FINAL REPORT

Office of Information Technology Follow-up Review–Progress Made Implementing Strategic Improvement Plan; Broader Issues Need Executive Attention for State to Advance Further

Report No. FR-OIT-12

Issues OPEGA noted during this review:

- Lack of executive-level governance for information technology adversely affects the State's ability to address critical information technology matters. (pg. 5)
- Disaster recovery and business continuity planning efforts have not mitigated risks associated with potential disasters or catastrophic system failures. (pg. 6)
- Data governance and analytics capabilities and practices are inconsistent across the Executive Branch and are at an immature level. (pg. 7)
- Roles, responsibilities and expectations of OIT and the agencies it serves are not clearly defined or communicated. (pg. 9)
- OIT's current funding model does not ensure sufficient resources for core IT activities common and critical to all State agencies. (pg. 10)
- OIT project managers cannot fully estimate costs on proposed projects or perform complete budget to actual cost analysis on IT projects in progress. (pg. 10)
- OIT needs to continue efforts to further mitigate IT-related risks for the State, move toward industry best practices, and improve the services it provides. (pg. 11)

August 2015

a report to the
Government Oversight Committee
from the
Office of Program Evaluation & Government Accountability
of the Maine State Legislature

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Office of Information Technology Follow-Up Review–Progress Made in Implementing Strategic Improvement Plan; Broader Issues Need Executive Attention for State to Advance Further

Introduction

OIT is responsible for delivery of safe, secure, high-performing networks and systems that support agencies in performance of their missions.

The Maine Legislature's Office of Program Evaluation and Government Accountability (OPEGA) has completed a follow-up review of the Office of Information Technology. OPEGA performed this review at the direction of the Government Oversight Committee (GOC) for the 125th Legislature.

The Legislature created the Office of Information Technology (OIT) in 2005 by consolidating IT functions in Executive Branch agencies into one entity within the Department of Administrative and Financial Services. OIT is responsible for the delivery of safe, secure, high-performing networks and systems that support agencies in the performance of their missions for the citizens of Maine. The State funds OIT through an "enterprise" account, meaning that all OIT expenses must be covered by charges to the other State agencies it supports.

Since 2006, OIT has made efforts to implement recommendations from an OPEGA review of statewide information technology planning and management.

In early 2006, OPEGA released a report on *State-Wide Information Technology Planning and Management*. Since then OPEGA has periodically reported to the GOC on OIT's efforts to implement various recommendations from that report. In 2011, the GOC considered a multifaceted request for a new OIT review. The issues raised in the request were the same as those in a number of unsolicited complaints regarding OIT that OPEGA had received over the years. They indicated that the recommendations from 2006 had not all been fully or adequately implemented. As a result, in 2012, the GOC directed OPEGA to conduct a formal two-year follow-up review of OIT's plans and progress in several critical areas.

Issues brought to the GOC in 2011, however, indicated there had not been much improvement in some areas. The GOC directed OPEGA to conduct a two-year follow-up review focused on three critical areas.

Key IT problem areas were widely known at that time and new management at OIT was attempting to address them. The purpose of OPEGA's review was to assist the Legislature in holding OIT more formally accountable for effectively addressing these known concerns going forward.

The review focused on ensuring OIT made acceptable progress in the following critical areas:

- project management;
- business continuity planning and disaster recovery; and
- supporting the data needs of Executive Branch departments.

For the past two years, OPEGA has monitored OIT's progress in developing, and then implementing, an improvement plan for these three areas that included detailed improvement goals and actions, with timelines, that OIT would take to reach those goals. OIT finalized its two-year Strategic Improvement Plan on March 1, 2013 and subsequently presented periodic progress reports to OPEGA and the GOC on June 14, 2013, January 10, 2014 and September 24, 2014.

OPEGA monitored OIT's progress in developing, and then implementing, an improvement plan. At the end of the two-year period, OPEGA hired an outside consultant to do a comprehensive assessment of OIT's efforts.

The final phase of OPEGA's follow-up review entailed a more comprehensive independent assessment of OIT's progress in implementing its Plan. In January 2015, OPEGA retained an outside consultant with IT audit experience, CohnReznick LLC (CR), to assess OIT's progress in realizing improvements in the three areas of project management, business continuity planning and disaster recovery (BCP/DR), and data governance and analytics. OPEGA also asked CR to identify any significant challenges or barriers impeding OIT's progress in achieving the stated improvement goals and make appropriate recommendations for addressing them. CR submitted its final report to OPEGA in June 2015. CR's report is included as Appendix A. OPEGA concurs with CR's observations and recommendations, which are reflected in the Recommendations made in this report.

Questions, Answers and Issues

1. To what extent has OIT effectively implemented its 2013 Strategic Improvement Plan for the three areas focused on in this review?

see pages 10-11 of Appendix A for more on this point

OIT made significant progress in implementing actions it could take unilaterally, and continued improvement is expected. CohnReznick observed that this progress was partially responsible for an upgrade in the State of Maine's current rating on a biennial national survey of technology presence and operations in state governments in the United States.

However, several actions in OIT's Plan were contingent on the efforts of other State agencies that have not occurred. Consequently, OIT has not fully implemented certain key parts of its Strategic Improvement Plan, particularly with regard to business continuity planning and disaster recovery and support for agency data needs. Progress for the State as a whole in these areas has not been as desired.

Agency participation, and effective partnerships between OIT and the agencies it serves, are required for the State to continue advancing its IT-related capabilities. Continued improvement is necessary to ensure the State is properly managing IT-related risks and in a position to capitalize on IT-related opportunities.

While OIT itself can do more to promote agency participation and partnerships, CR and OPEGA found several organizational challenges OIT does not have the authority to address on its own. These barriers include the lack of executive-level IT governance to ensure adequate funding for statewide initiatives and collaboration, coordination and action by all agencies toward IT-related goals. OIT also reported these challenges to both OPEGA and the GOC in its progress reports during the course of this two-year follow-up review.

2. To what extent has OIT achieved improvements in Project Management?

see pages 20-26 of Appendix A for more on this point

CR found that OIT made significant progress in developing its IT project management capabilities and converting to the Agile project management methodology. Continued improvement is expected as OIT continues to strengthen its project management function. CR noted several areas where further improvement will better align OIT with industry standard practices.

OIT's Agile Center for Excellence is not yet fully developed and OIT has not fully adopted portfolio management capabilities or procedures across its entire project portfolio. Standard processes such as project initiation procedures and project closeout meetings were not consistently followed in the sample of projects CR reviewed. The project intake process also did not include project managers until project decisions and intakes were completed, and project artifacts (tools) were not created uniformly across projects. Additionally, CR found that OIT did not perform project budgeting and cost analyses because project managers lack the necessary information to do so.

3. To what extent has OIT achieved improvements in Business Continuity Planning and Disaster Recovery?

see pages 12-14 of Appendix A for more on this point

OIT has made significant progress addressing previously known gaps in business continuity planning and disaster recovery such as conducting tabletop exercises and supporting agencies as they develop plans on an ad hoc basis. OIT has also hired a BCP/DR manager who is developing the structures necessary to support statewide BCP/DR efforts.

However, statewide BCP/DR efforts to date have not mitigated risks associated with potential disasters or catastrophic system failures. Business Impact Analyses (BIA) are necessary for sound business continuity and disaster recovery planning within both OIT and individual agencies, but have not been completed for any State agency. Agency participation is critical to BCP/DR efforts and such participation is impacted by broader organizational challenges outside of OIT's control.

4. To what extent has OIT achieved improvements in its capacity to support the data and analytic needs of analysts, managers and decision makers in all State agencies?

see pages 14-20 of Appendix A for more on this point

Little progress has been made in improving data governance[1] and analytic capabilities for Executive Branch agencies, primarily because this area is impacted by broader organizational challenges and did not receive much focus until late in the two year review period. OIT's new Enterprise Warehouse and Analytics group was only established in 2014. The roles, responsibilities and expectations of OIT and the agencies it supports still need clarification. Advancing data capabilities requires agency commitment and participation and an executive-level forum for engaging all Executive Branch agencies is still developing.

[1] For the purposes of this report, data governance refers to the overall management of the availability, usability, integrity and security of the data employed in an organization.

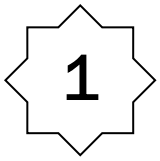
Currently, data governance and analytics capabilities and practices are inconsistent across the Executive Branch. CR assessed the overall maturity of the data capabilities of the Executive Branch and found the agencies to be at an immature level with limited users, islands of information systems across agencies and no designated executive business sponsor.

OPEGA identified the following issues during the course of this review. See pages 5-12 for further discussion and our recommendations.

- Lack of executive-level governance for information technology adversely affects the State's ability to address critical information technology matters.
- Disaster recovery and business continuity planning efforts have not mitigated risks associated with potential disasters or catastrophic system failures.
- Data governance and analytics capabilities and practices are inconsistent across the Executive Branch and are at an immature level.
- Roles, responsibilities and expectations of OIT and the agencies it serves are not clearly defined or communicated.
- OIT's current funding model does not ensure sufficient resources for core IT activities common and critical to all State agencies.
- OIT project managers cannot fully estimate costs on proposed projects or perform complete budget to actual cost analysis on IT projects in progress.
- OIT needs to continue efforts to further mitigate IT-related risks for the State, move toward industry best practices and improve the services it provides.

Recommendations

In making the following recommendations, OPEGA has drawn on CR's results as well as our own observations over the two-year period of this follow-up review. Recommendations 1-6 address issues CR and OPEGA identified as challenges or barriers to OIT's ability to support advancing the State's position with regard to the three areas under review. Implementing each will require the participation of agencies as well as OIT. Recommendation 7 captures the remaining recommendations contained in CR's report that OIT can address on its own.



The Administration Should Establish an Executive-level, Enterprise-wide IT Governance Function

The areas focused on in this review are individually important for every agency program and collectively critical for the State. However, there is currently no enterprise-wide, executive-level directive or governance for BCP/DR, data governance and analytics, or IT project management that ensures adequate planning, funding, collaboration and action on the part of both OIT and State agencies.

Efforts in these three areas require partnerships between OIT and the agencies. Given its role as a service agency and its position in the State's organizational structure, OIT does not have the authority to direct agencies to fund or otherwise engage in these efforts. Several of OIT's planned actions in its Strategic Improvement Plan were contingent on agencies providing funding and/or assigning personnel to work with OIT. OIT stated that it would be a challenge to engage the agencies in activities they may not see as a priority, and that progress made in BCP/DR and data analytics might be limited as a result.

OPEGA discussed this challenge with OIT and the DAFS Commissioner early on in our review. Subsequently, late in the two-year period, the Office of Policy and Management (OPM) was directed to facilitate OIT and agency efforts on data governance and analytics. OPEGA understands that OPM's facilitation role currently does not include BCP/DR or IT project management, nor does it include responsibilities and authorities for other enterprise-wide governance activities such as:

- establishing an overall vision, strategy and goals;
- establishing and supporting enterprise-wide priorities;
- ensuring adequate funding for enterprise-wide initiatives and priorities;
- clarifying roles and responsibilities between OIT and agencies; and
- ensuring collaboration, coordination and action among all parties.

Recommended Management Action:

The Administration should establish an executive-level, enterprise-wide IT governance function with responsibilities, and associated authority, consistent with those described above. Responsibilities could focus initially on the three areas encompassed in our review with other IT-related areas added as necessary and appropriate. A governance function could also oversee and drive the process of defining and documenting OIT and agency roles and responsibilities through Service Level Agreements as discussed in Recommendation 4.

Options for an executive-level IT governance function include, but are not limited to, assigning the responsibilities to an existing executive-level office, establishing a new executive-level function, or establishing a steering or oversight committee. The Administration could explore how other states have effectively incorporated IT governance into their organizational structure.

The Administration Should Ensure Business Impact Analyses and Subsequent Business Continuity Plans Are Completed for All Agencies

Business continuity planning and disaster recovery (BCP/DR) efforts have not mitigated risks associated with potential disasters or catastrophic system failures. Business Impact Analyses (BIA) for individual agencies have not been completed, and, therefore, OIT and agencies lack the information necessary to develop sound DR and BC plans. OPEGA identified inadequate business continuity planning as a key issue in its 2006 report and it appears that very little progress has been made since then. This is another area in need of executive-level direction and oversight.

A **Business Impact Analysis** is a process that identifies critical business functions, and describes what would be necessary to recover these functions, in the event of a disaster or disruption in service. For example, the State of Oregon's BIA objectives are:

- To identify business processes and prioritize them according to criticality.
- To identify the Recovery Time Objective (RTO) associated with each critical business process.
- To identify the Recovery Point Objective (RPO) associated with each critical business process.
- To identify the key computer systems, equipment, and applications associated with each critical business process.
- To identify the quantitative and qualitative impacts that will be incurred should a disruption occur.
- To identify critical interdependencies associated with the business unit and its processes.

Source: *www.oregon.gov/das/cio/bcp/docs/**business_impact_analysis_questionnaire.doc***

OIT's Strategic Improvement Plan called for BIAs to be completed by the middle of 2013 using an approach that focused on determining the criticality of business applications. However, the effort did not actually get underway until OIT hired the Business Continuity Manager in July 2014 and adopted a more standard industry approach to conducting BIAs. This approach focuses on determining the criticality of business processes. OIT has since been working to complete its BIA and plans to use it as a model for other agencies. The current plan is to have BIAs for all agencies completed within the next two years. Presumably, a more fully developed Disaster Recovery Plan, as well as agency Business Continuity Plans, will follow completion of the agency BIAs.

The issues discussed in Recommendations 1 and 5 continue to present significant challenges to completing BIAs and subsequent DR and BC plans within an acceptable time frame. In the meantime, State agencies continue to face the risk that an inability to recover from a potential disaster could result in customer service disruptions, excessive costs to restore service, and significant impacts to reputation. OIT also faces many near-term decisions on back up and disaster recovery options that may be made without information needed to ensure resources are appropriately allocated.

CR's report in Appendix A, pages 5-6 and 12-14, contains more discussion on BCP/DR.

Recommended Management Action:

As part of addressing Recommendations 1 and 5, or through some other means, the Administration should establish a mechanism for ensuring that BIAs and subsequent Business Continuity Plans are completed for all Executive Branch agencies by the end of 2017. This mechanism should include monitoring and oversight to ensure OIT and agencies are appropriately prioritizing and dedicating the necessary resources to meet this goal. OIT should use the completed BIAs to develop a complete and effective statewide Disaster Recovery Plan.

The Administration Should Take Steps to Advance the State's Data Governance and Analytics Capabilities

Data governance and analytics capabilities and practices are inconsistent across the Executive Branch and, overall, at an immature level. Many State agencies have limited data analytic capabilities and the State lacks any baseline capability for analyzing data across agencies. Sharing information between agencies is initiated on an as-required basis with requesting agencies executing a Memorandum of Understanding with agencies that maintain the required data.

CR assessed the Executive Branch's data capabilities using an industry standard maturity model and found the State was at level two of five levels. Analytic capabilities have only recently become a priority focus for OIT and the basics of sound data governance need to be in place before the State can hope to have useful data and tools for analyzing data across agencies. According to a recent article in Governing Magazine (Appendix B), other states also currently have these limitations.

One example in Maine is the State's existing financial reporting systems, which are inadequate to meet the needs of analysts, administrators and decision-makers. OIT's Enterprise Warehousing and Analytics group conducted a recent Gap Analysis of the Financial Warehouse for the State Controller's Office. The report found that key data missing from various systems create a need to use multiple systems to answer business questions, different agencies use different subsets of reporting systems, and the overall usability of the systems needs improvement.[2]

[2] Appendix D of CR's report (OPEGA Appendix A) is the report on the Gap Analysis of the Financial Warehouse. Page 8 of that Analysis has a complete list of these findings.

The Gap Analysis recommended solutions such as providing the capability to join annual budget data with accounting system data in one query and the formation of a governance group to ensure future system upgrades address the needs of the State as whole and individual agencies. According to the State Controller, the recommendations in the Gap Analysis report are in the process of being implemented.

Continuous improvement in the area of data governance and analytics will require partnerships between OIT and agencies with clearly defined roles and responsibilities of each party. OIT sees its role as IT service provider and caretaker of the data, with agencies being owners of the data and responsible for analysis and interpretation. CR, citing a 2014 NASCIO[3] study, *States and Open Data*, noted that OIT's perspective on this and the way it has defined its role is consistent with IT service functions in other organizations, but differs on the enterprise role for standards development and execution. CR noted the lack of defined service levels and quality metrics for data and analytics support provided to OIT customers and the lack of standard data analytic tools.

Challenges and issues associated with creating effective partnerships between OIT and the agencies have been discussed in Recommendations 1, 4 and 5.

CR's report contains additional detail on the subject on pages 6 and 14–20.

Recommended Management Action:

Advancing data governance and analytics capabilities should be specifically considered in actions taken with regard to Recommendations 1, 4 and 5. In addition:

A. Agencies should develop the necessary internal business intelligence capacity to effectively manage and utilize data. This might take the form of a dedicated position with the responsibility and technical expertise to collaborate with OIT and drive data governance and analytics within each agency.

B. OIT should develop a formal data governance policy with controls to manage data integrity and privacy risks for itself and a model policy for agencies to use as a basis for their own.

C. Agencies should develop data governance policies specific to their data with assistance from OIT as necessary.

D. OIT and agencies should partner to develop an inventory of data sources in each agency and assess the criticality and quality of data in each source.

E. OIT should identify and implement standard data query and analytics tools that will be used across agencies and develop capabilities to support agencies in using those tools by providing training and technical assistance.

[3] National Association of State Chief Information Officers
http://nascio.org/publications/documents/NASCIO_EAOpenData_May2014.pdf

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OIT Should Establish Service Level Agreements with Agencies

The roles, responsibilities and expectations of OIT and the agencies it serves are not clearly defined or communicated. Each focus area of this review requires a partnership between OIT and State agencies to effectively and efficiently address current needs and work toward continuous improvement. OIT has consistently stated that its role is a service function with limited business area responsibilities and authority. CR observed that this is an appropriate role for OIT and found that OIT was clear about its role and the services it provides to agencies. However, both OPEGA and CR observed that agencies do not fully understand OIT's role versus theirs and may not be aware of the responsibilities OIT expects and needs them to fulfill – particularly with regard to BCP/DR and data governance and analytics.

Additionally, although OIT is a service function, it does not appear to have a fully developed customer service focus and culture. Ten years after the IT consolidation, OPEGA and legislators continue to hear anecdotally about agency frustrations with the cost of IT services and difficulties in getting timely, helpful assistance from OIT. CR made several suggestions throughout its report encouraging additional OIT focus on the customer.

It is an industry standard practice to clarify roles, responsibilities, and performance expectations through the establishment of clear Service Level Agreements (SLA) between the IT organization and the agencies it serves. These agreements are customer focused. Generally, they include a commitment to continuous improvement, clarify roles and responsibilities of both IT and the agency, and establish performance measures for IT services that both parties monitor and track. SLAs can vary in specificity and may include the cost of each IT provided service.

Service Level Agreements between OIT and the State agencies could not only clarify roles and responsibilities, but also provide a means to establish service expectations that may begin to address agency frustrations regarding the level and value of OIT services in relation to what they cost.

Recommended Management Action:

OIT should establish a Service Level Agreement with each agency. OIT should be responsible for initiating the process; however, each agency will need to assign a representative with appropriate knowledge and authority to work with OIT on developing the Agreement. Oversight of the entire endeavor by an entity assigned the governance role outlined in Recommendation 1 could facilitate participation by all agencies in this effort. OIT should consider standard, effective SLAs and processes used by other states in developing its own.

DAFS Should Reassess OIT Funding for Core IT Activities Common and Critical to All Agencies

The State funds OIT entirely through an enterprise account that charges individual agencies for the various services it provides including BCP/DR, project management and data and analytics efforts. This funding model is a barrier to adequately addressing current IT needs and continuously improving in areas critical to the State as a whole and where a statewide base level of activity is necessary to provide sufficient services and address risks common to all agencies.

Resources put toward these efforts are impacted by the allocations of individual agencies whose budgets are constrained and who may not recognize how important areas like BCP/DR are to their programs and the State. On page 5 of its report, CR offers several examples of the consequences of insufficient funding for BCP/DR, data governance and analytics, and project management support. The risk of inadequate efforts resulting from such funding decisions might be mitigated by an alternative funding model. For example, one model could make direct appropriations to OIT to cover the cost of core statewide functions, and charge agencies directly for specific functions required by the agencies to pay for additional resources OIT must employ.

Recommended Management Action:

The DAFS Commissioner and State Controller, in conjunction with the Chief Information Officer, should reassess how OIT is funded for core functions and capabilities common to, and needed across, all agencies including disaster recovery and business continuity, data governance and analytics and certain portions of the project management function. The DAFS Commissioner should report to the Legislature's Joint Standing Committees on Appropriations and Financial Affairs and State and Local Government on the assessment, and whether a change in the funding model is desirable to ensure sufficient funding for critical, common IT-related activities across the Executive Branch. DAFS' report to the Legislature should include proposed legislation for implementing any desired changes.

DAFS Should Take Steps to Ensure OIT Project Managers Can Develop Accurate Budgets, and Monitor and Report on Costs

CR found that OIT project managers are not able to provide cost estimates or accurately report on costs incurred during projects. According to OIT, it does not have information readily available to do so and this also impacts its ability to develop a complete project budget and cost estimate during project planning. Consequently, OIT is not in a position keep customer agencies informed of variances and predicted challenges to project budgets.

OIT explained that while it knows the project assignments and billing rates for resources within OIT, that same information is not readily available to OIT for project participants in the agencies. For example, hourly rates for agency staff are calculated by the DAFS Service Center that supports the particular agency and are

not known to OIT during project planning. CR also noted that OIT's billing to an agency for a project was handled outside the project team with limited data regarding project spend and cost allocation available for tracking and assessment by either the project team or the customer agencies.

Recommended Management Action:

Budgeting and cost analysis are key components of successful projects. OIT should work with the DAFS Division of Financial and Personnel Services and the State Controller's Office, as appropriate, to identify and address the challenges impacting OIT's ability to develop accurate project budgets and analyze costs throughout projects. Subsequently, OIT should ensure that project managers are performing regular budget to actual cost analyses and keeping customer agencies informed of budget variances and anticipated budget challenges consistent with recommendations on pages 24-25 of CR's report.

OIT Should Implement the CohnReznick Recommendations Within Its Authority

In addition to the OIT-specific actions suggested in Recommendations 1-6, the CohnReznick report in Appendix A includes a number of OIT-specific recommendations related to issues that are within OIT's authority and ability to address on its own. These additional recommendations are summarized as follows:

Business Processes – OIT should consider a thorough analysis of business processes and identification of a broad range of opportunities along with key performance metrics for a wide range of projects. (See page 6 of CR report for more detail.)

IT Audit Function - OIT should consider re-establishing an Information Technology audit function. (See page 6 of CR report for more detail.)

COBIT Framework - OIT should consider adopting COBIT, or other framework, as a standard against which to evaluate its performance. (See page 6 of CR report for more detail.)

BCP/DR – OIT should increase partnership outreach and identify communication mechanisms to formalize reporting for BCP/DR initiatives between OIT and its customers. (See page 13 of CR report for more detail.)

Data Analytics (See pages 17-19 of CR report for more detail.)

- Establish a risk management process for data analytics.
- Prepare a comprehensive data policy
- Adopt data governance policies
- Establish technical standards
- Implement data assurance tools
- Monitor business performance metrics

Project Management (See pages 22-26 of CR report for more detail.)

- Continue developing Agile policies, tools and agency partnerships
- Standardize governance for Agile projects

- Standardize Agile project initiation practices
- Improve communication and quality management during project execution
- Develop remediation actions in the case of project failures to support customers in solving their problems
- Develop project close out signature requirements by all parties, including customer and project manager to ensure all issues are closed out and customer need is met
- Consistently conduct project close out meetings
- Develop project close out metrics and final reporting keys
- Develop testing standards for Agile projects
- Enhance oversight of third party providers
- Perform post-implementation goal assessments

Customer Service – OIT should strengthen its customer service focus and culture to enhance relationships, better understand needs, support improved execution of projects and ongoing technology efforts, and improve the delivery reputation of OIT throughout State government.

Recommended Management Action:

OIT should consider these additional CR recommendations and establish a timeline for implementing them, or appropriate alternative solutions, so as to further mitigate IT-related risks for the State, move toward industry best practices, and improve the services it provides. The Chief Information Officer should report to the Government Oversight Committee and the Joint Standing Committee on State and Local Government on its planned actions in response to these recommendations.

Recommended Legislative Action:

The Joint Standing Committee on State and Local Government should monitor OIT's progress implementing its action plan and advise the Government Oversight Committee of any concerns it has with OIT's efforts.

Agency Response

In accordance with 3 MRSA §996, OPEGA provided the Office of Information Technology and DAFS an opportunity to submit additional comments after reviewing the report draft. OIT's response letter can be found at the end of this report. DAFS and OIT's overall response and actions they are proposing to take in response to issues identified in this report are below.

The Office of Information Technology (OIT) is pleased to receive and respond to the 2015 Office of Program Evaluation and Government Accountability (OPEGA) report, findings and recommendations. The work of OIT in the areas of review can be very complex, and the OPEGA team and CohnReznick worked hard to understand our work and objectively complete their assessment.

Response to Overall Findings

OIT concurs with the overall findings of this report because they are closely aligned to OIT's current and established strategy to provide innovative, consistent results to our agency customers. The majority of recommendations have been addressed by work OIT has completed since the review or will be completed as part of projects that are currently underway.

Generally, we agree with the finding that enterprise executive level governance for information technology needs strengthening and that funding is needed to support the continuation of those planned improvements. We specifically agree that we:

- Made significant progress in the area of project management.
- Demonstrated important progress in the area of business continuity and disaster recovery.
- Are making progress in the area of data sharing and business intelligence.

We also concur that in all areas we must continue to improve. To that end, as part of our Five-year Road Map, OIT has developed a framework to achieve these improvements and estimated the resources necessary to be successful. OIT can continue to improve by:

- Continuing to foster strong partnerships with our agency partners.
- Expanding the role of the Project Management Office (PMO) to all IT projects.
- Growing the use of enterprise technology tools like Business Process Management and Electronic Content Management.
- Continuing to train and deepen the capabilities of the Agile Center of Excellence (COE).
- Completing agency specific business impact analysis (BIA) efforts.
- Executing current plans to improve network infrastructure.
- Increasing the maturity level of our data analytic offerings.

To be successful, OIT will need support from other executive branch agencies and the legislature in order to reach the highest level of quality outcomes. Agencies are very cooperative in the areas of project management, disaster recovery, cyber security, and data management. However, they are also straining under the load of supporting their own missions while assisting OIT with statewide IT initiatives such as the Windows 7 rollout and the upgrade to Internet Explorer 11. However, substantial partnerships will be needed to complete our work. For example:

- Agencies should continue to cooperate with the PMO and follow industry standard processes and methods, and should continue to incorporate project management cost allocations as part of the overall cost of projects.
- Agencies should continue to cooperate with BC / DR activities.
- Agencies should take the lead on articulating data sharing and Business Intelligence (BI) plans (enterprise wide information sharing and analytics) , while OIT provides data governance, the best-in-class tools and processes to realize those plans.
- The Maine Legislature should appropriate funds to encourage enterprise initiatives (disaster recovery, cyber security, project management, data analytics, etc.).

Response to OPEGA Recommendations

1

The Administration Should Establish an Executive-level Enterprise-wide IT Governance Function

OIT strongly concurs that enterprise-wide executive-level governance is needed. The State of Maine stands to gain much in the way of efficiency and innovation by following common, consistent and transparent delivery practices such as Agile and enterprise project management for all initiatives. Gains can also be realized by choosing enterprise technology solutions over single point solutions, establishing a single vision and strategic direction for technology adoption and innovation, and establishing enterprise technology priorities.

Action Steps

- Planned: As part of the Five-year Road Map, OIT will clearly articulate how agencies and taxpayers benefit.
- Planned: OIT will include agencies in specific implementations.
- Planned: OIT and DAFS will work with the Governor's Office to research and implement a stronger enterprise IT governance process.

2 **The Administration Should Ensure Business Impact Analyses and Subsequent Business Continuity Plans are Completed for All Agencies**

OIT agrees with this recommendation and to further a successful outcome, OIT will:

Action Steps

- Completed: Provide an industry best practice framework and lead a repeatable process to complete BIAs.
- Completed: Formally launch a network improvement project that will lower risk and increase performance.
  Completed: Initiate conversations with agencies to assist them in the creation of their BIA and Service Level Agreements (SLA).
- Underway: Continue on-going projects.

3 **The Administration Should Take Steps to Advance the State's Data Governance and Analytics Capabilities**

OIT concurs with this recommendation and commits to the following:

Action Steps

- Completed: Assemble a formal multi-agency data governance committee.
- Completed: Assemble, with agencies, a data integrity and inventory working group.

4 **OIT Should Establish Service Level Agreements with Agencies**

OIT concurs with this recommendation. Service Level Agreements are already utilized by OIT to formalize agreements with some agencies, and agrees that the use of SLAs should be expanded.

Action Steps

- Schedule regular agency engagement meetings where the following discussions take place:
  - Issues and problems
  - Future plans
  - Strategies to provide better customer service
  - Agreed action plans to remedy customer service or relationship issues

5 **DAFS Should Reassess OIT Funding for Core IT Activities Common and Critical to All Agencies**

OIT agrees to review this recommendation. Currently, as reported by OPEGA, OIT must cover all costs by directly recovering them from our partner agencies. This can limit OIT's ability to invest in enterprise improvement and innovation and to offer enterprise-level consulting services at a cost that can be accommodated by both small and large agencies.

6

DAFS Should Take Steps to Ensure OIT Project Managers Can Develop Accurate Budgets and Monitor and Report on Costs

OIT concurs with this recommendation and has already established a closer relationship with the State government service center to better measure and report on project budgets. OIT commits to continuing our improvement effort in all aspects of project management, including budget control.

Action Steps

- Completed: OIT has scheduled regular meetings with the Service Centers and selected agency representatives to improve project budgeting and controls.
- Planned: Propose pilot budget and control method for the Department of Labor project portfolio.

7

OIT Should Implement the CohnReznick Recommendations Within Its Authority

OIT concurs with this recommendation. Many of the recommendations proposed by CohnReznick are currently part of OIT's work plan. As reported, OIT has made strides in forwarding the Agile frameworks for projects; additional examples of initiatives currently underway include:

Action Steps

Business Process

- Completed: Continue infrastructure group adoption and implementation of an industry standard operational improvement regime known as KanBan.
- Planned: Formally launch planned Key Performance Indicator project.
- Planned: Standardize customer engagement process for projects and initiatives, including MOUs and SLAs.

Audit Function

- Planned: OIT will investigate audit function role and consider applicability.

COBIT Framework

- Planned: OIT will consider COBIT framework and investigate implementation.

