the Implement Service Design phase, we work with DPW to formalize the ITIL V3 service design processes such as availability, capacity and service level management. Similar to the previous phase, a Continual Service Improvement checkpoint is then taken at the end of this phase to measure progress.
- **Implement Service Strategy.** In the Implement Service Strategy phase, we work with DPW formalize the ITIL V3 Service Strategy processes such as service portfolio, demand and financial management. Similar to the previous phase, a Continual Service Improvement checkpoint is then taken at the end of this phase to measure progress.

Based upon the progress of DPW with ITIL and the goals of the organization, further improvement waves may be identified and the ongoing cycle of continual improvement progresses after the completion of the initial phase of ITIL adoption.



DPW CMMI and ITIL Assistance – Refinement and Expansion of CMMI and ITIL

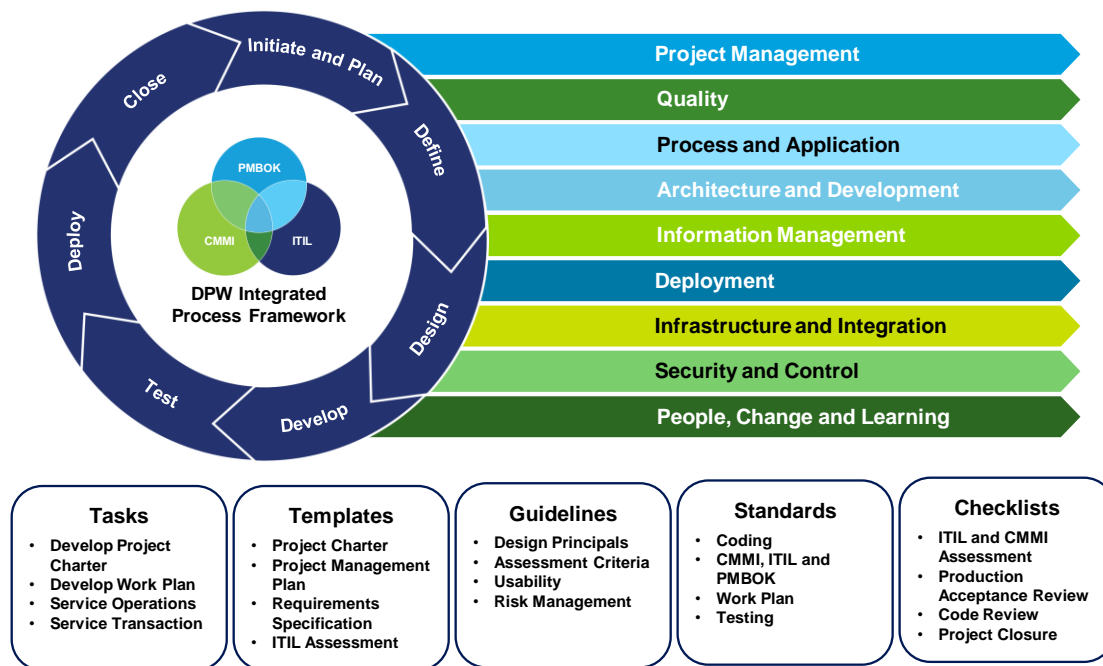
IV	Page IV-394	RFP Reference: Direct Technical Support Overview
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Provide specialist assistance for DPW strategy support for annual planning efforts for software quality control and solution development and delivery process improvement initiatives. Based on the request and priorities set by Contract Administrator, DEA, and DTE the following four areas of process specialist support services will be provided.

Deloitte provides specialist assistance and strategy support to annual planning efforts for software quality control and solution development and delivery process improvement initiatives. We assist DPW with CMMI and ITIL refinement and expansion as well as annual strategy support to assess CMMI and ITIL maturity levels. Deloitte has initiated CMMI and ITIL planning with DPW and brings the experienced resources to DPW to achieve two key goals in the coming contracting period:

- Support the DPW IT organization in their advancement to a CMMI Level 5 assessment.
- Support ITIL v.3 adoption and iterative improvements across the DPW IT organization.

Deloitte provides DPW with two major assets to enable the achievement of these two significant milestones: (1) a comprehensive process framework with complementary accelerators; and (2) CMMI and ITIL resources and qualifications in our local ITSS/DTSS team. We depict the integrated process in Figure 6.9-287.



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Figure 6.9-287. DPW Integrated Process Framework.

Our integrated process framework for DPW aligns with ITIL, CMMI, and PMBOK and includes assets and accelerators to help DPW implement these processes.

This process is based upon the 3 major process frameworks requested by DPW in the RFP:

- **CMMI.** Deloitte utilizes an accelerator for CMMI process improvement called the System Development Playbook. The Playbook is a repository of processes, standards, guidelines and templates that Deloitte has used to implement and improve our CMMI processes for software development projects around the globe. The Playbook can be used a la carte by DPW, providing benchmarks for process customization and including valuable supporting materials to help DPW save time in the CMMI process.
- **PMBOK.** Deloitte’s project management approach is structured to align with Project Management Body of Knowledge (PMBOK). The Project Management thread in the Playbook methodology is *fully aligned with PMBOK requirements*.
- **ITIL.** Deloitte utilizes a comprehensive modular ITSM Framework that integrates ITSM leading practices, Deloitte accelerators and frameworks into one centralized method that guides ITIL transformation activities and projects. For DPW, we use this framework not only for ITIL transformation support, but also to integrate CMMI development practices with design, build and transition of the operational solutions needed to support application solutions on an ongoing basis.

Kiran Honavalli, our proposed CMMI expert, provides on-site support to our DPW projects with CMMI process guidance, mentoring, and assessments. Deloitte delivers Kiran to support DPW’s advancement towards a CMMI Level 5 assessment.

Deloitte DPW Technical Expert Highlight – Kiran R. Honavalli



Kiran R. Honavalli

Deloitte Proposed CMMI Expert

“To monitor and ensure Deloitte maintains a Level 3 rating, we have conducted 36 internal Quality Assurance Audits and CMMI interviews across all the DPW projects.”

- 14 years of CMMI, CMM and ISO 9001 model implementation experience for many IT organizations across the world
- CMMI reviewer for DPW projects
- Participated in 7 CMM and CMMI appraisals (4 of each are high maturity Level 4 and 5 appraisals)

- Presented papers in the SEPG 2008, 2009 and 2010 North America Conference
- Published award winning white paper in 2007
- CMMI, PMP, ISO and Six Sigma expert

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Figure 6.9-288. Kiran R. Honavalli – Deloitte Proposed CMMI Expert.

Deloitte brings Kiran to DPW as CMMI expert to support DPW’s advancement towards a CMMI Level 5 assessment.

Our integrated process framework contains 22 CMMI process accelerators, an ITIL artifacts library with sample ITIL artifacts from our client base, and ITIL and CMMI assessment tools and process improvement guidelines. Deloitte provides DPW with this integrated framework and works with DPW to use the processes, tools, and assets to achieve CMMI Level 5 assessment and ITIL adoption.

Perhaps more important than our integrated process framework are the experiences and resources we provide to DPW. Deloitte is not quoting DPW CMMI levels for a remote development facility working on somebody else's software. Our CMMI experience and assessment is for our software development efforts with state governments across the county, including the work done in our Camp Hill development center to support DPW over the last 5 years. Figure 6.9-289 reflects our most recent CMMI assessment. The **CMMI Level 3** assessment was awarded for **Deloitte's entire systems development organization, and includes the DPW Project at Camp Hill Center.**



Figure 6.9-289. Deloitte System Development Organization Level 3 CMMI Assessment.
Deloitte's entire system development organization was assessed at CMMI Level 3.

Deloitte has worked with DPW on laying ITIL groundwork since 2009. Randy Steinberg, our proposed ITIL adoption leader for DPW is seen on in Figure 6.9-290 with ITIL books he authored, completed the DPW ITIL pre-assessment and worked with DPW IT and Deloitte ITSS staff to get their entire teams ITIL V.3 Foundation certified. Deloitte delivers Randy to complete the ITIL adoption in the coming contracting period.

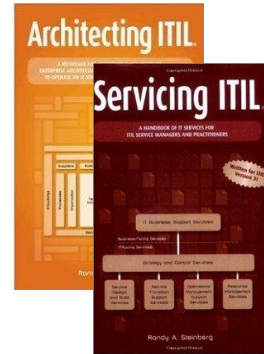
Deloitte DPW Technical Expert Highlight – Randy A. Steinberg



Randy A. Steinberg
Deloitte Proposed ITIL Expert



- ITIL implementation for many IT organizations around the world
- DPW ITIL Pre-Assessment
- Service Level Management solution recipient of a Malcolm Baldrige award for IT service



- ITIL V3 Expert, PMP, ISO20000 Consultant Certified
- 4 Books Published on ITIL Implementation
- Author of ITIL Version 3 refresh

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Figure 6.9-290. Randy A. Steinberg – Deloitte Proposed ITIL Expert.

Deloitte brings Randy to DPW as an ITIL expert to complete the ITIL adoption work he began with the initial DPW pre-assessment in 2009.

DPW CMMI and ITIL Assistance – Strategy Support for CMMI and ITIL

IV	Page IV-394	RFP Reference: Direct Technical Support Overview
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- Refinement and expansion of CMMI and ITIL models and governance frameworks
- Provide strategy support to assess CMMI and ITIL model maturity level baselines and map annual strategies for annual targets.

Refinement and Expansion of CMMI and ITIL

Deloitte provides a process to refine and expand the CMMI and ITIL models and governance frameworks. Our work with DPW has included an ITIL pre-assessment and comparison of the CMMI-based *System Development Playbook* with DPW's SDM and the Commonwealth's EPMM4. We leverage these assessments and comparisons as a baseline for further refinement and enhancement of the CMMI and ITIL models and work with DPW to identify and integrate changes to existing DPW and Commonwealth frameworks to align them with the CMMI and ITIL models. We understand DPW's current ITIL and CMMI compliance very well. This knowledge, in conjunction with our ITIL and CMMI experience and System Development Playbook accelerators, make us




the best suited service provider for DPW as they progress their CMMI and ITIL programs.

SDM-to-CMMI Pre-Mapping

Deloitte will assist the DPW IT organization in pursuing CMMI assessment for their organization. DPW currently uses their Software Development Methodology (SDM) as their software development methodology. Our technical process experts collaborated with project management and software life cycle specialists from our DPW project to conduct a pre-mapping of the DPW SDM against the CMMI Level 3 process areas to identify the changes needed to prepare for maturity assessments.

Our analysis, while only preliminary, identified several gaps in the SDM that need to be addressed for DPW to achieve CMMI Level 5 compliance on the basis of this methodology. We provide a summary of our findings in Figure 6.9-291.

CMMI Process Area	Current SDM Compliance	Deloitte Understands the Gaps Between SDM and CMMI Levels
<ul style="list-style-type: none"> • Requirements Management (SDM Aligned) • Project Planning • Project Monitoring and Control • Supplier Agreement Management • Process and Product Quality Assurance • Measurement and Analysis • Configuration Management 		<ul style="list-style-type: none"> • Process of initiating the project is not addressed. • Process for developing and managing the various plans such as Project Management Plan, Stakeholder Involvement Plan, Logistics Plan and Data Management Plan etc. is not addressed. • Process for estimating the work either using the top down and or bottom down approach is not defined. • Process for planning the quality management and performing the periodic quality assurance reviews not defined. • The focus of metrics defined is solely on Service Level Objectives (SLOs) and does not cover the process and product quality measures (e.g. Earned Value Analysis, Effort Variance, Defect Density, Review Effectiveness, and Defect Detection Efficiency). • Process for developing the Configuration Management Plan for managing the artifacts and source code is not defined.

CMMI Process Area	Current SDM Compliance	Deloitte Understands the Gaps Between SDM and CMMI Levels
<ul style="list-style-type: none"> • Requirements Development (SDM Aligned) • Technical Solution (SDM Aligned) • Product Initiation • Verification (SDM Aligned) • Validation (SDM Aligned) • Integrated Product Management • Risk Management • Decision Analysis and Resolution • Organizational Process Definition • Organizational Process Focus • Organizational Training 		<ul style="list-style-type: none"> • The requirements traceability matrix described in the SDM is not bi-directional as required. • Process for identifying the alternatives, performing the formal evaluation against the established criteria is not defined. • Validation activities relative to software development life cycle is not integrated with the project planning discipline. • Process of defining and managing the organization standard set of process is not defined • Process for indentify the training needs and managing the organizational training is not defined • Risk management guidelines for risk identification techniques, possible risk occurrence list and it is mitigation plans based on the past history is not available • Does not provide detailed process for identifying and managing the defects to closure for the formal review walkthrough, offline review and peer reviews • Does provide the guidelines for the users to tailor the processes and assets • No measurement repository established to support estimation

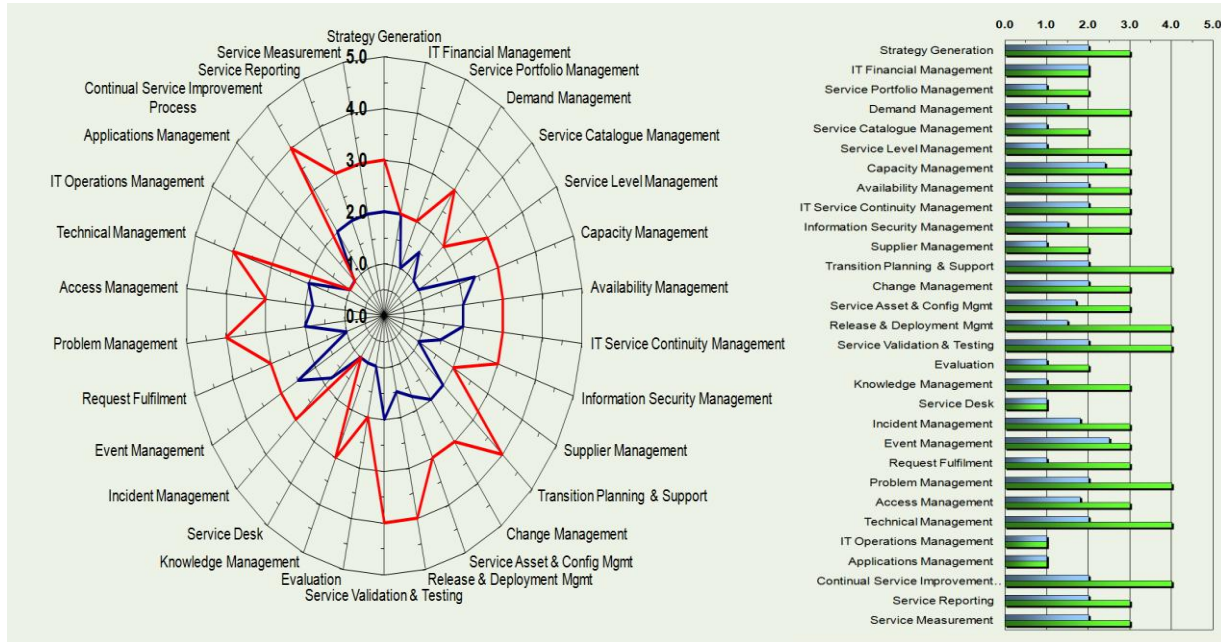
Figure 6.9-291. SDM-to-CMMI Pre-Mapping.

Our initial mapping between SDM and CMMI reveals that there are some gaps that needed to be filled to prepare for CMMI Level 3.

We expect that some of the gaps identified in our pre-mapping can be addressed by a more inclusive mapping that includes both the SDM and the EPMM to overcome the identified project management gaps. Deloitte works with DPW to refine the model used to pursue CMMI Level 5 providing CMMI process expertise along with necessary assets from our System Development Playbook to help DPW bridge the gap and accelerate the CMMI Level 5 assessment process.

DPW ITIL Pre-Assessment

We continue our work with the DPW IT organization forward from our last major ITIL touch point with DPW, the ITIL pre-assessment. The detailed results of the ITIL pre-assessment, as displayed through our ITIL assessment tool are shown in Figure 6.9-292. Based upon the pre-assessment results and planning discussions with leadership of the DPW IT organization, we identify where to focus initial ITIL implementation efforts. The order of activities during ITIL adoption was covered in a previous section. Please refer to *Establish the ITIL Adoption Approach* for details on the order of the activities. Based upon our knowledge of the DPW operations processes, our experience with the ITSS team and our ITIL expertise, we refine the ITIL processes to meet the needs of DPW as we progress through the initial adoption timeline and successive improvement iterations.



- Target Maturity or an IT Organization with Rapid Changes
- Current Maturity for DPW, Based Upon 2009 Pre-Assessment

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Figure 6.9-292. ITIL Assessment Tool Output for Pre-Assessment.

The DPW ITIL pre-assessment indicates where DPW needs to focus efforts during the ITIL adoption phases.

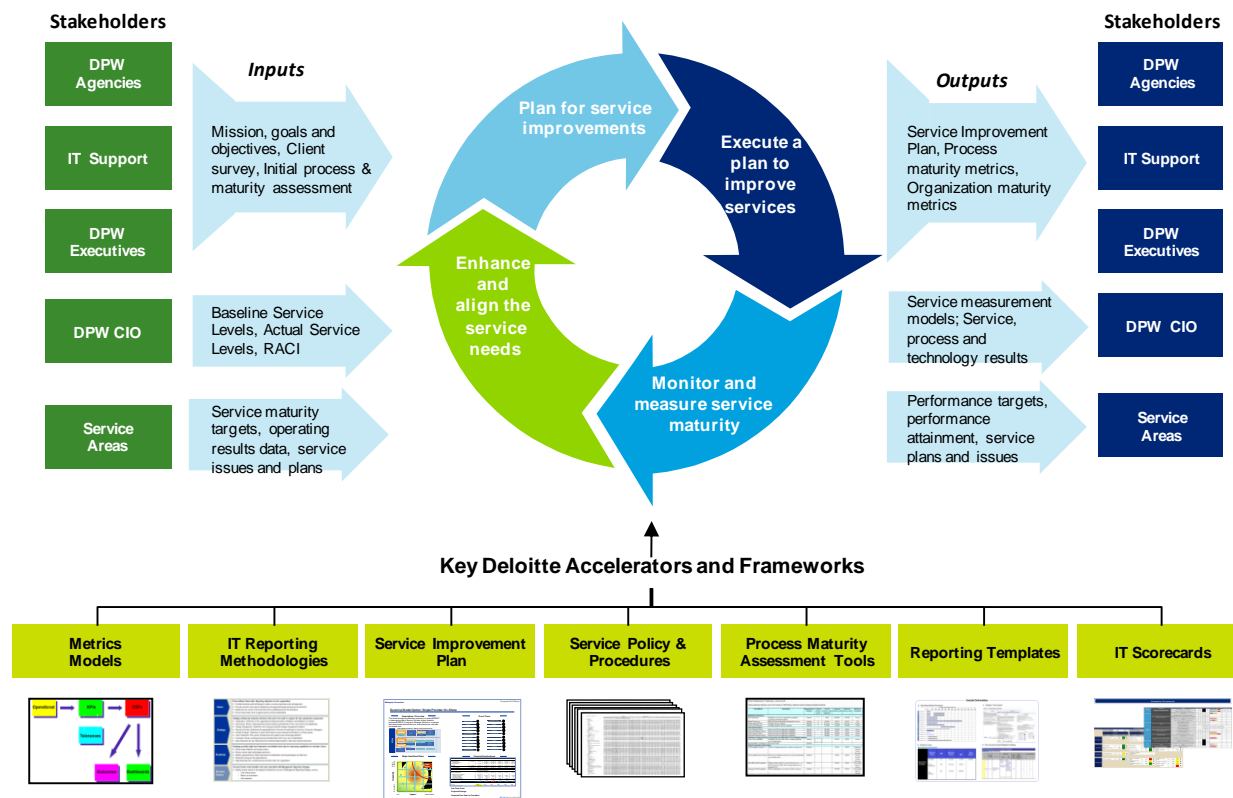
Strategy Support to Assess CMMI and ITIL Model Maturity Levels

Deloitte provides strategy support to assess CMMI and ITIL model maturity level baselines and map annual strategies for annual targets. We support DPW continual improvement with our standard process improvement framework, tailored to meet DPW's needs, including the annual planning and prioritization process. Our program, which is modeled after Deming quality improvement practices, allows for periodic re-assessment of the organizations ITIL and CMMI capabilities using the accelerators, frameworks, and tools we bring as part of our System Development Playbook and ITIL assets.

Deloitte's periodic assessment and improvement program operates within a cyclical service improvement effort modeled after Deming quality practices (Plan – Do – Check– Act) that run in recurring cycles. Our approach includes identification of an ongoing inventory of service improvement actions and projects (Plan); execution of selected incremental improvement efforts based on agreed priorities and benefits (Do); validation that planned actions achieved desired improvement results (Check); updating the inventory of service improvement actions and projects based on the results of the current improvement cycle (Act). The cycle then repeats for the next wave of improvements.

The Continual Improvement Program provides DPW with an ongoing capability and set of activities that span services, processes and supporting technology areas. It is

underpinned by our program approach, our metrics models, service reporting templates and reporting methodologies as shown in Figure 6.9-293 below.



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Figure 6.9-293. Deloitte ITIL and CMMI Continual Improvement Program.

Deloitte's Continual Improvement Program is modeled after Deming quality practices (Plan – Do – Check- Act) and tailored to support DPW's annual assessment requirement.

The Continual Improvement Program is executed at least once annually, to align with DPW's annual assessment requirement. More frequent iterations of the continual improvement program would benefit DPW in reaching their maturity targets as long as sufficient resources can be committed to participating in the review cycle. The cycle works on inputs and products outputs in a cycle modeled after Deming's quality practices as illustrated in the central process in Figure 6.9-293:

- **Plan For Service Improvements (PLAN).** Objective of this phase is to develop a CMMI and ITIL action roadmap showing the optimal sequencing of improvement activities plans and objectives for the current wave.
- **Execute A Plan To Improve Services (DO).** Goal of the phase is to execute on ITIL and CMMi action plans for the current wave.
- **Monitor and Measure Service Maturity (CHECK).** Check activities are performed to measure outcomes from the current wave and check progress against CMMI and ITIL compliance.
- **Enhance and Align the Service Needs (ACT).** Objective of this phase is to: (1) confirm the continuation of CMMI and ITIL improvement activities after implementation

of improvements completed during this wave; and (2) realign the overall ITIL and CMMI improvement strategy as needed.

At each annual assessment, a summary of each maturity level is taken for ITIL and CMMi process to assess progress. The Deloitte ITIL and CMMi Assessment tools are used to measure this maturity. We used these assessment tools for our ITIL pre-assessment and SDM-to-CMMi pre-mapping and have also used these tools with many of our major clients. A sample of the tools that we employ as part of the annual DPW ITIL and CMMi assessment are covered in Figure 6.9-294.