BCP/DR

- Planned: OIT has begun outreach to gain input and determine communication mechanisms to formalize reporting.

Data Analytics

- (See recommendation #3)

Project Management

- Planned: PMO will execute current plan to hire an Agile testing leader to standardize the process.
- Planned: PMO will establish in policy all implemented practices.
- Planned: PMO will review and amend current policy for common governance scheme for both Agile and tradition projects.
- Planned: PMO will execute current plan to add 7 additional Agile resources to COE.
- Planned: PMO will begin Agile/KanBan Coaching to DHHS/Office of Child and Family Services.
- Planned: Expand the role of enterprise Agile coaching.

List of related High Level OIT Actions, Planned, Completed or Underway

- Completed: Hired a BC/DR manager credentialed by the Disaster Recovery Institute.
- Completed: Developed a Business Impact Analysis for OIT.
- In Process: Have started the process to acquire the necessary equipment to provide redundancy between data centers.
- Completed: Established a team that is working with the agencies regarding the application of big data.
- In Process: Developing tools that will enable agencies to extract data that will contribute to better business decisions and metrics.
- In Process: Working closely with the agencies to complete BIAs and SLAs.
- In Process: Working alongside the agencies to increase the maturity level of our data analytic offerings.
- In Process: Working with the agencies to enhance the expanding role of the PMO to all executive branch Information Technology (IT) projects.
- Completed: Hired Agile Coaches to deepen OIT and agency Agile practices.

Acknowledgements

OPEGA would like to thank the management and staff at the Office of Information Technology and DAFS for their cooperation and assistance in providing information for this review. We also thank CohnReznick LLC for their work in completing an independent assessment of OIT's progress.

Appendix A.

Assessment on State of Maine's Office of Information Technology – Improvements for Business Continuity Plan/Disaster Recover, IT Project Management, and Data Analytics

June 2015

CohnReznick LLC

Assessment on State of Maine's Office of Information Technology – Improvements for Business Continuity Plan/Disaster Recovery, IT Project Management, and Data Analytics

Findings report to the Maine State Legislature's Office of Program Evaluation and Government Accountability (OPEGA)

From CohnReznick

June 2015

COHN REZNICK

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Glossary of Terms

AICPA	American Institute of Certified Public Accountants	ISACA	Information Systems Audit and Control Association
BA	Business Analyst	IT	Information Technology
BCP	Business Continuity Planning	ITCP	Information Technology Continuity Plan
BI	Business Intelligence	KPI	Key Performance Indicator
BIA	Business Impact Analysis	MOA	Memorandum of Agreement
BPM	Business Process Management	MOU	Memorandum of Understanding
CIO	Chief Information Officer	MRS	Maine Revenue Services
COBIT	Control Objectives for Information and Related Technology	MS	Microsoft
COE	Center of Excellence	NASCIO	National Association of State Chief Information Officers
DA	Data Analytics	OPM	Office of Policy and Management
DACF	Department of Agriculture, Conservation, and Forestry	OBIEE	Oracle Business Intelligence Enterprise Addition
DAFS	Department of Administrative and Financial Services	OIT	Office of Information Technology
DBA	Database Administrator	OPEGA	Office of Program Evaluation and Government Accountability
DHHS	Department of Health and Human Services	PII	Personally Identifiable Information
DOE	Department of Education	PM	IT Project Management
DOL	Department of Labor	PMO	Project Management Office
DOT	Department of Transportation	QA	Quality Assurance
DR	Disaster Recovery	REMT	Disaster Executive Management Team
DRT	Disaster Recovery Team	ROI	Return on Investment
DSS	Deliver, Service, and Support	SLA	Service Level Agreement
FTP	File Transfer Protocol	SOW	Statement of Work
GAGAS	Generally Accepted Government Auditing Standards	SQL	Server Query Language
IIA	Institute of Internal Auditors	UAT	User Acceptance Testing
IRR	Internal Rate of Return	WP	Work Paper

Executive Summary

Purpose

On behalf of the Maine State Legislature's Office of Program Evaluation and Government Accountability (OPEGA), CohnReznick LLP ("CohnReznick" or "we") conducted an assessment of the actions taken by Maine's Office of Information Technology (OIT) toward improvement in Disaster Recovery (DR) / Business Continuity Planning (BCP), ability to support the data needs of Executive Branch agencies, and IT Project Management. CohnReznick followed audit standards of the Institute of Internal Auditors (IIA) and Generally Accepted Government Auditing Standards (GAGAS) along with relevant portions of the Control Objectives for Information and Related Technologies (COBIT) framework throughout its review of the planned actions listed in OIT's 'Strategic Plan' and 'Stated goals and action plans' document.

Overall Observations for the State of Maine

During the past few years OIT has made significant progress in addressing previously reported gaps and adopting industry practices in the areas of Disaster Recovery/Business Continuity Planning, supporting the data needs of the Executive Branch agencies and IT Project Management. We found that methodologies deployed and actions taken have been very consistent with similar initiatives in public sector and commercial enterprises.

Although the focus of this engagement was on DR/BCP, OIT's ability to support the data needs of the Executive Branch agencies and IT Project Management, there are several broader issues that need to be considered at a statewide level.

- **Governance** – Each of the areas we reviewed is individually important for every agency program and collectively critical for the State of Maine. There currently is no statewide executive level directive for DR/BCP, data governance or IT project management. Although the Office of Policy Management (OPM) assumes the role of coordination and facilitation of policy formation, when an overall directive is absent, OIT and the agencies are making their own interpretations regarding state expectations. Although the areas evaluated include a high level of information technology, the direction related to the significance to the State of Maine should be made a higher level. Organizations often assign steering committees or oversight functions to establish goals and objectives. We recommend that the State of Maine consider establishing an executive oversight function to address the following types of questions:

  Business Continuity and Disaster Recovery Planning

  - How quickly should services be restored after a disaster?
  - What services are so critical that downtime is not acceptable?
  - What is a reasonable annual allocation based on requirements for the State of Maine?

  Data Needs of the Executive Branch Agencies

  - What is the minimum capability expected for all agencies?
  - Should capabilities for sharing data among agencies be established?

  Project Management

  - When should formal project management be mandatory?
  - When should a full business process evaluation be performed?

- **OIT Responsibility** – During our discussions with OIT there was clarity regarding its role and the services it provides to the agencies. However, there was less clarity in discussions with agencies especially regarding business intelligence and data analytics. The establishment of clear service level agreements is an industry standard practice that clarifies the roles and responsibilities of user departments and the information technology function. The need to clarify roles and responsibilities is rooted in OIT's development and evolution, which involved moving the information technology function out of individual agencies and into a centralized bureau. We recommend that roles and responsibilities be clarified in service level agreements.

- **Cost Allocation** – During our fieldwork we learned that there were challenges with obtaining cost estimates during projects. While the billing rates for resources within OIT are known, the rates for other project participants are determined by service centers and are not known during project planning. Project managers are not able to provide cost estimates or accurately report on costs incurred. Although we understand that this situation has improved, a goal should be to provide more timely and accurate project cost information.

- **Funding Model** – OIT charges by service provided to individual agencies when it participates in BCP/DR, Project Management (PM) and Business Intelligence (BI) initiatives. This funding structure represents both an opportunity and a challenge for OIT. From a project perspective, OIT is able to demonstrate value and generate revenue. However, there is a significant challenge because individual agency budgets are constrained and do not reflect the relative importance of these areas to The State of Maine. There may be initiatives that should be funded at a base level across state agencies. Please consider the following examples:

    - The lack of funding for BCP/DR for a specific agency program may lead to service interruptions that involve several other programs and disrupt customer service, result in lost revenue and cause reputation damage to The State of Maine.
    - The inability to access data from an individual agency due to insufficient data capabilities may limit the ability to obtain information for an important initiative.
    - Absent a baseline project management support structure in agencies, projects may not achieve identified goals or may significantly exceed budgets and schedules.

    The State of Maine should consider base level funding for the BCP/DR initiative, baseline data capabilities and a project management support structure.

- **Plan for Business Impact Analysis (BIA) Development** – The plan for preparing BIAs for all state agencies was reset after OIT hired the business continuity and disaster recovery manager. The previous focus on starting with business applications and determining business criticality primarily based upon technical considerations was not an acceptable practice. However, the time line for completion has been extended with the plan for developing a BIA for OIT by June 2015 and completion of BIAs for the agencies within a 2-year period. There are several challenges with this revision of the plan including the following:

    - A high-level cross-agency directive is needed to prioritize the BD/DR initiative and incentivize agency participation.
    - State of Maine agencies are exposed to unmitigated business risks from a potential disaster and the inability to recover may result in customer service disruptions, excessive costs to restore and significant impacts to reputation.
    - There are many near-term decisions such as migration to a cross-site redundant data center or cloud solution that would be made without information related to the criticality of business

applications and result in insufficient allocation of resources for significant functions or excessive costs for less critical areas.

  - Prioritized budget requirements for the BC/DR initiative need to be communicated during the annual budget cycle to avoid unanticipated reductions that would impact the State's overall goals.

- **Understanding Business Processes** –OIT has established a Business Process Management (BPM) group for evaluating end-to-end business processes and identifying opportunities for improvement beyond initial project requests. We noted the participation of BPM during the Blocked Claim Management System project where a highly manual process was automated to provide a customer self-service solution to eliminate virtually all manual forms and redundant data entry. However, we also noted that for most projects a thorough evaluation of business processes and identification of key performance factors was not included in the scope of the project. A thorough analysis of business processes and identification of a broad range of opportunities along with key performance metrics should be considered for a wide range of projects.
- **Information Technology Audit -** We understand that OIT previously had an internal information technology audit function. Based on the complexity of services offered and the broad range of potential risks, The State of Maine should consider re-establishing an information technology audit function. There is a potential for not only mitigating risks, but also for providing substantial value through performance audits.

- **COBIT Framework -** An overall framework provides a solid foundation for evaluating an information technology function. COBIT is an industry standard that provides a comprehensive, objective and repeatable assessment of the IT function. OIT should consider adopting COBIT or another standard to evaluate its performance.

Summary of Areas Reviewed

As noted abovie, OIT has made significant progress in addressing previously reported gaps and adopting industry practices. Below is a summary of the current risks for each area, comments on the current status, and recommendations followed by detailed report sections for each topic.

- **BCP/DR** – There are unmitigated risks associated with a potential disaster or catastrophic system failure. The plans for this area have effectively been reset with the hiring of the business continuity manager in July 2014. The present plans for completing business impact analyses for OIT by the end of the 2015 and full business continuity plans, including testing for all agencies, within 2 years should mitigate these risks. However, business processes and information technology that support critical services may be impacted prior to fully developing business and information continuity plans. The State of Maine should consider establishing overall guidance for both the agencies and OIT to set overall goals and objectives. Although OIT has made significant progress, the following was noted:

  - The Business Impact Analysis (BIA) had not yet been completed for OIT;
  - A full inventory of system components with required information had not been completed, and
  - Data restoration testing is only being performed on an ad-hoc basis by agencies.

- **Data Analysis** – Currenty, there are limited data analytic capabilities for many State of Maine agencies. Critical initiatives that rely upon agency information may be impacted by the lack of technical solutions, personnel resources and data integrity challenges. Individual agencies are limited by their allocated budgets to making investments to provide these capabilities. Besides the lack of data analysis capabilities for individual agencies, there is no baseline capability for inter-agency data analysis.

Sharing of information is initiated on an as-required basis by the requesting agencies executing a Memorandum of Understanding (MOU) with the agencies maintaining the required data.

The State of Maine should consider establishing a basic level of funding to provide these capabilities across all agencies. In addition, expanded functionality to provide cross-agency sharing should be considered. Although OIT has made progress, the following was noted:

- There are no service level agreements to clarify expectations, and
- Data sharing enablement across agency programs is limited.

- **Project Management** – OIT has made significant progress in adopting the Agile project management and systems development methodology. We noted remediation of most previously identified gap items and progress with adapting the Agile project methodology to a variety of active projects. However, the following was noted:

  - The Agile project management methodology is still being adopted and practices are not fully standardized;
  - Project close-out meetings are not consistently performed;
  - The Agile Center of Excellence is still in development, and
  - Delivery rates and metrics have not been established.

Background

CohnReznick LLC responded to a Request for Proposals issued by the Maine State Legislature's Office of Program Evaluation and Government Accountability (OPEGA) in December 2014. OPEGA needed to assess and validate the actions taken by OIT toward improvement in several critical information technology and service areas. Since November 2012, OPEGA had been engaged in the review of three critical areas related to issues identified in the 2005 OPEGA report on Statewide Information Technology Planning and Management. These areas were IT project management, DR/BCP, and OIT's ability to support the data needs in Executive Branch agencies. The purpose of OPEGA's two-year project was to ensure OIT makes acceptable progress in effectively addressing these known areas of concern. Accordingly, OPEGA's project focused on reviewing the improvement goals and action items in OIT's strategic plan for these areas and monitoring OIT's progress in achieving them over the past two years (2013 to 2014). OPEGA, nearing the end of the two-year review period, sought to conduct a more comprehensive independent assessment.

Methodology

To customize the audit to fit OPEGA's needs we completed the following phases in conducting our evaluation:

- **Planning**
  We obtained and reviewed OIT's "Strategic Plan Implementation" and "Action Plan" document to understand what OIT has accomplished since 2013 and the plan for 2015 and beyond. We met with

project leaders from OIT, OPEGA, and State of Maine agencies. At OPEGA's direction, we formed a steering committee, to establish oversight and a governance framework for the project, and to confirm the scope, timing, and expectations. The engagement was performed during the period of February through April of 2015. Our engagement date was set at Dec 31, 2014 to evaluate all remediation activities completed by OIT.

- **Fieldwork**
  - *Assessment of OIT Initiatives and Scope*
    - We approached the respective department heads of BCP/DR, Project Management, and Data Analytics to obtain a better understanding of the business processes and environment in relation to what we had learned from OIT's strategic and action plans.
    - We compared OIT's current processes and procedures to established industry standards (Appendix A).
    - We customized our audit program for each of the assessment areas by following the key steps below:
      - Review the planning documentation;
      - Conduct kick-off meetings with individuals relevant to the initiatives;
      - Gain an understanding of requirements, the plan for implementation, and the current status; and
      - Document initial observations related to the assessment.
  - *Evaluation of the Current Status*

    We assessed the current status of the components of IT project management, data analytic support capabilities, and disaster recovery/business continuity through interviews with personnel, walkthroughs of key processes, and reviews of available documentation. Additional procedures were performed as necessary, such as:
    - Observing and re-performaning certain procedures;
    - Comparing to industry standards where applicable; and
    - Documenting observations and providing recommendations to remediate gaps or mitigate risks.

- **Identify Strategic Business Opportunities**

  We tracked our observations on a spreadsheet that we collectively accumulated from our meeting notes, findings from work papers, and email correspondences. The spreadsheet of our findings was used to identify and summarize strategic business opportunities for IT project management, disaster recovery / business continuity and support data needs for Executive Branch agencies. We have also maintained a gap analysis based on the items listed OIT's Strategic Implementation Plan document.

- **Develop Recommendations and Present to the Steering Committee and OPEGA**

  The identified opportunities within our observation tracker spreadsheet and gap analysis were compiled into our "Appendix A – Detailed Observations" table in this report. The finalized recommendations will be presented to management after OPEGA comments and approval of the engagement report drafts, presentation of engagement observations and recommendations are complete.

Analysis

CohnReznick undertook an extensive analysis of OIT's strategic planning efforts and evaluated the actions taken by OIT against its strategic and operational goals. We performed a gap analysis against individual goals, interviewing approximately 20 members of the OIT community, speaking with 12 representatives from customer agencies, and obtaining key policies and procedures documentation to assess the status of the key actions previously outlined by OIT and OPEGA.

Strategic planning for OIT, like other leading technology organizations, was broken into thematic goals which helped to narrow broader areas of people, process, and technology investment into key action areas for the bureau. OIT's strategic planning efforts were documented in its annual reports, with support for this assessment deriving from its most recent 2013 report.[1]

OIT's strategic planning actions were formed via three pillars focused on improvements in people, process, and technology.

These key strategic areas were focused on for this assessment, with CohnReznick evaluating OIT in the following priority categories:

1. Business Continuity Planning and Disaster Recovery
2. Data Analytics
3. IT Project Management

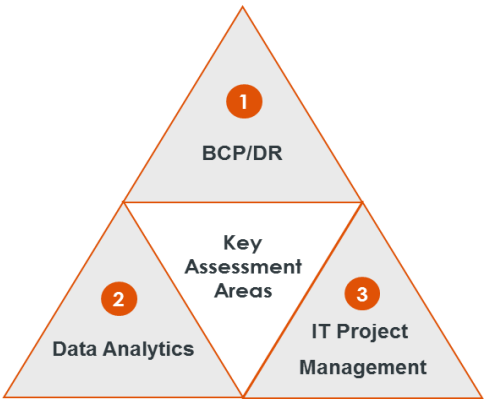


Figure 1: Priority Assessment Categories

Against the analysis and strategic actions outlined by OIT in the 2013 Strategic Plan, CohnReznick broke the three priority areas for assessment into component gap categories for further analysis. Overall, 77 total action items were developed to comprise the scope of analysis for this report. Actions were classified as either 'Resolved' (having no relevant gap observed) or 'Open' (actions either incomplete or in progress).

The results of the gap analysis, noted in *Table 1: OIT Gap Analysis Scoring Summary*, show significant progress across the three areas. In total, 52% of the actions had no relevant gap observed between the OIT planned action, and the in-practice execution of business operation as of 12/31/2014. Additionally, while 48% of the actions were characterized as 'Open,' nearly all of the actions in this category were in-progress or nearing completion through continued refinement and adoption.

[1] Source: Maine OIT. See the full report at: http://maine.gov/oit/about/annual_reports/2013OITAnnualReport.pdf

Table 1: OIT Gap Analysis Scoring Summary

Gap Category	Resolved	Open	Total
Business Continuity Planning/Disaster Recovery	9	13	22
Data Analytics	0	9	9
IT Project Management	31	15	46
Total	**40**	**37**	**77**
Percent of Total	**52%**	**48%**	**100%**

In addition to the gap analysis performed, CohnReznick customized an assessment framework, based on COBIT. This assessment framework guided the objective, best practice analysis in the 3 priority categories to support the measurement and evaluation of the progress made to date by OIT.

Largely due to improvements in these key assessed areas, the State of Maine improved a full grade (from a 'C' rating to a 'B' rating) in Govtech.com's 2014 "State of the Digital States" survey[2], a biannual survey rating technology presence and operations in state government in the United States. Maine's 'B' grade places it among the top quartile of states in IT performance. Notably, the report cited OIT's ability to "support [the governor's] policy priorities" and praised the use of business process management, an OIT strategic goal, as important attributes contributing to its rating rise.

CohReznick's assessment confirmed the progress cited in the survey results of improved maturity in IT functions and management. However, the core business functions observed in this report have opportunity for continued improvement. There is an opportunity to continue positioning OIT services to meet future enterprise needs that support customers through the transformation to a more e-government and digitally focused service offering.

As a general best practice, OIT should continue to improve communication with agencies regarding its capabilities and what it intends to offer to customers for services in each of the areas evaluated. Through continued refinement in the services offered, OIT will be able to better define its asset (human and capital) requirements with the type of processes that best suit the model it intends to move toward in order to effectively increase the value delivered to customers. By better understanding the capability model it wishes to use (flexible or rigid delivery, high touch or low touch service, scalable or fixed operations, etc.), OIT can

1. *make better decisions on the most economical and efficient operating mix to support its capabilities* and,
2. *define and measure the value that it intends to deliver*.

Additionally, OIT should continue its partnership and evangelism efforts across its operations to continue the drive for customers to adapt to and adopt OIT's best practices and methods in technology and process management. Increasingly, the visibility of success stories and 'wins' for both OIT and customers across government, serves both as an enabler and force multiplier for the transformation efforts.

[2] Source: Govtech.com *State of the Digital States Survey* http://www.govtech.com/state/Digital-States-2014.html?page=2

Observation Details

Business Continuity Planning and Disaster Recovery (BCP/DR)

Business continuity and disaster recovery planning was identified as a priority area for OIT by OPEGA. Key goals for this area include the assessment of gaps between the 2013 Strategic Plan and the current status of:

- The adequacy of OIT's 180-day plan to address gaps identified in the Cavan Group Gap Analysis;
- OIT's progress in implementing the 180-day plan, and
- The State's current level of exposure from unmitigated BCP/DR risks given the gaps previously identified and OIT's current progress in addressing them.

Table 2: Business Continuity Planning and Disaster Recovery Gap Summary

Gap Status	Resolved	Percent of Total
Resolved	9	44.4%
Open	13	55.6%
Total	**22**	**100%**

Key Assessments from Strategic Plan Gap Analysis

OIT has made significant progress in its business continuity planning and disaster recovery efforts. Nearly 50% of the components that CohnReznick identified as areas for analysis had no observable gap in outlined completion of actions. This includes taking key steps to align people, processes, and technology to best position OIT to execute its mission and serve its customers and the citizenry of Maine.

The gaps observed in analyzing OIT's performance against its outlined goals were primarily the result of the incomplete business impact analysis. OIT has made progress addressing this gap;conducting table top exercises and supporting agencies as they develop plans, but without conducting a full business impact analysis, the level of exposure from unmitigated BCP/DR risks remains high. Without identifying critical business applications, OIT is unable to assess risks related to specific applications across the state. Similarly, without performing the business impact analysis, OIT and the agencies are unable to complete business continuity and disaster recovery planning, because a comprehensive view cannot be discerned.

Over the past several years, OIT has taken key steps including hiring a BCP/DR manager to develop the frameworks and capabilities needed to support BCP/DR efforts across the state. These efforts have resulted in establishing the foundation for robust analysis capabilities that OIT is continuing to work towards.

As assessed against its strategic planning needs, the following themes were observed in OIT's performance as of 12/31/2014:

- OIT's ability to work with customers from agencies across Maine government has been challenged by the availability of funding for BCP/DR actions.
- Legacy Load Balancer testing had not undergone additional failover testing.
- A full inventory of mission critical applications had not yet been identified to ensure automated fail-over of such applications.

- A full-scale business impact analysis was not completed, which was tied to many of OIT's strategic goal components.

Additional Priority Areas Identified

1. *Evaluate Funding and Increase Outreach to Agencies*

   OIT to date has not developed a robust capability for supporting IT continuity across the agencies. OIT supports agencies with IT continuity, organizational, governance, and participation needs, but only when customer agencies are able to authorize funds for service. As a result of the fee for service model, agencies are required to make their own determinations of business continuity planning and disaster recovery investment in both process and technology support. OIT is only able to provide support levels and capabilities that meet the spending requirements of its customers, many of whom lack the awareness and insight into the business continuity planning and disaster recovery needed to make effective investment decisions. We understand that BCP/DR has become a separate line item for agency budgets and is often the first area of focus for budget reductions.

   Recommended Actions:

   - Develop an internal fund allocation, either through legislative appropriation or service fees to undertake necessary actions across all agencies.
   - Increase partnership outreach and identify communication mechanisms to formalize reporting for BCP/DR initiatives between OIT and its customers.

2. *Complete the Business Impact Analysis*

   OIT has taken steps toward identifying capabilities needed for maintenance of business operations across its own functions and those of its agency customers through IT support. As a best practice, business recovery needs and the drivers for the development of an Information Technology Continuity Plan (ITCP), also known as a disaster recovery plan (DRP), should be identified in order to understand the risk, governance, and participation needs of both OIT and its customers.

   OIT has not completed a risk assessment, or business impact assessment, as of 12/31/2014. We understand a BIA was in process prior to July 2014 but had to be re-performed due to the previous focus on technology platforms instead of critical business processes. In its previously developed strategic planning approach, OIT had identified the need for a business impact analysis to support the identification of key applications, infrastructure, and operational capabilities in order to inform statewide disaster recovery needs.

   The steps taken to date by the Business Continuity and Disaster Recovery manager to identify Tier One application needs have focused on recovery time objectives and recovery point objectives. These initial steps to identify critical components and business interruption exposures will help identify potential impacts and remediation alternatives that OIT and customer agencies can implement to minimize disruption to business processes due to adverse technology actions.

   Recommended Actions:

   - Complete the business impact analysis to identify the business needs and drivers in order to develop an IT Continuity Plan

3. *Complete Development of the IT Continuity Plan*

OIT has conducted analyses of technical matters that support business continuity and disaster recovery. The agency has performed and supported the performance of disaster recovery exercises for many of its customers to both identify needs and support capabilities in the event of a disaster.

CohnReznick noted a number of additional opportunities for improvement with the technical analyses that support a robust understanding of the technology components involved in the business processes that need to be maintained in the event of adverse shocks to Maine's IT environment. These areas included deeper identification of communications, hardware, and software components that support the business processes, as well as recovery abilities and needs for both data and staff. Additional procedural development and understanding of these areas will complement existing procedures that are undertaken to develop a stronger IT continuity focus.

Recommended Actions:

- Continue identification and analysis of technology components that support business processes across OIT internally and with its customer agencies.
- Develop a formal consolidated ITCP that addresses business continuity requirements defined in each agency's Business Impact Analysis

Data Analytics and Supporting Data Needs of Executive Branch Departments

Analytics and business intelligence have grown in importance and relevance in recent years as both the collection of data and analytic capabilities become more prevalent in all aspects of operations. In its previous assessment, OPEGA outlined analytics as an area of focus for technology in government.

OPEGA identified areas within analytics for OIT and set strategic goals to build analytics capabilities and better position OIT to provide knowledge and support across government. Although analytics and data needs were recently identified as a priority area for OIT and the Maine government, data collection actions, business intelligence tool use, and reporting tools have varying levels of maturity both at OIT and within individual government agencies.

Key analysis goals for this area include assessing OIT's progress and effectiveness in:

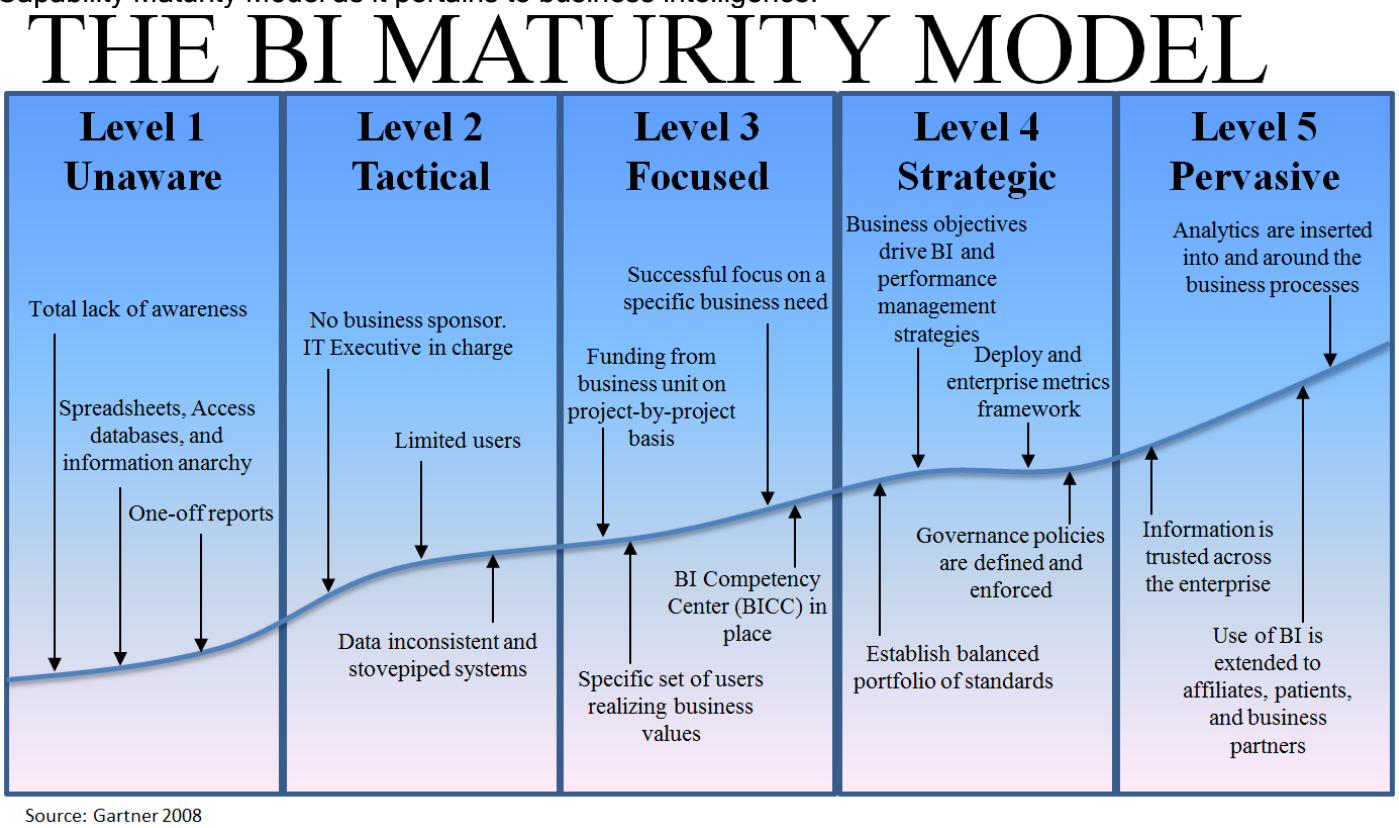
- Increasing/improving its capacity to support the data and analytic needs of analysts, management and decision makers in State agencies.
- The extent to which OIT is effectively facilitating data sharing and data analytics across State agencies.

During out initial assessment of the data capabilities of the executive branch, we assessed the overall maturity of the program using the industry standard Capability Maturity Model (CMM). The diagram below depicts the level of maturity of business intelligence for organizations. Based on the CMM model, there are 5 levels of maturity as follows:

1. Unaware
2. Tactical
3. Focused
4. Strategic
5. Pervasive

Based upon our analysis, The State of Maine agencies are at the tactical level. There are limited users, islands of information systems across the agencies, and no designated executive business sponsor.

Capability Maturity Model as it pertains to business intelligence.



Source: Gartner 2008

3

Key Assessments from Strategic Plan Gap Analysis

Table 3: Data Analytics Gap Summary

Gap Status	Resolved	Percent of Total
Resolved	0	0%.
Open	9	100%
Total	**9**	**100%**

OIT has made progress compared with previous observations regarding its analytics capabilities, but this is an area that was only recently identified as a priority focus. In the assessment of OIT, data applications and the management and execution of data sharing across agencies are business responsibilities, which OIT may play a role in hosting, but not directly own. Thus, the extent to which OIT is effectively facilitating data sharing and data analytics across State agencies is unable to be measured. As OIT continues to define its role in the Maine enterprise analytics ecosystem, increased assessment of this area should be considered.