<p>ITIL Process Framework</p>		<p>Used as a reference for identifying and organizing ITIL process implementation tasks for process design, deployment, and assessment.</p>																								
<p>ITIL Process Measurement Dashboard</p>	<table border="1"> <thead> <tr> <th>Key Performance Indicators (KPIs)</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>Total Upstream Expenses Related To Availability</td> <td>3.1</td> </tr> <tr> <td>Availability Resilience Index</td> <td>3.75</td> </tr> <tr> <td>Average Service Reliability Index</td> <td>1.0</td> </tr> <tr> <td>Availability Management Tooling Support Level</td> <td>1.0</td> </tr> <tr> <td>Availability Management Process Maturity Level</td> <td>2.25</td> </tr> <tr> <td>Average Internal Supplier Service Reliability Index</td> <td>2.75</td> </tr> <tr> <td>Average Vendor Supplier Service Reliability Index</td> <td>2.0</td> </tr> <tr> <td>Security Vulnerability Index</td> <td>10.25</td> </tr> <tr> <td>Serviceability Index</td> <td>2.0</td> </tr> <tr> <td>Availability Risk Index</td> <td>2.25</td> </tr> <tr> <td>Continuous Availability Improvement Index</td> <td>2.25</td> </tr> </tbody> </table>	Key Performance Indicators (KPIs)	Value	Total Upstream Expenses Related To Availability	3.1	Availability Resilience Index	3.75	Average Service Reliability Index	1.0	Availability Management Tooling Support Level	1.0	Availability Management Process Maturity Level	2.25	Average Internal Supplier Service Reliability Index	2.75	Average Vendor Supplier Service Reliability Index	2.0	Security Vulnerability Index	10.25	Serviceability Index	2.0	Availability Risk Index	2.25	Continuous Availability Improvement Index	2.25	<p>Pre-built dashboard used as a reference for identifying a starter set of process measurements</p>
Key Performance Indicators (KPIs)	Value																									
Total Upstream Expenses Related To Availability	3.1																									
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Serviceability Index	2.0																									
Availability Risk Index	2.25																									
Continuous Availability Improvement Index	2.25																									
<p>ITIL Assessment Tool</p>		<p>Used to assess As-Is processes and determine ongoing maturity levels, gaps, and issues</p>																								
<p>CMMI Process Guides</p>		<p>Used as a reference to provide a starter set of process descriptions, inputs, outputs, process flows that can be tailored to DPW projects needs</p>																								
<p>CMMI Process Measurement Dashboard</p>		<p>Used to analyze the project metrics collected and to reporting these metrics to project leadership</p>																								
<p>CMMI Assessment Tool</p>		<p>Used during the CMMI appraisal to determine the CMMI maturity of an organization</p>																								

Figure 6.9-294. ITIL and CMMI Assessment Tools.

Deloitte's ITIL and CMMI Assessment Tools are used in conjunction with our Continual Improvement Plan to conduct regular assessments of DPW's ITIL and CMMI progress and maturity.



DPW CMMI and ITIL Assistance – Technology Strategy Support for an Integrated Software Quality Assurance Approach

IV

Page
IV-394

RFP Reference: Direct Technical Support Overview

- Technology strategy support to establish an integrated software quality assurance approach throughout the SDLC phases

Deloitte provides technology strategy support to establish and integrated software quality assurance approach throughout the SDLC. We use a quality assurance approach for DPW that is consistent with the approaches espoused across DPW standards, CMMI, ITIL, and PMBOK. The approach provides a consistent mechanism to manage the quality of software delivered to DPW; enabling monitoring, verifying and evaluating the level of compliance with the adopted processes, standards and procedures used on the project. Our approach is based on a shared goal of excellence, common quality principles and the adoption of a quality framework that translates the principles into daily operations. The approach is rooted in continuous improvement to maintain the ongoing commitment to quality.

Our software quality assurance approach is a standard approach that we have customized to the needs of many of our clients. The process accommodates industry standards including CMMI and ITIL and can be used across the SDLC phases. We will work with DPW to customize the process to accommodate DPW specific quality assurance specifics such as:

- **DPW Standards** such as *STD-EASS009*, which covers Software Quality Assurance Testing
- **CMMI Customizations** made by DPW including those to *process and product quality assurance*
- **ITIL Implementation Specifics** including how DPW chooses to perform service level management
- **EPMM-Specific implementations** of quality planning, quality assurance and quality control project management processes.

We use our standard process, which is illustrated in Figure 6.9-295 and described in more detail below.



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Figure 6.9-295. Deloitte's Software Quality Assurance Approach.

Our approach can be configured to meet the specific quality needs of DPW and covers QA activities across the SDLC phases.

Our quality assurance approach consists of three interrelated quality assurance goals, each of which is represented as a horizontal tier in the figure.

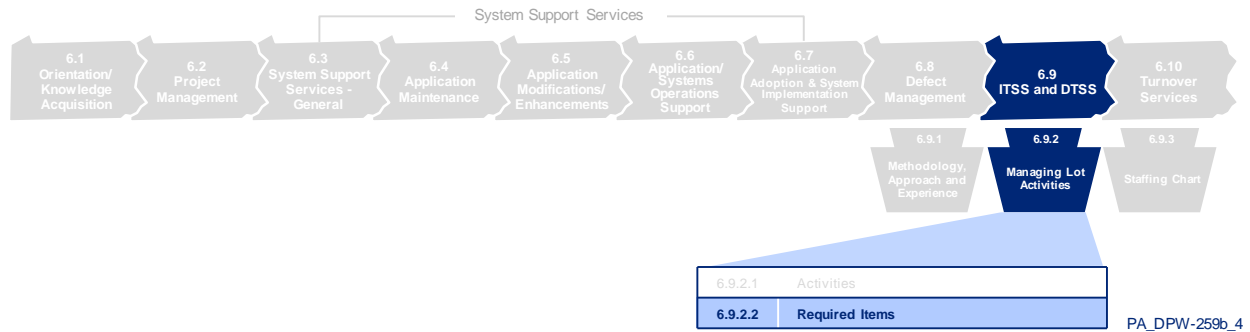
- **Quality Management Goal – Standards of Excellence.** Consistent with DPW standards, the goal of our efforts is to deliver consistent, reliable and efficient software.
- **Quality Management Principles.** The five Principles (Standards, Verification, Feedback, Measurement, Continuous Improvement) form the basis of the program. We pursue these goals by embedding these five fundamental principles into our ITIL and CMMI service strategy, design, transition and operational activities.
- **Quality Framework.** The Framework is a description of the quality objectives for different aspects of our practices, intended to promote consistency in implementing quality management across our IT services. It provides a means for driving the principles into the daily operations of delivering those services through a continual service improvement process.



Deloitte works with DPW to establish the integrated software quality assurance approach that works across the phases of the SDLC. The specific process addresses the following areas

- QA objectives and goals
- QA organization, roles and responsibilities
- Verification and Validation activities
- Formal inspection (review) process
- QA process assessments (To measure the ITIL and CMMI compliances in projects/organization)
- QA Metrics Planning
- QA Status Reporting
- Continual Service Improvement activities

6.9.2.2 Required Items



Our proposed ITSS/DTSS approach blends the right mix of critical DPW systems knowledge and Shared Services experience integrated at its core with the principles of ITIL and CMMI frameworks. Our team provides strategic, tactical, and operational support to advance the Department’s enterprise, service-oriented strategy.

Over the last 10 years we provide reliable Operations and Technical Support for the DPW suite of applications as the applications and systems environment. As the applications have grown in size and complexity, our team has demonstrated the ability to adapt to the requirements and provide the quality of services expected by the Department. We use ITIL and CMMI frameworks to evolve DPW’s award-winning Shared Services model and enterprise, service-oriented strategy without risking DPW’s mission critical application environment. Our team includes a unique blend of staff with in-depth DPW application and IT experience together with other experts from across the firm that bring expertise in ITIL, CMMI, enterprise architecture, SOA, security, cloud computing and other forward-thinking IT frameworks and technology trends. We highlight the key features of our approach to Maintenance Required Items in the following figure:

- Seasoned team that understands the intricacies and unique requirements of the strategic business and operating environments
- Team is ITIL v.3 Foundation Certified

Features	Benefits
Seasoned team that understands the intricacies and unique requirements of the strategic business and operating environments	<ul style="list-style-type: none"> • Speeds delivery of value with minimal learning curves • Enhanced system stability and availability during transition period and beyond • Lowers risk to DPW and citizens • Provides a unique team with an in-depth DPW systems experience with expertise in ITIL, CMMI, enterprise architecture, SOA, security, cloud computing and other forward-thinking IT frameworks and leading technology trends



Features	Benefits
<p>Applies ITIL and CMMI frameworks that extend DPW IT Methodology:</p> <ul style="list-style-type: none"> Detailed processes, procedures, reports, and tools Compliant with Commonwealth and DPW standards, methodology, and guidelines Continuous improvement activities consistent with ITIL 	<ul style="list-style-type: none"> Enhanced system stability and availability Enables cost-effective delivery Increases confidence in meeting and exceeding SLAs Lowers DPW and program risk
<p>Provides early and consistent cooperation and communication with DPW BIS, program offices, and other stakeholders, as well as other Lot vendors</p>	<ul style="list-style-type: none"> Better service to DPW stakeholders and citizens Reduces transition and on-going risk
<p>Applies demonstrated approach to support operations and technical processes</p>	<ul style="list-style-type: none"> Enhanced delivery using repeatable and measurable processes Provides better alignment with DPW's IT Methodology.
<p>Uses our extensive experience at DPW and other Commonwealth agencies.</p>	<ul style="list-style-type: none"> Thorough understanding of the DPW standards, Commonwealth security ITBs, Federal and State regulatory requirements based on Commonwealth implementation experience. Helps eliminate the transition and learning curve as Deloitte brings the systems implementation experience of DPW environments, processes, tools and techniques

Figure 6.9-296. Key Features and Benefits of Our Approach to Required Items.

Required Resources

IV	Page IV-394	RFP Reference: Information Technology (IT) Shared Services Model & Direct Technical Support Services Required Items
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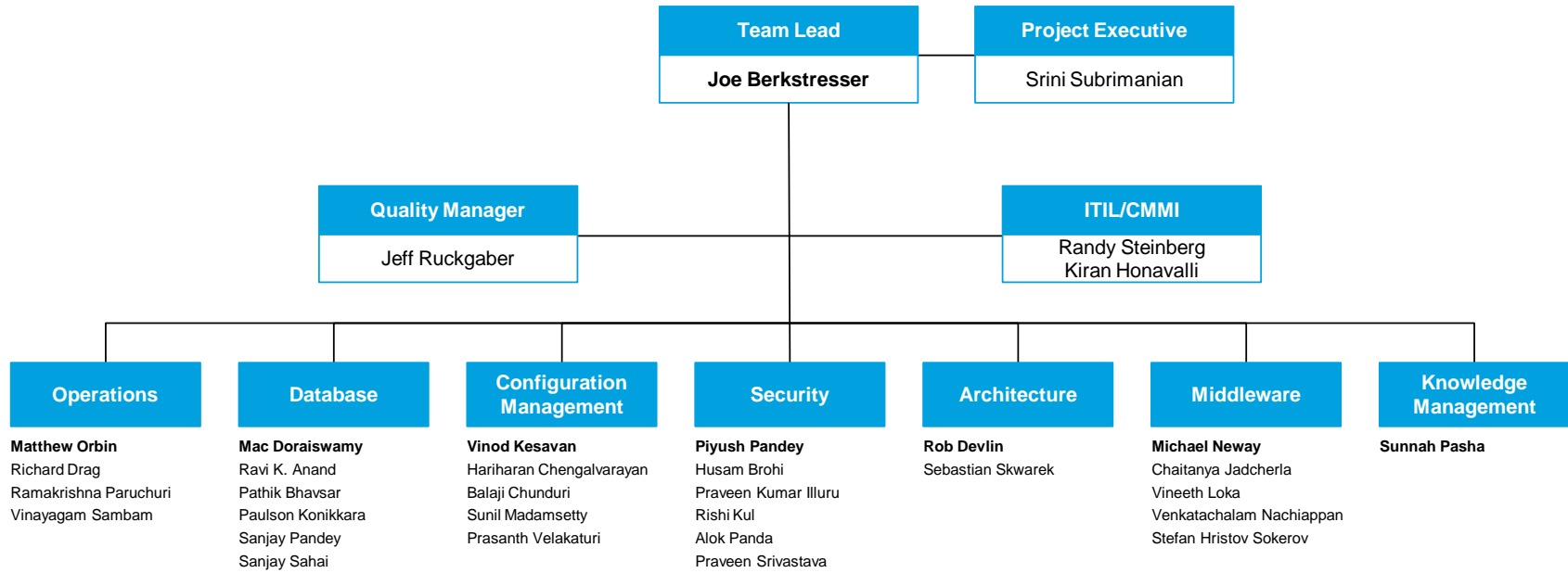
The Selected Lot #6 Offeror and Selected Lot #7 Offeror must describe in detail: 1) The resources required to support Shared Services and Direct Technical Operational and Consulting tasks including skill sets and experience 2) The associated organizational chart

We have provided the resources required to support ITSS and DTSS in the Staffing Chart. We have listed skill sets and experience by role in *Section 8.4, Staffing Narrative*.

We have organized the team supporting ITSS and DTSS in to an Operations team and then teams grouped by DPW's technology domain.



Enterprise Services, ITSS and DTSS



BOLD - Lead

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Figure 6.9-297. Organization Chart for ITSS.

The Organization Chart includes for ITSS and DTSS includes teams focused on Operations and Technology Domains.



Coordinate and Work with Designated DPW Stakeholders, Third Party Vendors, and Other Selected Offerors

IV

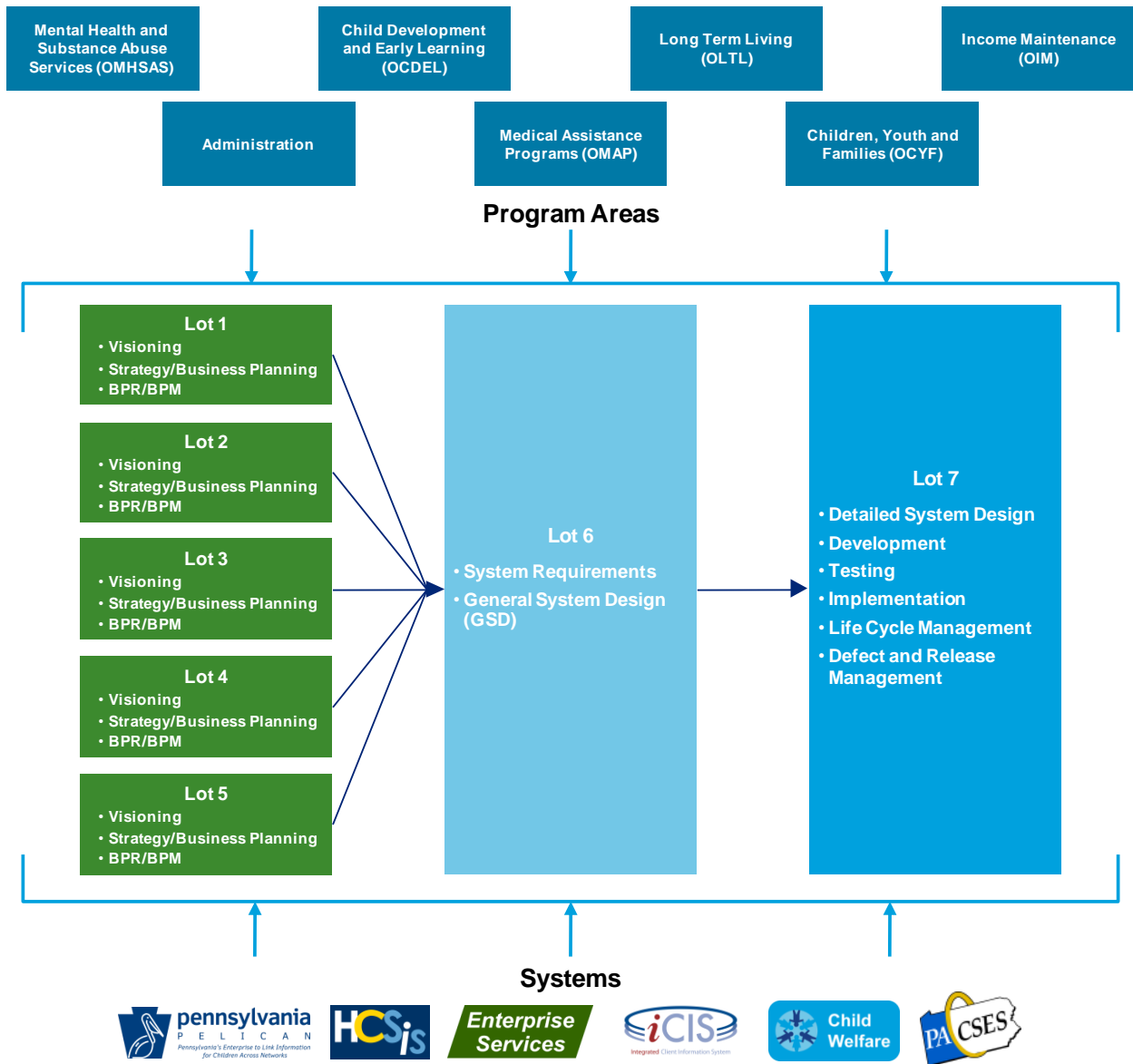
Page
IV-394

RFP Reference: Information Technology (IT) Shared Services Model & Direct Technical Support Services Required Items

The Selected Lot #6 Offeror and Selected Lot #7 Offeror must provide a detailed description of their approach and as to how they will effectively coordinate and work with designated DPW stakeholders, third party vendors, and other selected Offerors (if applicable) to:

- 1) Provide effective Share Services and Direct Technical Operational and Consulting assistance support for strategic, tactical, and operational initiatives throughout the life of this contract (as outline in Section E),
- 2) Triage to resolve complex operational issues,
- 3) Be luminaries and IT visionaries relative to EA-SOA supporting DPW mission

Deloitte coordinates and works closely with DPW stakeholders and third party vendors. We look forward to working with the other selected offerors as defined by the RFP, and as depicted in Figure 6.9-298.



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Figure 6.9-298. Effective Coordination Across Multiple Stakeholder, Program and System Needs.
Deloitte provides an effective model to enable coordination across lot vendors and with DPW stakeholders.



The following figure provides a general overview of our approach to effective coordination and working relationships between the various stakeholders.

RFP Overall Coordination Needs	Deloitte Activities Address DPW's Overall RFP Coordination Needs
<p>Effective Shared Services and Direct Technical Support</p>	<ul style="list-style-type: none"> • Work with BIS and the application teams to manage interactions with program offices during production readiness planning as well as the TFP and production sign off phases for application releases. • Collaborate with BIS on each of the DPW IT domain-level activities that occur between development and implementation of an initiative. This includes release planning, development, testing, conversion, and implementation activities. • Work with BIS, the program offices and third party vendors to align design, release and testing dependencies with other third party managed DPW applications and services (e.g.PROMISe, SAMS) that impact the systems covered in this RFP. • Coordinate design, release and testing dependencies with BIS, the program offices and third party vendors (e.g. Pearson) of systems external to DPW that integrate with systems covered in this RFP. • Coordinate planning and estimation activities with the vendors assigned to the requirements work. This includes gaining an understanding of the scope of work to assist with validating ITSS/DTSS level of effort estimates as well as transitioning domain-based activities, such as security testing, data model reviews, and ARB meetings to help confirm continuity of activities across the phases of the SDLC. • Coordinate transition of system requirements and design activities from Lot 6 into. This includes the transition of activities like database design and the Architecture Review Board (ARB) meetings across DPW system vendors as the move is made to the physical data model review and ARB 2 reviews, respectively.
<p>Complex Operational Issue Triage</p>	<ul style="list-style-type: none"> • Communicate problem information, scope, impact and potential duration to the appropriate DPW stakeholders. • Collaborate with DPW stakeholders to assess the business impact and resolution priority of each issue impacting the system and communicate, as appropriate, these priorities out to system users. • Work with BIS, third party vendors and other applicable DPW stakeholders through the escalation levels necessary to identify, diagnose and resolve the operational issue. • Support coordination of technical discussions with third party vendors and aggregate information across disparate technologies into problem, hypothesis, and resolution statements suitable for dissemination to a variety of DPW stakeholders.



RFP Overall Coordination Needs	Deloitte Activities Address DPW's Overall RFP Coordination Needs
Serve as IT Visionaries for EA-SOA	<ul style="list-style-type: none">• Engage the appropriate DPW stakeholders in the annual planning efforts along with the necessary technical and process specialist support for that process.• Coordinate with the DPW EKMS team and other DPW stakeholders to develop a next-generation EKMS strategy and identify strategic initiatives such as data quality, metadata management, and analytics that support the next generation EKMS strategy• Leverage our highly qualified technical experts in ITIL and CMMI to engage with BIS in the ITIL adoption process and the annual process to assess ITIL and CMMI maturity levels and map progress against annual targets.

Figure 6.9-299. Deloitte Activities Address DPW's Overall RFP Coordination Needs.

Our response highlights the complexity of the DPW systems and the diverse operating environments across mainframe, open systems, and middleware platforms. Efficient communication, coordination and collaboration across many different stakeholders is required to verify the needs of the business, and the DPW clients, are met.

These stakeholders include:

- **Program Offices.** Business functional groups within and outside DPW, which include Aging, Insurance, Education, Labor and Industry, DGS and Treasury among others.
- **BIS.** Technology support teams within DPW including DTE, DEA and DIMO as well as integration with the PMO and the DPW Project Managers.
- **Third Party Vendors.** External technology service providers such as Oracle, Microsoft, Adobe, Corticon and other product vendors, as listed in this section.
- **Other Lot Vendors.** In a multi-lot vendor model, multiple entities play a complementary role in support of Department initiatives. Substantial communication and coordination is required across the lots to maintain initiative momentum.

The following highlights the unique characteristics and working needs that reside with each of the DPW applications and its systems. Deloitte is the only vendor with the required DPW specific expertise, and prior experiences that can successfully manage these complexities across such a wide array of stakeholders and still meet the timeliness, quality and strategic vision of DPW's business goals.