[3] Source: Gartner 2008

In its 2014 study *States and Open Data*[4], the National Association of State Chief Information Officers (NASCIO) cited states such as Minnesota, leading the way in developing mature open data capabilities for their agencies and citizens. It noted that "State CIO [Carolyn] Parnell has assembled a commissioner level governance board….[that] is promoting a state enterprise perspective in viewing its information assets. Parnell believes that an enterprise approach to the management and governance of state data could yield substantial value for the state in terms of enhanced data sharing, improved program effectiveness and performance management, citizen engagement and more informed policymaking."

Importantly, the study agreed with the Maine OIT vision of data ownership, indicating that "the State CIO is not the custodian for all of this data…the individual state agencies are in that role." However, the study also suggested that the "benefits related to an enterprise and ecosystem thinking include moving toward or actually achieving: a single source of validated information that is stored once and shared across the enterprise, common terms and common definitions, and common business rules that contribute to optimizing business process and support establishing single authoritative data and process owners in government."

Consistent with the NASCIO view, OIT maintains that the State CIO is not the custodian for all this data, but differs on the enterprise role for standards development and execution.

As assessed against its strategic planning needs, the following observations were noted from OIT's performance as of 12/31/2014:

- The roles of OIT and agency personnel regarding data analysis and reporting initiatives need to be clarified.
- There are no defined service levels and quality metrics for data and analytics support provided to customers.
- Technology Business Consultants have not yet surveyed the customer groups they support to identify their analytics and data needs.
- There are no standard data analytics tools provided or training to agencies on analytics tools.
- The full-time Data Evangelist role has not been filled.

Although OIT's Data Analytics function has not completed the actions identified in its previous strategic plan, it is important to note that OIT has executed actions and achieved movement in this area. While not defined in its previous strategic planning goals, in 2014 OIT established an Enterprise Warehousing and Analytics group under the Associate CIO with responsibility for developing an enterprise cognizance of the state's data needs and, by extension, the need to deliver better services. The agency has developed awareness, activities, and maturity consistent with a learning organization in the areas of enterprise analytics and open data management.

OIT has begun to develop a partnership with Maine's Office of Policy and Management (OPM) to engage actors across the ecosystem of current and potential data users. This partnership recognizes that both OIT and agencies have significant roles to play in the development of actionable and defined enterprise data strategies, and seeks to better understand the pathways to facilitating interagency data sharing and the tools required to do so.

Significant progress has been observed in the understanding of analytics and the application of business intelligence across OIT's customer base. OIT provided application support for business intelligence tools including Oracle OBIEE, SAP Crystal Reports, and IBM Cognos as part of the services model employed by

[4] Source: National Association of State Chief Information Officers *States and Open Data: From Museum to Marketplace – What's Next?* Available at: http://www.nascio.org/publications/documents/NASCIO_EAOpenData_May2014.pdf

the agency, and conducted one individual-customer assessment of analytics needs and challenges via an "Information Reporting Health Check " when requested (and funded) by the customer.

Additional Priority Areas Identified

1. *Establish and Publish Service Level Standards*

   OIT did not introduce quality of service measurements for its systems analysts, or develop or maintain any service level agreements with the agencies it supports as customers. Neither technology nor human capital factors were tied to performance measures in the case of both business intelligence and non-business intelligence service functions.

   Recommended Actions:
   - Develop and maintain service level agreements between OIT and agency customers that include specific coverage for data programs and business intelligence capabilities.

2. *Establish Risk Management Process for Data Analytics*

   OIT services analytics needs and business technology tools as part of the maintenance and operational support provided to agencies that own the tools and host data on OIT-maintained servers. OIT did not have a risk assessment process or specific risk criteria developed or executed for data and analytics as of 12/31/2014.

   Data and analytics programs have sensitivities specific to their ownership and purpose. OIT did not conduct data classification or management activities to identify potential impacts to operations or unauthorized access to sensitive information during projects, because no policy or procedure was in place to analyze risks during the data support or maintenance processes.

   Recommended Actions:
   - Formalize and implement the risk analysis process into the new analytics project approach developed by the Enterprise Warehousing and Analytics team at both initial assessment and on an ongoing basis.

3. *Prepare a Comprehensive Data Policy*

   OIT did not have a formal, comprehensive data policy developed that was approved and maintained to govern the use and integrity of data across its own operations or that provided coverage for matters dealing with its customers.

   Recommended Actions:
   - Develop a formal data policy document that is approved by executive management and disseminate it throughout the organization as part of annual training requirements for any employee interacting with data or business intelligence tools.
   - Provide best practice advice to agencies across Maine government on data policy development including, but not limited to the following areas; data governance, roles and responsibilities, information sharing, data controls, service request and incident triaging, exceptions to the data policies, and internal data controls.

4. *Adopt Data Governance Policies*

In government, data has two key elements that require additional governance in order to successfully manage programs and maintain compliance with the expectations of customers and citizens. These two elements, data integrity and privacy, must be built into policy with maintained rigorous controls so disruptions and adverse actions do not result from OIT support.

OIT did not develop or maintain controls to manage data integrity and privacy risks specific to analytics projects or ongoing support initiatives for business intelligence programs. Although Personally Identifiable Information (PII) concerns were noted through the information security and awareness trainings, ongoing security actions to ensure understanding and analysis of potential impacts as part of ongoing initiatives were not conducted by OIT.

Recommended Actions:

- Develop and maintain controls as part of data policy to manage data integrity and privacy risks.
- Expand the project protocols developed by the Enterprise Warehousing and Analytics team to include executive oversight and governance for data integrity and usability.

5. *Establish Technical Standards*

OIT assumed the difficult task managing the success of a large number of disparate and complex information technology systems, including business intelligence applications owned by its customers. The agency has managed the coordination and care of the varying levels of maturity and governance associated with customer applications and policy.

Data structures, access, querying, and data collection were not standardized across OIT and varied significantly across the customer base OIT supports.

Recommended Actions:

- Develop governance and uniform structures for data components across OIT.
- Increase partnership efforts with customer agencies to strengthen technical standards within applications and application design to make data collection more efficient and actionable.

6. *Data Assurance Tools*

Software tools and governance to manage assurance for data and analytics activities occurred on a limited level within OIT's operations and across the operations of its customers. Incidents were captured and managed inside and outside of a formal ticketing system, which created visibility challenges and lack of insight on problem management.

Notably, information exchange across government via technological capability posed risks to both data integrity and data security. Data transfers occurred both inside formal business intelligence and data transfer tools, and also outside via e-mail and secure file transfer methods. This resulted in the possibility of unpermitted access and damage to the integrity of data being shared because of weak controls and poor access right maintenance.

Recommended Actions:

- Standardize incident management process to include analytic and business intelligence needs via a centralized capability with customer self-identification and self-service with core standards developed for ticket documentation and treatment.
- Implement security protocols and test access and data for security concerns in data policies and business intelligence projects.

- Develop visual automated controls for segregation of duties and access rights within business intelligence and data management functions.

7. *Monitor Business Performance Metrics*

OIT recognized the need for increased focus on metrics and key performance indicator development in order to better track and manage all of its operations, not just those restricted to business intelligence and analytics. The agency, like many of its customers, used metrics in basic reporting development, but did not undertake robust metric development or analysis related to return on investment or budget tracking.

OIT did not use metrics to maintain control of or monitor its software assurance program, nor did it provide related advice on success measurement to customers who sought to develop new or validate existing analytics programs. Program effectiveness was not a measured priority for OIT or its customers.

Recommended Actions:

- Establish Center of Excellence capabilities for analytics and business intelligence throughout Maine State government.
- Identify and execute efficiency gains from continuous analytic analysis to create positive feedback cycles for further adoption within OIT and with customers.

Case Study: United States Federal IT Dashboard

Launched in 2009 under CIO of the United States Vivek Kundra, the United States Federal Government embarked on a core IT analytics initiative to better facilitate the management and sharing of information to the public, across government agencies, and within policy-making groups to provide access to information and enable decision making.

The IT Dashboard is a website enabling federal agencies, industry, the general public and other stakeholders to view details of federal information technology investments. The purpose of the Dashboard is to provide information on the effectiveness of government IT programs and to support decisions regarding the investment and management of resources. The Dashboard is now being used by the Administration and Congress to make budget and policy decisions. The IT Dashboard displays data received from agency IT Portfolio and Business Case reports, including general information on over 7,000 Federal IT investments and detailed data for over 700 of those investments that agencies classify as "major." [5]

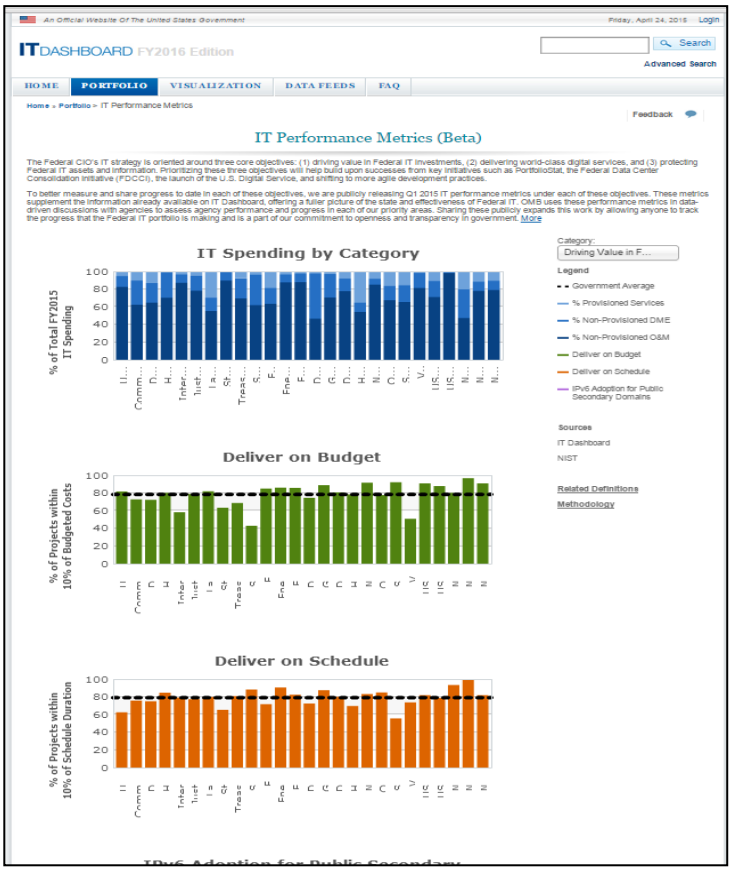


Figure 2: Federal IT Dashboard

Project Management

CohnReznick performed a gap analysis of individual goals, interviewing members of the OIT community, speaking with customer agencies, and obtaining key documentation to assess the status of the key actions previous outlined by OIT and OPEGA specific to IT project management capabilities, methodology, and practices with customers.

In this area, OIT has also undertaken significant change since its previous assessment by OPEGA. Key analysis goals for this area include assessing OIT's progress and effectiveness in:

- Converting to the Agile project management methodology.
- Increasing its capacity to manage the volume of current and anticipated projects.
- Improving performance on current projects as regards meeting expectations for timeliness, cost and quality.

[5] Source: US Federal IT Dashboard Website

Key Assessments from Strategic Plan Gap Analysis

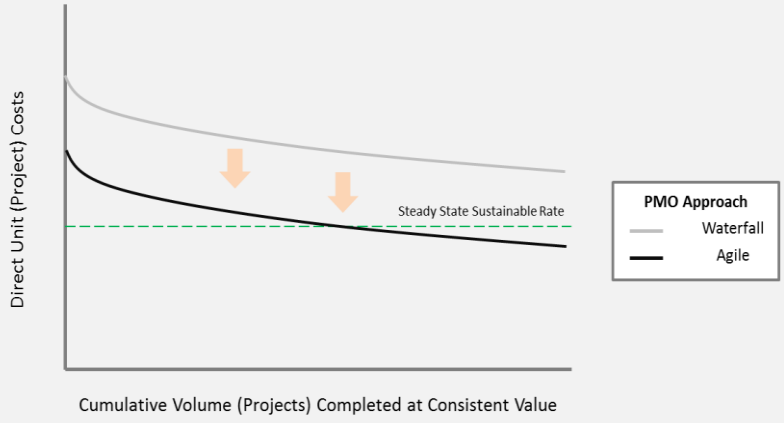
Table 4: IT Project Management Gap Summary

Gap Status	Resolved	Percent of Total
Resolved	31	67%
Open	15	33%
Total	**46**	**100%**

Relative to the other areas outlined in its strategic goals, OIT has made the most progress in developing its IT project management capabilities. Significant accomplishments include standing up a Project Management Office, beginning conversion to a new method of systems development and project management, and developing human capital capabilities to successfully execute business and technology projects.

Additionally, the PMO leadership team and the agency thought leaders have developed core capabilities to support execution of projects such as technology workflow and promulgation mechanisms to educate customers acrossState government. As a result, the integration of customers into project teams and the adoption of the Agile methodology have been significant achievements on the part of OIT. As seen in Exhibit 1, we believe that OIT has shifted its experience curve to a higher-value set capability with the opportunity to offer lower direct costs as it delivers more projects at the same value level. Compared to its position under a waterfall approach, the standardization and delivery capabilities associated with Agile will become more refined as OIT moves along its experience curve in project management and reaches a steady state with consistent constraint of resources and project availability.

Exhibit 1: OIT PMO Experience Curve



As assessed against its strategic planning needs, the following themes were observed from OIT's performance as of 12/31/2014:

- The Agile Center of Excellence was established through the adoption and promulgation of new capabilities, however a physical space and the Center's overall capabilities in Agile evangelism, training, research, and support for outside project teams are still in development.
- The project intake process which was formalized through an intake procedure within the technology workflow discipline did not include project managers until after project decisions and intakes had been completed.
- Project artifacts were defined as part of the key deliverables through the technology workflow discipline, but were not created uniformly across projects. The process for determining which key

artifacts were created was undeveloped and based on the subjectively assessed maturity level of the project team.

- Although it was developed and delivered to project managers, project teams, and customers who requested it, training on Agile was not tracked by the project management office.
- OIT had not fully adopted portfolio management capabilities or procedures across its project portfolio to obtain visibility into project performance and support reporting requirements across government, but did have a workable management visibility tool in place.
- Delivery rates and metrics were not yet developed or tracked across projects to gain insight into project completion cycles or performance.

Additional Priority Areas Identified

1. *Continue Developing Agile Policies, Tools and Agency Partnerships*

   After assessment by OPEGA, OIT undertook a transformation of its project management capabilities and its systems development methodology to move toward stronger partnership with business operators and the achievement of more consistent, successful project outcomes. In its transition to adopting an Agile methodology as its preferred systems development approach, OIT has laid an extensive foundation for capabilities and support around its new project management approach.

   By developing the support infrastructure OIT has opportunities for focusing on procedures, policy, and tools that can best support the processes involved with an Agile approach.

   Recommended Actions:

   - Develop formal criteria and policies for systems development methodology selection that addresses risk and best likely outcome analysis.
   - Develop robust project management policies that require and provide criteria for project documentation and artifact development and usage, and standards for development.
   - Migrate to a project management tool or capability that enables efficient project development, tracking, and reporting that supports the direction of the systems development methodology standard.
   - Adopt a measurement capability, such as Earned Value Management for Agile, to consistently and graphically track and measure value delivery in time boxes for projects.
   - Continue and expand partnership opportunities with agencies to better understand customer needs and improve delivery reputation of OIT throughout state government.

2. *Standardize Governance for Agile Projects*

   Similar to its supporting infrastructure, OIT has developed strong governance frameworks for its new project management office and project management approach. OIT has developed a core technology workflow to outline key components of the project lifecycle and supporting elements, including activities and deliverables for each stage.

   In practice, however, CohnReznick observed that compliance with and enforcement of the governance frameworks established by project management leadership were excepted in the sample of projects selected for analysis.

   Recommended Actions:

- Enhance management oversight of projects and compliance with policy and procedures to mitigate disagreements and keep management informed of progress.
- Develop standards for communications and escalation procedures.
- Strengthen the customer service function to enhance relationships, better understand needs, and support improved execution of projects and ongoing technology efforts.
- Implement a balanced scorecard measurement technique for reporting and dashboard analysis of programs.

3. *Standardize Agile Project Initiation Practices*

OIT developed project initiation capabilities through its formal intake process and technology workflow discipline. The agency took steps toward increasing the ability of customers to create project requests and service their own project needs through automated workflows and e-tools. These steps aided OIT personnel in understanding projects and managing the complex needs of customers through standardized requirements and risk and value analyses at the outset of the project. However, the fields for the business case were not mandatory and the lack of information supplied by customers resulted in information gaps in project development.

From project initiation, oversight varied with regard to levels of controls associated with project management functions. There was also significant variation in levels of analysis conducted for risk and potential issue mitigation throughout the project sample and OIT's observed methodology.

Informal subjective standards were applied to project assessments such as measurement of project team maturity by leadership, resource requirements, and alignment and familiarity with the customer mission and objective.This resulted in inconsistent experiences for customers and varying levels of achievement in project execution.

Anticipated costs were not developed as part of project initiation and no budget information or cost methodology was presented in project artifacts for the projects selected. We understand that OIT is working with the service centers to provide cost information on a proactive basis.

Recommended Actions:

- Develop required documentation for project management and systems development.
- Incorporate communications, training analysis, and planning as part of every project's change management requirements.
- Improve transparency of costs, including cost breakdowns for individual resources.
- Develop budget tools and require project managers to perform financial analyses and regularly report to customers.

4. *Improve Communication and Quality Management During Project Execution*

Projects executed using the newly adopted Agile systems development methodology were successful overall. OIT's governance for project workflows and iterative system design enabled successful project completion and achievement of goals in many cases. However, for several key areas related to project execution, best practices were not followed in some of the projects selected for sample.

Stage gating for projects including go/no-go sign offs and approvals from management teams (both project and business) are best practices that were not observed in the selected sample of projects except in one case where application deployment certifications were issued.

In project monitoring, risk and issue tracking were performed, but stakeholder escalation procedures were not observed. No escalation procedures were developed or executed outside of status meetings for projects observed. Additionally, it was noted by customers that during project execution, timely and relevant analysis of issues and escalation did not occur.

Two primary areas of change management were not addressed during the planning or execution of the projects selected for sample. These areas, communications and quality management, were not developed in the projects selected for sample. This included the development and execution of project communications plans and communication activities (outside of status meetings with stakeholders). Additionally, core quality assurance and quality management functions, such as standards for documentation, compliance with state and federal design requirements, and test report capture were not performed.

Recommended Actions:

- Implement change management capabilities into project management office functions including; learning and training development, stakeholder engagement and communications management, and culture adoption support.
- Require sign offs at all go/no-go milestones for project sprints to increase visibility.

5. *Consistently Conduct Project Closeout Meetings*

Project managers did not document formal project closure in observed cases of projects sampled. Only in one case was a 'definition of done' developed to support the close out of a project from both the business and technology perspective.

Similarly, project managers did not develop or obtain receipt of all project deliverables, other than sign offs for application deployment for software development projects. As a best practice, receipt of deliverables should be formally documented by all parties and tracked against project performance metrics to ensure compliance with outlined project goals.

Recommended Actions:

- Develop project close out signature requirements by all parties involved, including customer and project manager to ensure all issues are closed out and customer need is met.
- Develop remediation actions in the case of project failures to support customers in solving their problems.

6. *Consistently Perform Budgeting and Cost Analyses for Projects*

Budgeting and cost analysis are key components to successful projects, but were not performed in the projects selected for sample consistent with best practices of project management.

Project managers did not budget and monitor costs during the execution of projects. OIT's billing was handled outside the project team with limited data, regarding project spend and cost allocation of resources, available for tracking and assessment by either the project team or the customer agencies.

Recommended Actions:

- Put tools in place for project managers to perform budget to actual analyses at all times.
- Include project cost analysis as part of the portfolio management tool and balanced scorecard.

- Improve the billing function to better inform customers of variances and predicted challenges that affect budgets.

7. *Develop Testing Standards for Agile Projects*

OIT conducted testing as part of the systems development methodology in each sprint phase. However, test plans and test scripts were not captured for the projects sampled. As a best practice, the project plan should provide for adequate testing at the various stages of development, including definitions of the types of tests to be performed, the timeframe for testing, and documentation required.

Additionally, documented reviews of test results were not performed. As a go/no-go milestone, test analysis should include sign offs and approval from management.

Recommended Actions:

- Develop agency-wide standards for testing and test script development.
- Incorporate back-out planning as part of the overall testing process.

8. *Enhance Oversight of Third Party Providers*

OIT and its customer agencies regularly engaged third-party vendors when additional resources or capabilities were needed. In the project artifacts created, accepted Statements of Work and agreements to provide services were not signed, which puts project performance and deliverable fulfillment at risk.

No metrics or criteria were developed to support an analysis of vendor performance in the projects sampled that engaged vendors. Such metrics, including key performance indicators, can assist in assessing the health of the project and mitigate potential risks by identifying key measures of success throughout the project.

Recommended Actions:

- Ensure contract work is authorized and documented according to State of Maine contracting standards.
- Develop metrics and key performance indicators to track and manage third party vendor performance against project and contract objectives.

9. *Perform Post-Implementation Goals Assessment*

Post-implementation, OIT has focused on espousing the importance of its adoption of Agile, and its more robust capabilities, to deliver projects on time and at a higher value level to customers than was previously possible. As of 12/31/2014, OIT succeeded in completing a transition to Agile and managing its first sets of projects under the new methodology. OIT reflected on this move to better understand what it did well in project execution and identify areas for improvement.

OIT developed lessons learned around project execution, both on a sprint basis, and on an overall project delivery basis. It has adopted the attitude of a learning organization that has sought to identify challenges in its operating model and redefine its capabilities to align with best practices and be able to deliver the best value to customers.

The agency expressed its focus on evaluating projects against mission objectives outlined in the business case at the beginning of projects. In practice, this objective analysis, performed via key performance measures or objectively based metrics, was not performed. Success measures for

validating project performance against desired outcomes were inconsistently applied across the projects sampled. Building upon the business case, no project summary status or final reporting was developed to help OIT and its customers evaluate the performance of the project against overall outcomes. This included communications with customers regarding project close out and the resolution of any issues still facing the customer agency.

Recommended Actions:

- Ensure closure of issues with the customer and external vendors.
- Develop project close out metrics and final reporting keys.

Case Study: Utah Department of Technology Services Performance Management Dashboard

Ubiquitous in private corporations, and increasingly common in both federal and state government, dashboards and data visualization tools are used to collect, monitor, and manage data points from across an organization or an enterprise and provide drilled down details at a glance for viewers.

Utah's Department of Technology Services has adopted a balanced scorecard approach to reporting and data visualization for its overall operations, including its project management function.[6] Users are able to, at a glance, monitor the progress and performance levels of projects in the enterprise portfolio, understand any challenges, and assess their trends over periods. The portfolio management and performance management capabilities integrated into the scorecard enable operators, customers, and interested legislative parties to obtain the information needed to assess actions against overall strategic and tactical goals.

Department of Technology Services

Balanced Scorecard

DTS DEPARTMENT OF TECHNOLOGY SERVICES

Reporting Period: 4/15/2011 (March 2011)

Mission Statement: Bringing value and innovation to Utah through service and technology

Contacts: J. Stephen Fletcher, Director - 801-538-1758 Dan Frei, Finance Director 801-538-3459

Key Indicators	Status	Trend	Target	Current	Previous	Frequency	Metric Definition
Infrastructure Optimization: Strive for operational excellence that includes streamlining organizational processes							
Customer satisfaction with DTS		↑	4.50	4.65	4.63	monthly	Ongoing Help Desk customer satisfaction metrics (surveys are sent to customers upon submission of Help Desk ticket).
Infrastructure Uptime		↑	90%	94.74%	90.67%	monthly	Number of days with no infrastructure outages. Products include: Network, Wireless, Voice Telephony Network, Email System, PDAs, Security, Data Center, Remedy.
DTS Productivity		↓	55%	59.56%	59.85%	quarterly	DTS activities are defined as *discretionary* (new application, new services, etc.) and/or *non-discretionary* (break-fixes, maintenance, etc.) use of resources. The current target for this metric is 55% non-discretionary use of DTS resources. Ultimately, the target for DTS will be 40%.
Enterprise Optimization: Provide service our customers expect with innovation and value (see SLA tab for detail information on each Agency)							
Service Level Agreements: Application Availability target achieved		↓	99%	99.78%	99.93%	monthly	IT Directors report the availability of key agency business applications.
Service Level Agreements: Total Time to Resolution target achieved		↓	90%	88.54%	93.54%	monthly	Reported through Remedy - Identifies the average time to resolve customer's issue.
Service Level Agreements: Time to Initial Response target achieved		↓	85%	88.39%	92.93%	monthly	Reported through Remedy - Identifies the average time to respond to customer's need.
Service Level Agreements: First Contact Resolution target achieved		↓	65%	45.75%	51.08%	monthly	Reported through Remedy - Identifies percentage of customer's issues that are resolved with first point of contact.
DTS Interaction with Agency Business Leaders		↑	100%	100.00%	95.24%	monthly	IT Directors meet with Agency Business Leaders monthly.
Procurement - Number of Days to Process Customer Order		↓	5.00	2.23	2.45	monthly	Reported through Remedy - Based on average business days from Purchase Request entry in Remedy to Order Submitted to Vendor Date
Change Management - Monitor and Track Changes to minimize impact to customers		↓	15%	12.59%	14.42%	monthly	Number of Change Management Requests that are Emergency or Expedited (submitted within 2 weeks of required service)
Projects on-time		↓	100%	96.40%	98.10%	monthly	Activities within projects are on time: 268 of Total 278 Projects
Projects within budget		↑	100%	94.60%	93.65%	monthly	Activities within projects are within budget: 263 of Total 278 Projects

Major Project Summary:

Project	On Time		On Budget	
	actual	target	actual	target
IRIS (A.G.)	100%	100%	100%	100%
ITSM	100%	100%	158%	100%
MMIS	95%	100%	100%	100%
Desktop Optimiz	100%	100%	100%	100%

Financial: Achieve financial targets							
DTS Revenue targets achieved		↓	100%	98.9%	100.1%	monthly	Revenue is within 3% of target (above 100% = over-budget, below 100% = under budget) This figure ties directly to DTS Rates
DTS Cost targets achieved		↓	100%	97.9%	98.2%	monthly	Cost is within 3% of target (above 100% = over-budget, below 100% = under budget)
eGov							
Number of Online Services		↑	935	943	927	quarterly	Number of services that all Agencies provide online
Security Enhancements							
Security Vulnerabilities Resolved		→	100%	100.00%	100.00%	quarterly	Number of Corrective Action Milestones achieved, Vulnerability Scans completed, and Vulnerability findings that have been remediated during the quarter.
Number of Security Awareness Trainings Completed		↑	25.00%	58.31%	16.97%	monthly	Percentage of State employees who have completed Security Awareness Training. Target changes monthly (currently 2 of 12 months). Annual target is 95%.

Note: The Service Level Agreement metrics indicate the impact of the Working 4 Utah initiative on DTS Customers.

Figure 2: Utah DTS Balanced Scorecard

[6] Source: Utah Department of Technology Services Strategic Plan 2011-2014

Appendix A – Detailed Observation Listing

Business Continuity Planning and Disaster Recovery

Business Continuity Planning and Disaster Recovery (BCP/DR)	
IT continuity framework Best Practice: A framework for IT continuity to support enterprise wide business continuity management using a consistent process should be developed. The business continuity effort should be sponsored by the management of the business units or a business continuity task force. The framework should address the organizational structure for continuity management, covering the roles, tasks and responsibilities of internal and external service providers, their management and their customers, and the planning processes that create the rules and structures to document, test and execute the disaster recovery and IT contingency plans. The plan should also address items such as the identification of critical resources, noting key dependencies; the monitoring and reporting of the availability of critical resources; alternative processing; and the principles of backup and recovery.	
Organization and Governance Objective: The business has established a business continuity task force/committee/organization to establish and maintain a business continuity process.	
BCP-O1	**BCP Budget:** OIT had set aside funds for BC/DR activities. However, OIT did not have its own budget assigned from the State of Maine. Instead of a budget, OIT used an internal fee-for-service fund. Agencies made their own decisions regarding how much they wanted to invest in the BC/DR initiative.
BCP-O2	**BCP Team Member Roles:** Per discussion with the BC/DR Manager, key BCP roles and responsibilities were assigned at an appropriate level of authority. The IT Disaster Executive Management Team (DEMT) and the Disaster Recovery Team (DRT) were listed in the Cavan Group report (issued in 2013). However, there was no evidence of the most updated list of key BCP members and roles.
Participation Objective: The business continuity function includes representatives from affected business areas and IT, and the responsibility for the business continuity function is assigned to business operations and not IT.	
BCP-O3	**BCP Sponsorship:** There was no centralized entity with the proper authority to direct both OIT and the agencies to achieve the BCP/DR goals. Agencies made their own investment decision regarding BCP/DR. OIT did not have the authority to require agencies to invest in BC/DR capacity and participate in the planning.
BCP-O4	**BCP Process Reports Responsibility:** Although the BC/DR Manager communicated the BCP/DR need within OIT to the OIT Chief Information Officer (CIO), the overall support and resources needed for BCP/DR for all the agencies were not clear. There was no formal communication/reporting process defined between OIT and the agencies regarding the BCP/DR budget. OIT did not have the authority to require any communication or reporting from the agencies.
Business Assessment Best Practice: The business recovery needs and the drivers for the development of an ITCP plan should be identified.	
Risk Assessment Objective: Risk assessment and BIA methods are utilized to establish business interruption exposures, their probability and impact, and remediation alternatives.	
BCP-O5	**Risk Assessment Performance:** A BIA had not been completed as of 12/31/2014. A full risk assessment was not performed as of 12/31/2014. The BC/DR Manager planned to include a risk assessment as part of the OIT's BIA.
ITCP Development Best Practice The ITCP should be complete and should address the business continuity requirements defined in the BCP.	
Communications Objective: The communications components necessary to provide network access to the computing facilities are included in the ITCP.	