System	Stakeholder	Deloitte's Understanding of System Specifics for Coordination and Working Needs
I-CIS	Program Office	I-CIS systems support more than 6,500 CAO workers across 67 counties, including numerous offices in Philadelphia and Allegheny county, over 20 distinct data sharing relationships with business partners, critical interfaces with SSA and other Federal agencies as well as constant coordination with Treasury to manage the disbursement of over \$8,400,000,000 in funds annually. In addition, the ICIS suite of applications also support registering more than 4M clients supported by DPW, PID, PDA and PDE, and form the consumer portal (COMPASS) front end for a number of clients and providers. Impacts to any of these processes may result in a direct benefit to more than 1/15 th of people of Pennsylvania.
	BIS	I-CIS systems span the full spectrum of BIS technologies, including the Unisys mainframe, open systems, middleware platforms, .Net, Adobe Flex, Corticon, Adobe Document Management, Imaging solutions, Enterprise Services (MCI), etc. The I-CIS suite is the backbone of DPW system processing and requires extreme coordination and close working arrangements to verify the needs of the business are met – an example is the close coordination with business partners and citizens to support the local installation as the desktop liaison to the web services that support COMPASS.
	Third Party Vendors	As described previously, I-CIS solutions consume a diverse of technology solutions. Working through BIS and through our own Deloitte alliances, we engage the respective vendors such as Adobe, Oracle, IBM, and Corticon to gain access to the latest product strategies and insights and overall direction. To progress imaging initiatives, for example, close coordination with SRC Solutions is required. Deloitte has the history and relationship with the product vendors that provide support to DPW and bring this expertise to DPW.
	Other Lot Vendors	I-CIS centric requirements are extremely dynamic and complex. Deloitte works closely with the lot vendors to finalize the requirements for upcoming LIHEAP processing, federal mandates emanating from Health Insurance Reform and any associated legislative directions that may impact system processing.
HCSIS	Program Office	HCSIS supports automated solutions for ODP, OLTL, OMHSAS, PDA, OCDEL, OCYF and DOH. This requires extreme coordination to drive a singular solution across such disparate business entities
	BIS	HCSIS has the most defined users, roles and organization entities of all DPW's enterprise systems. Additionally, HCSIS uses Oracle's FGA as the basis of its' security foundation. This requires substantial coordination with the security team, database and server team to manage.
	Third Party Vendors	HCSIS leverages complex technical offerings from Oracle (FGA), Microsoft (Web Gardening) and shortly Corticon to support business processing. This requires extensive coordination and collaboration via BIS to support.
	Other Lot Vendors	HCSIS requires input from the lot vendors to manage the wide array of services supported including collaboration across program lots, and interfaces with PDA, OLTL, and OMAP. Expanding requirements collection and rationalization from one vendor to potentially five requires skilled coordination and collaboration.



System	Stakeholder	Deloitte's Understanding of System Specifics for Coordination and Working Needs
PACSES	Program Office	PACSES supports over 3,000 child support workers across the 67 county Domestic Relations Sections, more than 450,000 users of the PA Child Support Web site, over 25 critical interfaces with outside business partners and stakeholders including CIS, SSA, IRS, UC, STROP, New Hire, FIDM, PA SDU, confirming establishment, enforcement and collections of more than \$1 billion dollars annually in child support for children and families. Changes to these processes would not only impact PA families, but other state agencies and requires extensive coordination with and by DPW.
	BIS	The PACSES main line of business application is centered on the Unisys Dorado 380 mainframe which supports 3,500 users that administer the Child Support program for the Commonwealth. Additionally, there are other large-scale application components that use .NET, Oracle, webMethods, and the Adobe suite of products. PACSES also includes a large Data Warehouse that supports the annual creation of federally mandated statistical reports and provides business intelligence reporting for the Bureau of Child Support Enforcement management team. Extensive coordination with BIS is required to support business processing over such a wide array of technologies.
	Third Party Vendors	The third party products used by PACSES include software from KMSystems, Identity Systems, Pitney Bowes, Unicon, Adobe, Informatica, Oracle, and Microsoft among others. Deloitte has extensive firm alliances with some of these vendors that enable direct contact to review, discuss upcoming software changes, new features and functionalities as well as access to their knowledge library to adhere to software best practices. Additionally, we work through the DPW support contract to supply third party vendors with appropriate data to support production operations and infrastructure support issues.
	Other Lot Vendors	PACSES support team coordinate with child support lot vendor as they gather requirements for upcoming PACSES mainframe and open systems initiatives.
PELICAN	Program Office	PELICAN supports more than 1000 child care workers, and more than 1000 other providers and workers supporting the other programs within the PELICAN suite of applications. PELICAN offers distinct business solutions that must be managed across various program offices and bureaus as well as PDE. Pelican CCW, Pre K Counts, Provider Certification as well as ELN introduce complex coordination needs as business process integration and consistency is typically driven in parallel with system modifications.
	BIS	PELICAN leverages mobile technologies to support on site provider certification analysis. The distribution of software to these machines requires complex orchestration with various groups within BIS to concurrently support server and tablet software deployments. Additionally, the networking configuration of the CCIS's requires the awareness and collaboration with individual sites to verify appropriate access is provided.
	Third Party Vendors	Deloitte works closely with the Pearson vendor to support the certification of teachers and assessments of children in PELICAN programs. Intimate coordination is required to support changes to the assessment and the interfaces required to supply Pearson required data.



System	Stakeholder	Deloitte's Understanding of System Specifics for Coordination and Working Needs
	Other Lot Vendors	PELICAN requires assimilation of requirements from various lot vendors to support business needs while verifying external entities needs are met, such as the Department of Education.
Child Welfare	Program Office	Child welfare suite of applications provide mission critical support, and is used by the counties, citizens and providers within Pennsylvania. The Child Welfare team works closely with DPW to verify the Child Line solution is meeting business needs. Child Welfare programs are complex in nature and extremely sensitive, which requires very thorough and extensive coordination across the enterprise.
	BIS	Child Line is currently not entirely aligned with the DPW standard architecture. The solution requires unique coordination with BIS to support desktop centric installations, the unique database construct as well as the true 24x7 availability requirement.
	Third Party Vendors	As Child Line evolves to more current technologies, substantial third party vendor interaction is required.
	Other Lot Vendors	The Child Welfare team works closely with lot vendors to mature the strategic nature of the Child Welfare offering within DPW. This includes consuming enterprise services, common functionality and centralized IT services. This assimilation into the larger DPW environment mandates close coordination across all lot vendors to pursue the singular business and technical vision of the Department.

Figure 6.9-300. Unique Coordination and Working Needs.

As described thus far, Deloitte is an experienced steward of the DPW applications and we are committed to providing the necessary coordination and communication in support of DPW business objectives.

The following addresses the requirement to effectively coordinate efforts from a stakeholder point of view.

Effective Shared Services and Direct Technical Support

Deloitte effectively coordinates and works with designated DPW stakeholders, third party vendors, and other selected Offerors to provide effective Shared Services and Direct Technical Operational and Consulting assistance support for strategic, tactical, and operational initiatives throughout the life of this contract. We support DPW Application and Technical Engineering encompassing different cycle of an initiative: from strategic and tactical through operational. Our support approach includes parties external to the initiative such as other DPW stakeholders and third party vendors. The following tables highlight our approach to Coordinating and Communicating with DPW Stakeholders to provide effective shared services and direct technical support for strategic, operational and tactical initiatives, respectively.



Effective Services and Support for Strategic Initiatives

Stakeholders	Deloitte Approach to Effective Shared Services and Direct Technical Support for Strategic Initiatives
Program Office	<ul style="list-style-type: none"> Assist in the identification of potential enterprise services as part of each application release design phase that could reduce maintenance costs or promote reuse across multiple application domains. Support the program offices in working to conduct annual planning sessions, including scoping, level-of-effort assessment, and determining technology impact for baseline activities.
BIS	<ul style="list-style-type: none"> Provide technology strategy support to establish integrated software quality assurance approaches throughout the SDLC phases, and to assess CMMI and ITIL model maturity level baselines and map annual strategies for annual targets. Support BIS in working with program offices and application teams to conduct annual planning sessions, including scoping, level-of-effort assessment, and determining technology impact for baseline activities. Facilitate discussions between the Database, EKMS and application teams with respect to the most appropriate approach to business intelligence reporting from among DPW's data repository and reporting tool portfolio.
Third Party Vendors	<ul style="list-style-type: none"> Engage third party vendors, as necessary, during the strategic planning process to plan for new technologies needed to support upcoming initiatives.
Other Lot Vendors	<ul style="list-style-type: none"> Coordinate planning and estimation activities with the vendors assigned to perform business requirements work. This includes gaining an understanding of the scope of work to assist with validating ITSS/DTSS level of effort estimates as well as transitioning domain-based activities, such as security testing, data model reviews, and ARB meetings to help confirm continuity of activities across the phases of the SDLC.

Figure 6.9-301. Deloitte Approach to Effective Shared Services and Direct Technical Support for Strategic Initiatives.

Effective Services and Support for Operational Initiatives

Stakeholders	Deloitte Approach to Effective Shared Services and Direct Technical Support for Operational Initiatives
Program Office	<ul style="list-style-type: none"> Collaborate with program offices to manage interactions with application users/clients after a release implementation. These interactions often involve identification and resolution of production incidents, outages, or other anomalies that impact users/clients of the system and their ability to use the system
BIS	<ul style="list-style-type: none"> Work with BIS to manage interactions with application users/clients after a release implementation. These interactions can involve production incidents, outages, or other anomalies that impact users/clients of the system and their ability to use the system Provide support to BIS in the monitoring of production and non-production environments, the interpretation of technical metrics, and coordination with other third party vendors, as appropriate. Support each BIS technical domain during product upgrades, maintenance activities



Stakeholders	Deloitte Approach to Effective Shared Services and Direct Technical Support for Operational Initiatives
Third Party Vendors	<ul style="list-style-type: none"> • Work with BIS, the program offices and third party vendors to align design, release and testing dependencies with other third party managed DPW applications and services (e.g. Promise, SAMS) that impact the systems covered in this RFP.
Other Lot Vendors	<ul style="list-style-type: none"> • Work with other lot vendors and BIS to help the other vendors understand the impact of operating system and other system software upgrades on upcoming initiatives.

Figure 6.9-302. Deloitte Approach to Effective Shared Services and Direct Technical Support for Operational Initiatives.

Effective Services and Support for Tactical Initiatives

Stakeholders	Deloitte Approach to Effective Shared Services and Direct Technical Support for Tactical Initiatives
Program Office	<ul style="list-style-type: none"> • Support, as necessary, communications with the program offices related to technical issues impacting the release of tactical initiatives.
BIS	<ul style="list-style-type: none"> • Collaborate with BIS on each of the DPW IT domain-level activities that occur between development and implementation of an initiative. This includes release planning, development, testing, conversion, and implementation activities. • Assist with the coordination of application monitoring and troubleshooting activities for DPW’s applications, and manage and maintain the Application Life cycle Management (ALM) dashboard across DPW applications to evaluate alignment with the ALM baseline. • Work with BIS to evaluate new technologies, tools, and best practices to mature DPW’s configuration management processes.
Third Party Vendors	<ul style="list-style-type: none"> • As necessary to address DPW application needs, work directly with BIS to coordinate with vendors who provide direct services support to DPW (e.g. Data Powerhouse and network vendors) • Coordinate design, release and testing dependencies with BIS, the program offices and third party vendors (e.g. Pearson) of systems external to DPW that integrate with systems covered in this RFP.
Other Lot Vendors	<ul style="list-style-type: none"> • Collaborate with other lot vendors in activities related to ARB 3s and other technical and operational planning activities that warrant participation from lots 6 and 7. • Coordinate the distribution of release capacity data when release activities are transferred from the lot 6 vendor.

Figure 6.9-303. Deloitte Approach to Effective Shared Services and Direct Technical Support for Tactical Initiatives.



Complex Operational Issues Triage

IV	Page IV-394	RFP Reference: Information Technology (IT) Shared Services Model & Direct Technical Support Services Required Items
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The Selected Lot #6 Offeror and Selected Lot #7 Offeror must provide a detailed description of their approach and as to how they will effectively coordinate and work with designated DPW stakeholders, third party vendors, and other selected Offerors (if applicable) to:

- 2) Triage to resolve complex operational issues,

Deloitte effectively coordinates and works with designated DPW stakeholders, third party vendors, and other selected Offerors to triage and resolve complex operational issues. We follow a standardized workflow process for complex issue triage that includes four key groups of activities; two of these groups are focused on communications and coordination. The process includes internal and external stakeholder communication at several levels using both automated and highly interactive communications mediums. The following table highlights our approach to Coordinating and Communicating with DPW Stakeholders to support complex operational issue triage.

Stakeholders	Deloitte Approach to Complex Operational Issue Triage
Program Office	<ul style="list-style-type: none"> Communicate problem information, scope, impact and potential duration to Program Office stakeholders Collaborate with Program Office staff to identify business behavioral changes that may lead to potential problems Work with the Program Office to determine mitigation alternatives to problems that allow the business to continue to meet the needs of the citizenry Collaborate with affected Program Offices to assess the business impact and priority for resolution of each issue impacting the system Coordinate with the Program Office on any communication to the CAO's or other field staff
BIS	<ul style="list-style-type: none"> Participate or lead SWAT team conferences to identify, diagnose and resolve problems Provide detailed application information regarding system logs, error messages, system resource usage patterns, etc. that may identify a problem Leverage our understanding of the operating system, database, application server components or other third party software to provide insight and guidance to BIS staff Liaison to the Program Office any required notification of extended down time, system restarts, etc. that need to be coordinated
Third Party Vendors	<ul style="list-style-type: none"> Leverage our deep understanding of application construction and configuration to assist DPW in problem management by providing detailed and relevant information to appropriately integrate vendor tools
Other Lot Vendors	<ul style="list-style-type: none"> Coordinate and collaborate with other lot vendors as outlined in our response above.

Figure 6.9-304. Deloitte Approach to Complex Operational Issue Triage.



Serve as IT Visionaries for EA-SOA

IV	Page IV-394	RFP Reference: Information Technology (IT) Shared Services Model & Direct Technical Support Services Required Items
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The Selected Lot #6 Offeror and Selected Lot #7 Offeror must provide a detailed description of their approach and as to how they will effectively coordinate and work with designated DPW stakeholders, third party vendors, and other selected Offerors (if applicable) to:

- 3) Be luminaries and IT visionaries relative to EA-SOA supporting DPW mission

Deloitte effectively coordinates and works with designated DPW stakeholders, third party vendors, and other selected Offerors to provide specialist assistance for DPW technology strategy support for annual planning efforts, new technology support, EKMS assistance, and ITIL/CMMI adoption and assessments. Collectively, the new annual initiatives, new technologies, and software quality and operations processes align with the DPW EA-SOA vision.

We continue to bring DPW IT strategy assistance through technical specialists from our deep pool of resources, insightful thinking around the use of technology in DPW's programs, and advancing the use of services across DPW's enterprise architecture. As part of our ongoing commitment to DPW's EA-SOA vision, it is extremely important to coordinate strategic activities and facilitate strategic conversations across DPW's stakeholders. The following table highlights our approach to Coordinating and Communicating with DPW Stakeholders in Support of our Role as IT Visionaries for EA-SOA.

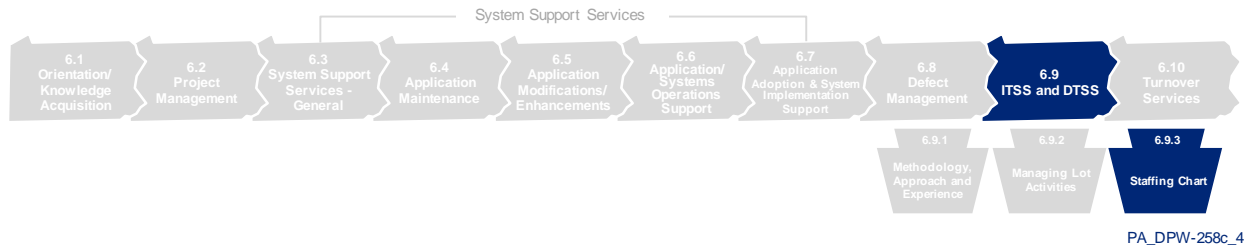
Stakeholders	Deloitte Approach to Serving as IT Visionaries for EA-SOA
Program Office	<ul style="list-style-type: none"> Engage DPW program offices in annual planning efforts, working with them to identify efforts that might be classified as enterprise shared services or enterprise level initiatives and which could warrant special technology strategy support.
BIS	<ul style="list-style-type: none"> Work with BIS to coordinate annual initiative planning efforts across the program offices, BIS, ITSS and the application team. Coordinate the development of a next-generation EKMS strategy and identify strategic initiatives such as data quality, metadata management, and analytics that support the next generation EKMS strategy. Collaborate with BIS on the planning, coordination and finalization of the ITIL adoption approach. Work with BIS to refine and expand the CMMI and ITIL governance models and governance frameworks to meet the particular needs of DPW. Leverage our highly qualified technical experts in ITIL and CMMI to engage with BIS in the annual process to assess ITIL and CMMI maturity levels and map progress against annual targets.
Third Party Vendors	<ul style="list-style-type: none"> Work with transfer technology vendors to understand the transfer technology and to assess the viability of integrating these technologies into the DPW enterprise architecture.



Stakeholders	Deloitte Approach to Serving as IT Visionaries for EA-SOA
Other Lot Vendors	<ul style="list-style-type: none">• Collaborate with other lot vendors in the establishment of an integrated software quality assurance approach that transcends the phases of the SDLC.• Coordinate the participation of other lot vendors in the annual planning process.

Figure 6.9-305. Deloitte Approach to Serving as IT Visionaries for EA-SOA.

6.9.3 Staffing Chart



II	Page II-3	RFP Reference: II-3. Work Plan
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Provide a role/description table for the Offeror’s proposed staffing roles for all Activities and Tasks to support the requirements of the RFP. A description of the duties and functions to be performed by the staffing role must be indicated.

The resources identified for Information Technology Shared Services and Direct Technology Shared Services are listed in the following Figure 6.9-306. More information about each one of these individuals, including resumes, can be found in *Tab 8.0*.

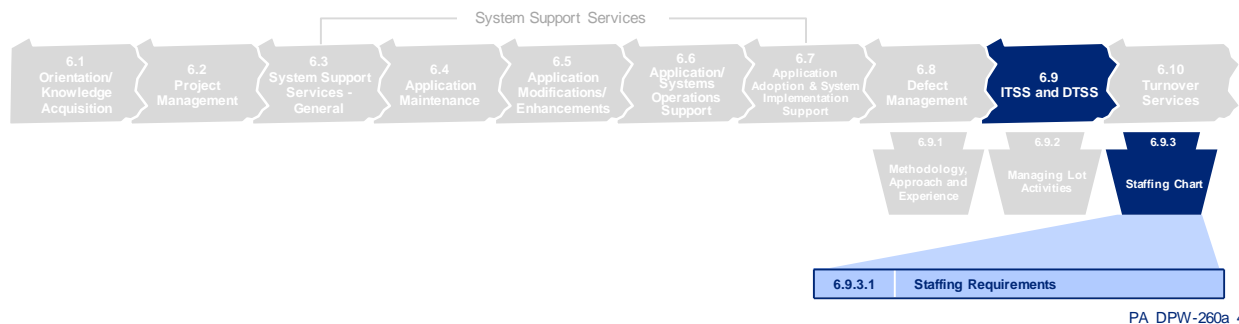
Proposed ITSS/DTSS Staff	Labor Category/Job Function
Subramanian, Srini	Project Executive
Berkstresser, Joe	Shared Services Manager
Steinberg, Randy	Quality Manager / Software Process Engineer
Honavalli, Kiran	Quality Manager / Software Process Engineer
Ruckgaber, Jeff	Quality Assurance Lead
Devlin, Rob	Software Quality Assurance Specialist
Kesavan, Vinod	Systems Architects
Skwarek, Sebastian	Systems Architects
Chengalvarayan, Hariharan	Systems Configuration Specialists
Orbin, Matt	Systems Configuration Specialists
Pandey, Piyush	Chief Security Architect
Srivastava, Praveen	Security Specialist
Illuru, Praveen	Security Specialist
Kul Rishi	Security Specialist
Panda, Alok	Security Specialist
Brohi, Husam	Security Specialist
Singhal, Akshay	Security Specialist
Neway, Michael	ESB/Middleware Architect
Sokerov, Stefan	Sr. Application Developers – Middleware
Jadcherla, Chaitanya	Sr. Application Developers – Middleware



Proposed ITSS/DTSS Staff	Labor Category/Job Function
Loka, Vineeth	Sr. Application Developers – Middleware
Nachiappan, Venkatachalam	Sr. Application Developers – Middleware
Pasha, Sunnah	Sr. Application Developers – Business Intelligence and Data Warehouse
Salmon, Rocio	Sr. Application Developers – Business Intelligence and Data Warehouse
Doraiswamy, Mac	Chief Database Architect
Sahai, Sanjay	Database Administrator
Bhalla, Ravinder	Database Administrator
Pandey, Sanjay	Database Administrator
Konikkara, Paulson	Database Administrator
Anand, Ravi	Database Administrator
Bhavsar, Pathik	Database Administrator
Chunduri, Balaji	Systems Configuration Specialists
Madamsetty, Sunil	Systems Configuration Specialists
Drag, Richard	ITSS and DTSS Team Member
Fisher, Jeff	Sr. Developers Legacy
Paruchuri, Ramakrishna	ITSS and DTSS Team Member
Sambam, Vinayagam	ITSS and DTSS Team Member
Velakaturi, Prasanth	ITSS and DTSS Team Member

Figure 6.9-306. Deloitte’s proposed ITSS/DTSS team.

6.9.3.1 Staffing Requirements



IV	Page IV-394	RFP Reference: Information Technology (IT) Shared Services Model & Direct Technical Support Services Required Items
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The selected Offeror must supply Application and Technical staff. Staff assigned to this project must be able to work cooperatively with Commonwealth staff and other individuals and entities. The selected Offeror's staff must be able to coordinate and receive direction from designated DPW staff. The selected Offeror's staff must be able to deliver work that is not in conflict with the priorities and hardware/software choices and limitations as established by the Commonwealth, Department of Public Welfare.

Our Deloitte team has solid history of working collaboratively with Commonwealth staff. We have a solid track record of working with DPW towards the enterprise technology strategies and goals. DPW's success in embracing the latest technologies, EA-SOA, enforcement technology standards across applications, and the shared services, are testimonials of Deloitte track record of collaborative and successful relationship with DPW.