Business Continuity Planning and Disaster Recovery (BCP/DR)	
BCP-O6	**Network Administration Department Organization** Not all the IT managers or representatives listed in the application inventory sheet were identified on the OIT organizational chart. The application inventory spreadsheet was not updated to reflect the role changes in the organizational chart.
Hardware Objective: The hardware configuration and procurement plans provide for the ability to acquire and configure hardware within the interim period established in the BCP.	
BCP-O7	**Hardware Inventory** An inventory of computer hardware was not available.
BCP-O8	**Hardware Configuration Layout - Floor Plans** The data center floor plan did not identify the physical location of each hardware device.
Software Critical Systems and Applications Objective: The critical applications and supporting platforms have been identified, and the required software and data are available for interim processing and restoration, and are in alignment with the BCP.	
BCP-O9	**Inventory of Critical Applications** Obtained the "App Server Agency Report" and verified that inventory of applications exists. However, the applications were not prioritized.
BCP-O10	**List of users and skills for application recovery** A list of critical applications was not available. Not all applications had a list of users maintained.
BCP-O11	**Employee and Vendor Contact List for Systems Software Version** The application inventory spreadsheet was updated to reflect the role changes in the organizational chart. The alternate contact name was not identified for each application.
BCP-O12	**Systems Programming Department Organizational Chart** All the application IT manager/representatives listed on the application inventory spreadsheet were not identified on the OIT organizational chart.
Data Recovery Objective: Data recovery procedures have been established and tested to ensure availability of data.	
BCP-O13	**Data and Operating System Restore Procedure Testing** The data retention standard stated that sample recoverability testing at the file level and full application recovery is done through the initiation of a Footprints ticket by the Development Team or data owner. However, OIT confirmed that no periodic restoration tests were performed.
BCP-O14	**Workstation Inclusion in Backup Process** The backup process did not include workstations for interfacing to the applications listed in the backup process.
BCP-O15	**Backup Lost Data Recovery Procedures** Specific procedures were not established to address the recovery of data lost between the last backup and the time of disaster.
Staff Recovery Objective: Staff responsibilities, notification, substitution, and access procedures are in place to permit the timely assembly of staff and the commencement of interim and/or restoration procedures.	
BCP-O16	**Staff Recovery Plan Documentation** Noted OIT's Business Continuity and Disaster Recovery Policy was in draft form and defined the BC/DR purpose, general direction, key roles and responsibilities. However, the policy was not executed as of 12/31/2014. Key BCP roles and responsibilities were assigned at an appropriate level of authority. However, there was no document identifying the current list of key BCP members and roles.
Plan Maintenance Objective: The plan is maintained through inclusion in the systems development methodology, routine review of plan components and linkage to BCP reviews and enhancements.	
BCP-O17	**Plan Maintenance Responsibility and Procedures** A BCP or DRP was not complete as of 12/31/2014.

Data Analytics

Data Analytics and Business Intelligence (DA)	
Risk Management Best Practice: All data support and maintenance processes are subject to the organization's routine risk assessment process.	
Initial Risk Assessment Objective: Management performs a risk assessment prior to implementing any material software development, acquisition or maintenance program.	
DA-O1	**Routine Risk Assessment Documentation** A formal process was to be followed during the define and design phases of project work related to data and analytics. The process included conducting an analysis and examining potential risks. However, this process was not introduced in practice as of 12/31/2014.
DA-O2	**Risk Assessment Approval Documentation** No documentation to support risk assessments related to business intelligence or analytics projects was created.
Ongoing Risk Assessment Objective: A risk assessment is performed and approved by management whenever major changes are initiated to software development, acquisition or maintenance programs to support data needs.	
DA-O3	**Ongoing Risk Assessment Documentation** A formal process was to be followed during the define and design phases of project work related to data and analytics. The process included conducting an analysis and examining potential risks. However, this process was not introduced in practice as of 12/31/2014.
DA-O4	**Risk Assessment Approval Documentation** No documentation to support risk assessments related to business intelligence or analytics projects was created.
Data Policy Best Practice: The organization has defined, documented, approved, deployed, and then maintains a comprehensive data policies.	
Data Policies Objective: A data policy document exists, is approved by the highest level of management and is disseminated in the organization.	
DA-O5	**Data Policy Documentation Existence** Neither OIT nor the agencies selected for sample, outside of the Department of Transportation, had documented data policies. OIT's policy on data was still in development as it defines its own responsibilities and capabilities vis-a-vis its customer responsibilities. The lack of data policy documentation included the lack of identification of a purpose for business intelligence excellence, standardized governance and monitoring metrics, role for managing data within the organization, and provisions for continued data availability with cross-agency analytical capability. OIT did, however, possess information security and awareness policies which, although not focused on data governance or business intelligence, provided guidance to employees on essential training related to overall information security.
DA-O6	**Data Policy Documentation Verification** The Department of Transportation defined data policies via its Data and Systems Governance Model, which was updated during August of 2014. It was the only selected agency with formalized data policies.
DA-O7	**Data Policy Documentation Definitions – Purpose and Metrics** The Department of Transportation's Data and Systems Governance Model and One DOT policy outline the level of detail including purpose for business intelligence use, but such details were not noted in any other data policy examined to be in place as of 12/31/2014.

Data Analytics and Business Intelligence (DA)	
DA-O8	**Data Policy Documentation Definitions – Role Identification** The Department of Transportation's Data and Systems Governance Model and One DOT policy outline the level of detail including specific roles and working groups, but no other organizational roles were noted in any other data policy examined to be in place as of 12/31/2014.
DA-O9	**Data Policy Documentation – Cross Agency Data Availability** Cross agency analytical capacity was not observed to be a robust capability. The selected sample of agencies indicated that structural barriers to information exchange and usability of data generated both internally and externally, as well as lack of procedural awareness, have inhibited the continued availability of data.
Data Policy Completeness Objective: The data policies cover all aspects of Deliver, Service, and Support functions (DSS).	
DA-O10	**Data Policy Coverage – Operations Management** Data policies related to business intelligence and analytics capabilities had not been developed and implemented by OIT as of 12/31/2014. Thus, no definitions of service levels or capabilities including problem management or problem resolution were in place specific to data and analytics. Additionally, as no data policy related to business intelligence and analytics was developed as of 12/31/2014, training requirements for continuity of data management are not defined.
DA-O11	**Data Policy Coverage – Management of Service Requests and Incidents** Data policies related to business intelligence and analytics capabilities were not developed and implemented by OIT as of 12/31/2014. Thus, no governance specific to the management of service requests and incidents related to business intelligence functions (aside from standard technical service functions) was in place.
DA-O12	**Data Policy Coverage – Manage Problems** Data policies related to business intelligence and analytics capabilities were not developed and implemented by OIT as of 12/31/2014. Thus, no governance specific to the management of problems related to business intelligence functions (aside from standard technical service functions) was in place.
DA-O13	**Data Policy Coverage – Manage Continuity** Data policies related to business intelligence and analytics capabilities were not developed and implemented by OIT as of 12/31/2014. Thus, no governance specific to the management of problems related to business intelligence functions (aside from standard technical service functions) was in place.
Data Policy Exceptions Objective: Exceptions to the data policies are rigorously controlled.	
DA-O14	**Data Policy Exceptions – Policy** In select cases where interagency information sharing is required, specific Memoranda of Understanding or Memoranda of Agreement were required to be developed, per agency specific policy and level of maturity, which was noted at the Department of Transportation, the Department of Education, and the Department of Agriculture, Conservation, and Forestry. However, no standard inter-agency policy existed as directed by OIT or within OIT for facilitating information sharing related to analytics.
DA-O15	**Data Policy Exceptions – Control and Documentation** Development and maturity of data policies with respect to exceptions varied significantly across the selected sample, ranging from non-existent, to formally documented with legitimate governance capabilities embedded in policy. Thus, proper documentation of exceptions to standards was not controlled in cases where data policies did not exist and channels to obtain certification for exception did not exist.
Service Level Agreement Best Practice: The organization has defined, documented, approved, deployed, and then maintains a comprehensive SLA with all its services.	
Service Level Agreement Objective:	

Data Analytics and Business Intelligence (DA)	
A SLA exists per IT service arranged between OIT and the executive branch agencies, is approved by the highest level of management and is disseminated in the organization.	
DA-O16	OIT did not generate or maintain any SLAs when initiating data support services for agencies or the executive offices.
SLA - Completeness Objective: The SLA covers all areas of the service to be conducted.	
DA-O17	**SLA Completeness** OIT did not generate or maintain any SLAs when initiating data support services for agencies or the executive offices. Thus, no coverage was in place for Enterprise Resource Planning, Operations and Compliance, Program/Policy Analysis, Targeted Agency Benefit, Incidence Management Planning, Service Objectives, Agency Requirements, or Maintenance Scheduling.
SLA - Exceptions Objective: Exceptions to the SLA are rigorously controlled.	
DA-O18	**SLA Exceptions** OIT did not generate or maintain any SLAs when initiating data support services for agencies or the executive offices.
Data Risk Management Best Practice: The organization maintains controls to manage data integrity and privacy risks.	
Risk-Based Development Objective: Risk management is embedded into the software development process.	
DA-O19	**Risk Analysis in Data Policy** Risk assessments related to data were not included in the policy for data projects as of 12/31/2014. However, a formal project and risk analysis process via data classification efforts was built into standard methodology to reduce potential impact in future design cases.
DA-O20	**Risk Analysis Performance in Data Software Projects** No risk analysis was performed related to business intelligence or data functions as part of the software development process as of 12/31/2014.
DA-O21	**Risk Analysis – Security Assessment** Risk management, as it relates to potential business impacts or downstream impacts on other operational elements was not conducted by OIT during the software development or modification process, as it relates to data functions. This was viewed as a business-driven responsibility and not an OIT mandate.
DA-O22	**Predictive Analytics Use in Business Intelligence** No predictive analytic capabilities were observed to be in practice for either any agency sampled or OIT.
Data Privacy Objective: The management process takes specific account of data privacy issues.	
DA-O23	**Application Classification Based on Sensitivity of Data** As of 12/31/2014 within OIT, data classification did not occur either on an application basis or a component basis within applications.
DA-O24	**Data Retention and Categorization Metrics** Data retention and categorization were observed to vary by agency and by control level. Only one selected agency created a governance structure to support categorization and organization of data. It was noted in an interview with an agency customer supported by OIT that data retention and categorization was previously conducted under a custom application, but that information was deleted and never restored based on determination of a security breach by OIT, causing the loss of large amounts of historical data and no recovery option. No data retention policy was in place or service agreement governing data management in this specific case.
Data Integrity Control Objective:	

Data Analytics and Business Intelligence (DA)	
The management process takes specific account of data privacy issues.	
DA-O25	**Personnel Data Access and Change Capability** Data access and change procedures were observed to vary significantly across agencies and were dependent upon both data policies and the tool set used to capture and manage the data. OIT was not observed to be managing or monitoring the permissions of agency personnel to alter data or data structures.
Technical Standards Best Practice: The conversion of the application design into machine-executable code (programming) embodies industry-standard software assurance good practices.	
Data Processing Objective: The management process ensures the conversion of the application design into machine-executable code (programming) which embodies industry-standard software assurance good practices.	
DA-O26	**Data Dictionary Sub-Committee – Coding Standards Provision** Each agency maintained their data repository within their data schema.
DA-O27	**Data Warehouse Evaluation** Agencies discussed with OPEGA that they had to use different queries to get the same data due to different tools such as Access Data warehouse or a SQL database being used across agencies.
DA-O28	**Data Collection Approach** Approaches and methods for collecting, gathering, and measuring data varied widely based on maturity level of organization with respect to analytics capabilities and reporting requirements.
DA-O29	**Data Drill Down, Interoperability, and Abstraction Development Planning** Data structuring as a form of planning at an agency level was only observed to be formally planned and developed as part of the development process by the Department of Transportation in their Data and Systems Governance Model.
Data Assurance Tools Best Practice: Automated software tools are used for assurance in the managing incidences and problems.	
Incident Tickets A ticket tracking tool is deployed to capture all reported incidences.	
DA-O30	**Standards and Documentation** A standard of capture for reported incidences or problems did not appear to be in place. Information was tracked by ticket number in some cases, however in other cases, it was indicated on the provided documentation that reports of incidents were tracked via email.
Dynamic Code Analysis ***Objective:*** A dynamic code analysis software tool is in use to detect faults in all new and maintenance code before the code is deployed into production.	
DA-O31	**Information Exchange Tool** Data exchange methods varied between agencies and the methods for transferring information differed significantly amongst groups. It was observed that agencies such as the Department of Transportation had robust information sharing abilities within their own internal business intelligence tools, while others, such as the Department of Agriculture, Conservation and Forestry, relied upon secure email or FTP transfers to share information.
DA-O32	**Data Linkage Documentation Support Tool** It was observed that no tool was in place to support data linkages and cooperation between agencies or applications.
DA-O33	**Change Effort Support Tool** It was observed that no tool was in place to support agency change efforts and incident resolution specifically related to business intelligence.
Security Testing Objective: All access and data are tested for security.	
DA-O34	**Security Testing Program and Documentation**

Data Analytics and Business Intelligence (DA)	
	No security testing program was observed in any of the agencies selected for review as part of a business intelligence function.
Logical Access Objective: Segregation of duties exist within critical applications	
DA-O35	**Access Rights Maintenance** Access rights to data and level of sophistication among data stewardship and technological management vary by agency. While staff is trained in information security according to State of Maine requirements, access rights to data and role-based permissions were not observed in cases where data management and exchange capabilities were immature. Noted in an interview that all agencies selected for sample have role-based governance for information security. In the case where a robust tool set is used, such as within the Department of Transportation, role based access is controlled by the tool.
Metrics Best Practice: Suitable metrics are maintained to control and monitor the software assurance program.	
Metrics Development and Use Objective:	
DA-O36	**Business Intelligence Rollout and Usage IRR Measurement** IRR metrics were not observed to be developed or evaluated by OIT. Ongoing IRR or ROI metrics were not observed to have been captured as part of any agency's roll out of business intelligence capabilities.
DA-O37	**Business Intelligence Initiative Budgeting and Tracking** As agencies within the State of Maine utilized business intelligence initiatives primarily on an ad-hoc and needs-based basis, the initiatives were not allocated budgets.
DA-O38	**Measurement Tools for Financial and Non-Financial Impacts of Analytics Initiatives** Management tools, including balanced scorecards for program effectiveness reporting views, were not used.
People Capability Model Objective: High performing organizations extend the Capability Maturity Model to key personnel, such as software and security specialists, technical specialists (DBAs and architects), and IT management, with the goals of "doing more with less," reducing turnover and improving work products.	
DA-O39	**Internal Marketing or Success Recognition in Data Efficiency** No such marketing or success recognition with respect to data efficiency or customer service was captured, relative to business intelligence functions.
DA-O40	**Center of Excellence Access** No center of excellence related to analytics existed within the State of Maine. Due to funding challenges, the Enterprise Warehousing and Analytics group was unable to provide "Center of Excellence"-like service, support, and knowledge to agencies.

IT Project Management

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Understanding Supporting Infrastructure Best Practice: The systems development and project management process are supported by entity standards, processes, and procedures. To properly evaluate the process, the supporting infrastructure needs to be reviewed and evaluated.	
Agile Determination Process Objective: Understand criteria for determining which projects follow Agile process and which follow non-Agile process.	
PM-O1	**Agile Process Determination Criteria** The PMO identified that an Agile approach was not applicable for some projects. It was observed that the criteria included risk associated with project, most notably maturity of team, level of familiarity with Agile methodology, and expected budget. It was noted that for projects which are expected to incur over $1 million in costs, a hybrid model may be chosen as the development methodology upon customer request. No formal documentation existed that outlines these criteria.
Project Management Policy Objective: Ensure project management policy requires project documentation, and provides guidelines and standards for project documentation.	
PM-O2	**Project Management Documentation Policy** It was noted that PMO managers and teams have been instructed that, based on the level of maturity, oversight, and control required by the project office and customer, project artifacts are produced at the Project Manager's discretion. Not all projects included the same level of documentation or the same documented project artifacts.
Project Management Tools Objective: Determine if project management tools have been implemented and used consistently.	
PM-O3	Though the Agile project management tools have been implemented, Project Managers used individual tools at their discretion.
Governance Best Practice: Management should provide adequate governance over the project to ensure that the project is adequately defined and approved by senior management and the business, and technical resources are assigned. Procedures should be defined to keep management informed of the progress. Communications and escalation procedures should be in place to allow management to respond to issues as they arise.	
Business Case Objective: A business case has been prepared and reviewed by management. The business case is the rationale for initiating the project, expected benefits, estimated costs, and key attributes to evaluate the success of the project.	
PM-O4	**Business Case Component Review** The 'Project Request form' (PM-2b) allowed project initiators to insert qualitative/quantitative ROIs and KPIs for the project. However, in practice the development of a formal business case was not always applied. This was observed in two of the selected projects (DOE- Nutrition Project, and DAFS- Load Balancer Project).
Scope Management Objective: The initial scope of the project has been established through a feasibility study, alignment with the IT architecture and the development of an initial high-level project plan.	
PM-O5	**Feasibility Study Development** No formal feasibility study was observed to have been conducted prior to undertaking any of the selected projects. However, it was noted during an interview with the OIT Business Analyst and PMO lead, that upon receiving a project request, a business analyst representative form the OIT team would meet with the project requestor to conduct an initial understanding of the business need and project definition.
PM-O6	**Feasibility Study - Scoping Decisions** The selected projects were not scoped based on a feasibility study or in a standardized way based on the project intake and management components of OIT's processes.
PM-O7	**Management Review of Scope** Scope reviews were noted in two of the three projects selected for sample under this assessment. The DOE Nutrition project was not observed to have a formal scope sign off or acknowledgement associated with it.

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Roles and Responsibilities Objective: The responsibility for the project is assigned to senior stakeholders from the affected business units and IT.	
PM-O8	**Steering Committee Establishment** Only one of the three projects selected for sample provided a comprehensive charter outlining the steering committee and organization chart with effectively delegated roles and methodology for issue approval, escalation, and management.
PM-O9	**Executive Sponsor and Chairperson Determination** Only one of the three selected projects provided a comprehensive charter outlining the executive sponsor, chairperson, and organization chart with effectively delegated roles and methodology for issue approval, escalation, and management.
PM-O10	**Chairperson Adequate Authority** Only one of the three selected projects provided a comprehensive charter outlining the executive sponsor, chairperson and organization chart with effectively delegated roles and methodology for issue approval, escalation, and management.
PM-O11	**Business Unit Representation in Steering Committee** Only one of the three selected projects provided a comprehensive charter outlining the organization chart with effectively delegated roles and methodology for issue approval, escalation, and management, including those at a business unit level.
PM-O12	**Steering Committee Role** Only one of the three selected projects provided a comprehensive charter outlining the steering committee and organization chart with effectively delegated roles and methodology for issue approval, escalation, and management.
PM-O13	**Project Leadership – IT or Business** IT Project leaders were identified as the OIT PMO assigned project manager in each of the sample projects selected.
PM-O14	**Project Manager Consultation for Project** It was observed that MOUs were not signed off on by the project manager in one of the selected projects. However, in other cases earlier Agile projects did not use an MOU as a basis of establishing sign off between project management and the business owner.
Return on Investment and Key Performance Indicators Objective: Metrics to objectively evaluate the success of a project are established.	
PM-O15	**ROI Definition in Business Case** It was noted that assessment of metrics across projects was not observed to be a standard practice of the project management office. Thus, expected ROI is not a metric that is noted or calculated in project decisions.
PM-O16	**KPI Establishment for Team Performance** No KPI measures were observed to be developed to track performance of project team or project, other than task completion percentages internal to the project.
Escalation Management Objective: Escalation of serious project issues should be directed to the steering committee and senior management on a timely basis; the escalation should be documented and resolution monitored.	
PM-O17	**Escalation Management Procedure** An escalation hierarchy was observed in project documentation for one of the three selected projects, but did not include specific procedures for documenting or escalating issues across project components.
Project Management Best Practice: The project management approach should be commensurate with the size, complexity and regulatory requirements of the project. The project management controls should ensure adequate oversight of the project (financial, meeting deadlines, etc.), appropriate involvement by the stakeholders, iterative evaluation of risks, monitoring of issues, and escalation of issues where required.	
Integration of business/information management Objective: The business and information management teams are integrated, information requirements are clearly documented, project objectives are aligned with the business and information strategies; and all affected business units are involved in the project. The steering committee reviews the effectiveness of the integration.	

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PM-O18	**Project Team Alignment with Organization Strategy** It was noted that while integration on the project team was highly centralized to the project, integration with other components of business and IT capabilities for customer organizations was lacking and posed challenges in executing projects because of visibility into larger business areas and unit objectives.
Composition of Project Team Objective: The project team consists of a project team leader with appropriate project management experience and the team members have the appropriate skill sets and authority levels from their respective business units.	
PM-O19	**Project Team Leader Experience** Project managers were observed to have varying levels of skill, professional experience, and experience with the OIT framework and methodology of managing projects. As such, certain project managers were granted more authority by the steering committee than others. Observed that the amount of project documentation and artifacts required to be developed in order to effectively monitor the project varied significantly.
PM-O20	**Project Team Skills** There were varying levels of skill in the composition of project teams. Project team members are selected on the basis of their association with customer agency and skill set in customer specific applications. As a result, less mature project teams required additional project artifacts to be created and an increased level of visibility in order to maintain sufficient oversight and support for project objectives.
PM-O21	**Agile Center of Excellence Talent Acquisition** The Agile Center of Excellence is still in the process of obtaining all the talent and skills required for completion.
Risk and Issue Management Objective: Risk analysis has been applied to the project during the initial phase; risks have been identified. Where risks can be mitigated, appropriate processes have been implemented; where risks are inherent to the process, appropriate monitoring processes are in place.	
PM-O22	**Initial Risk Assessment Performance** Observed that the initial risk assessment was performed as part of the business case development by customer agency and mitigating factors were considered. However, only one of three projects selected for sample had documented their risks on an initial basis.
PM-O23	**Comprehensiveness of Initial Risk Assessment** A full risk assessment was applied to the business case for one of three projects sampled with only a basic risk analysis and mitigation factors considered.
PM-O24	**Steering Committee Review of Risk Assessment** Observed during interview with PM that risk and issue management was part of an overall project management function, with the SharePoint risk tool being used extensively across managed projects to identify, document, and monitor risks. SharePoint platform also included a dashboard that enabled visual representation and at-a-glance. However, there was no indication that risk monitoring via the tool is performed by the steering committee team upon initial risk analysis performance.
Escalation Procedures Objective: Escalation procedures are established to include monitoring by the steering committee.	
PM-O25	**Escalation Plan** Observed escalation procedures in one of three projects selected for sample and confirmed a project's components were escalated by project hierarchy. Other projects selected for sample did not use an escalation methodology outside of project status meetings.
Quality Management Objective: Project sponsor has defined specific quality expectations and criteria.	
PM-O26	**Quality Management Identification** It was observed in the completion of the business case for specific outcomes that successful conditions are requested to be documented via business case e-form. However, there was no quality management function or criteria other than documented requirements for projects, which were completed in only one of three projects selected for sample.

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Communications Objective: A communications plan is established to provide stakeholders and project leadership with appropriate information to ensure that the project meets functionality, budgetary and timeline goals.	
PM-O27	**Communications Plan Assessment** No formal communications plans were documented in any of the projects sampled.
Budget Best Practice: The budget and accounting processes should be accurate, complete and provide the information necessary to manage the project.	
Accounting Objective: The recognition of expenses vs. capital expenditure is in compliance with tax and accounting principles.	
PM-O28	**Capital Expenditure Request Approval** Observed that project billing and invoicing was done on service fee basis by employee assigned to the project and reconciled by OIT procedure and policy outlined in Memorandum of Understanding with customer agency. Every 2 weeks customer was billed for services at fully burdened rate of employees assigned to project. Two of three projects selected for sample did not use an MOU for consultation. The one MOU that was observed had billing terms, but it was not signed.
Governance Best Practice Management should provide adequate governance over the project to ensure that the project is adequately planned and the business and technical resources are assigned. Procedures should be defined to keep management informed of the progress. Communications and escalation procedures should be in place to allow management to respond to issues as they arise.	
Business Case Objective: On a regular basis, the project team leadership monitors and provides reports to executive sponsors on the continued alignment of the project plan with the business case.	
PM-O29	**Stakeholder Documentation of Objective, Scope, and Business Value** It was observed that receipt of formal documentation defining objective, scope, and business value of project prior to the work beginning in the project phase was only noted in two of the three projects selected for sample. One project did not have a signed MOU or business case acknowledging the criteria for the project.
PM-O30	**Documented Acceptance of Projects** Documentation of project acceptance by key stakeholders, executive sponsors, and steering committee was observed in only two of the three projects selected for sample.
Scope Management Objective: The scope of the project is clearly defined and a project plan has been developed that clearly identifies the phases, processes and sub processes. Responsibility for managing scope changes is defined and procedures are in place to obtain approval of scope changes from the project steering committee or executive sponsors.	
PM-O31	**Scope Change Procedures** Scope change procedures were not outlined in OIT documentation or observed to occur on the three projects selected for sample.
Roles and Responsibilities Objective: Roles and responsibilities of the project team are clearly identified; appropriate subject matter experts and stakeholders are included on the project team; and the division of responsibilities is appropriate for the project and entity level organizational structure (including separation of duties).	
PM-O32	**Project Team Role Definition** Only one project of the three selected for sample included role definitions as part of a project hierarchy.
PM-O33	**Project Team Inclusiveness** Roles and responsibility for projects were assigned to project managers based on electronic notification of project draft completion, which triggered their involvement. In practice, it was observed that project managers familiar with their customers were typically involved in follow on work and additionally used application development teams that were

IT Project Management (PM)	
	most familiar with the customers they served. However, only two of the three projects selected for sample included project team members in the business case or project definitions.
PM-O34	**Appropriateness of Division of Responsibilities Among Organization Leadership** Only one project of the three selected for sample included role definitions as part of a project hierarchy, but did not include responsibilities for each actor identified.
PM-O35	**Overall Project Responsibility** Only one project of the three selected for sample included a project hierarchy. Two projects had executive sponsors, but did not specify ultimate responsibility for project activities including scope, budget, and timing.
PM-O36	**Project Leader Assignment of Responsibilities** One project of the three selected for sample included no level of assigned responsibilities or indication of a project leader for activities including: quality management, budgetary authority for resource and expenses, deliverables, and go/no go decisions.
PM-O37	**Project Owner Sprint Plan Establishment** Sprint plans were only observed in two of the three projects selected for sample, as the third project used a hybrid model of Agile and Waterfall approaches.
ROI and KPIs Objective: The calculations for determining project ROI and KPIs are approved by the steering committee and executive sponsor, are objective, and provide meaningful status of the project and a measure of its success.	
PM-O38	**Attribute Determination for Return on Investment Calculation** The OIT business case tool maintains a field and inclusive component for identifying business value and successful conditions, for which it was observed through interviews that the project managers assess tracking against overall business goals with agency customers at the end of each sprint period during sprint review. No ROI or KPI calculations were noted on projects selected, nor methodology for assessing or maintaining project tracking to goals.
PM-O39	**Key Performance Indicator Objectivity** No ROI or KPI calculations noted on projects selected, nor methodology for assessing or maintaining project tracking to goals.
Escalation Management Objective Steering committee and executive sponsors receive and act upon issues escalated by the project team.	
PM-O40	**Escalation Issue Identification** Escalation management is conducted on a project by project basis, which is driven by the cycle of status reporting demanded by each different party. It was noted through customer interviews that project managers do not consistently share information and communicate to executive sponsors, resulting in challenges for project operations and spending.
Functional Analysis Supports Buy or Build Decisions Objective: The buy or build decision is based upon business and functional requirements, with appropriate procurement procedures and steering committee authorization.	
PM-O41	**Process Determining to Buy or Build** Projects are judged on the maturity level of the team involved. In the case where additional resources need to be acquired, it may be conducted through standard proposal processes, with the understanding that new team members introduce risk to the project. No assessment criteria to judge maturity level of project team were observed to be in place.
Project Management Best Practice: The project management activity should provide appropriate oversight and process to ensure the timely execution of the plan, mitigation of risks as they are identified, issues are resolved or escalated to the appropriate management level, quality of process is maintained, costs are monitored and minimized, and a go/no-go decision is made at each critical milestone.	
Composition of Project Team Objective: The project team consists of the appropriate resources, with the knowledge of the business process and automated solution, to effectively plan the project.	

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PM-O42	**Project Team Organization Chart** Organization charts were not preferred by OIT project teams because of the introduction of contention within roles and hierarchy.
PM-O43	**Project Team Personnel Contingency Plans** Contingency plans were not in place to replace team members in the case of a leave. Contingency plans were to hire an external vendor to fill a skill gap or interim role, but were not developed as part of a plan of execution for a project.
Risk and Issue Management Objective: Risk analysis has been applied to the project during the planning phase; risks have been identified. Where risks can be mitigated, appropriate processes have been implemented; where the risks are inherent to the process, appropriate monitoring processes are in place. Issues identified during the planning phase are reported, and issues are monitored and closed.	
PM-O44	**Risk Classification in Project Planning** No risks were inserted in the business cases provided for two of the three projects selected for sample. Risk classification was not observed in the third project selected for sample, nor was it observed as a noted step in project planning.
PM-O45	**Known Issue Documentation during Planning** Known issues and risks were only documented during project planning in one of the three projects selected for sample.
Escalation Procedures Objective: Escalation procedures are utilized to inform the project team and the steering committee, where appropriate.	
PM-O46	**Escalation Procedure Use Verification** An escalation hierarchy was observed in project documentation in one project of the three sampled, but did not include specific procedures for documenting or escalating issues across project components. In projects sampled neither escalation procedures or documentation of attributes were developed outside of status meetings.
Quality Management Objective: The project process has defined quality assurance (QA) procedures.	
PM-O47	**Quality Plan Identification of Ownership and Metrics for QA** Metrics were not included in quality measures of any of the three projects selected for sample.
Change Management Objective: A change management procedure has been implemented that documents and obtains approval for changes in the scope, business case or key attributes of the project.	
PM-O48	**Change Management Procedure** No change management or formal change request process was observed in any of the projects selected for sample or on an overall OIT standardized basis.
Planning and Control Objective: The planning and control of the project includes effective time control, a project plan with milestones, deliverables, a sequence of process, resource projections and activity dependency.	
PM-O49	**Project Assumptions and Constraints Documentation in Project Plan** Assumptions and constraints were documented in the business case in two of the three projects selected for sample, but not in an overall project plan. Per inquiry and observation, earlier projects did not use business case. In the case of Nutrition, no assumptions or constraints were documented.
PM-O50	**Task Objective and Goal Statement** Task objectives and goals were observed in the user story development in two of three projects selected for sample, but were not documented in a project plan document.
Milestone Go/No Go Decisions Objective: At major milestones, management exercises and documents go/no-go decisions.	
PM-O51	**Management Review of Significant Milestones and Go/No-Go Decision Making** Only one project of the three selected for sample was observed to use formal Sprint reports for sign offs and tracking. One other project was observed to use MS project program for making go/no-go decisions, but no procedure for sign off and review was observed.
Progress Control Objective:	

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Progress, defined as meeting milestones and budgets, is tracked and reported.	
PM-O52	**Resource Time Reports and Completion Percentage Recording in Project Management** Two of three projects were observed to track task completion through the user story report, but completion percentages and resource time reports were not observed to be tracked.
PM-O53	**Daily Scrum and Sprint Planning and Execution Process Documentation** Only two of three projects selected for sample contained information on sprints and user stories, but project specific sprint planning was not observed to be contained within project planning documentation.
Expense and Time Management Objective: Expense and time management are accurately recorded and approved.	
PM-O54	**Resource Recording of Time and Expense to Project** Employees were allocated to projects and tracked through the overall workforce billing capacity, but limited data was available and tracked by project managers.
Communications Objective: A communications plan is established to provide stakeholders and project leadership with appropriate information to ensure that the project meets functionality, budgetary and timeline goals.	
PM-O55	***Communications Plan Provisions*** No formal communications plans were developed during project planning as part of the selected sample of projects, although informal communications mechanisms were noted on one of the three projects selected for sample.
Budget Best Practice The budget and accounting processes should be accurate, complete and provide the information necessary to manage the project.	
Budget Status Objective: The project budget is defined, segregated from other projects and is in alignment with the business case.	
PM-O56	**Project Cost Identification** Project costs were not observed to be clearly identified because of the adoption of Agile methodology, which breaks large scale projects into sprint phases. Additionally, due to lack of visibility into pricing structure and indirect cost application, it was observed in interviews that project costs were difficult to accurately identify and provide estimates against.
PM-O57	**Budget Establishment from Cost Estimation** No budget establishment based upon a cost estimation process was observed in project planning documentation in any of the projects selected for sample.
PM-O58	**Budget Variance Approval** Budget information was not observed to be included in any project planning documentation in any of the three projects selected for sample and no analysis of budget variance from cost estimate was observed to be performed.
PM-O59	**Gap Analysis for Budget Impacts** No gap analysis against potential budget impacts was observed as part of the project planning for any of the three projects selected for sample.
PM-O60	**Project Cost Center Determination** Project cost center information was not observed in any of the projects selected for sample. Indirect costs were observed to be applied to projects by OIT, but determination of cost allocation was not possible on any project selected for sample.
PM-O61	**Budget Contingency** No contingency was observed to be built into budgets at the project planning phase in any of the projects selected for sample.
Accounting Objective: The accounting of the project is in compliance with expense and capitalization requirements.	
PM-O62	**Cost Capitalization or Expensing Based Upon Standard Accounting Principles** It was observed that project managers were not involved in the finance or accounting function associated with projects. Because of this, project managers had a limited view of the financial components of their projects, including costs and status against scheduled

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	spend.
Adequacy of Testing Best Practice: The project plan should provide for adequate testing at the various stages of development, including definition of the types of tests to be performed, the timeframe for testing and documentation requirements. At minimum, testing should include unit testing, integration testing, UAT, integration of manual and automated processes, conversion testing and stress testing. Consider parallel testing or separate operating platform testing prior to implementation.	
Testing Requirements Objective: Testing requirements are established and include documentation and review standards.	
PM-O63	**UAT Planning** UAT's were not defined at planning in any of the projects selected for sample.
Project Plan Objective: The project plan provides adequate time for testing and remediation based upon test results.	
PM-O64	**Project Plan – Testing Time Allocation** In one of the three projects selected for sample, there was no evidence provided to outline the time that had been allocated for testing on a project basis within the project planning materials.
Testing Content Objective: Test scripts and volumes are adequate to ensure accurate, effective and complete results.	
PM-O65	**Test Planning – Full Testing of System** Test plans were observed to follow the test objectives listed in the Application Certification procedure, however, development of test scripts and a test methodology to ensure adequate testing of the full system or application was not observed in any of the three projects selected for sample.
PM-O66	**Test Result Reconciliation** No plans to reconcile test results against expected results were observed to be documented as part of a test plan in any of the projects selected for sample.
Readiness Assessment Objective: A readiness assessment is part of the implementation plan to ensure that the system is ready for the implementation phase.	
PM-O67	**Readiness Assessment Inclusion** No readiness assessment was observed to have been prepared in any of the three projects selected for sample and although a phase readiness assessment was observed as part of the OIT technology workflow, none were noted in any of the projects selected for sample.
PM-O68	**Readiness Assessment – Contains All Finalized PM Artifacts** No readiness assessment was observed to have been created in any project selected for sample.
Conversion Plan Objective: A conversion plan is part of the overall planning activity and includes documented conversion specifications, a dress rehearsal of the conversion, a blackout plan in the event the conversion is not successful, and a reconciliation of data between the new and old systems.	
PM-O69	**Conversion Plan Completeness** Documentation to identify conversion costs and benefits to develop a conversion plan had not been created in the projects selected for sample.
Communication Plan Objective: A communication plan informs stakeholders and management of the progress of the roll-out.	
PM-O70	**Communication Planning Review** No communications plans were observed to be developed in the three projects selected for sample at the planning phase of the projects.
Training Plan Objective: An appropriate training program has trained affected functions prior to implementation.	
PM-O71	**Training Programs Review** Although training occurred for project managers and development staff, training plans for users and designations for all affected functions outside of the direct project team were not observed to be developed or implemented as part of any selected project in the sample.

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PM-O72	**Plan Inclusion of Cross-Discipline Agile Curriculum Components** Although training occurred for project managers and development staff, training plans for users and designations for all affected functions outside of the direct project team were not observed to be developed or implemented as part of any selected project in the sample, including those related to the cross-discipline Agile components of the product development.
Transition Plan Objective: A transition plan is created to address interim processes that are required until the new system is fully operational and integrated with other systems.	
PM-O73	**Project Team Identification of Interim Processes Required** Transition plan documentation, including notations to identify interim processes required due to temporary interfaces or processes until full integration, was not developed in any of the three projects selected for sample.
PM-O74	**Additional Resource Planning to Augment Internal Team** No additional resources were observed to be included in the project plan to augment internal resources (or contract resources) in any of the projects selected for sample other than the resources directly identified for the duration of the project in the two projects which engaged external vendors.
PM-O75	**Additional Resource Cost Inclusion** No additional resource costs were noted to be included in budgets for the projects selected for sample, as budget information was not observed to be developed or captured by OIT in any of the projects selected for sample.
Blackout Plan Objective: The back out plan is prepared with appropriate review, approval and decision points to initiate the plan.	
PM-O76	**Back out Plan Review** A back out plan was part of the transition to go-live for one of the projects selected for sample, but no documentation was available to support the plan. Additionally, no evidence of back out plan procedures existed in the PMO's best practice handbooks.
Third Party Providers Best Practice: Third-party providers should be selected and managed effectively to provide maximum ROI, should be adequately vetted, and contracts should provide for measurable deliverables and safeguarding of entity intellectual property.	
Vendor Selection Objective: Criteria for vendor selection are predefined prior to selection, the selection and contract negotiation are performed according to policy, and the criteria and selection process are objective.	
PM-O77	**Contract Authorization Accordance with Enterprise Bill of Authority** The Statement of Work received on the project in the sample which used an external vendor did not show sufficient evidence of authority as no signature of the client was present on the Statement of Work document.
SLA and Contract Fulfillment Objective: SLAs are defined and objective to permit monitoring of vendor activities, compliance with contract and assignment of penalties for failure to comply with the contract.	
PM-O78	**SLA Documentation** The OIT organization did not develop or sign service level agreements with customer agencies.
PM-O79	**SLA Metrics** The OIT organization did not develop or sign service level agreements with customer agencies. Memoranda of Agreements governing work between OIT and customer agencies did not utilize metrics that were monitored or measured.
Governance Best Practice: Management should provide governance over the project to ensure that the project is adequately monitored. The business and technical resources should be assigned to ensure planned progress of the project. Procedures should be defined to keep management informed of the progress. Communications and escalation procedures should be in place to allow management to respond to issues as they arise.	

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Scope Management Objective: The scope of the project is clearly defined–a project plan is maintained and updated that clearly identifies the phases, processes and sub processes. Responsibility for managing scope changes is defined and procedures are in place to obtain approval of scope changes from the project steering committee or executive sponsors.	
PM-O80	**Scope Changes in Execution** In the projects selected for sample, no scope management procedures or documentation were observed, including as change request procedures, authorizations, or identified actors for supporting such efforts.
PM-O81	**Scope Change Component Verification** It was noted in an interview with customers that during the execution of projects, management of scope and magnitude requests have become issues and challenges for executive sponsors to track because of the lack of change procedures and the new approach to management.
ROI and KPIs Objective: The calculations for determining project ROI and KPIs are updated and reported to the steering committee and executive sponsor as scope or other components that affect performance or ROI changes.	
PM-O82	**Attributes for Calculating Return on Investment and Key Performance Indicator Updates** No key performance indicators or return on investment metrics were observed in two of the three selected projects. One project selected for sample included key performance indicator collection upon the introduction of a business process management component to the project.
Escalation Management Objective: Steering committee and executive sponsors are receiving and acting upon issues escalated by the project team.	
PM-O83	**Open Issue Identification and Disposition** Regular status reporting was integrated into the project schedules and reports were provided to stakeholders. It was noted that documentation of such status meetings was not created in all cases and that project teams only attend status meetings for the period of their status briefing.
Project Management Best Practice The project management activity should provide appropriate oversight and process to ensure the timely execution of the plan, mitigation of risks as they are identified, issues are resolved or escalated to the appropriate management level, quality of process is maintained, costs are monitored and minimized, and a go/no-go decision is made at each critical milestone.	
Risk and Issue Management Objective: Risk analysis continues to be applied to the project during the execution phase as risks are identified. Where risks can be mitigated, appropriate processes have been implemented; where the risks are inherent to the process, appropriate monitoring processes are in place. Issues identified during the planning are reported, and issues are monitored and closed.	
PM-O84	**Risk Changes – Stakeholder Involvement** Project risks were not identified, ranked, and communicated for any of the selected projects.
PM-O85	**Stakeholder Risk Informing – Exceeding Tolerance Levels** Risk tolerance levels of stakeholders were not assessed or noted as part of OIT project documentation and were not observed in any of the selected projects.
Escalation Procedures Objective: Escalation procedures are followed to inform the project team and the steering committee, where appropriate.	
PM-O86	**Issue Escalation Process Trace** It was noted that escalation procedures or documentation requirements were developed outside of status meetings. An escalation hierarchy was observed for only one project but did not include specific procedures for documenting or escalating issues across project components.
PM-O87	**Escalated Issues – Remaining Open** It was observed that in cases where inherent risk or systemic risk is related to a project, such as observed for migration from Windows 7, escalated issues and risk may remain

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	open with no indicated closure.
Quality Management Objective: The project process has defined QA procedures.	
PM-O88	**Quality Assurance Plan Followed** No quality management or quality assurance plan was followed in any of the selected projects.
PM-O89	**Quality Assurance Phase Review** No quality management or quality assurance plan was followed in any of the selected projects...
PM-O90	**Quality Assurance Review – External to Development Team** No quality management or quality assurance plan was followed in any of the selected projects.
PM-O91	**Quality Assurance Documentation Review** No quality management or quality assurance plan was followed in any of the selected projects.
PM-O92	**Quality Assurance – Monitoring of Software Quality Definition** No quality management or quality assurance plan was followed in any of the selected projects.
PM-O93	**Quality Assurance Verification of Performance** No quality management or quality assurance plan was followed in any of the selected projects.
PM-O94	**Quality Assurance Not Performed or Negative Review** No quality management or quality assurance plan was followed in any of the selected projects.
Use of Development Methodology Objective: The project utilizes the enterprise's development methodology.	
PM-O95	**Design Documentation – Impact of Data Output to Other Programs** Observed in user story design documents supporting build for one of three projects selected for sample that impact of data outputs was captured as it related to workflow. However, it was noted in an interview with agency-customer from Department of Labor that coordination with document management team did not occur.
Change Management Objective: A change management procedure is being utilized to document changes and approval in the scope, business case or key attributes of the project	
PM-O96	**Program Transfer Procedure Review** Observed that a formal process, including deployment certification and handoff was incorporated as part of OIT's technology workflow. However, no documented change management procedures were observed in any of the selected projects.
Milestone Go/No-Go Decisions Objective: At major milestones, management exercises and documents go/no-go decisions.	
PM-O97	**Management Review of Significant Milestones – Execution and Task Progression** Go/no go documentation was included as a key deliverable in the OIT technology workflow guidance, however it was not observed to have been created in any of the selected projects nor was any documentation indicating a decision criterion for go/no-go decisions observed for the projects selected.
PM-O98	**Go/No-Go Decision Process at Milestones** Go/no go documentation was included as a key deliverable in the OIT technology workflow guidance, however it was not observed to have been created in any of the selected projects nor was any documentation indicating decision criteria for go/no-go decisions observed for the projects selected.
PM-O99	**Milestone Requirement of Go/No-Go Decision** Go/no go documentation was included as a key deliverable in the OIT technology workflow guidance, however it was not observed to have been created in any of the selected projects nor was any documentation indicating decision criteria for go/no-go decisions observed for the projects selected.

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PM-O100	**Decision Making Process Documentation – Go/No-Go Decisions** Go/no go documentation was included as a key deliverable in the OIT technology workflow guidance, however it was not observed to have been created in any of the selected projects nor was any documentation indicating a decision criterion for go/no-go decisions observed for the projects selected.
Expense and Time Management Objective Expenses and time management are accurately recorded and approved.	
PM-O101	**Resource Time and Expense Management** Employees were allocated to projects and time was tracked through the overall workforce billing capacity. However, limited data was available and tracked by project managers.
PM-O102	**Team Member Time Recording** Employees were allocated to projects and time was tracked through the overall workforce billing capacity. However, limited data was available and tracked by project managers.
PM-O103	**Cost Recording** Costs were allocated to projects and tracked through the overall workforce billing capacity.
Communications Objective: A communications plan is established to provide stakeholders and project leadership with appropriate information to ensure that the project meets functionality, budgetary and timeline goals.	
PM-O104	**Communications Plans – Status and Exception Reports Planning** Status reports were regularly documented for each selected project based upon the direction of the business owner. However, communication plans outlining the timing or frequency of reporting were not observed for any of the selected projects.
PM-O105	**Communications Plans – Frequency and Content Alignment** Communications plans outlining frequency, content, and audience targets were not developed for the selected projects.
Budget Best Practice: The budget and accounting processes should be accurate, complete and provide the information necessary to manage the project.	
Budget Design Objective: The project budget is defined, segregated from other projects and is in alignment with the business case.	
PM-O106	**Budget Variance from Business Case Estimate** No budget estimates were included for any of the projects selected. It was noted that variances in costs have occurred.
PM-O107	**Executive Sponsor Interviews – Deliverable/Budget Gaps** It was noted during interviews with the agency customer from Department of Labor that known differences, including application of indirect costs and a lack of transparency in how fully burdened cost rate was applied to project participants have resulted in cost overruns.
Budget Status Objective: Determine if the budget and actual costs (including resources and expenses) are in alignment with the percentage completion.	
PM-O108	**Budget and Actual Cost** Due to adoption of the Agile methodology and OIT procedures, project budgets were not developed and managed by project managers. Billing was performed on sprint basis as defined by Memorandum of Understanding. No budget to actual tracking was conducted by OIT or is provided to project stakeholders for the selected projects.
PM-O109	**Actual Cost Verification** Observed that costs for the project were only incurred for each sprint period covered. However, lack of transparency about costs has resulted in variances from anticipated spend levels by executive owners as noted in interview.
PM-O110	**Budget to Actual – Management Exception Reporting Initiation if Behind Schedule** Observed that costs for the project were only recorded for each sprint period covered. There was no comparison of actual spend to budget. The lack of transparency has resulted in variances from executive owners anticipated spend levels.
Adequacy of Testing	

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Best Practice: The execution phase should exhibit adequate testing at the various stages of development, including definition of the types of tests to be performed, the timeframe for testing and documentation requirements. At minimum, testing should include unit testing, integration testing, UAT, integration of manual and automated processes, conversion testing and stress testing. Parallel testing or separate operating platform testing prior to implementation should be considered.	
Testing Requirements Objective Testing is performed according to project and enterprise standards and requirements and the testing is documented and reviewed.	
PM-O111	**Performance Testing Requirements for Each Type of Testing** No enterprise standards for testing were observed during any interviews or noted during review of project documentation. It was observed that testing programs were prepared for two of the three selected projects.
Testing Content Objective: Test scripts and volumes are adequate to ensure accurate, effective and complete results.	
PM-O112	**Test Results Review** Observed that test results were noted in completion of user stories and were tested on a sprint basis. It was observed during interviews and analysis of documentation provided for two of the three selected projects that test components were developed and executed. However, individual test scripts outlining steps and results of each step were not observed to have been developed or documented.
Pilot Test Plan Objective: Pilot implementations of the new processes are utilized to minimize the risks of a full roll-out of the application.	
PM-O113	**Go/No-Go Decision – Conclusion of Pilot** Go/no go evaluation was considered as part of overall technology workflow for each sprint stage. However, no evidence to support this decision was observed for any of the selected projects.
Communications Plan Objective: A communications plan informs stakeholders and management of the progress of the roll-out.	
PM-O114	**Communications Compliance with Communications Plan** A project communications plan was not observed to have been developed as part of the project startup for any of the three projects selected for sample.
Training Program Objective: The training program has trained affected functions prior to implementation.	
PM-O115	**Training Programs Results Review** Project training programs were not observed to have been developed as part of the project standup in any of the selected projects. Based on interviews with members of the project management office and customers, it was observed that differences of opinion were present for ownership of project based trainings between the business and IT.
Back Out Plan Objective: The back out plan has been prepared with appropriate review, approval and decision points to initiate the plan.	
PM-O116	**Back Out Plan Initiation** A back out plan was indicated to have been developed as part of one of the projects selected for sample; however no documentation to support it was available.
Governance Best Practice: Governance over the project should be achieved through management's oversight.	
Roles and Responsibilities Objective: The executive sponsor has approved and formally documented the closure of the project.	
PM-O117	**Formal Project Closure by Executive Sponsor** Obtained and received the certification form for one of the three selected projects. The deployment certification form had the executive sponsor's signature. The other two project samples did not have evidence of the executive sponsor's final sign off. No formal project close out related to resolution of all issues was observed to have occurred in the selected projects.

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Project Management Best Practice: The project management activity should be ended, with all active project follow-up transferred to operations or business units.	
Planning and Control Objective; Project management verifies that all deliverables have been completed.	
PM-O118	**Project Manager Formally Documents Receipt of Expected Deliverables** No formal documentation of receipt of all expected deliverables was observed. Project managers were responsible for signing the deployment certifications, and in the case of the Blocked Claims project, a "Definition of Done' form was created. It was not observed to be standard to develop such a document in the selected projects.
Expense and Time Management Objective: Expense and time management processes are closed, so no additional resource or expenses charges can be allocated to the project.	
PM-O119	**Time and Expense Closure for Project** Employees were allocated to projects and tracked through the overall workforce billing capacity. Limited data was available and tracked by project managers. Closure for projects was not observed to occur in any of the selected projects.
Communications Objective: The stakeholders have been notified of the closure of the project.	
PM-O120	**Stakeholder Verification of Project Closure** It was observed in project documentation that executive sponsors were required to sign off on the deployment certification form.
Budget Best Practice The budget and accounting processes should be accurate, complete and provide the information necessary to allocate final costs to the project.	
Budget Status Objective: The project budget is finalized with all costs. The budget to actual is prepared, with variance explanations.	
PM-O121	**Cost Application Determination of Final Budget** Final budget to actual comparison was not performed because of adoption of Agile methodology in selected project cases. Customer paid for each sprint phase and was charged service fees for finite list of personnel associated with each sprint based on fully burdened rate.
Third Party Providers Best Practice: Third-party providers should be paid according their contracts, remediation processes concluded, penalties collected and all deliverables due from the vendors received.	
Service Level Agreements (SLAs) and Contract Fulfillment Objective: Contract provisions have been reviewed, all deliverables have been reviewed and accepted, and open contract issues have been reviewed by project management and the executive sponsor, if necessary.	
PM-O122	**Project Manager Review of Deliverables to Determine Vendor Contract Satisfaction** No SLAs existed between OIT and customer agencies. The only evidence of contract fulfillment was the signed deployment certification form. Not all projects selected used the deployment certification form which was included as part of the technology workflow and delivery chain.
Governance Best Practice: The business case should be achieved, (i.e. project costs are within budget and management has provided governance over the project).	
Business Case Objective: The project team leadership, on a regular basis, monitors and provides reports to the executive sponsor on the continued alignment of the project plan with the business case.	
PM-O123	**Business Case – Executive Sponsor Review of Expected Process Feature Delivery** Noted that the project leadership team (from PMO side) closed out the project and

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	transferred ownership to the relevant application team upon implementation. Also noted that the project team continued to be engaged as development continued for Agile projects. It was noted that one project had been opened and subsequently closed with the coordination of OIT's PMO and an external vendor. The overall problem was not solved to the customer's satisfaction.
ROI and KPIs Objective: The project's ROI and KPIs have been reviewed by the steering committee and executive sponsor.	
PM-O124	**Return on Investment Calculation Review** ROI and KPI metrics were not observed to have been documented, measured, or assessed at any point for the project samples selected. The technology workflow and project stage-gate for assessments did not include ROI or KPI metrics.
Communications Objective: The stakeholders have been received and reviewed ROI and key performance metrics.	
PM-O125	**ROI and Key Performance Metric Provision to Stakeholders** ROI and KPI metrics were not measured for the selected projects.
Budget Best Practice: The budget and accounting processes should be accurate, complete and provide the information necessary to allocate final costs to the project.	
Budget Status Objective: The project budget is finalized with all costs. The budget to actual is prepared, with variance explanations. Management analyzes variances and evaluates how negative variances can be minimized in the future.	
PM-O126	**Project Summary Report Provision** No project summary report was provided by OIT Project Management to stakeholders or management teams in any of the selected projects.
Accounting Objective: The accounting of the project is in compliance with expense and capitalization requirements.	
PM-O127	**Appropriate Cost Capitalization and Expense** No cost capitalization or expense summary was observed in any of the selected projects.
Third Party Providers Best Practice: Third-party providers should be paid according their contracts, remediation processes concluded, penalties collected and all deliverables due from the vendors received.	
SLAs and Contracts Fulfillment Objective: Contract provisions have been achieved, all deliverables have been reviewed and accepted, and open contract issues have been reviewed by project management and executive sponsor, if necessary.	
PM-O128	**Vendor Open Issue Determination** It was observed in a project that issues were not closed out when the project was cancelled. The project was cancelled because of the inability of the vendor to complete the requirements and meet the customer need.

Appendix B – COBIT Framework

What is COBIT?

The COBIT framework provides guidance for organizations on how to effectively manage their technical/business risks and achieve IT (Information Technology) governance. This toolkit of best practices was developed by ISACA (Information Systems Audit and Control Association), an IT audit equivalent to the AICPA (American Institute of Certified Public Accounts). COBIT was developed by a group of IT experts to bridge the gap between a firm's technical team and management in understanding the business risks that a significant deficiency or material weakness in IT controls would have on the company's core operations.

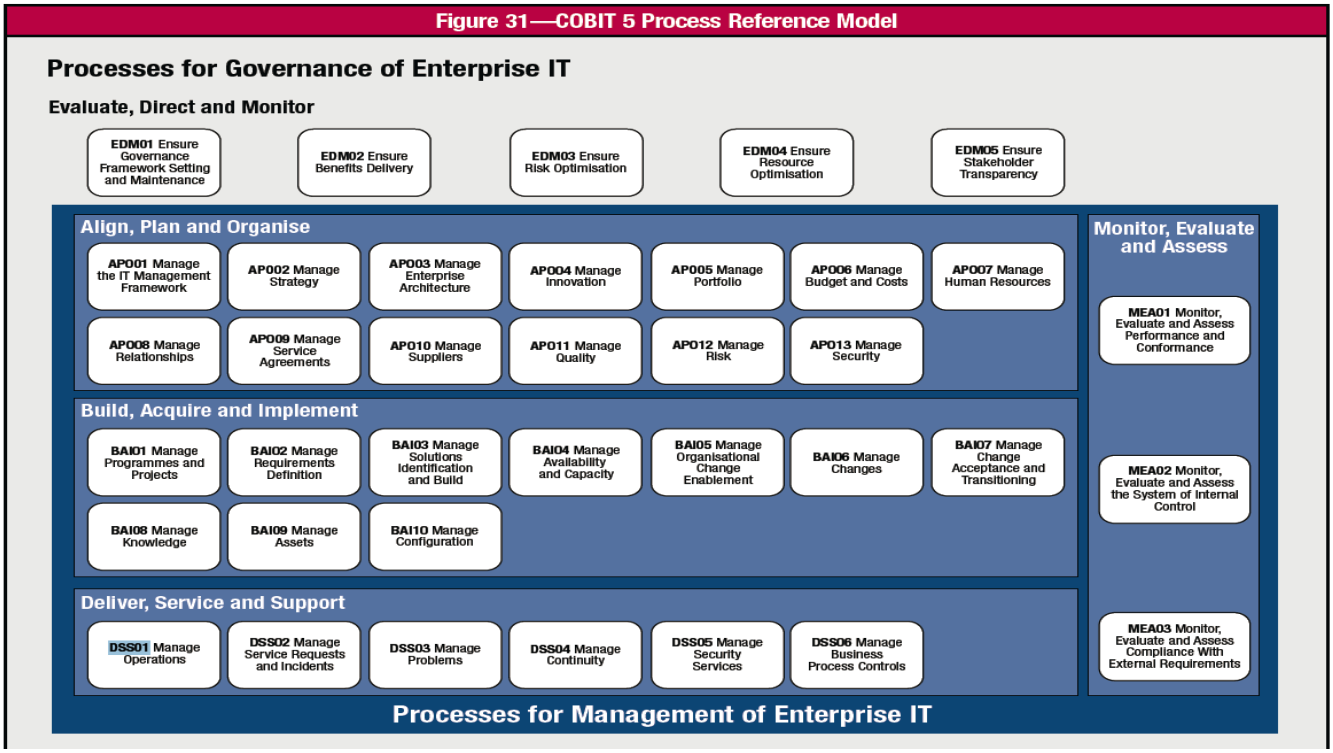
COBIT's five core principles encourages interdepartmental communication for applying an integrated framework in standardizing the management of IT enterprise applications:

1. Meeting Stakeholder needs
2. Covering the Enterprise End-to-end
3. Applying a Single, Integrated Framework
4. Enabling a Holistic Approach
5. Separating Governance from Management

Similar to its previous iterations, COBIT 5 (2013 version) maintains its four domains (aka "enabling Process") in maintaining an ongoing relationship in maturing business and IT processes (see diagram on p12):

- Align, Plan and Organize (APO) formerly known as Plan and Organize [PO]
- Build, Acquire, and Implement (BAI) formerly known as Acquire and Implement [AI]
- Deliver, Service and Support (DSS)
- Monitor, Evaluate, and Assess (MEA01)

Figure 31—COBIT 5 Process Reference Model

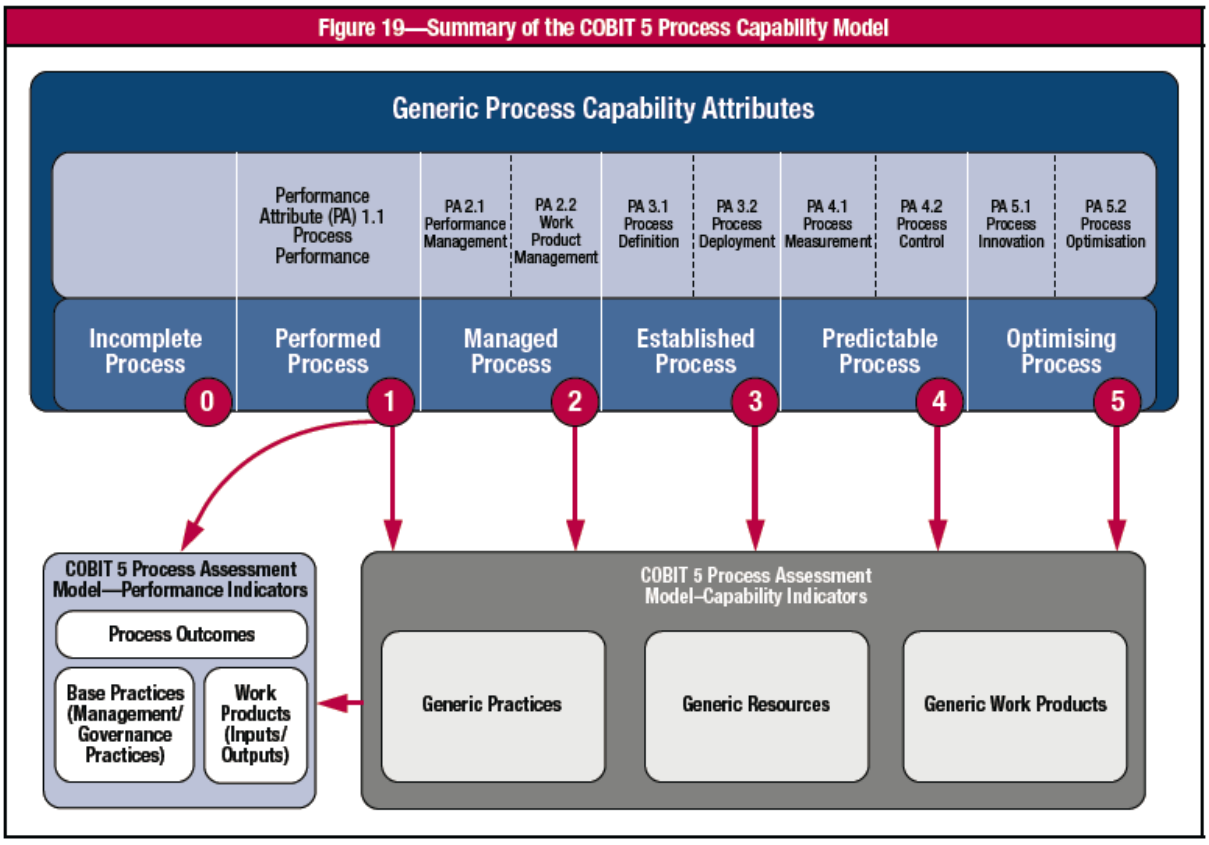


[7]

[7] Source: ISACA, COBIT 5, p74

Each process within these four domains has its own evaluation criteria to the test the control objectives within a standard audit program (refer to Appendix B). The maturity model used in COBIT 4.1 has been upgraded into the "Process Capability Model" for COBIT 5 to better evaluate how well the current process has been ingrained in the organization (below). On a scale from 0 to five a tester would evaluate how well the organization has managed their control objectives and the supporting evidence. An organization's personnel who perform control processes (in compliance with a generally accepted standard) and generating consistent evidence on a repeatable basis equates to a higher level of maturity under the COBIT model.