Because of our team's deep DPW experience, we bring knowledge of DPW's standards, processes and people which helps to align our work with the Department's priorities and procedures. We described in detail our collaborative work approach with DPW and stakeholders in the preceding *Section 6.9.2.2, Required Items - Coordinate and Work with Designated DPW Stakeholders, Third Party Vendors, and Other Selected Offerors.*

Delivering Solutions in Alignment with DPW's Choices and Priorities

Deloitte understands the importance of unwavering focus on the delivery of the solutions and continue to move the technology and enterprise architecture forward with the DPW and Commonwealth's priorities and choices. The IT industry is evolving at a rapid pace and enterprises stall in endless analysis of the choices and priorities. Unlike some service vendors who are owned by product companies and often directed to promote their parent company's products, Deloitte provides a product - independent view and uses a technology-agnostic approach with our clients. As discussed in the technology strategy, EKMS and Security domains, Deloitte uses the deep relationships with the leading product vendors to the benefit of DPW.

Deloitte observes that our successful clients choose a platform, hardware or software after careful considerations of the facts known in a point of time and remain committed to the chosen path, until a change in approach or strategy is truly warranted. This is the difference between a successful technology enterprise such as DPW – that has singular focus on reducing architectural complexity and using enterprise-level approaches vs. other state agencies that end up supporting multiple languages, platforms, and products driven by silo-based organizational decisions.

Support Technology Evaluation and Selection Process. Deloitte uses the DPW standard process (STD – EASS006) for evaluating and selecting COTS products, transfer technologies or other alternative solutions. We work with DPW to coordinate involvement of the appropriate lot vendors and technical specialists and involve our vendor alliances at DPW's request to complete the 7 phases of the evaluation and selection process.

Deloitte's practitioners look forward to continue this successful journey with DPW, in complete harmony of the DPW's enterprise architecture, hardware and software choices and priorities. Deloitte works with DPW with its choices and priorities and leverages Deloitte specialists and alliances to resolve issues and succeed.

Deloitte's Unique Product Independence Posture

Deloitte is an independent firm with loosely coupled alliances with technology and product vendors, with no prejudice to a specific technology or product hardware or software vendor. We leverage these alliances on behalf of our clients – and not on behalf of the vendors. This is a long standing Deloitte strategy, to provide our clients with balanced and executable advice. Analysts and clients recognize this aspect of independence and experience in diverse platforms that gives us the ability to successfully integrate and implement solutions better than the product vendors.

Have you heard?

Deloitte is the only offeror with no hardware or software affiliations that can potentially impair the independence while advising DPW on strategy and implementing DPW selected products and solutions. DPW has high profile decisions coming up in the near future in the areas of Enterprise Information Management, ITIL process enabling technologies and Cloud/SaaS solutions.

- DPW benefits from Deloitte's product independent stance are:
- DPW's benefits, Return on Investment (ROI) and Total Cost of Ownership (TCO) are our only consideration while facilitating selection and implementing hardware or software products
- Deloitte brings the power of the hardware and software alliances and our balanced feature comparisons and characterizes from hundreds of our engagements
- Deloitte practitioners specialize in various platforms, hardware and software. To promote providing the best talent, quickly, Deloitte taps to the best of the talent in the various products chosen from its large pool of professionals. As an example, as DPW started new initiatives with IBM Tivoli Identity Manager (ITIM) - Commonwealth's standard for user automated user provisioning product, Deloitte brought in specialists in that product to enable quick success with ITIM.



We have demonstrated our product and platform independence over 30 years of our association with DPW. The product independence stance became even more important as our clients embraced the open systems platform because of the wide array of choices. We provide specific examples of the upcoming DPW decisions that will have long term impact on DPW's technology strategy, and select examples of Deloitte's demonstration of the product independence stance with DPW over the past 10 years of DPW's selection and implementation of technologies in Figure 6.9-307:

Technology Platform/Product	Deloitte's Commitment to DPW Project Goals and Objectives
<ul style="list-style-type: none"> • Year 2000: Microsoft vs. Java application development technology choice 	<p>DPW's choice was the Microsoft platform, after careful considerations of the TCO and long term Commonwealth and DPW direction; considered by many as a bold choice on an application development environment that was maturing and the hardware choices to run mission critical applications for the platform still in early development stages Deloitte has remained committed to this DPW's choice and has implemented the mission critical systems.</p>
<ul style="list-style-type: none"> • 2001-2002: Human Services Network (H-Net) – Facilitate enterprise product solutions 	<p>Deloitte facilitated product selections and assisted in the successful implementation. Deloitte's ability to bring specialists in these product families, independent benchmarks and establishing selection criteria based on DPW's environment and requirement has been a differentiator. DPW has continued their enterprise use even though the products have been acquired by other companies, more than on one occasion.</p> <ul style="list-style-type: none"> • Middleware – WebMethods DPW chose webMethods after Deloitte facilitated the product selection. Today, WebMethods is at the heart of DPW's services strategy and implementation. DPW embraced the use BizTalk and OpenTI for specific use cases, documented through DPW standards • Security – CA Netegrity SiteMinder DPW chose Netegrity SiteMinder as the enterprise Access Management platform to provide single sign-on services to the applications. Nine years later, DPW operates one of the most complex SiteMinder implementations successfully; supporting over 200,000 users, 70,000 logins and 5,000,000 authorizations a day. Deloitte has been an integral part – facilitating the product selection and implementing the infrastructure and integrating over 27 systems.
<ul style="list-style-type: none"> • 2005-2006: DPW's server hardware platform 	<ul style="list-style-type: none"> • Deloitte worked with DPW through the change of the Oracle database platform through the choices of running on Sun Microsystems platform running on Sun OS to Unisys ES7000 platform. • Commonwealth's decision to use IBM server platform for commodity servers – Deloitte worked in harmony with DPW in implementing the IBM platform for the utility services
<ul style="list-style-type: none"> • 2009: Rules Engine 	<ul style="list-style-type: none"> • Deloitte assisted DPW in the product selection of the Rules Engine. Once DPW selected Corticon as the Rules Engine standard, Deloitte assisted in the implementation of the infrastructure and use by the application

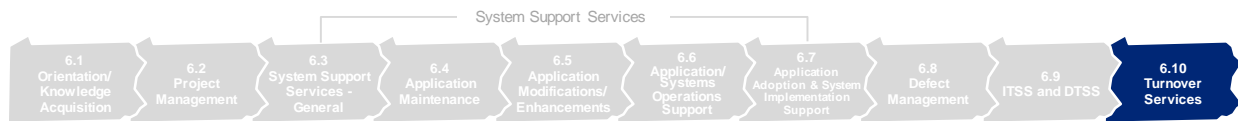


Technology Platform/Product	Deloitte's Commitment to DPW Project Goals and Objectives
<ul style="list-style-type: none"> • 2010: Avicode for Application monitoring/debugging solution 	<ul style="list-style-type: none"> • Deloitte assisted DPW in the product section and implementation of Avicode for application monitoring and debugging the application code in Production environment.
<ul style="list-style-type: none"> • 2010 and beyond: Cloud and SaaS Platform 	<ul style="list-style-type: none"> • DPW will be looking for a Cloud environment as it embraces the cloud technology and uses SaaS offerings. Deloitte looks forward to bringing the lessons learned in the technologies and move forward locked in step with DPW.
<ul style="list-style-type: none"> • 2010 and beyond: ITIL process enablement technology and tool sets 	<ul style="list-style-type: none"> • Deloitte is looking forward to DPW acquiring the right tool sets for the Configuration Management Database (CMDB) and tools for technology enabling processes such as request management, problem and issue management and relevant ITIL processes.
<ul style="list-style-type: none"> • 2010 and beyond: Enterprise Information Management 	<ul style="list-style-type: none"> • DPW has been working on strategy refresh for the Enterprise Information Management related technologies and will embark on action to execute on the strategy and roadmap. The execution of the EIM strategy will likely involve acquiring new tools for Metadata Management, Master Data Management, Data quality improvement measures. Deloitte looks forward to providing specialist assistance in these and other relevant data and Knowledge Management tool sets.

Figure 6.9-307. Deloitte's Demonstrated Product Agnostic Approach helps in the success of DPW's Enterprise Technology Choices.



6.10 Turnover Services



PA_DPW-200j

II	Page II-2	RFP Reference: II-3. Work Plan
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Describe in narrative form your technical plan for accomplishing the work. Use the task descriptions in **Part IV** of this RFP as your reference point.

IV	Page IV-300	RFP Reference: Systems Architecture Lot #6 and Technical Support Services Lot #7
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Turnover Services – The selected Offeror will be responsible for providing a turnover plan that identifies the critical tasks that need to occur to provide a smooth and orderly turnover of functions between the outgoing Contractor and the new Contractor and/or state staff with minimal disruption to the operation.

Additional RFP Reference: Systems Architecture Lot #6 and Technical Support Services Lot #7, Page IV-396

Deloitte shares the belief with DPW that you accomplish an effective turnover with a strong turnover plan and rigorous execution of that plan. We know that strong collaboration principles, coupled with vast knowledge of the nuances of the DPW business and technology domains, are necessary for a successor team to continue providing support for these critical DPW systems. The end goal is a transition which provides continuation of uninterrupted service.

Deloitte understands the importance of a smooth transition of application and maintenance operational support services to follow-on staff with minimal disruption. Deloitte’s past service experience with the Commonwealth, as well as our reputation and service within the Health and Human Services Industry at a national level, reduces risk to DPW during this crucial phase in the event that a turnover is required.

Unique and Distinguishing Factors



Deloitte has a strong track record of successful turnover of large Public Sector projects:

- Delaware Client Information System II (DCIS II)
- Pennsylvania Human Service Network (H-Net)
- Administrative Office Pennsylvania Courts Common Pleas Case Management System
- West Virginia Families and Children Tracking System (FACTS)
- Pennsylvania Finance Transformation
- Pennsylvania Child Support Enforcement **

*** Deloitte won the PACSES bid and took over from ACS in 2001.*



Our combined 35 years of service to Health and Human Services clients who have transitioned services from Deloitte to a successor, or assumed responsibility for system maintenance themselves, are a testament to this fact.

Our experience shows that providing for an effective and orderly turnover is a continuous and phased process that relies upon a positive, collaborative learning environment; an environment that must be established early in the project life cycle.

Throughout the project our team members actively work side-by-side with their DPW team members to successfully accomplish project activities. In doing so, our approach provides DPW staff the opportunity to absorb and practice completing the same project tasks, applying the same procedures, and using the same tools as our team resources. This helps alleviate the burden that a large volume of information can create when a formal turnover is scheduled for a set period of time at the end of the contract.

If Deloitte is not selected for Lot 7

- We will begin turnover of 6 mission critical systems during an election year
- We will execute our current turnover plan from April 1st through September 30th
- We will turnover 27 applications, 200+ subsystems, 15 Million lines of code
- We will use our almost 300 work orders that consists of 2100 artifacts as a baseline of documentation

Features	Benefits to DPW
Experienced staff with knowledge gained as the original architects and maintainers of the applications	We will maintain our project staff through the turnover period. Our knowledge of these systems is gained through long-term experience, not through training provided from another source. Participating in the development and evolution of these systems allows us to not only provide knowledge of how these systems work, but also why they work the way they do.
Turnover actually starts on day one of the project, not at the end	In order to be effective, turnover cannot be limited to a period at the end of a project – especially for a multi-year effort. To support effective turnover, knowledge transfer should be a continuous process based upon a positive, collaborative learning environment established early in the project life cycle.
Highly collaborative approach	Our team will work side by side with DPW staff and the other Lot vendor teams throughout the life of the project. During the turnover period, this collaboration will provide benefits as our team and the other Lot vendors work side-by-side with DPW to allow them to gain familiarity with the systems and corresponding maintenance operations and support procedures.
Continued system operations during the turnover period	Of critical importance to DPW during the turnover period are continued, uninterrupted services to the people of the Commonwealth. Our approach to turnover facilitates a seamless transition that will help DPW to continue to meet their business obligations during the turnover phase.

Figure 6.10-1. Features and Benefits.

Key features of our turnover approach and corresponding benefits those features provide to DPW.

Our turnover processes include a well-defined, repeatable approach that we have successfully executed for many other similar engagements. We follow a three-stage methodology that facilitates a seamless turnover and enables DPW to continue to meet their business obligations during the turnover phase:

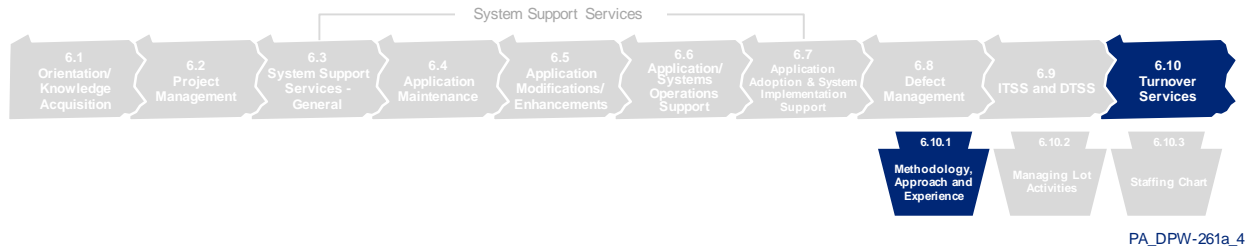
- **Turnover Planning.** Develop the detailed Turnover Plan that drives the knowledge transfer effort for the successor team.
- **Turnover Execution.** Execute and monitor the approved Turnover Plan.
- **Turnover Closeout.** Consolidate observations and findings from the turnover execution phase and provide DPW with an assessment of whether the turnover process met/exceeded the defined the acceptance criteria.

Prior to initiating the knowledge transfer effort, incoming support team participants should have a basic understanding of the breadth of technologies associated with the DPW systems (e.g., for the current environment these would include .NET, Oracle, webMethods, SQL Server, Unisys mainframe technologies). Knowledge transfer builds upon and leverages the basic system and technical understanding of the participants gained through prior development and/or support experience and training. A successful turnover requires a joint team with qualified resources that can accept the turnover and transition activities.

Keys to Successful Turnover

- Collaboration and joint accountability with DPW and/or the successor vendor.
- Expectations for knowledge transfer established through individual assessments and plans
- Regular formal and informal checkpoints
- Established turnover methodology utilized on numerous large HHS projects.

6.10.1 Methodology, Approach and Experience



II	Page II-3	RFP Reference: II-3. Work Plan
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Where possible, the Offeror should provide specific examples of methodologies or approaches that will be used to fulfill the various requirements, how these methodologies will be adapted for this contract and implemented, and examples of the Offeror's similar experience and approach on comparable projects.

Methodology

We apply a turnover methodology and processes to help maximize the effectiveness of the effort for DPW IT Services staff while reducing the substantial risks associated with a turnover of this size and complexity. Our methodology has been successfully used on a broad spectrum of large Public Sector projects, providing a structured, phased approach to turnover activities that is designed to maximize transparency, promote collaboration, and report on the success of the turnover.

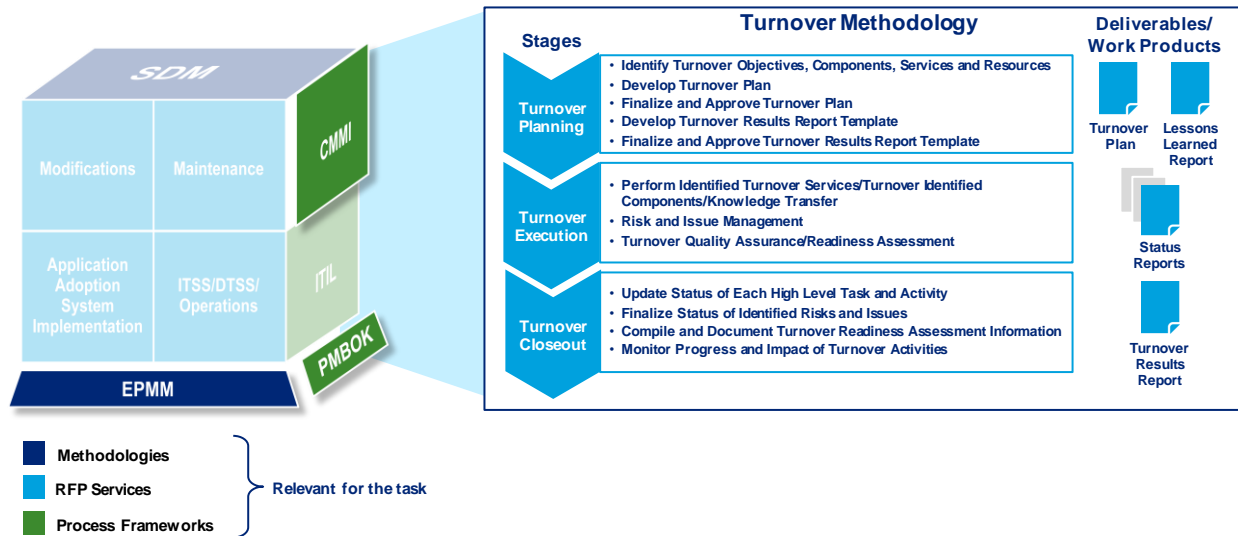
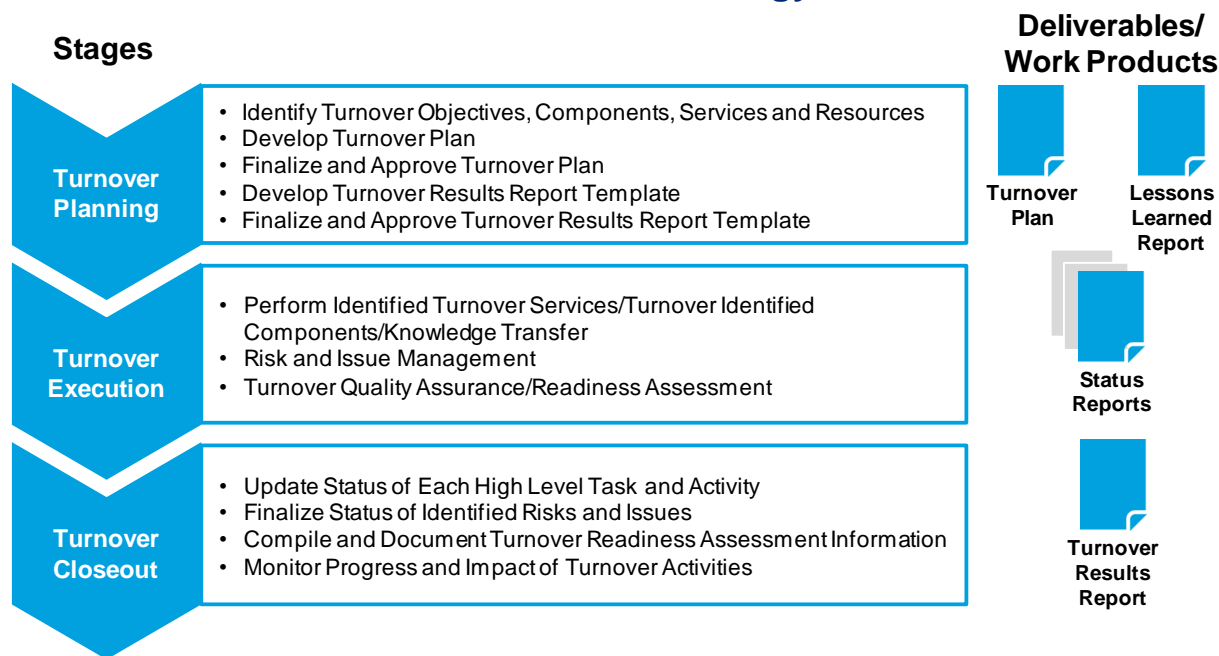


Figure 6.10-2. Turnover Methodology as it relates to our overall proposed approach.
Our established Turnover Methodology is a component of our overall approach to the DPW IT Services project.

Our Turnover Methodology is comprised of three phases: Planning, Execution, and Closeout. These phases provide an in-depth approach to realize a successful turnover. Figure 6.10.1-3 provides a more detailed overview of our Turnover Methodology and the deliverables produced during each phase.

Turnover Methodology



PA_DPW-310_4

Figure 6.10.1-3 Turnover Services Methodology.

Our methodology is comprised of three phases: planning, execution, and reporting/closeout that provide an in-depth approach to realize a successful turnover.

Phase 1: Turnover Planning

During the Turnover Planning phase, we help establish the foundation for the turnover activities by identifying the specific objectives for the in scope systems. Today, the scope is comprised of 6 applications, 27 business systems, 25+ enterprise services, and 200+ subsystems, services and COTS products. However, in 5-8 years, the scale and complexity of the in scope systems may be vastly different. During Turnover Planning we document the business and technology skill sets that are necessary for DPW and/or a successor vendor to effectively manage the maintenance and operation support for these systems. We also assess Lessons Learned from the transition period and other experiences over the course of the project that potentially impact the procedures, knowledge transfer techniques, and other important elements of the Turnover Plan.

During this phase we also assess the overall scope of the turnover services and define a detailed timeline. This phase requires participation of the project stakeholders to commit to the detailed timeline including DPW, the successor vendor team, and our team.

Next we draft the Turnover Plan for which we identify various system transition methods, determine milestones, document turnover success criteria, define specific resource readiness criteria, and prioritize and plan each individual task required to successfully complete the turnover. This draft Turnover Plan is then peer reviewed prior to submission to DPW for approval.



After submission of the draft Turnover Plan DPW will reviews the plan and confirm that it sufficiently mirrors DPW's resource allocation priorities, and identifies and addresses the department's operational risks. DPW also validates that the organization is prepared for the actual execution of the plan. The team incorporates required changes into the plan and submits the updated plan for final approval. Once DPW reviews and accepts the final Turnover Plan, it is ready for execution.

Phase 2: Turnover Execution

During the Turnover Execution phase we manage and perform the planned turnover activities and apply the elements for knowledge transfer defined in the plan to meet the department's defined turnover objectives. Our team continues to identify the turnover components which represent high risk to operational stability of the DPW systems. This in turns helps us to adjust and prioritize turnover tasks in order to reduce the risk of disruption to ongoing program operations. We regularly measure the progress of turnover execution by assessing the readiness of DPW and/or the successor team members to assume responsibility for the maintenance and operational support of the DPW systems.

We perform turnover activities (e.g., knowledge transfer, component transfer, resource transfer) as per the DPW approved Turnover Plan. These activities are described in more detail in *Section 6.10.2.3, Required Items*.

Phase 3: Turnover Closeout

During the Turnover Closeout phase we assess the completion of the turnover effort and prepare the Turnover Results Report. The report provides a summary of the turnover effort, including the following detailed information:

- Completion status of each high level task and activity that took place during the turnover period, linking the report items to the turnover success criteria established during the turnover planning process
- Detailed description of how each of the objectives stated in the Turnover Plan have been achieved
- Documentation of the resolution of issues identified and prioritized during the turnover process
- Final report of items identified through the risk identification, assessment, and mitigation component of the Turnover Plan

With many years experience working with the DPW IT systems, we have established our success in helping prepare clear documentation, processes and plans to project activities.