Figure 19—Summary of the COBIT 5 Process Capability Model



[8]

[8] ISACA, COBIT 5 p42

Appendix C – Gap Analysis

		Plan Date	Ref#	Action	August 2014 Reported Status	Documentation	OIT Comments in August 2014 Report	Result	Gap
1	**BC/DR**	Mid 2013	**DR01-1**	OIT hire a BC/DR manager	Yes	Job Posting Resume	John Driscoll hired as BC/DR Manager. Began work 7-14-14	CohnReznick confirmed that John Driscoll was hired as BC/DR Manager and started in July 2014.	No relevant gaps noted.
2			**DR01-2**	IT Consultants (Cavan Group) BC/DR assessment and Gap Analysis Completed	Yes	Power Point Presentation	IT Consultants (Cavan Group) BC/DR assessment and Gap Analysis Completed 8-25-13	CohnReznick obtained the Cavan Group report (see BCP-1a) and the related presentation slides. It was confirmed that the BC/DR assessment by the IT consultants Cavan Group was completed. CohnReznick met with OIT's BC/DR Manager on February 13, 2015. Per the discussion, the BC/DR Manager had reviewed the Cavan Group Report. The BC/DR Manager indicated that the Cavan Group Report provided good reference for OIT's BC/DR initiative. However, the majority of the recommendations of the Cavan Group Report can only be implemented after a Business Impact Analysis (BIA) is completed and Tier I applications are identified.	No relevant gaps noted.
3			**DR01-3**	Complete 180 day plan which outlines a plan to address gaps and improve BC/DR posture.	In-Process	180 Day Plan DRAFT	180 day plan (DRAFT) completed 7/31/14. Outlines a plan to address gaps and improve BC/DR posture	A BC/DRP Development Plan (180 day plan) (see BCP-2) had been developed and updated on a periodic basis to outline key milestones and planned timeline for BC/DR initiative. CohnReznick obtained the 180 day plan updated 1/16/2015 to confirm that the plan has been developed and updated as described.	No relevant gaps noted.
4		Annually	**DR01-4**	Annually: As part of each year's budget for IT, work with agencies to look for ways to build in BC/DR capacity for their mission-critical business systems. Since OIT does not have its own budget but uses an internal fee-for-service fund, Agencies' willingness to make greater investment in BC/DR capacity depends partly on their awareness of the risk they now face, as documented in the set of partially completed business impact analyses (BIAs).				Per discussion with John Driscoll, the BC/DR Manager, BC/DR capacity consideration was included by some, but not all, agencies in their annual budgeting. According to John Driscoll, the State of Maine runs on a biennial budget. Every two years, OIT develops monthly rates for their data hosting services. Agencies allocate a part of their funds received from the state (shown as DR activity on their operational budget) based on their IT needs. The allocated amount is communicated through TBCs and service centers. The BC/DR Manager planned to include risk assessment as part of the BIA. After risks for each agency are identified after completion of BIA for the agency, the risks are communicated to the agency.	Not all agencies' annual budgeting for IT include BC/DR capacity for mission-critical business systems including Maine Revenue Services.
5		Mid 2013	**DR02-1**	Data Center Status	Yes	Floor plans of SSDC and CMCC to include square feet, number of racks and servers	OIT has improved the excess capacity in one of the data centers.	CohnReznick visited the two data centers on February 13, 2015 accompanied by the BC/DR Manager and Jon Richard, Operations Director. CohnReznick verified that the Sewell Street Data Center (SSDC) has available floor space after the improvement.	No relevant gaps noted.
6			**DR02-2**	Legacy load balancers will be removed and testing will resume with vendor to ensure fail-over capability.	In-Process testing still needs to be completed	Equipment configurations have been documented	Legacy Load Balancers will be removed 8/7/14. Testing will resume with vendor (Radware) to ensure fail-over capability; further tests needed for session state	CohnReznick performed inquiry with Jon Richard, Operations Director on February 13, 2015 to confirm that the Legacy Load Balancers have been removed. On March 6, 2015, Debby Menards, Network Services, confirmed that the Load Balancers were removed on August 7, 2014. No formal testing was resumed to ensure the fail-over capability (PM-16-vi). OIT completed on February 18, 2015 configuration for Content Load Balancing to provide application health checks. There was no information provided on session state from the App/Dev group. On March 19, 2015, CohnReznick confirmed with Diana Olore that fail-over test was not performed but remediation step was finalized.	After removal of the legacy load balancers, testing was not resumed with vendor (Radware) to ensure fail-over capability. No information was available on whether further tests were needed for session state.
7			**DR02-3**	Construct high level Data Center Recovery/Replacement Plan to include multiple options, including cloud solutions of a hybrid warm-site option with University of Maine-Orono.	In-Process	Draft requirements, SLA, etc.	Constructing high level Data Center Recovery/replacement to include funding plan that will be reviewed with the GO. Reviewing multiple options, including cloud solutions or hybrid warm-site option with UMO	Per discussion with the BC/DR Manager, OIT is consideration multiple options for recovery/replacement plan, including: - Cloud solutions - Option with UMS-Orono (or "UMO") for High Availability and Disaster Recovery - Hybrid warm-site option with UMS-Orono CohnReznick obtained draft slides of OIT Data Center Disaster Recovery Strategy Decision Briefing (dated Jan 9, 2015) (see BCP-7). The document indicated that analysis has been performed to compare the options. Further approval was needed before OIT could move forward with next steps outlined in the draft document.	No relevant gaps noted.

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8		End 2013	**DR02-4**	The OIT DR Manager will facilitate estimating the BC/DR capacities of both OIT data centers.				CohnReznick obtained and reviewed a copy of OIT's Data Center DR Strategy Decision briefing (see BCP-7). CohnReznick confirmed with Eric Stout, IT Project Manager, on March 6, 2015 that a BC/DR capacities estimate was developed for both data centers.	No relevant gaps noted.
9		End 2014	**DR02-5**	OIT will ensure completely automated failover of mission-critical systems between the two primary data centers. This will require both technical work, as well as a greater investment in equipment capacity.				Per discussion with the BC/DR Manager, automated failover is configured for some applications. Whether an application is configured automated failover depends on the agency's need and whether the agency is willing to pay for the automated failover configuration.	A full inventory of mission critical applications has not been identified.
10		End 2014	**DR02-6**	Contracts with vendors for potential fail-over to externally hosted data centers.				Per discussion with the BC/DR Manager, this planned action is not applicable as there were no failover to externally hosted data centers as of December 31, 2014. If management determines that a cloud recovery solution is appropriate, vendor contracts for fail-over should be executed.	No relevant gaps noted.
11		Mid 2013	**DR03-1**	Business Impact Analysis (BIA)		Electronic BIA's on intranet	The Technology Business Consultants (TBCs) are working through the Business Impact Analysis. Focusing on potential Tier 1 applications first.	CohnReznick met with OIT's BC/DR Manager on February 13, 2015. The BC/DR Manager believes BIA provides the basis for identifying Tier I applications. The BIA process being performed by the Technology Business Consultants (TBCs) before the BC/DR Manager arrived were focused on technical components instead of business processes. More than 800 BIAs was performed for the numerous technical platforms. The BC/DR Manager redirected the effort to focus on recovery time objective (RTO) and recovery point objective (RPO). Currently a BIA is being performed for OIT. The plan is to roll out the BIA process to other agencies after the completion of the OIT BIA. The BC/DR Manager is also in process of obtaining a BIA software to assist the BIA process.	A BIA had not been completed as of December 31, 2014.
12		End 2014	**DR03-2**	Through the growing set of BIAs, OIT will provide DR cost estimates to the agencies, in order to satisfy their needs for recoverability of each system. Based on these estimates, Agencies may adjust their BC/DR expectations to what they can realistically afford.				Per discussion with OIT's BC/DR Manager on March 6, 2015, the BC/DR Manager did not believe that all agencies were given a "quote" on DR services because a full IT environment assessment had never been conducted for any agency to determine DR needs. Currently, the TBCs and agencies discussed hosting options as listed in OIT's menu of services with their associated rates. Agencies expressed their BC/DR expectations through their assigned TBC or App/Dev representatives.	There appeared to be a lack of documentation to track budget communications between OIT and the agencies. Limited documentation hinders OIT's ability to track agency needs and to better serve their customers. DR activities may go over budget or under budget and that may lead to fewer funds allocated to the agencies from the state.
13		End 2014	**DR03-3**	OIT and the agencies will continue to complete and update the BIA for all agency-critical business application systems.				See DR03-1.	N/A A BIA had not been completed as of December 31, 2014.
14		End 2013	**DR04-1**	Begin documenting DR exercises (internal and external hosted)				Per discussion with Eric Stout, IT Project Manager and John Driscoll, BC/DR Manager, OIT had just completed its first tabletop exercise in January 2015. Written reports would be used going forward for future exercises. The reports included a situation manual (see BCP-3a) with exercise instructions and a summary report (see BCP-3b) outlining OIT's assessment responses, identified gaps, and action items. Moving forward the action items and gaps would be documented and reviewed quarterly by the BC/DR Planning Team who would report the status of action items identified in the report. This status would then be reported to senior managers and the BC/DR steering committee quarterly.	No relevant gaps noted.

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15		End 2013	**DR04-2**	Inventory of critical business application systems and core infrastructure updated (and refreshed quarterly).				An inventory of applications was maintained, but the critical business applications were not identified, because a BIA was not completed as of December 31, 2014. Per discussion with the BC/DR Manager, OIT is planning to issue an RFP to include inventory maintenance. Per discussion with Eric Stout, IT Project Manager and John Driscoll, BC/DR Manager, all application teams are accountable for ensuring all metadata regarding Agencies' applications are current in the application inventory system. Likewise, Core Technology Services ensures that the records within the "infrastructure assets" (e.g. servers, databases) inventory stay current. The two primary systems used for managing infrastructure assets are the Server Inventory and the Oracle Billing Database. Each system is updated daily or as needed by staff from one of three groups: Applications, Windows (Microsoft assets: servers, databases, etc.) and Oracle.	An inventory of applications was maintained, but the critical business applications were not identified, because a BIA was not completed as of December 31, 2014.
16		End 2014	**DR04-3**	Completed and continuously updated plans and exercises in place.				OIT had not finalized a BC/DR plan as a BIA was not completed as of December 31, 2014. Per discussion with Eric Stout, IT Project Manager, the BC/DR exercises will be updated quarterly once a BC/DR plan is developed.	N/A OIT had not finalized a BC/DR plan as a BIA was not completed as of December 31, 2014.
17		End 2014	**DR04-4**	Subject to availability of funds, complete planning and framework for annual DR exercises of mission-critical systems (internal and external hosted)				Per discussion with the BC/DR Manager, this planned action was not in place yet.	Planned action has not been implemented as of December 31, 2014
18		End 2014	**DR04-5**	First mock disaster drill.				Per discussion with the BC/DR Manager, this planned action was not in place yet.	Planned action has not been implemented as of December 31, 2014
19		End 2014	**DR04-6**	Consider possible cloud vendor contracts				Per discussion with the BC/DR Manager, OIT is considering multiple options for a recovery/replacement plan, including: - Cloud solutions - Option with UMS-Orono (or "UMO") for High Availability and Disaster Recovery - Hybrid warm-site option with UMS-Orono CohnReznick obtained draft slides of OIT Data Center Disaster Recovery Strategy Decision Briefing (dated Jan 9, 2015) (see BCP-7). The document indicated that analysis has been performed to compare the options. Further approval was needed before OIT could move forward with next steps outlined in the draft document.	No relevant gaps noted.
20		Annually	**DR04-7**	The OIT DR Manager will facilitate the DR plan, for both OIT-hosted and remotely-hosted applications. The OIT DR Manager will facilitate annual DR exercise for OIT-hosted applications.				Per discussion with the BC/DR Manager, this planned action was not in place yet.	Planned action has not been implemented as of December 31, 2014
21		Annually	**DR04-8**	The OIT DR Manager will hold remote-hosting vendors accountable regarding their DR plans and recovery exercise results.				Per discussion with the BC/DR Manager, this planned action was not applicable as of December 31, 2014.	N/A Per discussion with the BC/DR Manager, this planned action was not applicable as of December 31, 2014.
22		End 2014	**DR05-1**	Independent, 3rd party assessment of readiness and approach.				Per discussion with the BC/DR Manager, this planned action was not applicable as of December 31, 2014.	N/A Per discussion with the BC/DR Manager, this planned action was not applicable as of December 31, 2014.

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23	**Data Analytics**	Mid 2013	**DA01-1**	OIT Technology Business Consultants survey agencies' understanding of their data and analytics requirements.	In Process		Difficult to get traction because this is an unfunded mandate.	On 3/24/2015, CohnReznick interviewed OIT Enterprise Warehouse and Analytics (EWA) leader Jeff Jordan. According to Jeff Jordan, select cases of agency surveying have been undertaken, but have been conducted on an ad-hoc basis to date because it has not been a funded effort for OIT. Jeff Jordan indicated that some individuals have conducted research and developed a gap analysis on a select basis on their own, including an analysis of the lifecycle management of the DAFS data warehouse since it was first implemented in the 1990s. As of the current time (interview date), unless an agency or department requests and pays for expertise and advice regarding their tool capabilities and analytics use, OIT is unable to provide it on a formalized basis. It should be noted, however, that an effort to develop a working group consisting of executive level individuals from agencies to discuss analytics and centralized, efficient data functions has been established, with individuals from agencies identified and the first session to be held on 7 April, 2015.	OIT Technology Business Consultants have not conducted surveys of agencies' understanding of their data and analytics requirements.
24			**DA02-1**	Status update every quarter	Completed			On 3/24/2015, CohnReznick observed during interview with OIT Enterprise Warehouse and Analytics leader Jeff Jordan that select cases of agency surveying have been undertaken, but have been conducted on an ad-hoc basis to date because it has not been a funded effort for OIT. Due to this, OIT has not requested nor provided quarterly status updates to support the customer agencies' understanding of their data and analytics requirements, as it is the position of the IT Executive Committee that the understanding and development of needs for analytics and business intelligence purposes rests with the business partners themselves and not OIT. Progress is being made toward this goal with the development of the new EWA group within OIT and the establishment of a working group involving OIT, OPM, and a number of State of Maine agencies in support of analytics programs beginning in December 2014 and being put into action beginning April 2015. The frequency of these meetings and the ownership for providing status updates regarding requirements for need and use of analytics is not yet clarified. It is the position of OIT that needs assessments, tool selection, data ownership and management, and execution of analytics programs are the responsibility of agency customers, and not OIT.	OIT has not provided a status every quarter regarding its engagement with other agencies on business intelligence and analytics.
25			**DA03-1**	IT Executive Committee, clarify agency and OIT roles for data and reporting	Completed	The August 7, 2013 meeting		CohnReznick gathered documentation and interviewed stakeholders regarding vision for Agency-level and OIT roles in developing, operating, and executing business intelligence programs across state government. In its initial strategy outline presented in an IT Executive Committee meeting in August, 2013, OIT's Support Strategy was outlined as the following: 1. Work with all Agencies as needed to create a Data and Reporting needs assessment. 2. Coordinate data efforts across agencies: -Best practices -Reuse solutions 3. Provide forums and Agency collaboration 4. Support and coordinate Agency and IT **OIT Roles** OIT, through the IT Executive Committee and the establishment of the Enterprise Warehousing and Analytics working groups during the winter of 2014, has outlined goals and begun to define its vision for clarifying agency-level and OIT-level roles for data and reporting as both a business unit and enterprise function. Additionally, with the support of the Office of Policy and Management, OIT has further developed its initial programmatic goals as of December, 2014 to: 1. Identify data handling solutions that scale for the needs and means of agencies. 2. Collect interagency data sharing MOUs. 3. Work to bridge barriers to effective data storage, handling, and sharing 3. Implement modern data sharing technologies which will facilitate seamless data sharing. Agency Roles OIT, through the IT Executive Committee and the establishment of the Enterprise Warehousing and Analytics working groups during the winter of 2014, has also begun to clarify agency roles for data and reporting: 1. Identify agency data needs and potential toolkits to support analysis 2. Train analysts and management in data analysis techniques and benefits 3. Refine and manage data and data collection 4. Establish governance for data 5. Execute data analyses and coordinate cross-governmental analytical needs	The IT Executive Committee had not established its own position on data and reporting as of 12/31/2014 as having OIT responsible for providing support, thought leadership, best practice, and creating a needs assessment that each agency can conduct on their own. However, the levels of ownership and responsibility for each party have not been formally defined or clarified in policy throughout government.

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			DA04	Within 3 months of the agency assigning a Business Analyst, OIT will: • Pair the agency Business Analyst with an OIT Systems Analyst. • Provide the Business Analyst with analytics tools. • Train the Business Analyst in relevant data structures and chosen analytics tools.					
26		Mid 2013	**DA04-1**	Number of Agencies who assigned Business Analysts	No Funding			On 3/27/2015, CohnReznick observed during interview with OIT staff member Eric Stout and via documented email provided by Paul Sandlin that only one agency has created a formal position called 'business analyst' with respect to analytics and assigned that person as a liaison to OIT. However, CohnReznick also observed that the perspective of the staff at OIT was that agencies have found difficulty in assessing exactly what a 'business analyst' title is with respect to analytics. Several agencies, including those selected as sample (DOE, DOT, DACF, DHHS), each have personnel that are involved with analytics in some capacity. Some of these agencies have a formal business intelligence program or application, and have dedicated staff that are familiar with the tool and able to provide analysis. OIT does not track the number of agencies who have created formal Business Analyst positions, but rather provides support through systems analysts and other technical positions on technical matters across all functions, including databases, data warehouses, and business intelligence applications. However, in the other agencies selected for sample, each was observed to have coordination with OIT on IT matters and needs.	Only one agency, Department of Environmental Protection, was observed to have created a formal 'Business Analyst' position that serves as a liaison to OIT on analytics matters and other elements.
27		End 2013	**DA04-2**	Number of Business Analysts paired with an OIT Systems Analyst	No Funding		Requested	On 3/24/2015, CohnReznick observed during interview with OIT Enterprise Warehouse and Analytics leader Jeff Jordan that several agencies have chosen to engage OIT support personnel for matters strictly related to data warehousing and business intelligence as they were able to allocate funding to afford additional cost. However, only one agency, the Department of Environmental Protection, has deemed a individual role as a business analyst (Terry Gould) for this function. OIT has provided support to several specific agencies on additional levels with more formal systems analysts, however a business analyst position within the counter-part agency has not necessarily been defined. These agencies are: Department of Health and Human Services (Jerry Curtis), Department of Environmental Protection (John Gagnon), and Department of Education (Sean Robichaud).	OIT has not paired agency Business Analysts with an OIT Systems Analyst to coordinate on analytics matters.
28			**DA04-3**	Number of Business Analysts provided with analytics tools	No Funding		Requested	Only one agency, the Department of Environmental Protection, has deemed a individual role as a business analyst (Terry Gould) for this function. However, the direction of OIT has been established that individual agencies as businesses are responsible for purchasing analytics tools themselves as well as training their staff, whether they are formally defined business analysts or staff in other roles that interact with data and use analytics for reporting and analysis purposes, themselves. Upon interview with OIT staff members Paul Sandlin, Eric Stout, and Jeff Jordan, it was observed that there is a desire to support agencies in the selection of tools and provide a leadership role in suggesting the best value tools for an agency's needs, but that OIT would not be responsible for the provision of such tools (as agencies are required to pay for the tools and user access to the tools).	No Business Analysts were observed to have been provided with analytics tools by OIT.
29			**DA04-4**	Number of agency business analysts and OIT systems analysts trained by OIT in data structures and analytical tools	No Funding		Requested	On 3/24/2015, CohnReznick observed during interview with OIT Enterprise Warehouse and Analytics leader Jeff Jordan that the direction of OIT is not to train external users in data structures within the technical component of data warehouses or data marts. The OIT viewpoint is that agencies, as business operators, are responsible for the development of data governance, data validation within their own organizational uses, and are responsible for training and ensuring their own business operators can effectively use the tool sets they purchased and pay for maintenance on. It was noted that because OIT does not have a cross-functional operating budget to support overarching provision of training and guidance to agencies, OIT does not typically provide such support. However, in the case where an agency is willing to pay the equivalency rate for an FTE assignment, OIT does have capability to develop and deliver trainings to agencies.	No agency Business Analysts were observed to have been trained by OIT in data structures or analytical tools.

		Plan Date	Ref#	Action	August 2014 Reported Status	Documentation	OIT Comments in August 2014 Report	Result	Gap
30		Mid 2014	**DA05-1**	Recruit a full-time OIT Data Evangelist, working with all data stakeholders to continuously increase quality of data and analytics.			Requested	CohnReznick interviewed stakeholders from OIT, including Associate CIO Paul Sandlin and Enterprise Warehousing and Analytics leader Jeff Jordan, as well as examined documentation surrounding the agency goals and directives including kick-off materials for an enterprise-wide business intelligence user group facilitated by OIT and the Office of Policy and Management. Upon investigation, it was observed that although a single person or job entity has not been recruited to the agency or expressly defined within OIT's organizational structure, the newly formed Enterprise Warehouse and Analytics team possesses the capabilities, knowledge, and reach to support the future facilitation goals of OIT. It is also notable that in OIT's definition and analysis of its own leadership role in the analytics space within the Maine government, OIT views its role, and the role of its evangelists as that of facilitating the frameworks for information sharing and best practices on applications, with the ownership and operation (including the needs for increasing the quality and structure) of data and analytics elements being the responsibility of agencies themselves. Although this role is not captured in a single job definition at present, OIT believes it possesses the current structures and capabilities to serve in this capacity organizationally and operationally.	OIT has not recruited a full-time Data Evangelist.
31		Ongoing	**DA05-2**	Associate CIO for Applications will ensure quality-of-service for OIT Systems Analysts.				CohnReznick interviewed the Associate CIO and observed that the original plan for analytics was created without extensive involvement of IT leadership and without a full understanding of the agency's direction and methods for providing support to customer organizations. It was identified that there are no formal performance management measures in place for people with respect to the services they provide to customers. This was noted to apply to the OIT Systems Analysts, including with respect to analytics and support for business intelligence applications. An informal agreement, often through an MOU or MOA, is developed with customers, but no formal Service Level or Service Quality definitions are created in any case for Systems Analysts.	Formal policies and agreements for levels of service, including quality measures related to personnel performance management have not been established, and this is observed as a gap against stated goals for OIT.
	Project Management	Mid 2013	**PM01**	Overall Goals · PMO Restructuring · Retraining · Some projects using Agile · Discuss Agile governance with business leaders	See Below	See Below			
32		Details:	**PM01-1**	New job descriptions and organization structure and org chart finalized	YES	3 new Job Descriptions		CohnReznick obtained three new job descriptions (Program Manager, Project Manager, and Business Analysis) and an organizational chart dated August 20, 2014. Per review of the new job descriptions and updated organizational chart, CohnReznick confirmed that this planned action was completed. CohnReznick met with OIT's PMO Director on February 20, 2015. According to the PMO Director, the following changes were made in PMO's organizational structure. The OIT Project Manager oversees each agency's project manager, including the Agile Project Manager. The Agile project manager facilitates the Agile process, and business analysts support the project initiation phase (e.g. obtain request approval and gather required information). The PMO Director planned to add a product owner, BPC, and TBC for each department in 2015. According to the PMO Director, segregation of duties have been established within the current organizational structure for project management. Scrum leaders prioritize key actives. Product owners communicate requested scope changes and needs of an agencies business manager to the PMO. The PMs review and approve tests and final products to be implemented. The PMO Director approves the project requests.	No relevant gaps noted.
33			**PM01-2**	Key vacancies are filled with Agile PMs	YES	Can Supply Resumes		According to Doug Birgfeld, PMO director, the organization structure has been formalized. OIT is interviewing candidates for the DHHS Program Manager position. Chrystal Cugini, Program Manager for DHHS, was recently hired, but the DAFS Program Manager position is still empty.	The DAFS Program Manager position is currently vacant and will not be filled at this time.
34			**PM01-3**	Business analyst practice within the PMO defined	Defined but not fully implemented		Sub-Team in PMO is charged with this task	The defined business analyst (BA) practice consists of Terry Gordon and her assistant. The BA group manages the administrative steps of the project initiation phase (e.g. requirements gathering and intake collection). At a PM meeting, business analysts present the results of their feasibility analysis to the executive sponsors, PMO director (Doug Birgfeld), Agile project manager (Joshua Karstens), and Stakeholders to determine whether the change should go through the Agile framework.	No relevant gaps noted.

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35			**PM01-4**	Seek additional staff to operate an Agile Center of Excellence	Not Fully implemented		Sub-Team in PMO is charged with this task	Per discussion with the PMO Director, confirmed that PMO is in the process of assigning project owners as liaisons between the agencies and PMO in facilitating Agile projects. On March 17, 2015, CohnReznick confirmed with PMO leadership that Agile Center of Excellence staff are being developed from the thought leaders and evangelists within the organization to drive policy and adoption. "Additional staff" in the form of re-trained and re-focused individuals have been cultivated within OIT.	No relevant gaps noted.
36			**PM01-5**	New business case documents that support Agile complete and in use	YES	Business Case tool example	https://sharepoint.state.me.us/sites/pmo/Pages/default.aspx https://sharepoint.state.me.us/sites/pmo/PMO/Business%20Case%20Details/Forms/AllItems.aspx	On March 11, 2015, CohnReznick interviewed the project managers from each selected agency. CohnReznick confirmed that the selected projects, went through an undeveloped version of the Agile framework and artifacts were used at the discretion of the project owner. Business case documentation is created as part of the overall project intake process via an e-form available to agency customers. Cohn Reznick has obtained Project Management Framework (PMFs)(screen shot of Sprint and Backlogs in use) (see PM-10) and the project intake form from OIT. CohnReznick verified that business case documents are used to manage the Agile framework as part of the overall project intake process, but in practice, business case documents have not been created or produced as project artifacts in all cases. Lastly, the creation of the business case is not uniform, leading to various levels of input being developed into the case.	Business case documents had not been created or produced as project artifacts in all cases.
37			**PM01-6**	Selected Projects will begin using some aspects of Agile	YES	List of Projects	DOL, DOE, some HHS	On February 20, 2015, CohnReznick spoke with the PMO team to learn about the current status of Agile implementation. CohnReznick confirmed that the Agile methodology has been fully implemented, and one project had been completed under the Agile protocol. At Scrum 0 (project request stage), some projects still incorporate some aspects of the intake process under the waterfall methodology. On 11 and 12 March 2015, CohnReznick confirmed in interviews with project managers from PMO organization that two projects, Blocked Claims with Department of Labor, and Nutrition project with Department of Education, are fully following or have fully followed Agile methodology in practice. Another sample selected project, Load Balancer project, followed aspects of Agile, but as an infrastructure project, it more closely resembled a Waterfall project and used Kanban processes during execution.	No relevant gaps noted.
38			**PM01-7**	First short term agile projects report lessons learned	YES	In process		Per discussion with the PMO director, PMO had learned through projects how to manage rollbacks, scope re-assessments, and the maintenance process under the Agile methodology. On 11 March, 2015, CohnReznick confirmed during interview with Joe Larrabee, PM of the Nutrition project for the Department of Education, that during sprint reviews following every sprint, reviews were conducted and lessons learned were discussed to follow into each new sprint phase. It was also confirmed on 12 March 2015 during interview with Diana Olore, PM of the Load Balancer project which used select Agile processes, that lessons learned were generated after first phase of project and used to inform both stakeholders and second phase of project implementation.	No relevant gaps noted.
39			**PM01-8**	The PMO begins closely aligning with App/Dev and TBCs resources	YES	N/A		On 11 and 12 March 2015, CohnReznick confirmed during interviews with PMO Project Managers and Business Analyst Terry Gordon that the PMO is only engaged with project teams if the business customer approves the additional resource expenditure, since it constitutes an additional cost to the project. In project structures, the PMO is integrated with application development teams, aligning with overall service offering of OIT.	PMO and other teams are not fully integrated because application development teams support their agency customers and PM inclusion in projects is only dictated by customer and customer approval to pay.
40			**PM01-9**	The PMO begins changing project process for new projects	YES	See Work Flow	URL	The 'Technology Workflow Overview' ppt (see PM-6) outlines OIT's PM methodology that contains the standard activities and deliverables of Agile. Per discussion with the PMO group, changes include increased interaction between developers and business owners, and milestones for determining whether the project should go to the next step or return to the last stage for approved new specifications to be added. Sprint 0 still contains some elements of Waterfall.	No relevant gaps noted.
41			**PM01-10**	The PMO identifies projects ready for aspects of agile	YES	See Work Flow	URL	Upon intake, all projects use the Agile methodology as a default project management and project development approach. Upon investigation and analysis of the business case and overall project requirements during discussions with the customer, the PMO may determine that an Agile approach is not applicable in all aspects of the project. In select cases, such as infrastructure projects, projects are managed according to an appropriate methodology as dictated by project need. In such cases, including as observed during the Load Balancer project performed for the Department of Administration and Finance, elements of Agile are used to dictate the project management practice, such as the inclusion of Kanban's pull, but are not necessarily fully Agile managed.	No relevant gaps noted.

		Plan Date	Ref#	Action	August 2014 Reported Status	Documentation	OIT Comments in August 2014 Report	Result	Gap
42			**PM01-11**	PMO leadership identifies thought leaders to promulgate the model	YES	N/A		On 17 March 2015, CohnReznick confirmed through interview with PMO leaders that an individual had been identified (Julie Donohue) as initial thought leader for Agile adoption and methodology. Julie was responsible for forming an initial thought leadership capability on overall Agile methodology and developing component areas over time to be filled with additional thought leaders. Since that time, each component of the Agile practice has an individual thought leader for their respective area, who are responsible for both developing internal capabilities and cascading adoption across future projects. The current thought leader list has six major players for aligning staff with the Agile process. Josh Karstens (Agile Project Manager) manages Agile projects across agencies. Terry Gordon (Business Analyst) and her assistant Kayla Cole (PM For Agile Practice) perform project intake and requirements gathering. Their analysis results are presented in a meeting to determine whether the requested project is approved or denied by Doug Birgfeld (PMO director). Leigh Wilkinson is the project portfolio manager for DOL and Julie Donohue (DPS/RFP specialist) collects and processes RFPs.	OIT has started but is still in process of refining its thought leadership capacity with respect to new model adoption and providing education to customers and internal groups about benefits and best practices using Agile where thought leaders have been identified.
43			**PM01-12**	The PMO in partnership with the leadership team communicates the importance of business involvement and collaboration	YES	N/A		In sprints, an agency's business manager voices his/her needs and concerns to the Project Manager to ensure their projects stays within budget and is consistent with the agreed upon specs as listed in the MOU. Per inquiry with the PMO director, projects with consistent communication between agencies and the PMO have ensured most Agile projects have stayed in good "health". CohnReznick confirmed that PMO leader Doug Birgfeld serves on a Commissioner-level committee focused on Management and Action, which involves communicating the importance of business involvement and collaboration to leadership teams of agencies. It was also observed during interview with project managers Saksham Sharma and Joe Larrabee, that PMO has implemented or is currently implementing projects using the Agile framework, that their respective business manager (customer) is highly involved in each stage of the sprint to connect with concerns, requirements, and constant feedback.	No relevant gaps noted.
44			**PM01-13**	Agile training for PMs identified, scheduled and in process	Partially		RFP is posted	Agile training has been identified, scheduled, and executed for Project Managers at OIT as observed in Workpaper PM-15.	No relevant gaps noted.
		Fall 2013	**PM02**	Overall Goals • All new projects use Agile • New PMO project initiation policies • Agile Center of Excellence pilot • Requirements gathering process standardized • Gating workflow established within enterprise governance					
45		Details:	**PM02-01**	New Job Class vacancies filled	YES			According to Doug Birgfeld, PMO director, the organization structure has been formalized. OIT is interviewing candidates for the DHHS Program Manager position. DAFS Program Manager position is still empty.	PMO has not started searching for potential candidates to fill the DAFS agency's program manager position.
46			**PM02-02**	All Staff is aligned to new structure	YES			OIT staff have been aligned to the new structure. Staff alignment from the agencies varies. Staff alignment was assessed and assigned high, medium, or low level of maturity, documented in the 'Maturity and Adoption' document (see WP Admin-4b). Confirmed with the PMO director that staff from agencies with low Agile maturity have not yet aligned to the new structure.	Staff from agencies with low Agile maturity have not yet aligned to the new structure.
47			**PM02-03**	A cross discipline agile curriculum is established	Partially		RFP is posted	Per inquiry with the PMO director on 2 April 2015, CohnReznick observed that a cross-discipline Agile curriculum has been informally established for agency project managers and project team members engaged in, or seeking to engage in, Agile projects. Training material for scrum masters, scrum team, business partners, project owners, and project managers, business analysts have been identified in accordance with Agile standards and recognition that in order to become Agile certified, project team members must have participated in all sprint phases.	The curriculum for Agile has not been observed to be documented and put into place on a formalized basis.

		Plan Date	Ref#	Action	August 2014 Reported Status	Documentation	OIT Comments in August 2014 Report	Result	Gap
48			**PM02-04**	The PMO establishes a Center of Excellence for Agile Methodology	Yes, but needs work		Sub-Team is charged with this task	Confirmed with the PMO director that the Center of Agile Excellence has been initially established, but the full capabilities of the Center of Excellence are still undefined and traction of all agencies has not been gained. On March 19 2015, CohnReznick received a Scrum Handbook and Best Practices document for running an Agile framework within OIT, which was supplied by Joshua Karstens, the manager who governs the Agile Center of Excellence initiative within OIT. The physical Agile COE is presently in development as of March 2015.	The Agile Center of Excellence has been established, but its overall capabilities in evangelism, training, researching, and supporting outside project teams are still in development. Additionally a physical Center of Excellence is still in development.
49			**PM02-05**	Business Analyst Business Process Management trainings scheduled	Yes		Internal Trainings	CohnReznick observed in the OIT-provided training logs that preliminary Agile training for Business Analysts have been completed, as evidenced by Terry Gordon's completion of the training curriculum for Agile (see PM-15). It was also confirmed that Pega provided a training to the project team that participated on the Blocked Claims project in the fall of 2013. The Pega BPM methodology and Agile toolset were used on this project and project trainings were documented and posted to an intranet portal to be made available to the rest of the organization and new team members.	No relevant gaps noted.
50			**PM02-06**	All PM artifacts for agile are finalized	Inception and Elaboration	PMF	Sub-Team is charged with this task	Per inquiry with the Agile PM, project intake forms, BPM (Business Process Management) and OIT MOUs, Sprints, Backlogs, and User Stories are generated to manage Agile projects. A screenshot of the project intake form (see PM-2a), BPM&OIT and MOUs (see PM-12) currently in use was obtained. CR also obtained screenshot of the Sprint and PEGA program used to manage the project backlogs (see PM-10).	No relevant gaps noted.
51			**PM02-07**	Agile PM tools are identified and implementation begins	Yes	PMF	URL	Per discussion with the PMO director, all identified Agile tools are actively used. This includes the Project Management Frameworks, Atlassian JIRA tool, and the Pegasystems software suite which facilitate the management of Agile projects and development of software. CR obtained the screenshot of the sprints and back logs showing tools used to track the progress of existing projects (see PM-10).	No relevant gaps noted.
52			**PM02-08**	Requirements gathering process standardized	Partially	See USE CASE flows	Sub-Team is charged with this task	Per inquiry with the PMO director, the business analyst (Terry Gordon) gathers information to validate the proposed resources and eligibility requirements to present to the PM meeting for approval to initiate the project. Project managers from PMO team and business analyst confirmed that during Agile engagements, requirements gathering is conducted as part of a standard project initiation phase called 'Sprint 0', where requirements are gathered and prioritized into sprints and a backlog. This is restricted to projects following Agile methodology (PM-9). For projects following a Waterfall development approach, requirements gathering is also conducted at the onset of the project by OIT business analysts in coordination with business managers from the customer side.	No relevant gaps noted.
53			**PM02-09**	The PM is consulted at the start of every project via intake process	Yes	https://sharepoint.state.me.us/sites/pmo/Pages/default.aspx	As far as we know	On 17 March 2015, CohnReznick observed in documented project intake workflow that a project manager (PM) was not consulted at the start of each project intake. Business analysts are the responsible party for accepting and triaging project requests at intake level. The PM was not consulted until after a business case draft is approved. This is documented in WP PM-13. According to Terry Gordon, Business Analyst, memorandums of understanding (MOUs) are used to evidence that a project manager is consulted. Two MOUs can be used as evidence of PM consultation. One is signed between the Business Process Management (BPM) and the service department, while another MOU is signed between OIT and the Agency as evidence of consultation. Some projects may not require an Business Process Management signed MOU, if the project does not involve a change in the framework.	According to documented intake process, PMs are not engaged until after business case is developed. A business analyst, instead of a project manager, has conducted initial project assessment and coordination meeting with the customer.
54			**PM02-10**	Project intake process finalized	YES	https://sharepoint.state.me.us/sites/pmo/Pages/default.aspx		On 17 March 2015, CohnReznick observed that a formalized project intake workflow had been established by OIT and was documented through a swimlane diagram outlining the steps and actors involved with each stage of the project intake process. Per inquiry with Terry Gordon, Business Analyst, the PMO uses a electronic form to collect all project requests for business analysts to assess whether a request is eligible to be a project before presenting it at the PMO managers meeting.	No relevant gaps noted.

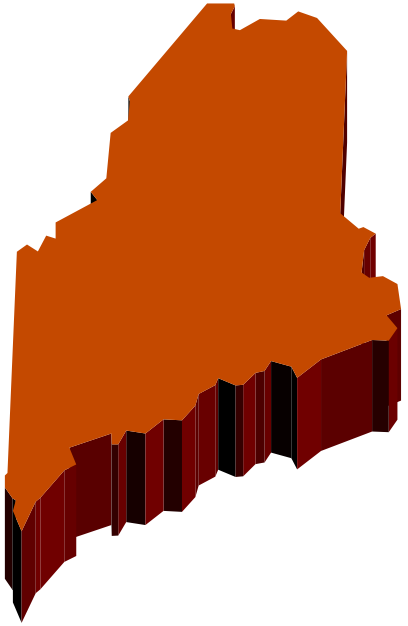
		Plan Date	Ref#	Action	August 2014 Reported Status	Documentation	OIT Comments in August 2014 Report	Result	Gap
55			**PM02-11**	PM and OIT review process reformed to evidence based review	Yes, but not at every agency	See Engagement plan for east side agencies		The review process has been finalized. Per inquiry with PMO leaders, an initial review and approval is conducted at a PMO meeting to assess whether the project should be implemented under the full Agile process. Sprint meetings were conducted between the project owners and developers to assess what areas needed to be modified.	No relevant gaps noted.
56			**PM02-12**	Gating Workflow Established	Yes		Still rolling out	It was observed that business cases and a formal intake process had been developed by OIT for establishing governance around prioritization and size of the portfolio of projects. OIT had developed a formal technology workflow for projects from intake to execution and closure. The workflow was formally documented and included processes for undertaking requirements elicitation, scoping, and adoption into project plans that exist within the organization.	No relevant gaps noted.
57			**PM02-13**	The PMO provides training to business partners	No		RFP is Out	Per discussion with PMO leadership team, OIT Workforce Development team is responsible for coordinating and documenting training attendance for customers. OIT provides three separate training offerings for customers at the executive, managerial, and product owner levels. It was observed that in the MOUs signed by agencies upon agreement with OIT to provide services, that the business customer was encouraged to participate in training and education prior to undertaking involvement in Agile project with OIT. The training is offered and tracked by the OIT Work Development Group. Business partner trainings were observed in to be provided regularly (PM-21d).	No relevant gaps noted.
58			**PM02-14**	The PMO conducts informational outreach sessions for Business partners	Partially			The PMO is currently informing business partners of the new Agile methodology by providing training offerings through both external vendors on an as-needed basis and through intellectual capital capture in the case of projects performed, such as what was observed during the Blocked Claims Pega BPM project. Training is handled and coordinated by the workforce development arm of OIT. It was noted that training and outreach was largely done at the project team level.	No relevant gaps noted.
		Spring 2014	**PM03**	Overall Goals • Agile PM and portfolio management tools implemented • Standard project intake regime in place • Some agencies will have adopted Agile governance matures • Gating workflow • CMM level 3					
59		Details:	**PM03-01**	Final adjustments to organizational structure complete.				Obtained a copy of the OIT organizational chart dated August 20, 2014. According to Doug Birgfeld, PMO director, the organization structure has been formalized, although both the DHHS Program Manager position and the DAFS Program Manager position are still empty.	No relevant gaps noted.
60			**PM03-02**	Staff is aligned to Application Development and Technology Business Consultant resources.				Confirmed with the PMO Director that TBCs and BPMs work closely together in managing Agile projects with the PMO. OIT staff have been aligned to the new structure. Staff alignment from the agencies varied. Staff alignment was assessed and assigned high, medium, or low level of maturity, documented in the 'Maturity and Adoption' document (see WP Admin-4b). Confirmed with the PMO director that staff from agencies with low Agile maturity have not yet aligned to the new structure.	Staff from agencies with low Agile maturity have not yet aligned to the new structure.
61			**PM03-03**	The PMO Center of Excellence is in operation.				Confirmed with the PMO director that the Center of Agile Excellence had been initially established, but the full capabilities of the Center of Excellence were still undefined and traction of all agencies had not been gained. On March 19 2015, CohnReznick received a Scrum Handbook and Best Practices document for running an Agile framework within OIT, which was supplied by Joshua Karstens, the manager who governs the Agile Center of Excellence initiative within OIT. The physical Agile COE was in development as of March 2015.	The Agile Center of Excellence had been established, but its overall capabilities in evangelism, training, researching, and supporting outside project teams were still in development. Additionally a physical Center of Excellence was still in development.
62			**PM03-04**	Agile PM tools implemented.				CohnReznick interviewed the Project Managers on March 12, 2015. CohnReznick learned that even though the Agile artifacts and frameworks had been implemented, Project Managers used the documents at their discretion. The PMO is in the process of standardizing their requirements to have all agency's Project Managers use the Agile documents consistently to properly track future projects (PM-22).	No relevant gaps noted.

		Plan Date	Ref#	Action	August 2014 Reported Status	Documentation	OIT Comments in August 2014 Report	Result	Gap
63			**PM03-05**	Complete delivery chain process finalized.				On 2 April 2015, CohnReznick performed walkthrough of project lifecycle and reviewed technology workflow documentation provided by OIT (see PM-6). It was noted that the delivery chain process, from project intake to deployment certification and handoff to customer and maintenance had been completed and put into practice.	No relevant gaps noted.
64			**PM03-06**	Project Managers are leading Agile teams.				Per discussion with the PMO director, project managers are leading Agile teams and interacting with business owners.	No relevant gaps noted.
65			**PM03-07**	Some agencies will have adopted Agile governance.				Per review of the "Maturity and Adoption of Modern Enterprise Project Management by Agency" (see WP Admin-4b) and confirmation with PMO, some agencies such as DAFS and DOL had a strong maturity level on adoption of modern enterprise project management using Agile frameworks, while others, such as DHHS had not adopted Agile practices.	No relevant gaps noted.
66			**PM03-08**	The language of Agile and value-driven practice will be commonplace.				Per review of the "Maturity and Adoption of Modern Enterprise Project Management by Agency" (see WP Admin-4b) and confirmation with PMO, Agile had not been communicated to all agencies.	Agile had not been communicated to all agencies.
67			**PM03-09**	A growing number of agencies will partner closely with OIT and the PMO to achieve outcomes.				Although some agencies had a strong maturity level for adoption of a modern enterprise project management using Agile frameworks, per review of the "Maturity and Adoption of Modern Enterprise Project Management by Agency" (see WP Admin-4b) and confirmation with PMO, Agile has yet to be communicated to all agencies. However, because the number of agencies partnering over time had increased, there is no observed gap in this case (PM-23a vs. PM-23b).	No relevant gaps noted.
68			**PM03-10**	Project intake process in full use.				Per interview with the PMO director, Doug Birgfeld, that the process electronic intake form on OIT's website was the standard method used to submit project requests.	No relevant gaps noted.
69			**PM03-11**	Gating workflow fully mature				OIT had developed a formal technology workflow for projects from intake to execution and closure, which was formally documented. However, adoption and application of this gating workflow's components had not been consistently applied across the projects selected for further analysis. In particular the 'key deliverables' associated with each stage of the gating workflow had not been processed or created in all cases consistently across the projects.	The framework for the gating workflow had been adopted, but was not fully mature. The adoption and execution of the components of each stage, such as the 'key deliverables' outlined in the workflow had not been noted in cases including go/no decisions and communications plans in the two Agile projects selected for sample, the Department of Education's Nutrition project and the Department of Labor's Blocked Claims project.
70			**PM03-12**	Final adjustments to PM review process in place.				The review process had been finalized. Per interview with PMO leaders, an initial review and approval is conducted at a PMO meeting to assess whether the project should be implemented under the full Agile process. Sprint meetings were conducted between the project owners and developers to assess what areas needed to be modified.	No relevant gaps noted.
71			**PM03-13**	The PM is consulted at the start of every project via intake process.				On 17 March 2015, CohnReznick observed in documented project intake workflow that a project manager (PM) was not consulted at the start of each project intake. Business analysts were the responsible party for accepting and triaging project requests at intake level. The PM was not consulted until after a business case draft is approved. This is documented in WP PM-13. According to Terry Gordon, Business Analyst, memorandums of understanding (MOUs) are used to evidence that a project manager is consulted. Two MOUs can be used as evidence of PM consultation. One is signed between the Business Process Management (BPM) and the service department, while another MOU is signed between OIT and the Agency as evidence of consultation. Some projects may not require an Business Process Management signed MOU, if the project does not involve a change in the framework.	According to documented intake process, PMs were not engaged until after business case is developed. A business analyst, instead of a project manager, had conducted initial project assessment and coordination meeting with the customer.
72			**PM03-14**	Program managers are engaged with facilitating good governance practices with agencies.				Project owners served as the liaisons between OIT's project managers and the departmental heads in facilitating the proper Agile practices.	No relevant gaps noted.

		Plan Date	Ref#	Action	August 2014 Reported Status	Documentation	OIT Comments in August 2014 Report	Result	Gap
73			**PM03-15**	First metrics for delivery rates available				Observed in interview with PMO Director Doug Birgfeld and Business Analyst lead Terry Gordon, that the focus on discipline establishment and lack of a comprehensive portfolio management tool affects OIT's ability to calculate delivery rates. OIT spends a lot of time calculating and collecting predictive information on whether or not individual projects are successful by recording sprint burn downs and risk registers but less time collecting holistic-project view information like delivery rates. Additionally, it was observed in interviews that more qualitative assessments of success were defined during business case development. These subjective measurements are captured for projects as assessed against mission objectives for agencies rather than more quantitative measures of measurement and success.	Delivery rates for projects were not well defined and quantitative metrics of project performance and success were not typically assessed as part of the delivery measurement of OIT projects.
74			**PM03-16**	Portfolio Management tools in place				On 17 March 2015, it was observed during interview with Doug Birgfeld, PMO director and Joshua Karstens, PMO lead, that OIT had adopted Sharepoint as a primary Portfolio Management tool, and followed processes from intake to project close to track projects and ensure consistent capture of data. It was noted, however, that various teams used various different tools for different elements of project and portfolio management based on their functional purpose and the type of project. As an example, some developers used JIRA or Pegasystems products when conducting their portfolio management activities. OIT indicated that because no COTS (Commercial off-the-shelf) solution meets their needs, this process and collection of applications is required. Although steps have been taken in addressing the Portfolio Management need and Sharepoint's status dashboard provides an "at a glance' viewpoint of projects in the portfolio and pipeline, a mix of tools are used across the project lifespan with data being captured in disparate systems that do not provide reporting or overall management information regarding the portfolio of projects (PM-2+K814a, PM-24b).	No relevant gaps noted.
75			**PM03-17**	CMM level 3 achieved.				CohnReznick met with PMO and learned that the Agile framework had been implemented and some projects had used some of the Agile portfolio tools (e.g. request form on OIT webpage, back logs on PEGA system, and sprints on SPr-52). Overall the Agile Manifesto achieved CMM level 3 within OIT, as the tools and procedures are in place but had not reached the level of automation for all agencies.	No relevant gaps noted.
76			**PM03-18**	First group of fully able Agile PMs are trained.				On 20 March 2015, CohnReznick observed in workpaper PM-15 that a group of project managers had been trained in Agile project management techniques and best practices via a series of courses and handbooks, which is noted in workpapers PM-15 and PM-8a through PM-8f.	No relevant gaps noted.
77			**PM03-19**	First group of fully able Business Analysts are trained.				On 20 March 2015, CohnReznick observed in workpaper PM-15 that a group of project managers have been trained in Agile project management techniques and best practices via a series of courses and handbooks, which is noted in workpapers PM-15 and PM-8a through PM-8f.	No relevant gaps noted.

Appendix D – Financial Warehouse Gap Analysis

Financial Warehouse Gap Analysis



Analyzing the functional capabilities of DAFS information systems, and their ability to meet the financial data reporting needs of State of Maine stakeholders

Office of State Controller
State of Maine

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Executive Summary

The existing financial reporting systems for the State of Maine struggle to meet the needs of decision makers, administrators, and analysts. The primary system, the **GQL**, has a dated interface, and the data warehouse has not been kept entirely current with source system changes. Data consumers have had limited role in the governance of financial data. The loss of key budget data in the **GQL** in 2007 has led to a proliferation of sub-systems and a "spreadmart" approach to data reporting. A one stop portal is desired for access to Accounting, Budget, Payroll, and HR data.

Background Information

SOM/OSC Profile

The Office of the State Controller (OSC) is a support bureau under the Department of Administrative and Financial Services for the State of Maine. OSC is responsible for all financial reporting and forecasting, setting accounting policy and procedure, and internal auditing to mitigate risk and loss. Primary deliverables include the state's Comprehensive Annual Financial Report (CAFR), the state's Schedule of Expenditures of Financial Awards (SEFA), and the State's Monthly Undedicated Revenue Reports.

Current Systems

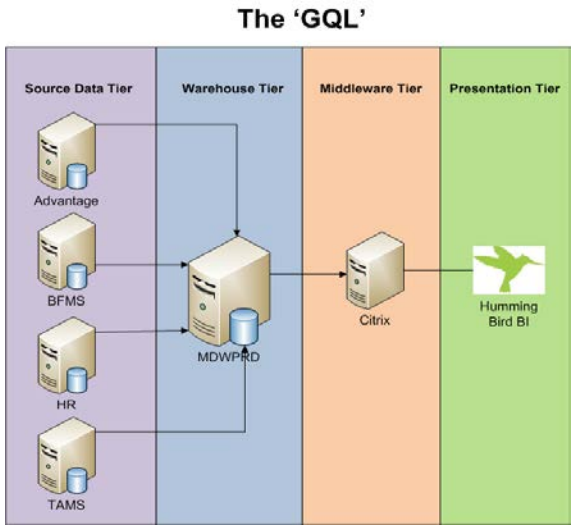
Financial data used by analysts around the state flows through the **MDWPRD** data warehouse. It is consumed in various ways, but primary to our scope are three systems:

- The **GQL,** also referred to as Hummingbird, Hummingbird BI, OpenText BI, "the citrix application", and "the warehouse".
  - This is listed in the OIT Application Inventory as: **DAFS Fin DW - BI QUERY/GQL**, app id: **565**
- The **Cube**, also referred to as the DHHS Cube or the SQL Server SSAS Cube
  - This is listed in the OIT Application Inventory as: **DAFS Fin DW – MS SQL Server**, app id: **2338**
- The **Report Manager** also referred to as, SSRS, FIN_SESC and "The Dennis Corliss Application"
  - This is listed in the OIT Application Inventory as: **FIN_SESC**, app id: **6379**

State financial analysts, department heads, bureau directors and program managers consult a combination of these systems to handle the day to day financial reporting mandated by state and federal law, as well as the reporting required by grants and contracts. Additionally these tools are used to assist in the creation of budgets and to formulate spending and resourcing plans.

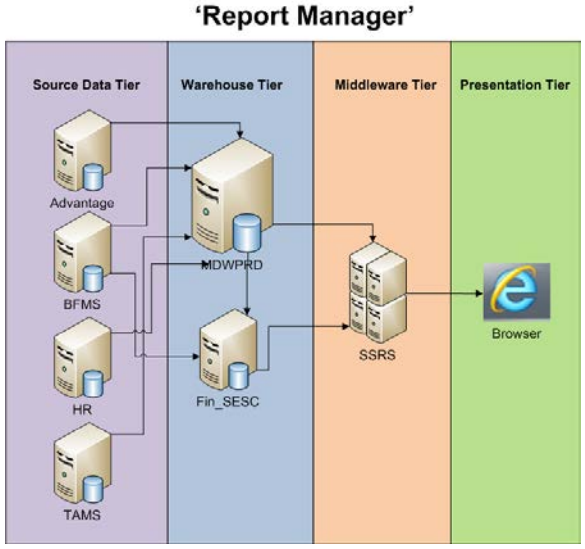
The systems are described here:

The GQL



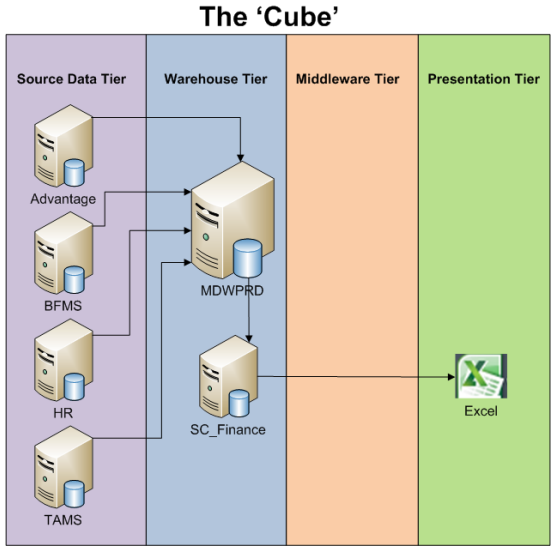
The OpenText Hummingbird BI tool is used to present data via a citrix connection, sourcing its data entirely from the **MDWPRD** Oracle database. This database is populated nightly by extract, transform and load (ETL) processes from **Advantage**, **BFMS**, **HR**, and **TAMS**. It provides point and click querying of document level financial transactions. Data is available to the end user for both current **Advantage** systems, and from the legacy **MFASIS** accounting system, although this data is logically separated. Budget data is available for budgets from prior to state fiscal year 2007, but 2008-current budget data is not available. Data obtained from the **GQL** is considered highly accurate and reliable.

Report Manager



Report Manager is a SQL Server Reporting Services implementation which makes use of the **MDWPRD** Oracle database, but merges the data with some service center maintained data which has been built into the **Fin_SESC** SQL Server database. Additionally **Fin_SESC** is being populated nightly with data directly from the **BFMS** system. This data source resolves a major gap in the **GQL,** the missing annual budget data. Customized reports which meet several frequently occurring needs and a prompt driven user interface have led to a high degree of acceptance among end users who have access to this system. The major concern dissuading the OSC from allowing greater access to this tool is system governance and the overall security structure.

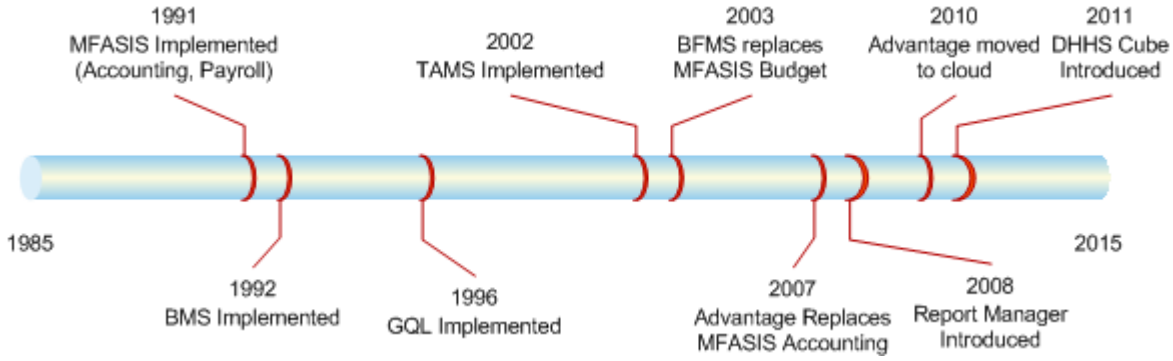
The Cube



The **Cube** is a Microsoft SQL Server Analysis Services presentation of **MDWPRD** data. The data is aggregated, cubed and delivered to the end user via an Excel pivot table presentation. This is a powerful experience for those savvy in excel and familiar with State of Maine financial data coding structures. It is more daunting for a new Bureau director to climb in and begin investigating the financial footing of their agency.

History & Timeline

- Prior to 1991 largely manual processes existed for Accounting, Payroll and Budget
- 1991: Mainframe system, **MFASIS**, developed to handle Maine's Accounting, Payroll and Budget
- 1993: Oracle data warehouse project started to support these systems
- 1996: **GQL** system implemented
- 2002: **TAMS** system developed to hold Time and Attendance data
- 2003: **BFMS** system implemented, moves budgeting off the mainframe
- 2006: **Advantage** system implemented, moves accounting off the mainframe
- 2008: **Report Manager** introduced at SESC
- 2010: **Advantage** system moved to CGI cloud / managed services contract
- 2011: The **Cube** introduced at DHHS



Timeline

From 1988 through 1991, the State of Maine worked on incorporating its Accounting, Payroll and Budgeting systems into a mainframe computer system called **MFASIS**. The first implementation beginning in fiscal year 1991, the Account and Payroll systems came online. This was followed up the next year by the implementation of **BMS,** the budgeting application, also on the mainframe.

Once the operational systems were online, the next stage in the effort was to set up a data warehouse to support the reporting and auditing needs for the state. To this end the **MDWPRD** Oracle database was implemented, with a visual query tool (Hummingbird BI) as an interface, this system was called the **GQL**. This system satisfied the financial reporting needs of the State of Maine at the time of implementation, and was considered a modern and efficient system, an improvement over historical reporting capabilities.

In 2002 the **TAMS** system was implemented. Then in 2003, **BMS** was replaced by **BFMS,** a budget system which was client server in nature. These moves were indicative of the move away from the mainframe which was happening everywhere in both government and business.

In 2007 Maine replaced **MFASIS**, with a modernized solution; CGI Advantage ERP. With the implementation of **Advantage**, OSC intended to support adhoc reporting and data mining with a product called **Info Advantage,** however this rolled out with limited success and the **GQL** persisted in use. **Info Advantage** was later abandoned, largely due to cost. At the time it was assumed that an investment to bring **Info Advantage** to the current version would have resolved the usability problems. The underlying structure of the accounting data changed with **Advantage** and this necessitated the need for a new subject area in the warehouse and **GQL**. Building a new subject area for the budget data was out of scope for this project. Since 2007 budget data has been generally missing from the **GQL** and the data warehouse for regular consumption.

Between 2007 and today, there have been a proliferation of small systems implemented by various end users in order to stem the gaps that exist between the various financial data sets and the data warehouse / **GQL.** Twenty six miscellaneous data extracts which source **MDWPRD** have been identified. Additionally two smaller scale reporting systems, the **Cube** and the **Report Manager** have been developed and eventually have come under the maintenance supervision of OIT and OSC**.** The Gap Analysis

Analysis & Process

System overviews were conducted with the technical teams supporting the various applications, but the core of this analysis was based on the functional review of systems with end users. Interviews and desk audits were conducted with service center staff and managers, bureau directors, and financial analysts from various organizations within state government. The systems and components were considered collectively or horizontally. The resulting analysis is presented in a "**SWOT**" format, to highlight the **S**trengths, **W**eaknesses, **O**pportunities and **T**hreats found. Gaps in functionality are highlighted for each system. The "Overall" section is intended to synthesize the sum of all available functionality, gaps indicating shortfalls in functionality that are

being overcome with manual effort. An additional table detailing available data by subject area has been included as provided by the general government service center.

Findings

1. Key data is missing from various systems causing a need to use multiple systems to find answers to business questions
2. No single end point exists to manage and direct traffic to the various systems
3. Each organization uses a different subset of reporting systems
4. End user training for these systems does not meet the need
5. Usability of the systems need improvement

Prior to fiscal year 2007 the **GQL** held both accounting and annual budget data. Around the time of the implementation of **Advantage**, the budget data extracts were stopped. I was unable to determine the exact cause. Historical budgets are still resident but new budgets are not. This creates a functional gap for budget to actual reporting queries which source data only from **MDWPRD**. Additionally, the **GQL** does not store an end of month, or beginning of period balance. This creates difficulty in providing a cash balance report, which would allow business end users to know how much cash they have on hand.

While functionality exists to meet all state and federal reporting requirements, there is no single source of data for this purpose. This necessitates the access of multiple systems. This causes confusion and hinders efficient data handling, as data from more than one source must be merged. Cut and paste operations in spreadsheets is a routine function for analysts today. The lack of a single source can also lead to obstacles for reproducing an analysis. Because business rules are not encapsulated by a single reporting engine it is possible for two people come up with different answers to the same question. For this reason DOT has put in place a governance process to vet all reports, analysis before the results can be released.

Because the reporting systems other than the **GQL** were not created by a central authority, with a tested and validated development methodology they have not been universally adopted. The DHHS service center uses the **Cube** and the **GQL**, while the SESC for example uses **Report Manager** and the **GQL.** DOT analysts do more than 70% of their work in a homegrown Oracle Business Intelligence reporting system, but need to look up budget data directly from **BFMS**. This lack of standardization likely leads to differing quality at each agency, and also represents and inefficiency in terms of training within the organization when looked at from a statewide level.

Training has been described as nonexistent for these systems. One user expressed the situation as, “you only know what your predecessor knew”. The training gap is exacerbated by bad form in the warehouse. Because of the training issues, getting new users started is a slow process. This is especially problematic when mass turnover happens, for example when a change of party happens in the executive branch due to an election result.