Deloitte will utilize the 2100 artifacts submitted since 2006 as baseline critical documents for turnover to another vendor.

Approach

Our approach to the Turnover Plan is similar to the Turnover Plans that we created and submitted for the current Integrated Strategic Systems and PACSES contracts. The



plan provides details on the technical transition of applications and operations and identifies the key activities associated with turnover. This helps enable a planned systemic approach to turnover strategy for DPW while preserving key current processes and documentation. To meet DPW requirements, the plan:

- Addresses specialized technical turnover of applications and operations
- Identifies the critical tasks that need to occur in order to facilitate a smooth and orderly turnover of functions
- Contains timeframes for completion and how the turnover activities will be managed
- Identifies the “Transition to” resources required for the turnover, including those from DPW, our team, and the new Offeror, if applicable
- Identifies the system turnover objectives and work plan activities on a Gantt chart
- Documents activity timeframes and responsibilities

We understand DPW has identified a six month window for execution of turnover activities. During development of the turnover plan we will work with DPW to determine the exact schedule of activities for final project turnover. Changes in size, scale and complexity of the DPW systems as they will exist 5-8 years from now could necessitate a different turnover calendar. An outline of the expected time schedule is as follows:

Time frame	Deloitte Support of Turnover Events
9 months prior to contract end	<ul style="list-style-type: none"> • Assess the Lessons Learned report and other project experiences that may impact our approach to the turnover effort • Develop competency evaluation criteria to measure effectiveness of skill proficiency • Submit Turnover Plan • Identify and finalize resources from our team, the Commonwealth, and the successor vendor team • Review and finalize Turnover work plan • Finalize turnover logistics, seating, computers, etc.
6 months prior to contract end	<ul style="list-style-type: none"> • Begin turnover activities - system demonstrations, walkthroughs • Conduct skill proficiency evaluations • Review documentation and procedures • Participate in project meetings
90 days prior to contract end	<ul style="list-style-type: none"> • Successor team members begin to perform project tasks e.g. maintenance, production monitoring, application support • Evaluate results of skill proficiencies and determine gaps • Successor team members begin facilitation and presentation at project meetings
30-days prior to contract end	<ul style="list-style-type: none"> • Begin to compile turnover results report • Successor team members begin to lead and independently perform project functions • Finalize transition close-out procedures



Time frame	Deloitte Support of Turnover Events
	<ul style="list-style-type: none"> Review transition results

Figure 6.10-4. High-level Turnover Timeframes.
Outline of turnover timeframes based upon the DPW requirements documented in the RFP.

Our turnover approach emphasizes some important activities knowledge transfer activities so the identified members of the successor team are provided with the mechanisms to gain knowledge that is required to do their jobs effectively. The list of activities in the table below represents some of the tasks Deloitte may perform during the Turnover Phase.

Key Activities	Description
Pre-requisite Learning	A solid foundation in skills relevant to turnover activities is important for those resources identified on the successor team. Working with DPW we identify pre-requisite learning activities for successor team members to finalize prior to the initiation of the turnover process. Examples of these topics may include object oriented design, .NET principles, SOA Architecture, Data Warehouse principles, etc.
Documentation Review	This activity involves the successor team resources carefully reviewing available project and system documentation for each of the turnover services topics. This documentation review is critical to the successful completion of the majority of the turnover tasks and may result in questions that can be addressed using one of the other methods defined in this table.
Meeting/Discussion Forum	These forums allow the appropriate resources to openly discuss a turnover topic and provide firsthand accounts and explanations of important details related to the topic. Each meeting should have a defined agenda to control the scope of the discussion. Participants should review related documentation prior to attending the meeting. Controlled scope and meeting preparation enable the discussion to be as productive as possible and also allow those participating to truly get a grasp of the information being covered.
System or Tool Demonstration	Often considered informal or on-the-job training, this activity includes a demonstration of a component of a system or of a specific tool used to support the system or other project activities. It involves the visual presentation, as well as a detailed discussion of the underlying business function and architecture. The participants should review relevant documentation prior to attending the demonstration so they have a basic understanding of the topic. This allows the participants to conduct an effective review of the details during the demonstration.
Walkthroughs	Walkthroughs provide a logical or sequential overview of a functional or technical component of an application or system. They involve visual presentations of the topic, as applicable, as well as discussions of relevant details. Similar to a system demonstration the participants should review the documentation prior to attending the walkthrough.



Key Activities	Description
Shadowing or Participation in Meetings and Activities	Job shadowing involves having the resources that are responsible for turnover jointly participate in tasks, activities, and/or meetings during the course of the normal day. This allows these resources to learn firsthand and experience the project activities, operations and other tasks they will take over when turnover is complete. For shadowing to be most effective, it is important that well-defined objectives be set up front to effectively use the time of those involved.
Substantial and Meaningful Assignments	As transition progresses and the successor team members take on additional responsibilities, we begin the transition from job shadowing to job takeover. Throughout the transition our team works to provide the successor team resources with meaningful assignments and activities related to the applications they will be supporting.
Skill Proficiency Testing	Based on DPW and Deloitte mutual agreement, we may develop and facilitate skill proficiency assessments to determine if the vendor is acquiring necessary competencies for taking over the mission critical systems of DPW. Skill proficiency gives DPW an understanding of what competencies have been achieved and which ones still require work. Using proficiency testing reduce DPW turnover risk.
Governance Meeting Participation	This method provides a hands-on means to understand project structures by participating in the various governance meeting forums – steering team, project team, development team, logistics and user education team meetings, etc.

Figure 6.10-5. Key Knowledge Transfer Activities.

Our team uses a broad spectrum of techniques to provide a means of enabling knowledge transfer.

Since turnover is performed along with ongoing maintenance and modifications, we will work with DPW to continually monitor and prioritize these activities based upon the support needs of the various applications and the availability of resources, both from our team and from the successor team.

DPW Benefits from Shared Responsibilities, Effective Monitoring and Management of Turnover Tasks

Deloitte operates with high standards of professionalism. We maintain this level of professionalism throughout the turnover period to effectively transfer responsibility for the DPW systems to a successor team. In part, this commitment is a function of our desire to see DPW continue its success with and gain recognition for its outstanding systems, but also in part because we know that its continued success will provide significant benefits to people throughout the Commonwealth.

- Continuing to perform project services while DPW is in the process of identifying a successor
- Providing qualified, experienced staff to execute turnover and knowledge transfer tasks








- Sharing information and maintaining clear channels of communication with the DPW and/or the successor vendor throughout the turnover period
- Monitoring the effectiveness of the turnover process and making adjustments as necessary

In order to provide an effective turnover of application services and support it is critical that shared responsibilities of the Transfer From and the Transfer To organization have clearly defined goals, roles and responsibilities, and effective monitoring and management of activities. Deloitte has been the Transfer To vendor on a number of engagements and some of the keys to successful turnover include the following:

- **Independent Transition Management Team.** An independent transition manager was essential in providing neutrality and the necessary independence to manage a host of issues.
- **Operational Cut-Over Team.** A soft cut-over arrangement allows for the Transition To vendor to operate the system with the Transition From vendor providing an insurance policy and advanced consulting support.
- **Executive Alignment.** The executive team, including senior leadership from the stakeholders, should be aligned to the mission and frequently engaged to resolve issues and share updates
- **Leadership Decision Support.** The Transition PMO constantly listens to each perspective and works to reduce “noise” and resolve root issues. Issues are presented weekly in an orderly fashion for discussion and resolution.
- **Transition Team Assembly.** The transition team should be assembled as quickly as possible and subject matter experts within DPW identified.
- **Transition Project Management Office.** The Transition PMO should take ownership of documenting events and issues.

Experience

Deloitte has experience with other large project turnovers, including the current DPW contracts. We have an established track record of effectively turning over responsibility on large Public Sector projects to the original agencies and/or other vendors, and have successfully completed over 50+ transitions in the past five years. Our past service experience with DPW, as well as our experience with Health and Human Services projects across the country, helps to reduce your risk during the critical phase of transitioning support to a successor team while also continuing to maintain system availability and service levels.

Deloitte Experience Footprint	Example	Deloitte Role in Providing Services Similar to DPW Requirements
<p>Commonwealth of Pennsylvania</p> 	<p>DPW, Human Service Network (H-Net)</p> <hr/> <p>AOPC Common Pleas Case Management System</p> <hr/> <p>DPW, Master Provider Index (MPI)</p> <hr/> <p>DPW, Invoice Management for Quality (IM4Q)</p> <hr/> <p>Office of the Budget, Finance Transformation</p>	<p>We worked with DPW to facilitate turnover of database services and system components (e.g., XML, configuration management, middleware, technology standards and procedures) for H-Net.</p> <hr/> <p>For the Administrative Office Pennsylvania Courts we completed a successful transfer of responsibility and knowledge to AOPC leadership and staff for aspects of the Software Development Life Cycle utilized for the Common Pleas Case Management System.</p> <hr/> <p>Maintenance of the DPW Master Provider Index (MPI) was turned over to DPW resources prior to the initiation of our current Integrated Strategic Systems contract.</p> <hr/> <p>Maintenance and support for the Invoice Management for Quality (IM4Q) system was turned over to DPW resources and they continue to successfully support this system.</p> <hr/> <p>Successfully led Commonwealth staff to self-sufficiency in maintaining and using their upgraded SAP 6.0 system. Participants gained project management, communications, and process improvement skills and techniques through hands-on project involvement and mentoring with their Deloitte counterparts.</p>
<p>State of Texas</p> 	<p>Texas Integrated Eligibility Redesign System (TIERS)</p>	<p>In 2005 we helped the Texas Health and Human Services (HHSC) agency position a successor vendor (Accenture) for uninterrupted continuity of services supporting TIERS. Two years later, in June 2007, the Accenture contract was cancelled and Deloitte was re-engaged by HHSC using a sole-source contract to maintain and enhance TIERS.</p>
<p>State of Florida</p> 	<p>Florida Eligibility and Child Support</p>	<p>We conducted a turnover of the Florida Eligibility system and the Child Support Enforcement Automated Management System (CAMS) to a state support team. Florida has successfully taken over the maintenance and operations of these systems.</p>
<p>State of Delaware</p> 	<p>Delaware Client Information System II (DCIS II)</p>	<p>A complete application turnover, including management of maintenance and enhancement activities. This project included a shift away from a mainframe application to a much larger client/server application. Deloitte continues to provide development support to supplement Delaware's staff.</p>
<p>State of West Virginia</p> 	<p>Families and Children Tracking System (FACTS)</p>	<p>Deloitte conducted a complete transition of FACTS to the state. This included the transition of maintenance, enhancement and operation activities, as well as the use of several new technology components.</p>





Deloitte Experience Footprint	Example	Deloitte Role in Providing Services Similar to DPW Requirements
<p>State of New Hampshire</p> 	<p>New HEIGHTS Integrated Eligibility System</p>	<p>Conducted multiple technical training events for the State to provide a more inclusive understanding of technology used to support business functions, and provided an SDLC overview to the Office of Information Technology (OIT).</p>
<p>State of Minnesota</p> 	<p>Health Match IV&V</p>	<p>As the IV&V vendor for the Health Match (eligibility) project, Deloitte helped transition completed work to state resources. The State of Minnesota had previously terminated the Health Match contract with ACS.</p>

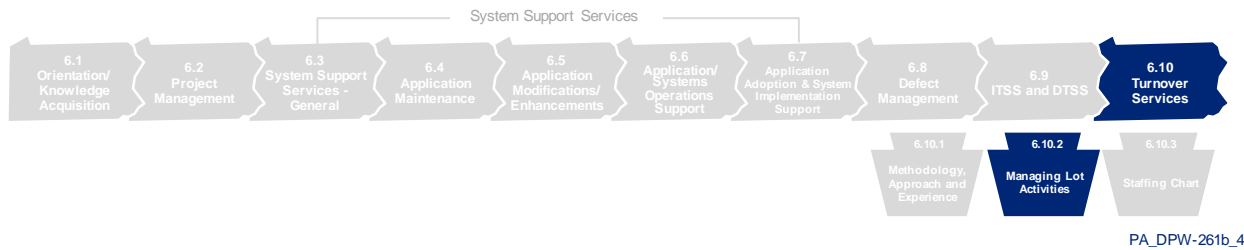
Figure 6.10-6. Deloitte Turnover Experience.

Representative samples of projects where Deloitte successfully turned over support activities to a state organization or another vendor.

We have established our success in helping prepare clear documentation, processes and plans for project activities. Our established turnover methodology will help reduce risk and promote seamless transfer of system operations so that DPW and/or a successor vendor can continue to support the users of the DPW programs as well as the Commonwealth citizens to whom they deliver services.



6.10.2 Managing Lot Activities



II	Page II-3	RFP Reference: II-3. Work Plan
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Provide a description of the Offeror's plan and approach for managing the Lots Required Activities and Tasks

Issues, Risks and Proposed Solutions

II	Page II-3	RFP Reference: II-3. Work Plan
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During this discussion, the Offeror should identify potential issues/risks and proposed solutions.

We have experience in managing the successful turnover of application and maintenance operational support responsibilities for projects of similar size and scope – to both our clients and to other vendors. We are able to effectively deploy our team for turnover tasks, effectively monitor project scope changes that may impact the turnover schedule, and identify, manage, and resolve turnover-specific issues and risks. To help maintain focus on turnover while the team simultaneously continues to provide maintenance and application support, we designate a Turnover Manager who is solely responsible for the turnover effort, managing and tracking related issues and risks that are escalated as necessary.

Our proven dedication to fostering genuine team work both within the Deloitte organization and with our clients has been recognized. The teams we establish with our clients enable us to easily share project knowledge, lessons learned, and leading practices.

The impacts of risks and issues across the project are essentially the same, regardless of the project phase or task. These potential risks and issues include:

- Inability to keep your core systems operating and providing services
- Inability to implement new policy in a timely fashion
- Inability to implement in-flight initiatives
- Inability to carry forward your enterprise services vision forward
- End user dissatisfaction



- Loss of federal funding or incentive funding
- Time spent in negotiating between your vendors, and teaching them the DPW history and intricacies of program operations

The table below lists one of the specific risks and issues associated with the turnover effort, its potential impacts to DPW, and how the risk is mitigated by choosing our team for Lot 7.

Issue/Risk	Deloitte's Mitigation Strategies
Commitment to providing ongoing knowledge transfer and final turnover responsibilities	<ul style="list-style-type: none"> • Deloitte will continue to create the system artifacts required to document the enterprise systems and services which will aid in turnover activities. We will make ourselves available for formal turnover activities which may include side by side sessions and formal training if needed

Figure 6.10-7. Issues/Risks for Turnover.

A description of possible risks and how our approach will help DPW to mitigate the impact of these issues/risks.

Processes and Tools

II	Page II-3	RFP Reference: II-3. Work Plan
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For each of the Lot's Required Activities and Tasks, describe the processes that will be followed and tools that will be used; describe the reports that will be used to track, monitor work, and measure performance.

Activity 1: Turnover Planning

At the start of the turnover effort we work with DPW to finalize our proposed plan for turnover. This includes confirming the team members conducting turnover, finalizing the tasks to execute and the processes to follow during execution, setting the timeframes for each task, defining the roles and responsibilities for our team, DPW and the successor team, and specifying the success factors by which turnover progress will be measured on an ongoing basis. This task is accomplished via a number of methods including but not limited to meetings, discussion forums, documentation reviews, system and tool demonstrations, peer reviews, formal classroom training, status reporting review, and participation in governance meetings.

As part of the Turnover Planning process we incorporate our lessons learned from the project transition phase by virtue of the Lessons Learned Report. The analysis provided by the report helps to identify areas of concentration for the turnover effort, such as applications and/or related technologies that may need to be covered in more depth or knowledge transfer techniques that we found to be particularly effective for the DPW applications. We propose creating the Lessons Learned Report at the conclusion of the Orientation and Knowledge Acquisition phase so that the team does not have to recover the results of transition work that was completed 5-8 years prior to the start of the turnover phase.



In order to prepare for the turnover effort, designated successor team resources are responsible for reviewing system documentation and other available information sources. This review is critical in the ongoing success and timely completion of the turnover process. During this review the successor team resources will also prepare questions for clarifications in structuring the transition process.

The table below outlines the activities we perform as part of Activity 1 – Turnover Planning, with additional details for each process below.

Turnover Planning Process	Tools and Methods Enabling Turnover Planning
Conduct Transition Kickoff Meeting with Stakeholders	Microsoft Office Suite, Meetings, Discussion Forums
Establish Turnover Management Process	Microsoft Office Suite, Status Reporting
Determine Transition Methods	Microsoft Office Suite, Meetings
Establish Turnover Status Reporting Requirements	Microsoft Office Suite, Status Reporting
Establish Turnover Issue Escalation and Resolution Procedures	Microsoft Office Suite, Status Reporting
Finalize Turnover Logistics	Microsoft Office Suite, Meetings
Create, Validate, Update Turnover Plan	Microsoft Office Suite, Meetings, Documentation Self Review, Discussion forums
Review System Documentation, DPW Documentation	Microsoft Office Suite, Documentation Self Review
Define Production Program and Documentation Update Procedures during Turnover	Microsoft Office Suite, Meetings, Discussion Forums
Define Schedule for Actual Transition of Activities and Responsibilities	Microsoft Office Suite, Meetings
Define Key Success Factors for Turnover Activities	Microsoft Office Suite, Meetings
Submit Final Turnover Plan and Key Success Factors	Microsoft Office Suite, Meetings

Figure 6.10-8. Summary of Activity 1 Turnover Planning.
Summary of processes and tools encompassing this activity.



Conduct Transition Kickoff Meeting with Stakeholders. The Kickoff meeting is used to formally initiate turnover, establish objectives of the turnover effort, and communicate to participants the processes and time frames that are to be followed during turnover. DPW hosts the kick-off meeting with active participation by our team and the successor team members. At this time, DPW provides the successor resources with access to relevant system documentation.

Establish Turnover Management Structure and Define Resources. We work with DPW and the successor team to finalize the turnover management process. This sets the tenor and objectives for accomplishing turnover within the agreed upon schedule. This process also determines the level of resource allocation of our staff among maintenance, operations and turnover activities. The number of team resources dedicated to turnover is based on priorities set by DPW. The establishment of the Turnover Management process also defines a Turnover Manager and clear processes to be followed for status reporting and issue escalation and resolution.

Determine Transition Methods. Identify various system knowledge transfer methods (e.g., mentoring, job shadowing/OJT, classroom training, document reviews), define milestones, document overall turnover success criteria, and prioritize each individual task required to implement the Turnover Plan. This information is incorporated into the turnover work plan, a component of the overall Turnover Plan submitted to DPW for final review and approval.

Establish Turnover Status Reporting Requirements. DPW establishes the requirements for reporting on the status of the turnover activities for both Deloitte and the successor resources. This status reporting is based on the mutually agreed upon status reporting requirements.

Establish Turnover Issue Escalation and Resolution Procedures. DPW establishes issue escalation and resolution procedures for issues that arise during the turnover execution for both Deloitte and the successor team. This process is based on the mutually agreed upon escalation methods.

Finalize Turnover Logistics. We work with DPW and the successor vendor to help finalize logistics prior to the execution of turnover activities. This includes the on boarding of the new successor resources, including an overall DPW organization overview, alignment plan, access to the facilities, emails and other requirements for the successor team to start working on-site with the systems. Space and individual hardware and software for the successor vendor team members are provided by DPW or the successor vendor.

Create, Validate, Update Turnover Plan. Create a draft of the Turnover Plan and review it with the DPW stakeholders as well as representatives of the successor vendor. The plan will then be updated based on feedback from the review. Turnover activities are planned and finalized within the priorities set by DPW. Activities in the plan are prioritized based on available resources and directions provided by DPW in terms of balancing tasks between maintenance, operations support and turnover.



Review System Documentation, DPW Documentation. In order to prepare for transition, the successor resources are responsible for reviewing the available system documentation. This review is critical in the ongoing success and timely completion of transition. The successor team will also prepare questions for clarification in structuring the transition process.

Define Production Program and Documentation Update Procedures during Turnover. The current process for maintaining documentation updates will be followed throughout the turnover execution phase. The overall ownership of the document during this phase will be determined by DPW, and resources will be allocated appropriately for these tasks during this phase.

Define Schedule for Actual Transition of Activities and Responsibilities. We work with the successor team to establish the schedule for transition of system responsibilities during the turnover execution phase. This also includes addressing the overlap time frames, shadowing of activities and final turnover completion. This schedule is dependent on the level of knowledge, experience and background of the successor resources. We integrate turnover activities into the overall master work plan, status and resource allocation reports before Turnover begins.

Define Key Success Factors for Turnover Activities. We work with DPW to establish specific metrics for internal management of turnover progress. DPW assesses the overall transition success based on the activities taken over gradually and successfully by the successor team resources and the overall readiness of that team to assume full responsibility for the DPW systems.

Submit Final Turnover Plan and Key Success Factors. The Turnover Plan is updated throughout the planning process to reflect input from the various stakeholders and completion of the planning activities. The Turnover Plan is also updated to reflect the key turnover success factors defined with DPW, along with other information as agreed upon during the turnover planning phase. The Turnover Plan is submitted to DPW for review and approval no later than 9 months prior to the end of the contract, or within 3 months of request by DPW.

Activity 2: Turnover Execution

The execution of the Turnover Plan assumes that the successor team resources have dedicated the time and effort to understand current system documentation, and possess overall skill levels with the relevant technologies to proceed with knowledge transfer activities. The DPW-specified time frame for turnover execution and planning are based on these resource characteristics and levels.

The figure below outlines the activities we perform as part of Activity 2 – Turnover Execution, with additional details for each process below.



Turnover Execution Process	Tools and Methods Enabling Turnover Execution
<p>Transition Project Management Responsibilities</p> <ul style="list-style-type: none"> • Review Roles and Responsibilities • Review Governance • Review Management Control Procedures • Review Current Work Plans • Review Meetings Schedule • Review Tools • Transition Project Management and PMO Responsibilities 	<p>Microsoft Office Suite, Meetings, Discussion Forum, Status Reporting and Governance Meeting participation</p>
<p>Transition Application Management</p> <ul style="list-style-type: none"> • Review Governance • Review DPW Standards and Requirements • Review DPW Software Development Methodology (SDM) • Turnover Production Releases <ul style="list-style-type: none"> - Turnover Current System Documentation - Review Current System Documentation - Review Schedule of Current Application Activities - Review Current Outstanding Program Change Requests (PCRS) - Turnover Requirements, General System Design, Detailed System Design - Conduct System Overviews • Turnover Development <ul style="list-style-type: none"> - Conduct Technical/Code Walkthroughs - Conduct Interface Architecture Walkthroughs - Conduct Application Architecture Walkthroughs - Conduct Data Architecture Walkthroughs - Turnover Software Integration and Testing - Review Testing Procedures - Review Acceptance Test Procedures - Turnover Acceptance and Installation - Review SAT Procedures - Review SAT Scenario Templates 	<p>Microsoft Office Suite, Meetings, Discussion Forum, Status Reporting, Documentation Self Review, Shadowing and Governance Meeting participation</p>
<p>Transition Technology Support (Shared) Services</p> <ul style="list-style-type: none"> • Review Governance • Platform and Configuration management <ul style="list-style-type: none"> - Conduct Technical Infrastructure Walkthroughs - Review Migration Procedures • Data <ul style="list-style-type: none"> - Conduct Database Architecture/Maintenance Walkthroughs - Conduct Data Model/Data Dictionary Walkthroughs - Review Data Maintenance Processes - Review Database Object Maintenance Processes 	<p>Microsoft Office Suite, Meetings, Discussion Forum, Status Reporting, Documentation Self Review, Shadowing and Governance Meeting participation</p>



Turnover Execution Process	Tools and Methods Enabling Turnover Execution
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- **Operations**
 - Review Batch Architecture(s)
 - Review Batch Scheduling/Maintenance Processes
 - Review Load Testing Processes
 - Review Reporting Processes
- **Security**
 - Conduct Security Architecture Walkthroughs
 - Transition Production Support and Operations Responsibilities
- **Enterprise Application Architecture and SOA**
 - Conduct Architectural Walkthroughs
 - Conduct Architectural Standards Review
 - Conduct Architectural Protocols Review
- **Network and Desktop Services**
 - Conduct Desktop Inventory/Configuration Walkthrough
- **Integration and Middleware**
 - Conduct Middleware Architecture Walkthroughs

Turnover Application Support (Technology Adoption) Services

- Review Governance
- Review Field Support Procedures
- Review Field Support Documentation
- Conduct Walkthrough on Advisory Team/Statewide Meeting Preparation and Facilitation
- Conduct Help Desk Support Walkthrough
- Review Other Field Support Activities
- Conduct Walkthrough of LMS Use

Microsoft Office Suite, Meetings, Discussion Forum, Status Reporting, Presentation, Documentation Self Review, Shadowing and Governance Meeting participation

Figure 6.10-9. Summary of Activity 2 Turnover Execution.

Summary of processes and tools encompassing this activity.

Transition Project Management Responsibilities

Turnover Lot 7 project management responsibilities to the successor team resources. Final hand over is confirmed by DPW based on their determination of the level of success achieved by successor resources in the overall transition of this function. Specific aspects of this transition include:

- **Review Roles and Responsibilities.** Review current responsibilities for each team role so as to validate the organizational structure and further define the responsibilities of the staff. This also paves the way for easy transition of roles as the roles for future takeover and shadowing are clearly defined.
- **Review Governance.** Review the current governance structure and confirm transition strategy and participation in the governance meetings. Transition evolves from participation at the meetings to preparing and running the meetings.



- **Review Management Control Procedures.** Successor resources conduct a self review of the current management control procedures and prepare questions for clarification by DPW and our team. DPW takes the lead on presenting and discussing DPW standards and management control procedures.
- **Review Current Work Plans.** Successor resources conduct a self review of the current work plan and prepare questions for clarification by DPW and our team. As necessary, the team schedules meetings for further discussions and clarification.
- **Review Meetings Schedule.** Successor resources conduct a self review of the current meeting calendar and align their calendars and schedule to participate in these meetings during the course of the turnover period. They also prepare questions for clarification to DPW and Deloitte. As necessary, the team will schedule meetings for further discussions and clarification.
- **Review Tools.** Review the management tools that are being used by our team. This includes project management tools, software development life cycle tools, estimation tools, and governance tools.
- **Transition Project Management and PMO Responsibilities.** At the conclusion of these series of project management tasks, project management responsibilities are formally handed over to the successor resources. This transition hand over will be decided by DPW based on their determination of the level of success achieved by the successor team in the overall transition of this function.

Transition Application Management

Turnover of the application management functions involves the transition of tasks associated with the Lot 7 support activities for the production DPW applications and systems. Specific aspects of this transition include:

- **Review Governance.** Review the current governance structure and confirm transition strategy and participation in the governance meetings. Transition evolves from participation at the meetings to preparing and running the meetings.
- **Review DPW Standards and Guidelines.** Provide a detailed review of the current DPW standards and procedures. Gaining an in-depth knowledge of these standards and procedures is crucial to the ongoing management of DPW programs and policies, and application procedures.
- **Review DPW Software Development Methodology (SDM).** Provide a detailed review of the current DPW Software Development Methodology. Gaining an in-depth knowledge of the SDM and strict adherence to this methodology in the software development process is crucial to confirming software quality and documentation details.
- **Turnover Production Releases.** This activity commences the series of steps in the turnover of the DPW production systems to the successor resources, and includes the following steps:



- **Turnover Current System Documentation.** DPW verifies that the system documentation handed over during turnover planning is the latest; the Deloitte will update if necessary.
- **Review Current System Documentation.** Deloitte provides an overview of system documentation and provides sessions for clarification and support. The successor team conducts a detailed self review, and identifies questions for clarification. Deloitte, working with DPW, provides additional meetings and discussion forums to clarify and further describe any questions regarding related systems documentation and support materials.
- **Review Schedule of Current Application Activities.** The successor resources must review the work plans and release plans to understand the schedule of current application activities and initiatives. Our team will provide sessions to clarify this plan and provide adequate insights as necessary.
- **Review Current Outstanding Program Change Requests (PCRS).** The successor resources must review the list of current PCRs to understand the scope of application activities and initiatives that are pending. We will help to organize these PCRs by functional areas and provide a high level overview of the change requests that are currently in place.
- **Turnover Detailed System Design.** These activities commence the transition of documentation and materials as established by the DPW SDM. Given that the DPW systems are already operational, the detailed system design for each application is reviewed as a single package.
- **Conduct System Overviews.** Provide detailed overviews for each of the 6 applications, 27 business systems, and any follow-on systems included in the scope of the DPW IT Services project. The intent is to provide the successor resources with more information about the design details of each of the systems.
- **Turnover Development.** This activity focuses on transitioning development related tasks including the overall source code, its management, standards and procedures. This also includes the handover of common objects, specific source code packages, and related resources and includes the following steps:
 - **Conduct Technical/Code Walkthroughs.** Technical/Code walkthroughs will be held to explain the general coding format, standards, and guidelines that were used during the development of the systems. Since code walkthroughs are time consuming exercises, the number and extent of the walkthroughs will be performed based on overall priorities and direction set by DPW.
 - **Conduct Interface Architecture Walkthroughs.** Interface walkthroughs will be held to explain the general interface design format, standards, and guidelines that were used during the development of the system. The successor resources will perform the code walkthrough and we will answer any questions as needed. For a list of interfaces, please refer to the Requirements Document.
 - **Conduct Application Architecture Walkthroughs.** Application architecture walkthroughs will be held to explain the general application architecture and

infrastructure of the DPW systems. These walkthroughs will provide the successor resources with more information as well as a forum to ask questions identified during their documentation review.

- **Conduct Data Architecture Walkthroughs.** Data architecture walkthroughs will be held to explain the general database architecture of the system. This also includes their integration with other databases of integrating systems.
- **Turnover Software Integration and Testing.** The testing activities for these subsystems involve addressing PCRs and general Production maintenance. This also includes overall activities in terms of existing scenarios residing in ATS and other related testing collateral.
- **Review Testing Procedures.** The successor resources provide a plan to understand testing activities. This review includes the documentation for unit testing, integration testing and pre-SAT testing activities for application changes.
- **Review Acceptance Test Procedures.** The successor resources review the testing scripts currently used for regression testing. These are modeled after the SAT scripts and hence are very similar in content and extent of detail. As necessary, we will schedule sessions for further clarifications on these scenarios.
- **Turnover Acceptance and Installation.** The acceptance and installation activities for these subsystems involve supporting the SAT effort for the production PCRs as well as supporting the general training and implementation activities. Turnover of these activities will focus on discussions on these established DPW procedures. DPW primarily handles this area of responsibility, and our turnover will focus on discussions of processes and procedures.
- **Review SAT Procedures.** The successor resources understand the DPW expectations of SAT activities. This review includes the documentation around coordinating and supporting SAT activities for application changes.
- **Review SAT Scenario Templates.** The successor resources conduct a review of the SAT scenarios currently used for the DPW systems.

Transition Technology Support (Shared) Services

Turnover of the existing application architecture processes to manage technology through the SDLC and an understanding of the processes to engage BIS is crucial to an effective turnover. This activity focuses on the overall execution of the technology related transition activities. Specific aspects of this transition include:

- **Review Governance.** Review management processes that govern the management of the Technology Support Services team, its interaction with BIS and the existing protocols that support initiatives across systems.

Platform and Configuration Management

- **Conduct Technical Infrastructure Walkthroughs.** Provide a review of the technical infrastructure in order to effectively support the application maintenance and future

development. We conduct in conjunction with DPW detailed walkthroughs of the technical infrastructure, configuration and related areas.

- **Review Migration Procedures.** Outline the processes that must be followed for migrating software throughout the server environments. We demonstrate the migration activities and answer questions as part of this review.

Data

- **Conduct Database Architecture/Maintenance Walkthroughs.** Review database architecture and maintenance procedures in order to effectively support application maintenance and future development.
- **Conduct Data Model/Data Dictionary Walkthroughs.** Conduct review sessions in conjunction with the DPW data management team to provide a general explanation of the data architecture.
- **Review Data Maintenance Processes.** Review procedures for how to maintain data and perform functions like data fixes. Also review similar procedures and methods for Database Object Maintenance.
- **Review Database Object Maintenance Processes.** The successor resources must understand how to maintain the database objects in order to effectively support the applications. We will review the procedures and demonstrate the maintenance process during the transition.

Operations

- **Review Batch Architecture(s).** Provide a detailed overview of the existing batch application architecture and standard designs used to support DPW batch processing. This includes a review of the current batch schedules for each of the DPW applications.
- **Review Batch Scheduling/Maintenance Processes.** The successor resources must understand the processes to manage and maintain the test and production batch schedule.
- **Review Load Testing Processes.** The successor resources must understand the processes to effectively schedule, coordinate, execute and present load tests and load test results. We will work as part of the transition to conduct demonstrations to support this effort.
- **Review Reporting Processes.** The successor resources must understand the operational reporting requirements that exist to support the Department. This includes daily business metrics report, quarterly capacity plans, etc. We will work as part of the transition to conduct demonstrations to support this effort.

Security

- **Conduct Security Architecture Walkthroughs.** The successor resources will need to be familiar with the security architecture, including Unified Security, in order to effectively support the application maintenance and future development. We will work in conjunction with DPW to provide these walkthroughs. This will include the application security vulnerability testing processes followed to be compliant with DPW standards.
- **Transition Production Support and Operations Responsibilities.** This activity marks the conclusion of transitioning the production support and operational responsibilities. DPW will determine the readiness of the successor resources to confirm that they are ready to take on the production related activities.

Enterprise Application Architecture and SOA

- **Conduct Architectural Walkthroughs.** The successor resources will need to be familiar with the DPW application architecture and the overall strategic vision of the Department. We will conduct in conjunction with DPW detailed walkthroughs of the technical activities, infrastructure, configuration and related areas.
- **Conduct Architectural Standards Review.** The successor resources will need to understand the existing DPW technology standards, developer practices and governance protocols. The successor team resources will need to review the BIS and OA/OIT standards.
- **Conduct Architectural Protocols Review.** The successor resources will need to understand the protocols with regard to leveraging existing or introducing new architectures within DPW. BIS will review the technology governance process and forums such as the Technical Review Team, Architecture Review Board, and proof of concept methodologies with the successor resources.

Network and Desktop Services

- **Conduct Desktop Inventory/Configuration Walkthrough.** Provide a review of the inventory, configuration and deployment methodology of desktop software needed to support development activities.

Integration and Middleware

- **Conduct Middleware Architecture Walkthroughs.** Review the middleware architecture and the overall strategic vision of DPW, including the inventory, architecture and listing of Enterprise Services. We conduct, in conjunction with DPW, detailed walkthroughs of the technical infrastructure, configuration and related areas.



Turnover Application Support (Technology Adoption) Services

Turnover of the application support services is a key activity in the overall turnover process. This activity focuses on the overall execution of the application support related transition activities. Specific aspects of this transition include:

- **Review Governance.** Deloitte, DPW and the successor team will meet to review the current governance structure. The group decides transition strategy and participation in the governance meetings. Transition will evolve from participation to transitioning to prepare and run these meetings.
- **Review Field Support Procedures.** The field support activities for the production systems include facilitation of the monthly Advisory Team Meetings, support of the Help Desk, support of the creation and distribution of system Communiqués, and implementation planning and support activities.
- **Review Field Support Documentation.** The successor resources need to understand the current field support activities and responsibilities.
- **Conduct Walkthrough on Advisory Team/Statewide Meeting Preparation and Facilitation.** The successor resources need to understand and walkthrough the Advisory Team Meeting schedules, agendas, preparation activities and responsibilities as they are important to the day to day operations of the DPW systems.
- **Conduct Level 2 Help Desk Support Walkthrough.** The successor resources need to understand and walkthrough the Help Desk support responsibilities as they are important to the day to day operations. This is applicable only to HCSIS and PACSES.
- **Review Other Field Support Activities.** The successor resources need to understand and walkthrough other field support activities and responsibilities that are important to the day to day operations.
- **Conduct Walkthrough of LMS Use.** LMS is the Learning Management System used by HCSIS and PELICAN for training end users. We will conduct a system demonstration of HCSIS LMS, and how the various components within LMS are used in the context of HCSIS. LMS is a system licensed by Deloitte to DPW.



Activity 3: Turnover Close Out

During this task we monitor the turnover activities and prepare the Turnover Results Report at the conclusion of the turnover period. The Turnover Results Report describes the final outcomes of the turnover effort and provides information such as:

- Status of the completion of each high level task and activity that took place during the turnover period, linking the report items to the turnover success criteria established during the turnover planning process
- Detailed description of how each of the objectives stated in the Turnover Plan have been achieved
- Documentation of the resolution of issues identified and prioritized during the turnover process
- Final report of items identified through the risk identification, assessment, and mitigation component of the Turnover plan

This task concludes with the close out of the tasks and activities relating to turnover. At this point the successor team resources have successfully finalized the transition and takeover of each area of the application maintenance and operations support effort, in line with DPW requirements and the relevant Department and Commonwealth standards.

The following are the activities we perform as part of Activity 3 – Turnover Closeout.

Turnover Closeout Process	Tools and Methods Enabling Turnover Close Out
<p>Report Status of Turnover Activities. Turnover progress is reported on a regular basis to DPW by both our team and the successor vendor through formal, periodic turnover status meetings. New and ongoing issues are reported throughout the course of the turnover period, with final status documented within the Turnover Results Report.</p>	<p>Microsoft Office, Status Reporting, Proficiency Evaluation Tool</p>
<p>Create and Submit the Turnover Results Report. Our team uses an approved template for the Turnover Results Report and drafts the report to summarize the results of the turnover effort based upon the approved DPW success factors within the Turnover Plan. The Turnover Results Report is submitted to the DPW stakeholders for review and approval.</p>	<p>Microsoft Office, Status Reporting</p>
<p>Conduct Final Turnover Closure Meeting. Following approval of the Turnover Results Report and the final completion of turnover activities, we conduct a final meeting with DPW to formally close the turnover effort.</p>	<p>Microsoft Office, Meetings</p>

Figure 6.10-10. Summary of Activity 3 Turnover Close Out.

Summary of processes and tools encompassing this activity.



Reports

II

Page
II-3

RFP Reference: II-3. Work Plan

For each of the Lot's Required Activities and Tasks, ...describe the reports that will be used to track, monitor work, and measure performance.

Lessons Learned Report

As required by the RFP, we provide a Turnover Lessons Learned Report to DPW or its designee nine months before the end of the project or within three months of a request from DPW, in a format mutually agreed to by DPW and Deloitte. The Turnover Lessons Learned Report summarizes the lessons learned from our Orientation/Knowledge Acquisition effort, specifically lessons such as the most effective methods for knowledge transfer, complex or voluminous application knowledge areas, knowledge areas that were particularly important for the maintenance and support process, etc.

Given that the intent is to describe lessons learned from the Orientation and Knowledge Acquisition phase, we propose creating the initial Lessons Learned Report at the conclusion of the transition phase itself, rather than waiting 5-8 years until the start of the turnover phase. The report would remain relevant, as it would reflect the outcome of the transition of the DPW applications and technologies. It would also reflect the knowledge of the team at that moment, rather than having the team attempt to recover the results of the transition effort many years later. The report is updated during the turnover planning effort to reflect the applications and elements of the technical architecture that will inevitably change over the course of the project, and any only those lessons learned that remain relevant would be incorporated into the turnover plan.

The accumulated Lessons Learned are incorporated as appropriate into the Turnover Plan. Reference a more detailed description of the Lessons Learned Report below in *Section 6.10.2.2, Deliverables*.

Proficiency Measurement Report

Proficiency Measurement will allow DPW to have visibility into the areas of turnover that may need a higher degree of attention and training. We will use a proficiency measurement report which outlines each area of responsibility and to whom we will be turning over activities. This measurement report allows us to pinpoint areas needing more attention and will give DPW an understanding of the areas of risk in the turnover execution. Turnover is a collaborative process by which specific project knowledge is transitioned from our team's project leadership and team members, with the primary goal of transitioning knowledge required to sustain the project. During turnover we link the resources to their corresponding knowledge areas and apply three ratings; Aware, Proficient, and Expert. DPW will need to determine if the risk of turnover is high based upon the required and attained proficiency levels reflected in the report. For example, if a specific activity is rated in Yellow or Red, DPW must help determine the mitigation steps to be taken to reduce turnover risk.



Team Name: DPW
DPW Team Lead:
Deloitte Team Lead:

Turnover Focus Area/Elements	Evidence of Successful Turnover Activities	Turnover Action Plan	PMO Evaluation Timing			Transfer From (Team Member)	Team Member										Date Met	Comments
			Date 1	Date 2	Date 3		TF	TT	TT	TT	TT	TT	TT	TT	TT	TT		
Business Process Training																		
R-010 Develop Periodic and Long Range Plans																		
R-040 Develop Periodic and Long Range Plans																		
R-050 Develop Periodic and Long Range Plans																		
Application Setup and Maintenance																		
R-010 Develop Periodic and Long Range Plans																		
R-010 System Setup																		
R-010 System Maintenance																		
R-040 Develop Periodic and Long Range Plans																		
R-040 System Setup																		
R-040 System Maintenance																		
R-050 Develop Periodic and Long Range Plans																		
R-050 System Setup																		
R-050 System Maintenance																		
Project Management / Project Related																		
SDM Methodology Training																		
Understand Business Process Design/Analysis																		
Maintain Process Maps																		
Project Schedule Management																		
Utilizing Project Management Center (PMC)																		
Issue and Risk Management Procedures																		
High Level Estimates																		

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Figure 6.10-11. Proficiency Measurement Report.

Proficiency measurement may provide DPW with a view into what tasks are being transitioned and which ones might need more attention.

Turnover Results Report

We will provide the Turnover Results Report to DPW for review and approval upon completion of the turnover activities. The Turnover Results Report will document the completion and outcome of each step of the previously approved Turnover Plan. Reference a more detailed description of the Turnover Results Report below in *Section 6.10.2.2, Deliverables*.



Management Controls, Communication, and Evaluation

II

Page
II-3

RFP Reference: II-3. Work Plan

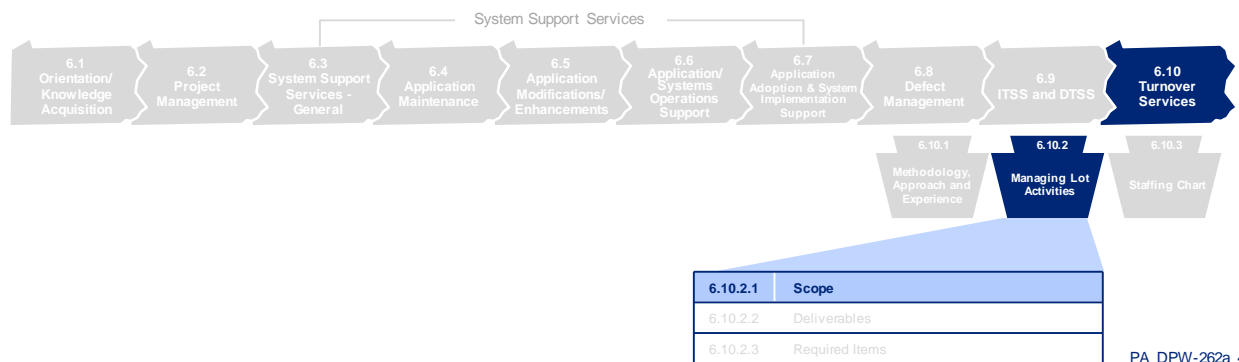
Describe the management controls that will be used to identify and manage risk, maintain project schedules, ensure the quality of the work, and meet all of the performance expectations. Based on its experience, the Offeror should include a discussion of its formal and informal communication processes within a project of this nature. The Offeror should also address its approach to internally monitoring and evaluating its effectiveness in meeting the RFP requirements for the Lot throughout the course of the contract.

Management controls, formal and informal communications processes, and monitoring and evaluating of effectiveness are managerial functions that we use to identify and monitor potential errors from which we perform the necessary corrective actions. These functions on a project of this nature include planning, organization, staffing and directing of work to minimize deviation from standards and to achieve the stated goals of the organization. We establish controls by setting standards and based on these internal controls, measure and evaluate actual performance to these against these goals. Communication processes, internal and external to the project organization, are the means for facilitating these control mechanisms and the resulting corrective actions.