The **GQL** and **Cube** systems generally do a poor job of presenting fields and attributes for selection, and frequently require the end user to be intimately familiar with the State's financial coding system. Usability of the system suffers in this regard, particularly when a program manager or other business user is attempting to procure self-service data. The **Report Manager** attempts some of this code translation, by concatenating both the code and the lookup value for presentation to the user. However, handling of the lookup table crosswalk is a manual effort because not all of the lookup values exist in the source systems, so a daily report is run to alert analysts of missing codes. They then update the **Fin_SESC** database manually to remediate the issue.

Complaints from end users revolved around budget to actual reporting. Data retrieval is a labor intensive and inefficient chore. The interviewed subject matter experts held the consensus that there should be one point of access to all the data; accounting, budget, payroll, and human resources. Another resounding statement was, "if I put it in, I should be able to get it out" as a general principle of data access and availability. Yet another theme was, "we spend more time collecting data, and less time using data." this message was punctuated with, "by the time we can answer a question, the business has lost interest."

A secondary line of complaints revolve around the handling of internal (department to department) billing. This seems to be primarily a source system issue, and standardization of department names, but could perhaps be considered while addressing the warehousing and reporting systems.

The spreadmart which has developed to span the existing functionality gaps is detrimental to data security and report accuracy. Manual manipulation of data extracts is frequently required, for example, when joining annual budget and accounting data.

While some performance issues were noted, for example a performance cliff in the **GQL** when attempting to retrieve lookup values for report filters, they were not a prevalent theme in the discussions. The speed of data retrieval was much less of an issue than the need to consult multiple sources, and to manually manipulate data from those sources to join them together.

Some end users feel alienated. There is a feeling of lack of input into system-wide decisions which impact the veracity of the data systems. One highly positioned official thought they would have difficulty getting a fairly simple change implemented, while the resource directly responsible for system maintenance felt changes like that were made frequently. This has been noted as a system-wide lack of governance. Some of this may be due to the history of the systems, how they came into being, and how ownership or charge has changed hands through turnover and attrition.

Horizontal Analysis

System	Strengths	Weaknesses	Opportunities	Threats	Gaps
GQL	• Document level detail available • Point and Click query interface • Unquestioned validity and accuracy • Ability to build and save reports	• Missing Annual Budget Data • Need to be familiar with state accounting and coding to build queries • Antiquated Interface, despite point and click functionality • Table, Field, Attribute presentation not user friendly • Historical data stored separately from current data, unions and joins not “easy” • Copy and Paste to excel not efficient • Lookup code performance • Active Directory not integrated, requires multiple log ins • Run away queries can impact performance for others	• Required citrix server upgrade may provide opportunity to upgrade GQL Interface • Budget data has been remapped into warehouse, needs to be tested/validated • Newer versions of Hummingbird BI are available	• HRMS system replacement may change structure of HR data • HRMS project to incorporate TAMS	• Missing annual budget data • Training • Governance • Aggregated data • Modern Presentation • Canned Reports • Single Sign on • Performance of Lookup Values • Query controls

System	Strengths	Weaknesses	Opportunities	Threats	Gaps
Cube	• High performance access to aggregated data • Native excel interface • Pivot tables are analyst friendly • Integrated with Active Directory	• Missing annual budget data • Drill to detail performance • Instability of application • Some additional transformation of data required • Table, Field, Attribute presentation • Not available to all users / technology challenge	• SSAS cubes can be addressed by modern BI tools, including newer versions of Hummingbird BI	• HRMS project	• Missing annual budget data • Training • Governance • Detail data • Stability • Interface for non-analysts • Availability to some agencies
Report Manager	• Annual budget data integrated • Prebuilt reports enhance efficiency • Prompt driven dashboards • Overnight report caching • Active Directory integration	• Governance • Security model, access controls • Proliferation of tool to new agencies has been limited • No end user access to programmability features	• Roll out to other service centers considered minimal effort	• HRMS project • Security issues	• Governance • Limited availability • Adhoc capability • Security concerns

System	Strengths	Weaknesses	Opportunities	Threats	Gaps
Overall	• Source data is clean and validated • All the data needed for federal and state requirements is available	• Spreadmart issues • Data security • Governance • Training • Ease of Use • Handling of internal billing	• Citrix life cycle may drive adoption of new or updated BI tool	• HRMS Project • Security issues • High volume of data warehouse extracts restricts flexibility	• Joined budget and accounting data not generally available • No single entry point to retrieve data • Usability/User Friendliness • Training / Startup time • Governance

System Capabilities by Subject Area

The general government service center provided this additional, detail functionality review. This information was gathered by Kim Smith and her staff; it is included here to provide more detail on the availability of data for all systems, including systems of record.

Information	Cube	Report Manager	GQL	Advantage Reports	Advantage System	BFMS
General Statements	• Good for ad hoc • Query updates with every change – becomes time consuming when having to update multiple fields and you have to wait for the query to finish in between each change • Available as of the end of the previous business day	• Combines information from multiple sources (Advantage, Cube, Finance/Budget Warehouses • Flexible • Access to information not available in other places • Available as of the previous business day	• Good for difficult queries • Payroll Warehouse only place to get detail on salary and benefit expenditures • Finance Warehouse has tables that don't connect (i.e. revenue and expenditures tables)	• Good for reference • Some are only place to get certain pieces of information, but info is in PDF form	• Information is real-time • Information not in format that is easily usable	• Primary source for budget information • Information for analysis obtained by running a report and saving to Excel (still requires manipulation to make usable)
Cash Balances	• Doesn't incorporate FY2008 beginning cash balance • Flexible, can view for Units, Programs, etc.	• Flexible, can view for Units, Programs, etc.	• Difficult, can't query revenue and expenditures together; no beginning cash balance	• GA02 available weekly • Static report by Appropriation, Unit and Revenue/Object Codes	• Real-time, but only at Appropriation level	• BFMS does not maintain cash balances

Information	Cube	Report Manager	GQL	Advantage Reports	Advantage System	BFMS
Allotment Balances	• Summary only: annual total and by Object Class (Line Cat)	• Extracts from BFMS Warehouse, available as budgeted (details) • Provides drill-down capability to view more information as needed	• Not available or not used	• Not available or not used	• BQ90 Level 3 is annual and by Object Class • Allotment screen breaks down by quarter	• Available through static reports • Can view quarter to date and year to date • Time-consuming to pick and choose what to view (reports are for whole department or one subset at a time)
Procurement Documents	• All PO document types now available	• Includes encumbered and unencumbered documents • Includes commodity line information • Links to payment detail	• All Procurement document types now available	• AP02A & AP02O Weekly Reports • Available for department in total, sorted by document code, number	• Only searchable by document code	• Encumbrances are summarized

Recommendations

The capability to join annual budget data with accounting system data in a single query should be provided. This can be accomplished either through the rollout of **Report Manager** to all stake holder groups, or by validating the annual budget data subject area in **MDWPRD** and making it available again, based on roles/permissions.

A governance group should be formed to ensure that future system upgrades either to source systems, or the warehouse and reporting systems address the needs of the enterprise as well as the individual stakeholder organization.

Expansion of canned reports and a drilled or prompted navigation of data would enhance the efficiency of analysts and senior agency administrators. This cannot replace the need for adhoc access for specialized questions, but will improve day to day performance. This will allow analysts to focus on adding value to data, and will expedite the more mundane data retrieval.

A modern business intelligence (BI) tool, capable of data blending, or federated BI seems in order. A tool with the capabilities of Oracle Business Intelligence Enterprise Edition, or IBM's COGNOS would resolve many of the problems with data presentation, and consolidation of the multiple points of entry. Additionally a modernized interface would streamline the training issue, as new users experienced in data analysis outside of state government should be familiar with tools such as these due to a greater market share than the current **GQL** solution.

Role based access controls need to become more granular. This can be accomplished at either the warehouse tier or the middleware tier depending on the solution chosen. Again, a modern business intelligence tool will allow you flexibility in this manner.

Usability of the system should be improved. End user presentation should focus on values not coding, however coding can continue to be delivered for ease of use to those that require it. Field and attribute list presentations should be given in a meaningful way. Typically dates will be presented first, and then attributes should be presented alphabetically organized within dimensions.

Whatever solution is implemented, standardized training should become a priority. Each individual charged with the use of state financial data should have a minimum level of understanding of these systems. This will ensure valid and proper conclusions are drawn from the data, and will protect the integrity of the government decision making process.

Potential solutions should look to both improve access to data which the end user should have access to, but also restrict access to data that should not be available, based on role. Discipline should be used in developing these systems with all requirements being recorded, and tested against. The ability to reproduce point in time analysis to support audits and federal reporting is critical as well.

Minimize manual data manipulation where possible will strengthen the accuracy of data and reports.

Appendix E – RFP Response Items

Excerpt from OPEGA RFP #14-01 OIT Follow-Up	CohnReznick Observations
OIT's progress in implementing its strategic plan for each of the three areas particularly with regard to: • The extent to which OIT has completed its planned actions; • The extent to which actions taken have been effectively implemented to help ensure long-term results; and • The extent to which OIT has achieved its stated goals.	40/77 Identified gaps resolved • Implemented actions include: ○ BC/DR Manager has been hired ○ Agile training has been identified, scheduled, and executed for Project Managers at OIT • High level goals not reached include: ○ BIA has not been performed for all agency-critical applications ○ OIT has not paired agency Business Analysts with an OIT Systems Analyst or provided with analytics tools ○ Staff from agencies with low Agile maturity have not yet aligned to the new structure.
In the area of Project Management, the assessment will include a specific focus on OIT's progress and effectiveness in: • converting to the Agile project management methodology; • increasing its capacity to manage the volume of current and anticipated projects; and • improving performance on current projects as regards meeting expectations for timeliness, cost and quality.	31/46 Identified gaps resolved • Actual use of Agile is still at partial stage; tools have been implemented; although new projects incorporate some aspects of waterfall methodology, observations conclude that multiple projects have been completed on the Agile framework. • The PMO has begun to expand its people resources to take on a greater queue of projects requested by other departments • PMO's management is beginning to develop key metrics to budget resources use for delivering project results in a timely manner.
In the area of Business Continuity and Disaster Recovery, the assessment will include a specific focus on: • the adequacy of OIT's 180-day plan to address gaps identified in the Cavan Group Gap Analysis; • OIT's progress in implementing the 180-day plan; and • The State's current level of exposure from unmitigated BC/DR risks given the gaps previously identified and OIT's current progress in addressing them.	9/22 Identified gaps resolved • 180 Day Plan updated 1/16/15, confirming that plan has been developed as per the recommendations of the Cavan Group Report. • Gaps still present: ○ Lack of budgeting for and no full inventory of mission critical BC/DR systems; ○ BIA incomplete as of 12/31/14; OIT has not finalized BC/DR plan ○ Legacy load balancers deleted, fail-over test needs to be performed; need inventory of mission critical applications to determine repercussions

In the area of Data Analytics, the assessment will include a specific focus on: • OIT's progress and effectiveness in increasing/improving its capacity to support the data and analytic needs of analysts, management and decision makers in State agencies; and • The extent to which OIT is effectively facilitating data sharing and data analytics across State agencies.	0/9 Identified gaps resolved • Although the levels of ownership and responsibility for each agencies' OIT requirements have not been formally defined or clarified in policy, the OIT has established guidelines and roles that it will adopt moving forward • Creation of Enterprise Warehouse and Analytics team will facilitate better cross-agency communication moving forward • Although EWA team is not captured in a single job definition at present, OIT believes it possesses the current structures and capabilities to serve in this capacity organizationally and operationally

Appendix F – Business Intelligence & Analytics

Business Intelligence & Analytics

Blueprint for Rationalizing and then developing Strategic OIT BI Capabilities

1. Understand Current Data Enablement & Acquisition Capabilities
    a. Sources of Data
        i. Inventory of Relational Data Marts & Warehouses
        ii. Inventory of ERP Systems
        iii. Inventory of Operational Systems Data
        iv. Inventory of MS Excel and Text File Data
        v. Inventory of External Data (Web, Cloud)
    b. Timeliness of Data and Availability
    c. Integration Requirements across Disparate Data (Data Federation, Data Virtualization)
    d. Meta Data Capabilities
        i. Inventory and Description
        ii. Business Data Dictionaries
        iii. Security Controls
    e. Data Stewardship & Governance
        i. Roles & Responsibilities
        ii. Data Quality Definitions
        iii. Automated Systems for Adherence
        iv. Manual procedures for control
    f. Software Tools being used for
        i. Data Enablement & Integration
        ii. Data Marts & Warehouses
        iii. ETL
        iv. Master Data Management
        v. Data Quality
        vi. Data Stewardship
        vii. Data Governance

2. Understand Current Business Intelligence Capabilities
    a. End User Requirements
        i. Dashboards
        ii. Formatted Reports
        iii. Ad hoc
        iv. Predictive Analytics
        v. Enterprise Search
        vi. Data Exploration & Visualization
        vii. Self Service
    b. Software Tools being used for
        i. Dashboards
        ii. Formatted Reports
        iii. Ad hoc
        iv. Data Exploration & Visualization

3. Design Strategic BI Platform (includes Data Enablement and all forms of Information Delivery)
        i. Mission Statement
        ii. Logical Architecture Model

iii. Physical Implementation Model
iv. Data Enablement & Security Model
v. IT & Business User Roles & Responsibilities
vi. Operational Control & Procedures
vii. Performance and Scale Monitoring

4. Establishment of an OIT "BI Center or Excellence":
    a. Mission Statement & Charter – Enterprise Adoption & Value Creation
    b. Service Level Agreements - Monitoring & Chargeback
    c. Governing Body – Business & IT
    d. Roles & Responsibilities
    e. Operational Control & Procedures
    f. Measuring User Satisfaction

Enhancement Roadmap & Release

Appendix B

Source: http://www.governing.com/topics/mgmt/gov-bad-data.html

The Causes, Costs and Consequences of Bad Government Data

States and localities are embracing the promise of big data. But just how good is the information theyâ€™re collecting in the first place?

BY: Katherine Barrett & Richard Greene | June 24, 2015

Data is the lifeblood of state government. It's the crucial commodity that's necessary to manage projects, avoid fraud, assess program performance, keep the books in balance and deliver services efficiently. But even as the trend toward greater reliance on data has accelerated over the past decades, the information itself has fallen dangerously short of the mark. Sometimes it doesn't exist at all. But worse than that, all too often it's just wrong.

There are examples everywhere. Last year, the California auditor's office issued a report that looked at accounting records at the State Controller's Office to see whether it was accurately recording sick leave and vacation credits. "We found circumstances where instead of eight hours, it was 80 and in one case, 800," says Elaine Howle, the California state auditor. "And the system didn't have controls to say that's impossible." The audit found 200,000 questionable hours of leave due to data entry errors, with a value of $6 million.

Mistakes like that are embarrassing, and can lead to unequal treatment of valued employees. Sometimes, however, decisions made with bad data can have deeper consequences. In 2012, the secretary of environmental protection in Pennsylvania told Congress that there was no evidence the state's water quality had been affected by fracking. "Tens of thousands of wells have been hydraulically fractured in Pennsylvania," he said, "without any indication that groundwater quality has been impacted."

But by August 2014, the same department published a list of 248 incidents of damage to well water due to gas development. Why didn't the department pick up on the water problems sooner? A key reason was that the data collected by its six regional offices had not been forwarded to the central office. At the same time, the regions differed greatly in how they collected, stored, transmitted and dealt with the information. An audit concluded that Pennsylvania's complaint tracking system for water quality was ineffective and failed to provide "reliable information to effectively manage the program."

When data is flawed, the consequences can reach throughout the entire government enterprise. Services are needlessly duplicated; evaluation of successful programs is difficult; tax dollars go uncollected; infrastructure maintenance is conducted inefficiently; health-care dollars are wasted. The list goes on and on. Increasingly, states are becoming aware of just how serious the problem is. "The poor quality of government data," says Dave Yost, Ohio's state auditor, "is probably the most important emerging trend for government executives, across the board, at all levels."

Just how widespread a problem is data quality? In a *Governing* telephone survey with more than 75 officials in 46 states, about 7 out of 10 said that data problems were frequently or often an impediment to doing their business effectively. No one who worked with program data said this was rarely the case. (View the full results of the survey in this infographic.)

How often do you run into problems with bad data in public-sector agencies?

It's not that data, in general, is worse than it was in the past. Not long ago, huge quantities of data existed only in warehoused file cabinets; technology has changed that for the better. But our dependence on data has increased dramatically and the problems caused by poor information have expanded as well. "In an age of Google and with the advent of big data on the Internet," says John Traylor, New York's executive deputy comptroller, "expectations for data have gone up. People are asking questions that they didn't ask before."

Most of the data problems are in program management, not in financial accounting. Traylor says he has accountants who are "trained in a discipline that places a high value on peer review, internal controls, edit checks -- all the stuff that accountants want to do. In the programmatic world, you have program administrators who don't have that type of training. Their disciplines are focused on getting data out quickly or looking at it quickly."

That's a problem with a lot of dangerous implications. At all levels of government right now, there's an intense focus on collecting information and using it to drive decision-making. Call it the gospel of data: the sense that predictive analytics will solve all problems, all of the time. In many ways, that's true. Data analytics can be a powerful tool to help governments run more efficiently and effectively. But data analytics are only as good as the data itself. As states and localities focus ever more intently on information gathering and analysis, there's a crucial question that frequently isn't being asked: How good is our data?

Generally, how would you rate your own agency’s data?

The Pain of Bad Data

When states can't come up with the appropriate data -- or simply rely on bad data -- it's a lot like trying to drive a car with an empty gas tank or like putting salt in the gasoline. For example, the Railroad Commission in Texas is responsible for the regulation of oil and gas development. It tracks violations of the rules, and its data showed that 96 percent of cases were closed with no enforcement action. That would lead policymakers to the conclusion that the vast majority of cases were without merit.

But there was a hitch. There was no effort to link the violations with companies to see if problems were recurring. One company could be cited 10 times, and only be subjected to enforcement actions the 10th time. "They had no idea whether the same company was recidivating -- committing similar violations over and over. We requested the raw data and put it together," says Ken Levine, director of the Texas Sunset Advisory Commission, which reviewed the Railroad Commission's work for the state legislature in 2011. "We showed that they were doing a poor job of ensuring enforcement was done at a level that would deter future bad acts."

The agencies with the worst problems in many states are those involved with social services and economic development. Weaknesses also often show up in small units of government -- those with

inadequate IT skills and very decentralized agencies that are heavily reliant on local administration of state services. "When there are lots of people with their hands on the data," says Dianne Ray, state auditor of Colorado, "that's where we find the biggest problems."

On the positive side, programs that are partially funded by the feds tend to be richer in data than most others "because the federal government requires it," says Carrie Vibert, who runs the Connecticut Office of Program Review and Investigations. Most state transportation agencies handle data fairly effectively because they are required to report a plethora of information to Washington. "Transportation measures things because it's run by engineers who like to count," says John Turcotte, head of North Carolina's Program Evaluation Division. "They collect very good data."

In many agencies, however, it isn't a question of good or bad data. There isn't any usable data being collected at all. In Massachusetts, for example, there has been a great deal of debate over the value of charter schools. The state auditor's office planned on issuing a report late last year that would help lay some of the more contentious debates to rest. But that never happened. There was so little reliable information being gathered that the state was simply unable to come to any useful conclusions.

Neighboring Connecticut offers another troubling example: The Rocky Hill Veterans Home, which provides housing for homeless veterans. One of the goals of the program was for residents to exit the home within three years. But for a long time, nobody knew -- or could possibly know -- if the goal was being achieved or not. That's because there had been no usable data collected, except in individual files, on how long people actually stayed. And since no one was going through the individual files one at a time, the aggregate numbers weren't available.

When reviewers decided to look into this issue, they did their own survey of veterans in the home. It turned out that about 60 percent of the residents had lived there longer than three years and about half had been there at least five years. When asked about the help they had received from the staff in finding permanent housing, only 10 percent said they were satisfied.

And consider West Virginia's river gages. The state has a goal of ensuring that 90 percent of its gages, which are used to measure water levels, are operating properly. The Division of Homeland Security and Emergency Management offered up 2012 data showing that some 93 percent of the state's gages were functioning as intended. That was an encouraging number. But when the agency was asked for documentation, it turned out there was none. According to John Sylvia, director of the legislature's Performance Evaluation and Research Division, the figure was based on "visual estimates and memory" of the communications officer.

West Virginia officials based its water-level measures on "visual estimates and memory." (Flickr/Dion Hinchcliffe)

Why There's a Problem

In order for governments to address the issues of bad or nonexistent data, they need to understand the underlying causes of both. In Massachusetts, for instance, the technology systems are so old and clunky in the Department of Families and Children that social workers stopped inputting all of the records into them. It's just too time consuming.

In Alabama, the use and analysis of data is thwarted by early 1990s technology. "There are limitations to our old system that have made it very difficult to analyze data and extract the data. That's been a hindrance here," says budget officer Kelly Butler.

But the age and capacity of the technology is only a part of the problem; and one which is difficult for many states to alleviate in a time of fiscal stress. There are a number of other critical failings that have blocked the most effective uses of data. The list is long and includes error-filled data input, ineffective system controls, untrained workers, inconsistent definitions, siloed systems, lack of centralized control of data and problems with data collected by private-sector contractors.

Siloed Systems

In many states there is minimal sharing of data between technology systems that are run by separate agencies or even separate programs within the same agency. In Louisiana, for example, there has been resistance to building data warehouses in which data could be shared. "Everyone is proprietary over their systems," says Catherine Lyles, a senior auditor in the state.

The disadvantages of such data silos are many. Most obviously, the ability to coordinate services is limited. Shouldn't the mental health department, for example, know what's happening to someone who is receiving mental health assistance within the Office of Aging and Adult Services? And vice versa?

One reason often cited for a resistance to sharing is that state or federal laws mandate privacy for individual pieces of data. This is valid in some cases, but when state attorneys general look into the situation, they often find fewer legal impediments to sharing data than they anticipated. It's just a handy excuse.

Massachusetts' state auditor, Suzanne Bump, has a skeptical take on why some agencies are resistant to sharing their data.

In her view, these agencies don't want to share simply because they don't want to reveal how little they understand about the data they keep.

The Rocky Hill Veterans Home in Connecticut, which wasn't collecting usable data on how long people were staying. (CT Monuments.net)

Bad Definitions

In state agencies that depend on multiple sources of data -- such as local governments, school districts and regional offices -- a tenacious effort has to be made to ensure that all data collectors are gathering the same information in the same way and using the same definitions. The most obvious mistakes involve names and addresses, which are often input differently if naming conventions are not thought out in advance. "Are you dealing with the same Bill Jones, William Jones, Billy Jones, Bill A. Jones and so on?" asks James Nobles, Minnesota's legislative auditor.

The lack of solid definitions often compromises the meaning of the information collected. During the recession, the Pennsylvania Legislative Budget and Finance Committee looked into the effectiveness of the state's Keystone Opportunity Zones program using a survey of businesses that was generated by the program itself. But though the gist of the issue was "jobs," the survey didn't identify that word

adequately. Philip Durgin, executive director of the committee, says there was no explanation of whether the number of "jobs created" was a cumulative total or a total for one year or whether part-time and full-time jobs were to be treated in the same way. "That wasn't specified," he says. "Some reported anticipated jobs. Some reported jobs created in a single year, while others reported jobs created since joining the program. The whole common definition thing was a huge problem."

One state that has set about unifying its streams of data is Utah, which has labored to make sure all the different parts of government understand financial information in a consistent way. State officials are now working on reaching a similar level of understanding about program data. On the financial side, it has a chart of accounts that is shared across all three branches of government as well as the school system. "We're using a common set of definitions," says Jonathan Ball, a legislative fiscal analyst.

Third-Party Issues

When government services are privatized, often the data available on performance is greatly diminished. Bruce Myers, the longtime Maryland auditor who retired in 2012, often warned about data problems when governments deal with third parties, such as contractors, other levels of government or school systems.

Contractors specifically tasked with reviewing or analyzing data may stumble in their efforts to communicate the information adequately. In the simplest of cases, New Jersey county officials were unable to use four of the six major data reports that pointed out instances of possible food stamp fraud, because the state's vendor, which was responsible for providing this information, did so in a format unusable by the counties.

The third-party problem is particularly significant in Medicaid managed care. A Government Accountability Office report released a year ago pointed out that neither the states nor the feds have strong data on improper payments in managed care because just about all tracking efforts are geared to traditional fee-for-service systems. The report also noted that claims information in Medicaid managed care can be difficult to obtain and often winds up in a kind of "neglected data middle ground" between information collected at the federal and state levels.

Ineffective Controls

Controls may be built into a technology system, but it's not uncommon for employees to shut them down in order to get things done more quickly. Or they might subvert them in other ways. For example, a computer form might not allow a worker to move forward without a Social Security number, and rather than delay an application, employees resort to the expedient solution of listing participants as having a Social Security number of 999-99-9999.

This has been the case in New Jersey's Department of Human Services. "They do it to move through but then don't come back and fix it because it's not important to the program person," says state auditor Stephen Eells. "But the data has no integrity."

The common use of spreadsheets as a repository for data adds to control issues. Numbers stored in Excel or other similar programs are very easily changed as time goes on; as a result, there may be no older number that can be used for analysis or to compare with the current number in order to pick out outliers. "It's easy to replace numbers but you lose history," says Virginia's Nathalie Molliet-Ribet,

deputy director of the state's Joint Legislative Audit and Review Commission. If the number of jobs that have to be created in an economic development deal is changed from 300 to 100, the original number will just be replaced, and the fact that there was a change will be lost.

Undertrained Workers

When people talk about data flow, an image emerges of rivers of words and numbers being transmitted smoothly and speedily from one computer to another. There's something missing in that picture, however: the flesh-and-blood human beings who manually put information into the system. In a variation on the cliché "garbage in, garbage out," John Geragosian, auditor of public accounts in Connecticut, likes to say that "data is only as good as how it was input."

There was the case of a data inputter in Oregon who filled out a payment field for an invoice of $323.88, but mistakenly put the federal ID number in the payment field instead of the amount owed. Federal ID numbers are long. So a check was written and mailed for $1,748,304.24. If that wasn't bad enough, this number had to pass through a supervisor before the check was sent, and he, too, was asleep at the data switch. The average payment going out was less than $3,500, so a check in excess of $1 million should have been more than a red flag -- it should have been a luminescent display of fireworks. Fortunately, the state did get its money back when the error was exposed.

Problems with inputting and using data are particularly common because the men and women who are hired to do the job aren't necessarily well trained in data management. Often they don't have any mental filter to alert them when a number appears incongruous or at odds with common sense. Says Texas' Ken Levine, "You have a lot of people who are extremely low-paid whose jobs are to get the data input as quickly as possible."

Like most states, Massachusetts uses a contractor to provide reports on the data generated through the use of electronic benefit cards. The contractor provides monthly data reports to track unusual patterns of benefit usage -- for example, Massachusetts food and nutrition benefits used outside of the state. Agency staff had the capacity to use this information to detect potential fraud, but "we were told they didn't know how to read the reports that their system had been generating for years," says state auditor Bump.

Even when there's an original intent to provide adequate training, it can sometimes disappear in the dark of a late afternoon budget session, when a technology project appears to be running over budget and behind schedule. Says California auditor Howle: "If a project is behind schedule, the project management that gets cut is training. There's not enough training before a system is rolled out and that's typically where you see problems. Training is where things get cut way back. It's not nearly as robust as it should be."

More Access, More Vulnerability

Says Connecticut auditor Geragosian, "A lot of our concerns have to do with permissions that are overly generous within agencies -- the ability to manipulate data [should] only go to the appropriate person and there should be a separation of duties."

A New Jersey audit of the Department of Human Services found data was potentially compromised by a large number of employees who were characterized as "super-users" of the computer systems. These

65 individuals had the ability to sign on to the computer, create electronic benefit accounts, issue benefit cards and put money on those cards -- duties that most auditors and accountants would agree should have been kept as separate and distinct.

What is at the root of your bad data?

Looking for Answers

Some of the solutions to bad data issues involve spending money to replace and update ailing technology systems. There is also the need for more data scientists and analysts in government, a potentially expensive proposition given the demand that the private sector has for these individuals as well.

But many other solutions can work because they don't rely on a heavy investment of new dollars. The list starts with providing better definitions of what computer fields mean, creating data inventories so that states know what information they have, building system controls to prevent inputting errors, making sure that workers who are inputting data are trained and supervised, and teaching managers to use the data they receive in reports from vendors.

Creating or improving data governance can also be of help. In most states, the chief information officer is responsible for the technology itself, but that doesn't translate to responsibility for data quality. Several auditors and evaluators mention that technology officers regard data quality and accuracy as a topic that lies outside their sphere of responsibility. "They don't think their role includes how consistent the data is or being able to use the data," says one. That leaves it up to the agencies to figure things out for themselves.

Fortunately, there is a movement to formalize data governance in some states. According to the Council of State Governments, as of July 2014, seven states had chief data officers: Arizona, Colorado, Connecticut, Maryland, New Jersey, Texas and Utah. New York's deputy secretary for technology also functions as a chief digital officer and legislators in California are considering creating a chief data officer position.

Finally, before spending money to collect data, states should consider the whole range of agencies that can possibly use that information, beyond the single one that's actually collecting it. For instance, Virginia gathers a great deal of information about its personal income tax, which accounts for 57 percent of its revenue. It collects very little data about its corporate income tax, which accounts for only 4 percent of revenue. The imbalance of information might make sense if you were thinking only about the taxes. But the data collected via corporate taxes could also be very useful for the state's economic development efforts.

As states struggle to improve the reliability and utility of their data, there will always be question marks following the assumptions used to derive it in the first place. But it's worth the effort. Consider the words of Arthur C. Nielsen, founder of the market research firm that churns out some of the most sought-after data on the planet. "The price of light," Nielsen said, "is less than the cost of darkness."

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August 17, 2015

Beth Ashcroft
Director
Office of Program Evaluation and Government Accountability
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Augusta, Maine 04333-0082

Dear Beth:

On behalf of the Office of Information Technology (OIT) and Department of Administrative and Financial Services, I would like to thank you and your staff for your efforts in completing your recent two-year follow up review.

We thank the OPEGA team and CohnReznick for their diligent work on this report and their collaboration with OIT staff and leaders during this review. OIT sought to provide our highest levels of cooperation, partnership and attention to assisting OPEGA during its review. We made our staff, records and leadership available, and had many substantive discussions, work sessions and interviews with the auditors. The review process was well organized and efficient, and your staff is to be commended for the professionalism they demonstrated throughout the review.

As has been communicated to your office and is reflected in our response, OIT is in general agreement with the recommendations included in your report and has already begun the task of implementing several of the suggestions.

Sincerely,

Jim Smith
Chief Information Officer