Turnover Process	Deloitte Approach
Plan	<ul style="list-style-type: none"> • Create draft Turnover Plan • Identify resource needs • Create draft Lessons Learned Report • Define Critical Success Factors for turnover completion • Incorporate Lessons Learned into the Turnover Plan • Finalize Turnover Plan
Organize	<ul style="list-style-type: none"> • Conduct Turnover Kickoff Meeting • Review Turnover Plan with DPW stakeholders • Incorporate DPW feedback into the Turnover Plan and Obtain DPW Sign-off
Staff	<ul style="list-style-type: none"> • Assign specific resources to turnover activities • Maintain current staffing levels
Direct	<ul style="list-style-type: none"> • Conduct weekly team meetings • Review status of turnover tasks and activities • Take corrective action as required • Coordinate activities with the successor team resources, DPW and the Commonwealth as appropriate
Communicate	<ul style="list-style-type: none"> • Attend turnover status meetings • Facilitate user/stakeholder communication
Evaluate & Monitor	<ul style="list-style-type: none"> • Create draft Turnover Results Report • Evaluate and adjust Turnover Plan during execution • Assess completion and success of the Turnover Plan execution

Figure 6.10-12. Turnover process and approach.

6.10.2.1 Turnover Scope



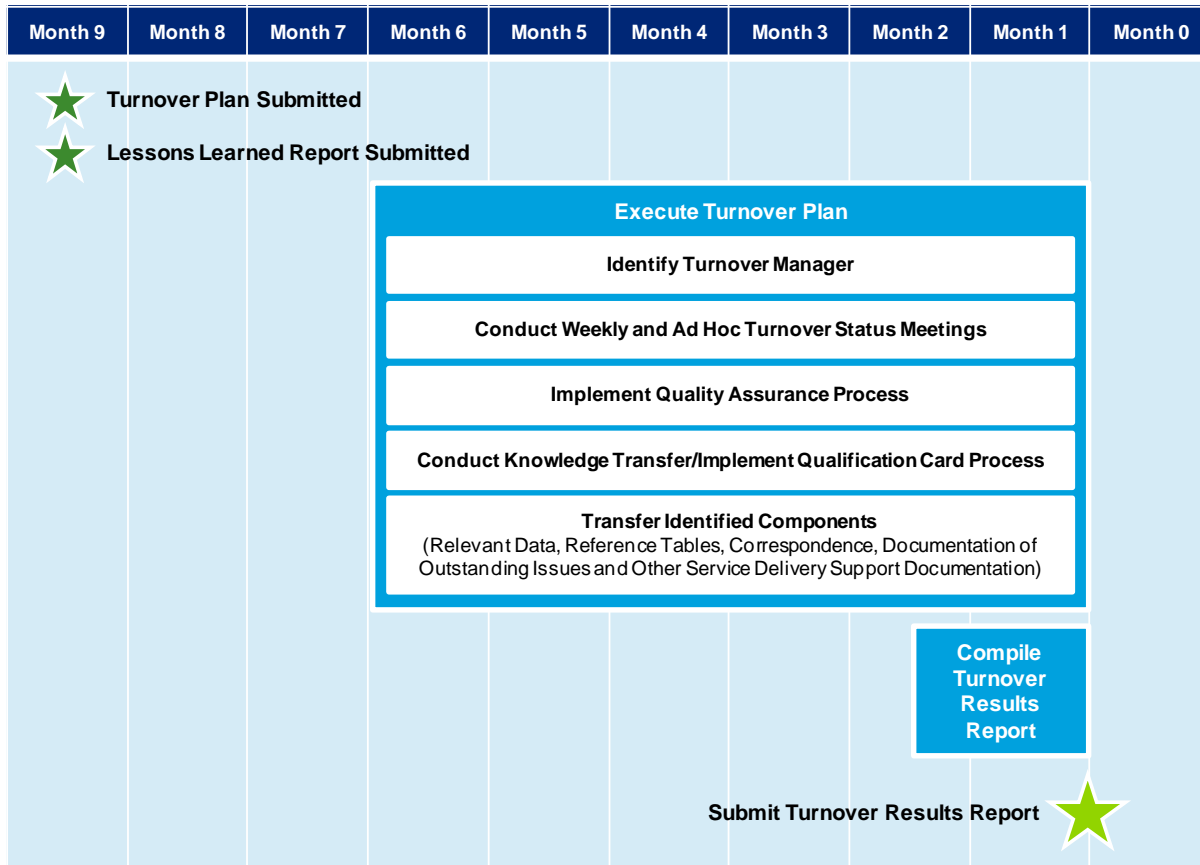
IV	Page IV-396	RFP Reference: 1. Turnover Scope
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During turnover, the selected Offerors for Lot #6 and Lot #7 must confirm that program stakeholders do not experience any adverse impact from the transfer of services. Nine months prior to the end of the contract term, the selected Offeror must develop and submit a comprehensive Turnover Plan that details the proposed schedule, activities, and resource requirements associated with the turnover tasks identified. Six month prior to the end of the contract term, the selected Offeror must implement a DPW approved Turnover Plan.

We understand that an effective turnover is necessary to allow DPW and/or successor team resources to continue the tasks associated with operating and maintaining the mission-critical DPW applications and systems. We will work to effectively transfer responsibility for these DPW systems to a successor team, and delivering turnover services with no less rigor or enthusiasm than any other project task.

Based on the depth of our experiences with DPW, we understand and will identify the areas that are critical to maintaining uninterrupted business operations and application support integrity for the DPW systems. The ongoing success of the DPW systems is largely influenced by the business and system knowledge of the staff that use and support them. As a result, our goal is to assist DPW to focus efforts on the most critical aspects of ongoing operations in order to reduce the risks associated with the turnover. This plan must then be integrated with the transition plan for the incoming support team (Commonwealth or successor vendor) to further confirm that required technical skills, business knowledge and project procedures and activities are covered during the turnover process.

At a high level, the activities, deliverables, and timeframes associated with the turnover process are outlined in Figure 6.10-13. As previously described, we submit a formal Turnover Plan – incorporating input from our Lessons Learned Report – for review and approval by DPW nine months prior to the end of the contract. We begin implementation of the Turnover Plan six months prior to the end of the contract.



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Figure 6.10-13. Turnover Milestones.

The Turnover Milestones chart depicts the timeline of the Turnover phase and when the required deliverables will be submitted.

Given the size, scope, scale, and complexity of the applications and systems being supported through the DPW IT Services project, we feel that Turnover activities should actually occur informally throughout the duration of the project. Our collaborative approach to project delivery means that we expect to work with DPW staff on a continual basis in order to help the Department achieve its goals. This approach helps to ease the final turnover process. At contract end, formal Turnover activities are undertaken to finalize the Turnover process and transition of the project components, documentation, procedures, operations and training manuals, and any other information or assets required to support ongoing DPW operations by the successor team.



Turnover Activities

IV

Page
IV-396

RFP Reference: 1. Turnover Scope

Turnover activities include, but are not limited to:

- Transfer of information including documentation relating to software and interfaces; functional business process flows; and operational information concerning subcontractors;
- The implementation of a quality assurance process to monitor turnover activities;
- The plan for training the State and/or its designated agent's staff in the delivery of services;
- Post-Turnover services including a Turnover Results Report and access to the Offeror's staff with technical and operational expertise.
- Appoint, with State approval, a manager to manage and coordinate all turnover activities outlined in the Turnover Plan approved by the State.

The selected Offeror for Lot #6 and Lot #7 must:

- Execute the approved Turnover Plan in cooperation with the incoming vendor's Transition Plan.
- Maintain service delivery staffing levels (no reduction in staffing) during the turnover period; all changes require prior approval by the DPW Contract Administrator;
- Not restrict or prevent the Offeror's staff from accepting employment or contract positions with DPW or with any successor vendor. DPW will work with the incumbent and successor vendors on the timing of any transition of incumbent staff.
- Notify the DPW Contract Administrator of reassignment or termination of employment or contract with any of its staff during Turnover prior to reassignment or termination of the staff.
- Provide to DPW or its agent, within 15 business days of the request, all updated scripts and other documentation and records required by the DPW or its agents.
- Turn over the operation and management of all service delivery functions to DPW or its designee. This turnover must be planned and managed in an orderly fashion so that no disruption of service to users or clients takes place.
- Work closely with DPW to confirm that this turnover of responsibilities and the necessary knowledge transfer are completed by the end of the contract period.
- Submit turnover deliverables as outlined in Figures 10, 11, and 12 below.
- Respond to all DPW requests regarding turnover information, in the time frame defined by the Commonwealth at the time of the request.

The RFP specified a number of required activities to be completed during the turnover period. While we have previously described our methodology and approach to the turnover process in previous sections, the following table summarizes our direct response and intent in delivering these required activities.

Turnover Activity	Deloitte Meets DPW Turnover Requirement
Transfer of Information	<p>As part of the transfer of information, the Turnover Plan includes documentation reviews involving the incoming Commonwealth or successor team members reviewing available project and system documentation on turnover topics.</p> <p>The documentation and demonstrations cover:</p> <ul style="list-style-type: none"> • Systems operations including documentation, tools, and processes required to operate the system • Project management including turnover management functions, process, procedures, and documentation • Application maintenance including the required documentation, procedures, and related tools to support ongoing maintenance • Operational responsibilities of our team members



Turnover Activity	Deloitte Meets DPW Turnover Requirement
<p>Quality Assurance Process</p>	<p>We will work with DPW to measure and report progress in meeting established standards. As part of turnover, we assess the turnover service requirements and determine key areas to be measured such as:</p> <ul style="list-style-type: none"> • Preparation and submission of the Turnover Plan • Timeliness of the submission process • Timeliness of review, incorporation of DPW feedback, resubmission • Completeness of plan (e.g., total number of content omissions) • Completeness of Walkthroughs: (e.g., total held, total number of successor team participants) • Completeness of System or Tool Demonstrations (e.g., total demonstrations held, number of participants) • Completeness of Classroom Training (e.g., total participants, survey of participants) <p>During the turnover period we update the Turnover Results Report and score card as turnover activities progress. We also provide status updates, allowing DPW to assess the performance of Turnover activities against the standards approved in the plan. Additionally, throughout the process and before close out, we assess the readiness and required skill level of the successor team staff to perform the tasks to which they are transitioning.</p>
<p>Training Plan</p>	<p>We have a history of using a collaborative approach and working side by side with the Commonwealth throughout the duration of a project. Knowledge transfer therefore begins day one, as DPW or designated representatives are included in daily operations as necessary to gain the level of experience and knowledge to perform tasks. Throughout the duration of the project, we also involve DPW in regular trainings hosted or attended by our team, including:</p> <ul style="list-style-type: none"> • Monthly training to DPW staff on different technology components • Project management training • Training classes offered to our team (if open seats are available) is offered and available to DPW staff for knowledge transfer and increasing skill proficiency
<p>Post Turnover Services</p>	<p>As part of Turnover Closeout, we provide a final Turnover Results Report which documents the completion of the turnover activities. The results report includes a turnover performance scorecard to provide a consolidated up to date view of the final progress.</p>
<p>Turnover Manager</p>	<p>Prior to the start of turnover planning we designate a Turnover Manager with sole responsibility for the overall turnover process. The Turnover Manager provides overall management of project turnover activities, monitors and reports turnover progress, manages contract compliance, and tracks the overall execution of the approved Turnover Plan.</p>
<p>Execute Turnover Plan</p>	<p>Starting six months prior the end of the contract, we begin executing the detailed activities within the approved Turnover Plan to transition project and system support responsibilities to Commonwealth and/or successor vendor resources. As part of the turnover process, we work with the successor vendor to coordinate the Turnover Plan with the approved transition plan activities for the vendor.</p>

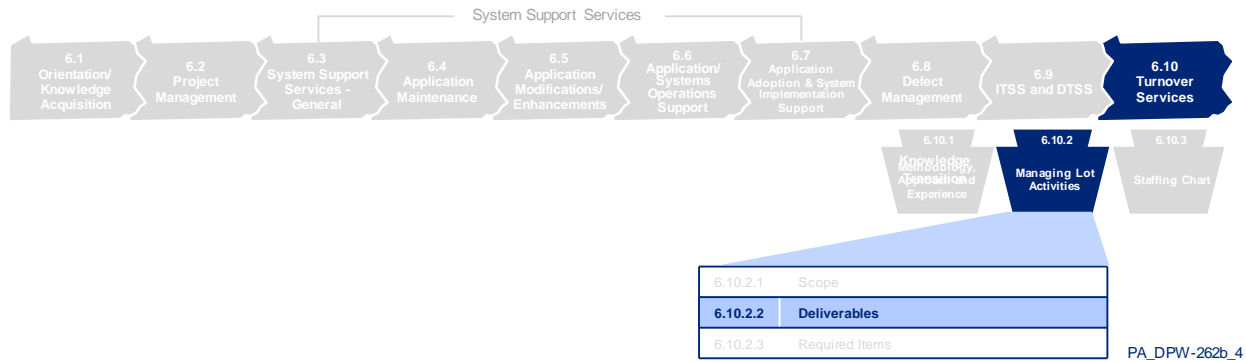


Turnover Activity	Deloitte Meets DPW Turnover Requirement
Staffing Levels During Turnover	In order to complete a smooth turnover, consistent with the annual planning our project staffing levels will not be reduced and will remain consistent throughout the turnover period. Although we have experience with different staging plans for turnover periods (e.g. gradual reduction in staff and maintenance of existing staffing levels), we agree with the Commonwealth that keeping the existing staffing level consistent throughout the period represents the leading approach to providing a full turnover of operations and activities. If any reductions in resources are needed they will be at the discretion of DPW when you believe the resources are proficient with maintaining and operating the systems.
Employment/Contract Positions	Consistent with industry practice, Deloitte routinely has its employees enter into certain employment agreements with the firm. The particulars of the agreements and terms will vary depending on the employees position and level. For the employees performing the subject services, it is likely that these employees will be subject to certain restrictive covenants regarding employment with clients and/or certain competitors. Clearly, Deloitte's employees are a valuable asset to the firm and are integral to its success. In addition, Deloitte invests in its employees and has legitimate interests, as permitted by applicable state law, to impose reasonable restrictions. Deloitte respects DPW's desire for continuity of staff, but Deloitte feels a balance is in order to avoid situations where other vendors may get an unfair and inappropriate advantage based on the skills and qualifications that the firm has cultivated in its employees. With complex contract issues like this one Deloitte is willing to discuss your needs to determine if we can arrive at a mutually agreeable solution.
Notification of Reassignment or Termination	In accordance with the Commonwealth's requirement, we notify the DPW Contract Administrator of reassignment or termination of employment or contract with any of our team members during the turnover period prior to reassignment or termination of the team member.
Updated Scripts and Other Documentation	As part of the Turnover Plan, we review and turn over system, process, and supporting documentation and source code.
Turnover of Operation and Management	We work continuously with DPW and other Lot vendor staff throughout the project time frame to provide knowledge and experience with our service delivery functions. This helps reduce some of the required turnover activities with DPW and/or the successor vendor during the execution of the Turnover Plan.
Collaboration with DPW	We advocate a collaborative approach with Commonwealth staff throughout the project time frame. This is particularly important (and beneficial) during turnover planning and execution. We create a formal Turnover Plan for review and approval by DPW. Deloitte is recognized by leading 3 rd party vendors for our collaborative style.
Submission of Turnover Deliverables	As part of the turnover process we submit our Turnover Plan for review and approval at least nine months before the end of the contract. A corresponding Lessons Learned Report from the Orientation/Knowledge Acquisition phase is also submitted nine months before the end of the project or within three months of the Commonwealth's request.
Response to DPW Requests Regarding Turnover	Deloitte will work closely with DPW throughout the turnover and respond to requests regarding turnover information within the requested time frame.

Figure 6.10-14. Proposed Response to Specific DPW RFP Requirements.



6.10.2.2 Deliverables



Turnover Plan

IV	Page IV-397	RFP Reference: a. Turnover Plan Deliverable
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See RFP Figure 10: Turnover Plan Deliverable

The Turnover Plan covers the turnover of the Lot 7 activities – maintenance and application support for the DPW systems – to the Commonwealth and/or a successor vendor. It is the first deliverable developed during the turnover period. As required we develop and submit a Turnover Plan no later than nine months prior to the end of the contract term or within three months of request by DPW. Before the formal submission, we will work with DPW to review the Turnover Plan and address comments and feedback.

Our proposed Turnover Plan is similar in content and structure to the Turnover Plans for the current contracts. Below is a sample Table of contents from a previous Turnover Plan.



Business Area	Application/Service	Critical Turnover Technology Knowledge Areas
Eligibility	<ul style="list-style-type: none"> • Client Information System (CIS) • Web-based Client Information System (eCIS) • Third Party Liability (TPL) • Income Eligibility Verification System (IEVS) • State Supplemental Issuance (SSI) • COMPASS 	<ul style="list-style-type: none"> • Unisys 2200 • COBOL 74/85 • Unisys DMS-2200/RDMS-2200 • Oracle 10g/11g, PL/SQL, Golden 3.2 (Toad) • .NET Framework and Application Architecture, Active Server Pages, COM + • Windows Communication Foundation (WCF) • IQ-U PLUS-1 • DocuShare • Corticon Rules Engine • Team Foundation Server • Unisys Open TI • Adobe Forms, Adobe Suite • DPS Web TS • webMethods • SQL Server 2005 and 2008 ,SQL Server Reporting Services • BizTalk • Cognos 8.3, Informatica Power Center 8.6.1
Provider Management	<ul style="list-style-type: none"> • PELICAN Application suite • PELICAN Data Warehouse 	<ul style="list-style-type: none"> • .NET Application Architecture, session management, error management • Oracle Fine Grained Authorization • webMethods (SOAP 1.2, WSDL 2.0, SSL 128-bit encrypted, SOA Security Manager protected, MSMQ Plug-in) • Enterprise Library 4.1 and Testing Tools • Team Foundation Server (TFS: project repository, build-server, work products) • Internet Information Server (IIS), Component Services (COM+) • SQL Server Reporting Services • Microsoft Visual J# .NET Redistributable Package 1.1 • Corticon Rules Engine • Oracle 10g/11g, PL/SQL, Golden 3.2 (Toad) • Mainframe Integration category (JCA, OpenTI) • Adobe Doc Server • Unified Security/Netegrity/Siteminder • OpCon Scheduler • Innovative Geo-Online – Client • FileNet • Cognos 8.3, Informatica Power Center 8.6.1



Business Area	Application/Service	Critical Turnover Technology Knowledge Areas
Case Management	<ul style="list-style-type: none"> • HCSIS Application suite • Managing for Quality (M4Q) • Incident Management • HCSIS Data Warehouse 	<ul style="list-style-type: none"> • Oracle 10g/11g, Oracle Fine Grained Access, PL/SQL, Golden 3.2 (Toad) • .NET Framework and Application Architecture • Windows Communication Foundation (WCF) • FileNet • ReportNet • OpCon Scheduler • Cognos 8.3, Informatica Power Center 8.6.1 • Docushare CPX 6.0 • SQL Server Reporting Service (SSRS) • Adobe Doc Server, Adobe Live Cycle • Unisys ES 3700 • Windows 2003 Data Center • Team Foundation Server (TFS: project repository, build-server, work products) • Biztalk
Child Welfare	<ul style="list-style-type: none"> • Child Welfare Legacy Applications 	<ul style="list-style-type: none"> • .NET Framework and Application Architecture, session management, error management • Windows Communication Foundation (WCF) • CA-SiteMinder Application Security and SSO access controls • webMethods (SOAP 1.2, WSDL 2.0, SSL 128-bit encrypted, SOA Security Manager protected, MSMQ Plug-in) • Enterprise Library 4.1 and New Testing Tools: • Internet Information Server (IIS), Component Services (COM+) • Microsoft Visual J# .NET Redistributable Package 1.1 • Corticon Rules Engine • Oracle 10g/11g, PL/SQL, Golden 3.2 (Toad) • Mainframe Integration category (JCA, OpenTI) • Adobe Doc Server, Adobe Live Cycle • SQL Server Reporting Services • OpCon Scheduler • FileNet • Informatica Power Center 8.6.1 • Team Foundation Server (TFS: project repository, build-server, work products) • Oracle APEX



Business Area	Application/Service	Critical Turnover Technology Knowledge Areas
Child Support	<ul style="list-style-type: none"> • Pennsylvania Child Support Enforcement System (PACSES) • Child Support Web Site (CSWS) • Performance Improvement Module • Paternity Tracking System • Director's Dashboard • PACSES Home Page (PHP) • PACSES Data Warehouse • Data Management Applications (DIT, DPSR) • Central Data Operations Applications (Administrator Module) • Query Interstate for Kids (QUICK) • Web PACSES 	<ul style="list-style-type: none"> • Unisys 2200 • COBOL 74/85 • Unisys DMS-2200/RDMS-2200 • Oracle 10g/11g, PL/SQL, Golden 3.2 (Toad) • IQ-U PLUS-1 • Mainframe Integration category (JCA, OpenTI) • DocuShare • Corticon Rules Engine • .NET Framework and Application Architecture • Windows Communication Foundation (WCF) • Team Foundation Server (TFS: project repository, build-server, work products) • Adobe Doc Server, Adobe Live Cycle • webMethods • SQL Server Reporting Services, SQL Server 2005 and 2008 • ASMX Services • Biz Talk • Cognos 8.3, Informatica Power Center 8.6.1



Business Area	Application/Service	Critical Turnover Technology Knowledge Areas
Enterprise Services	<ul style="list-style-type: none"> • Master Client Index (MCI) • Master Provider Index (MPI) • Early Learning Client Data Services • Imaging Repository (iREP) • Enterprise Correspondence Service (ECS) • Enterprise Incident Management (EIM) • Enterprise Provider Search • Enterprise Notification Service • Enterprise Rate Service • Provider Certification Services • Submit Application Service • COMPASS Application Submission Services • File Storage Web Services (FSWS) • SOA Security Manager Services • Address Validation and Geocoding • SQL Server Reporting Services • Adobe Document Creation Services • Correspondence Direct Print Service • DocuShare Document Storage Services • Corticon Decision Services • Fine Grained Access Control • MCI Management Interface • Scheduling • Self Registration • User Repository (UREP) 	<ul style="list-style-type: none"> • Other tools for testing and development support: <ul style="list-style-type: none"> - Visual Studio Suite - Unisys Clearpath - DPS Web TS - HP Functional Tester (QuickTestPro 9.5) - Innovative Geo-Online – Client - RouteMap – Client - Erwin Data Modeler - Enterprise Architect - Microsoft Office Suite and Project - Knowledge of accessible Web site design according to the Commonwealth standard - CA-SiteMinder Application Security and SSO access controls - Software Vulnerability Tools (Web, Dev, and QA Inspect)

Figure 6.10-16. Technology Knowledge Areas for Turnover.

Representation of the technologies that would be included in the turnover effort based upon the current DPW technology domain; these technologies will likely change over the duration of the project.

The Turnover Plan is a document detailing, at a minimum, the proposed schedule, activities and systems, and resource requirements associated with the turnover tasks. The plan provides specific detail on the tasks, procedures, risks/issues, resources, timeframes, and other elements of the turnover. The plan incorporates lessons learned



from prior turnover efforts, as well as the lessons learned from the Orientation and Knowledge Acquisition effort conducted at the beginning of the project. It enables a streamlined turnover strategy for DPW while preserving key current processes and documentation. The plan outlines critical tasks that need to occur to facilitate a smooth and orderly transition of functions. It also contains timeframes for completion, and how the transition activities will be managed. Specifically, the plan includes the following content.

Deliverable Section	Deloitte’s Approach to the Turnover Plan
Introduction and Assumptions	This section outlines the purpose and objectives of the document. In addition, any project assumptions related to the turnover effort are described in this section.
Approach to Turnover	The approach section provides an overview of the three phases of the turnover period and the methods and tools that will be utilized by the project team.
Turnover Risk and Issue Management Process	Confirms the established process for capturing, documenting, reviewing, and reporting upon risks and issues associated with the Turnover process. In addition, this process will also describe the general approach to addressing risks and issues as they are identified.
Turnover Objectives and Success Criteria	This section documents the specific objectives identified by DPW, along with detailed metrics for assessing that the turnover process was finished successfully for each component identified in the Turnover Plan.
Turnover Components	This section provides a detailed list of the tools, methods, procedures, source code, documentation, operations that are part of the scope of Turnover Services.
Turnover Services	This section describes the specific methodologies and services that will be used to execute the Turnover process.
Turnover Resources	This section of the Turnover Plan lists the required resources for successful execution of the turnover process across DPW, our team, and the successor vendor team, as well as any other stakeholders that are required to participate in the Turnover process. Included within this section is a description of the required skillsets and qualifications for each of the positions included within the scope of the turnover.
Detailed Turnover Tasks	This section of the plan addresses the specialized functional and technical transition tasks. It describes and defines the critical tasks that need to occur in order to facilitate a smooth and orderly transition of functions. In addition, it outlines the resources that are required as part of the turnover services and identify the “transition to” resources required for the turnover, including those from DPW, our team and the successor vendor, if applicable.
Timelines and Work Plan	The timelines and work plan section of the document defines the turnover activity timeframes and provides a high-level Gantt chart to represent the turnover services. In addition, a detailed work plan of the turnover services will be included.

Figure 6.10-17. Proposed Sections of the Turnover Plan.

A summary of key sections of the Turnover Plan.

We will provide the Turnover Plan as specified in Figure 6.10-15, Turnover Plan Table of Contents. The plan addresses each of the turnover requirements as documented in Figure 10 on RFP page IV-397 and repeated below for clarity:

- Identify and turn over copies of relevant data, documentation, or other pertinent information necessary to take over and successfully assume operational business activities for the DPW IT Services project
- Provide a detailed description and diagram showing the configuration of the hardware and telecommunications network
- Provide a detailed inventory of DPW software programs and modules, scripts, parameters, files and databases, data element dictionary, user code or exits used in proprietary software packages, login IDs/passwords and other necessary credentials, etc., that comprise the DPW systems
- Provide documentation of external interfaces identifying the external entity, description of interface, frequency, volume (size of files), and media or type of interface (e.g., FTP server, email, CD/DVD, clearing house, tape file, etc.)
- Provide an inventory of documentation including systems, operations, user, provider, design, system change orders, defects, special projects, training materials, operational and desk-level procedures, and program policies, etc., used to carry out our responsibilities under this contract
- Review and turnover of correspondence, documentation of outstanding issues, and other service delivery support documentation
- Provide a description of our approach and schedule for transfer of operational support information
- Provide a description of information and systems required to continue service delivery
- Outline the methodology for supporting the new successor vendor to:
 - Engage stakeholders
 - Describe the application support service
 - Focus the transition plan design
 - Support the well-rounded approach and credible efforts of the transitions
 - Justify the processing and conclusions of the transition
- Provide a capability turnover plan
- Provide a list of knowledge transfer topics
- Provide the knowledge transfer schedule
- Provide a Staff Load and Qualification document
- Provide a turnover inventory of Documents plan
- Provide an asset inventory



- Provide detailed Business Systems Platform Blueprints (Hardware and Software technologies, configurations, systems specifications, and associated technical procedures)

Also as required in the RFP, we provide the Commonwealth or its agent, within 15 business days of the request, the scripts and other available and related documents and records necessary to assume operational activities. In the Turnover Plan, our team provides a detailed schedule for the turnover of computer programs, data and reference tables, scripts, and other documentation and records. The Turnover Manager, working with DPW, is responsible for establishing a mutually acceptable schedule for the turnover tasks.

Lessons Learned Report

IV

Page
IV-398

RFP Reference: b. Turnover Lessons Learned Deliverable

See RFP Figure 11: Turnover Lessons Learned Report Deliverable

We submit a Lessons Learned Report, documenting the lessons and experiences from prior DPW turnover efforts as well as our experience from the Orientation and Knowledge Acquisition effort for this project. The Lessons Learned Report is submitted in conjunction with the Turnover Plan, no later than nine months prior to the end of the contract term or within three months of request by DPW. However, we propose creating the initial Lessons Learned Report at the conclusion of the transition phase itself, rather than waiting 5-8 years until the start of the turnover phase. As a result the report will reflect the knowledge of the team at the conclusion of the transition effort, rather than having the team attempt to recover the results of that effort many years later. The report is updated during the turnover planning effort to reflect the applications and elements of the technical architecture that will inevitably change over the course of the project.

The Lessons Learned Report provides input to the Turnover Plan, specifically with regards to the effectiveness of prior knowledge transfer efforts and key considerations for the turnover of specific activities, procedures, technologies, etc., associated with the DPW IT Services project. Proposed actions to address the lessons learned that impact the turnover effort are directly reflected within the corresponding section of the Turnover Plan. Figure 6.10-18 provides a sample of a project template spreadsheet used to collect lessons learned and corresponding category data and action plan.



#	WO Number	Initiative/WO Name	Phase	Type	Lesson Description	Action Plan
51	WO-161-PM1	Gathering and documenting requirements	Requirements	Improve	Requirements set without all impacted groups being notified.	Conduct requirements meeting with DCSES client as well as other project staff.
52	WO-161-PM1	Gathering and documenting requirements	Requirements	Improve	An adequate amount of details were not gathered during the requirement phase. For example an unambiguous definition of fields led to confusion in later design and development phases.	Conduct requirements meeting with DCSES client as well as other project staff.
53	WO-161-PM1	Completing of GSD	GSD	Improve	Vague interpretations of field details and what is actually wanted. Subject to interpretation.	Further define in the GSD phase the detail and level of what is actually expected and of what fields will be extracting and populating by completing a Data Mapping document for each field.
54	WO-161-PM1	Completing DSD	DSD	Improve	A template does not exist that allows for the definition of stored procedures and reference tables.	Create documents for Stored procedures and reference tables that include an explanation plan will be included noting a step by step process.
55	WO-161-PM1	Technical limitations identified during development	Development	Improve	All impacted groups (DACSES, Technical Services, and SME) are not included in the development cycle of the work order and understanding of the processes involved.	Include the DACSES staff, technical services team, & SME team in the development phase of the work order. Clarify and define with the technical services team what their expected process is.
56	WO-161-PM1	Technical limitations identified during development	Development	Improve	Improvement needed in the communication of document changes.	Keep a digest of questions/issues and their associated outcomes. When completed in this fashion, the changes and outcomes can be communicated to all involved parties in an orderly and mass communication so that impacted teams will not be excluded. Documents should only be updated by a change control.

PA-DPW-915

Figure 6.10-18. Collection of Lessons Learned.

We will collect lessons learned throughout the Orientation and Knowledge Acquisition phase using a standard lessons learned template. Entries will be compiled into a Lessons Learned Report that will provide input to the creation of the Turnover Plan.

We agree with the Commonwealth and understand the importance of lessons learned and how they must be applied to the turnover process. We will leverage the lessons learned from Orientation/Knowledge Acquisition activities throughout the entire project for continuous process improvement and knowledge transfer, but they will be particularly important to consider for turnover.

As a leading practice we complete a lessons-learned analysis after each phase the work orders for our current contracts, and we have submitted lessons learned reports to the Commonwealth for each of our work order completions. These lessons learned have been utilized by DPW and our team to improve processes and provide a higher degree of success during project execution.

Turnover Results Report

IV	Page IV-399	RFP Reference: c. Turnover Results Report
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See RFP Figure 12: Turnover Results Report

Final turnover activities include preparation of a Turnover Results Report that documents the completion and outcomes of the turnover activities executed under the approved Turnover Plan. Our team prepares and submits the report to the Commonwealth within 30 calendar days of the completion of turnover activities. Prior to submission of a final report, a preliminary report is prepared for DPW review and comment. The preliminary report is subsequently updated and submitted as the final report.



The Turnover Results Report documents completion of our turnover activities other than post-turnover support. In the process of creating the report, we can also assist the Commonwealth in completing a readiness assessment of the successor team. Throughout the turnover period we provide status updates via a turnover status report; a consolidated up-to-date view of the final turnover status is included in the final Turnover Results Report.

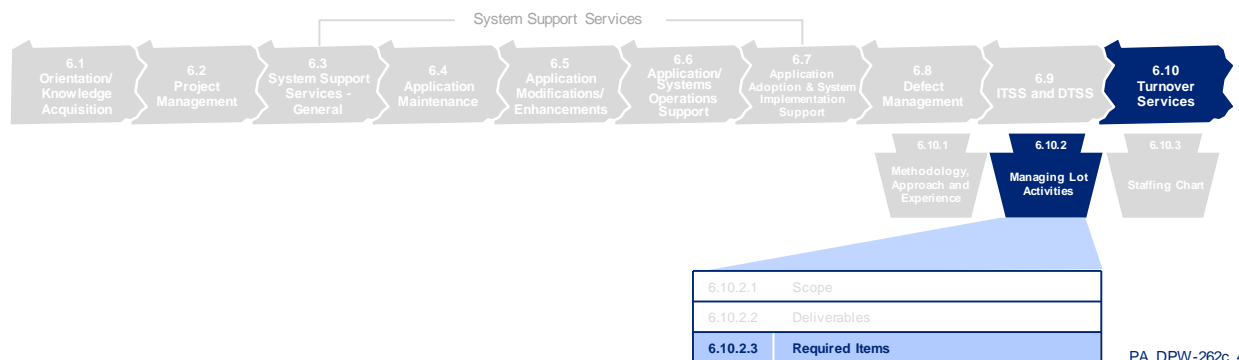
Specifically, the Turnover Results Report includes the following content.

Deliverable Section	Deloitte’s Approach to the Turnover Results Report
Introduction	Outlines the purpose and objectives of the Turnover Results Report and provides background information related to turnover services.
Turnover Tasks and Activities	Describes the overall completion of turnover activities and a detailed completion status for each high-level task and activity that took place during the turnover period. In addition to the status of each task, the section also includes results of the turnover assessments that were conducted as part of the formal turnover services.
Turnover Objectives	A summary of the turnover objectives from the Turnover Plan and the corresponding results. This section documents the level to which the Turnover Objectives were met based on the predefined success criteria identified in the Turnover Success Criteria section of the Turnover Plan. This section includes a descriptive summary of the success criteria, as well as a performance scorecard that graphically depicts the turnover results.
Turnover Risk and Issues	A detailed listing of the risks and issues associated with the turnover effort along with a detailed description of the status on the resolution of risks and issues. Risks and issues are managed using the project-level risk and issue management processes summarized within the Turnover Plan.
Outstanding Fixes and Changes	A description of the current status of in-scope DPW applications and systems as well as information about outstanding fixes and changes as of the end of the turnover period.

Figure 6.10-19. Proposed Sections of the Turnover Plan.

A summary of key sections of the Turnover Results Report.

6.10.2.3 Required Items



Turnover Skill Sets and Required Experience

IV	Page IV-399	RFP Reference: Turnover Required Items
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The Selected **Lot #6** Offeror and Selected **Lot #7** Offeror must describe in detail: 1) The resources including skill set and experience required, and resource allocation strategies (roll-on or roll-off) of the to support a successful turnover,

Per the RFP, we will maintain service delivery staffing levels with no reduction in staffing during the turnover period. Any changes will be submitted for prior approval by the DPW Contract Administrator.

Resource Skill Set and Experience Required

The Turnover Plan must also define the specific resource requirements for turnover, representing the different positions and skillsets for which the incoming support team will have to assume responsibility. As with the technical requirements, it is difficult to project the changes to the resource requirements that may occur in the next 5-8 years as the in scope systems evolve. The overall evolution of the application may change significantly over the next 5-8 years. Our turnover skills and resources will change as a result of the technology changes that will occur over the next contract period. Deloitte will work with DPW to use the below table as a starting point and we will work with you to identify changes that are needs as a result of technology changes and the skills required to support that technology turnover. The following table illustrates the resource requirements for the turnover effort based on the current DPW technology and system domain; these resource requirements will continue to evolve over the course of the project.

Position	Resource Responsibilities	Required Skill Set and Experience
Contract Administrator	<ul style="list-style-type: none"> • Single point of contact for DPW across the many facets of the contract • Supports overall DPW objectives in delivery within the contract 	<ul style="list-style-type: none"> • 8-10 years in active engagement and project management of large-scale IT, development and maintenance projects



Position	Resource Responsibilities	Required Skill Set and Experience
	<ul style="list-style-type: none"> • Organizes, facilitates and executes contract administrator meetings focusing on overall agenda, highlights, risks and issues that impact the various components of the contract • Coordinates internally across project teams • Manages compliance at the overall contract level for matters relating to issues, risks, SLAs, and warranty • Brings leading industry practices in Health and Human Services in the context of people, process and technology impacts to the various application systems within the contract 	<ul style="list-style-type: none"> • 8-10 years of HHS experience • 8-10 years of experience in managing a project in an enterprise environment integrating with common business and technology processes • 3-5 years of experience in managing large-scale contracts involving 300+ staff in delivering complex IT integration and HHS solutions • Experience in managing complex cross system issues in an HHS environment • Experience in delivering a services-based model in an HHS environment
PMO Manager	<ul style="list-style-type: none"> • Single point of contact for DPW PMO for financial and contract deliverable questions • Perform final QA on contract and artifact submissions • Direct and oversee the daily activities of the PMO team • Monitor timely submission of contractual items – correspondence, deliverables, work products, invoices, status reports, etc. • Capture and report on contract performance measures • Report Management <ul style="list-style-type: none"> - Gather, validate, consolidate, and research issues, risks, and highlights being escalated from the system teams to the CIO - Prepare and submit contract dashboard - Prepare agenda and meeting minutes for CIO contract meetings - Perform final QA on monthly and quarterly reports • Risk Management <ul style="list-style-type: none"> - Coordinate cross system meetings to identify and track risks and issues - Escalate risks and issues to Contract Administrator 	<ul style="list-style-type: none"> • 10+ years experience with DPW • 5+ years in management workload and prioritization of activities • 2+ years in managing a program management office • 10+ years of HHS experience • 7+ years of experience with automated project management and change management tools such as PMC, ATS, or similar tools



Position	Resource Responsibilities	Required Skill Set and Experience
Project Management Staff	<ul style="list-style-type: none"> • Report Management <ul style="list-style-type: none"> - Perform QA on periodic reports - Prepare quarterly report templates - Create/run reports to generate project/contract data - Validate reports with project teams - Resolve questions - Prepare reports for submission • Contract Budgeting and Invoice Activities <ul style="list-style-type: none"> - Manage Project burn rate and resource allocation - Maintain contract compliance around work order management, time sheet management, invoicing and associated reporting • Meeting Management <ul style="list-style-type: none"> - Responsible for coordinating periodic meetings – controllers, management team meeting, and DPW PMO meeting • Process Compliance <ul style="list-style-type: none"> - Monitor team compliance with standards, templates and processes - Coordinate cross team discussions to update templates, standards, and processes - Update and monitor work plan - Issue Contract Correspondence numbers - Log submission documents received in the PMO email inbox - Monitor and track submissions due against scheduled times - Validate necessary approvals have been obtained for each submission - Perform initial quality control and log defects for submission documents - Prepare submissions for final approval - Work with teams to resolve defects in submission documents - Prepare email for submissions - Create FileNET links and insert into submission letters - Upload submitted files to FileNET - Upload large submissions into SharePoint 	<ul style="list-style-type: none"> • 2+ years experience in DPW • 5+ years of experience in Access database • 2+ years of experience with ATS or similar tool • 2+ years of financial and general accounting experience



Position	Resource Responsibilities	Required Skill Set and Experience
	<ul style="list-style-type: none"> • Artifact Management <ul style="list-style-type: none"> - Generate and submit the dispositions due report - Generate and submit the report of submissions due - Maintain artifacts list - Assign work order numbers to new initiatives and maintain list - Publish artifact list reports - Maintain electronic Submissions Library - Maintain distribution lists for artifact submissions for each system and artifact type • Disposition Handling <ul style="list-style-type: none"> - Validate and record dispositions received - Communicate dispositions to project team - Create artifact entries in the artifacts list for responses to conditional approvals/rejections - Issue Completion Letters based on the dispositions received - Maintain electronic dispositions library - Maintain electronic library of incoming official correspondence not related to dispositions - Send periodic Artifact list to the client • Resource Management <ul style="list-style-type: none"> - Confirm staffing dates in Appointment and Termination Letters. - Enter data from Appointment and Termination Letters into the Appointment Tracking and Termination Tracking tool to support CWOPA ID management. - Log and forward Enclosure 3 to Management Directive 205.34 Amended forms after confirming each individual has been reported via an Appointment and Termination Letter. - Confirm Notice of Termination is received for terminations and submit Notices of Termination to the client after each individual is reported via an Appointment and Termination Letter. 	



Position	Resource Responsibilities	Required Skill Set and Experience
<p>Project Principal</p>	<ul style="list-style-type: none"> Align project team with DPW vision, goals, and standards Provide engagement oversight and guidance – align and deliver people, process, operations and technology components of the engagement Monitor compliance with DPW business and IT goals Manage overall conformance to project objectives and requirements Bring leading industry practices in HHS in the context of people, process and technology improvements 	<p>PACSES</p> <ul style="list-style-type: none"> 8-10 years in active engagement and project management of large-scale IT, system development and maintenance projects 5 years of experience in managing a project in a enterprise environment integrating with common business and technology processes 5 years of experience with DPW solutions and standards, and cross project systems or in a similar environment of integration with an integrated eligibility system 3-5 years in active engagement and project management of large-scale Microsoft Web-based systems development and maintenance projects Ability to contractually bind Deloitte. <p>iCIS</p> <ul style="list-style-type: none"> 5-8 years of in depth program knowledge of HHS eligibility programs (e.g. Cash Assistance, Food Stamps, Medicaid, Long Term Care, Childcare, LIHEAP, etc.) in a engagement management role for an integrated eligibility system <p>HCSIS</p> <ul style="list-style-type: none"> 5-8 years of in depth program knowledge of HHS programs especially in Medicaid, Home and Community Based Services, Medicaid waivers and related programs, Mental Health, and Enterprise Incident Management <p>PELICAN</p> <ul style="list-style-type: none"> 5-8 years of HHS eligibility programs especially in childcare (LI, FS, GA, TANF and unsubsidized), children’s services, and associated systems Experience in an integrated early learning outcome based environment



Position	Resource Responsibilities	Required Skill Set and Experience
		<p>ITSS</p> <ul style="list-style-type: none"> • 8 – 10 years of Enterprise Architecture Management experience; broad experience in various EA domains such as middleware, security, platform infrastructure and SOA • Technology strategy, implementation and operational management of large-scale IT enterprises • Familiarity with DPW and Commonwealth technology policies
<p>Project Manager</p>	<ul style="list-style-type: none"> • Provide overall system Quality Assurance and alignment with established standards and policies • Manage contract compliance and timely completion of deliverables, work products and operational work products • Manage and use resources for overall project delivery • Facilitate project stakeholder communications • Manage project issues/risk and escalate to address to senior management • Manage timely completion of timesheets and overall project invoicing • Manage project schedule and timely completion of established tasks • Manage compliance with business requirements • Perform Change Control Management • Integrate individual aspects of system maintenance and project coordination 	<ul style="list-style-type: none"> • 5-7 years in active management of software development methodology in a large-scale IT systems integration project. Experience with DPW SDM or a similar waterfall or Unified Process based methodology • 5-7 years of project management experience of a Web-based system handling HHS programs and proven experience of project management concepts and tools • 5-7 years of experience in the understanding of end user, and operational delivery of HHS services • 5-7 years of hands on experience and knowledge of integrated front end capabilities and functional requirements as well as future goals or in a similar state HHS environment • 3-5 years experience overseeing the design and implementation of system components using SOA principles and application frameworks <p>iCIS</p> <ul style="list-style-type: none"> • 5-7 years of hands on experience with the implementation of large-scale state Child Support or OIM administered eligibility programs – Cash, TANF, Food Stamps, Medicaid, Long Term Care, and LIHEAP, or in the implementation



Position	Resource Responsibilities	Required Skill Set and Experience
		<p>of these HHS programs in a similar state environment</p> <p>HCSIS</p> <ul style="list-style-type: none"> • 5-7 years of hands on experience and knowledge of HCBS system or case management system capabilities and functional requirements as well as future goals or a similar environment • 5-7 years of hands on experience and knowledge in the implementation of ODP, OLTL, OMHSAS, OCYF, OCDEL and PDA administered eligibility programs (home and community based programs, waivers, long-term care, and related programs) or in the implementation of the programs in a similar state environment <p>PELICAN</p> <ul style="list-style-type: none"> • 5-7 years of hands on experience and knowledge of PELICAN capabilities and functional requirements as well as business requirements of OCDEL in a similar state environment for HHS programs
<p>Application Manager (s)</p>	<ul style="list-style-type: none"> • Coordinate aspects of SDLC based system development and maintenance using DPW SDM • Leverage and bring application development leading practices from similar HHS systems and processes • Participate and/ or lead requirements sessions with program office • Manage compliance with project schedules • Provide technical support and guidance to the application team • Provide accurate level of effort and resource estimates • Manage application change control and execute established change priorities • Manage quality assurance of application initiatives – including architecture, design and components • Provide functional insights during design and development 	<ul style="list-style-type: none"> • 5-7 years of hands on experience and knowledge in the application management and implementation of HHS programs in the state environment • 5-7 years of hands on experience and knowledge in the implementation of large-scale state Child Support or OIM administered eligibility programs – Cash, TANF, Food Stamps, Medicaid, Long Term Care, and LIHEAP or in the implementation of these HHS programs in similar state environment • 5-7 years of experience in the understanding of end user, and operational delivery of services in a similar HHS environment • 5-7 years of experience in the understanding of program experience in a HHS environment