

# The Commonwealth of Massachusetts

AUDITOR OF THE COMMONWEALTH

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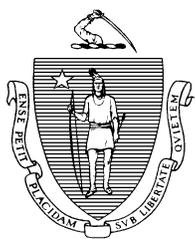
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NO. 2006-0884-4T

OFFICE OF THE STATE AUDITOR'S  
REPORT ON THE EXAMINATION OF  
THE INFORMATION TECHNOLOGY DIVISION'S POLICY  
FOR IMPLEMENTING THE OPEN DOCUMENT STANDARD

September 25, 2003 through December 8, 2006

**OFFICIAL AUDIT  
REPORT  
SEPTEMBER 20, 2007**



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September 20, 2007

The Honorable Marc R. Pacheco, State Senator  
Chair of the Senate Committee on Post Audit and Oversight  
State House  
Room 312B  
Boston, Massachusetts 02133

Dear Senator Pacheco:

We are presenting our audit results and recommendations regarding our examination of the process undertaken by the Information Technology Division (ITD) to adopt the OpenDocument standard and to develop, review and approve the implementation policy for the standard. In addition, we reviewed the cost analysis submitted by ITD in support of the policy and determined whether the cost analysis was sufficiently comprehensive to support management decision making regarding the adoption and implementation of the standard. We also determined the extent to which the cost analysis supported the implementation policy that all office suite products will comply with the OpenDocument standard beginning in January 2007.

Our audit, which covered the period of September 25, 2003 through December 8, 2006, was conducted from November 1, 2005 through February 7, 2007. Our report is intended to specifically respond to your request and to provide recommendations to assist Commonwealth management in addressing the OpenDocument format issue. Our preliminary results were discussed with Louis Gutierrez, CIO on October 30, 2006 and with Bethann Pepoli, Acting CIO on January 25, 2007.

We appreciate the courtesy and cooperation extended to us by the ITD's staff during the review. We would be pleased to provide any additional information regarding this report at your request.

Sincerely,

A handwritten signature in black ink that reads "A. Joseph DeNucci".

A. Joseph DeNucci  
Auditor of the Commonwealth

cc: Leslie A. Kirwan, Secretary, Executive Office for Administration and Finance  
Anne Margulies, Assistant Secretary for Information Technology and CIO  
Bethann Pepoli, Deputy Chief Information Officer

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## EXECUTIVE SUMMARY

On September 22, 2005, Senator Marc R. Pacheco, Chairman of the Senate Committee on Post Audit and Oversight, requested the Office of the State Auditor to review the Information Technology Division's (ITD) cost analysis for the January 1, 2007 implementation of the OpenDocument standard. On October 31, 2005, Senator Pacheco expanded his request to include a review of the process by which ITD adopted the OpenDocument standard and developed the policy for implementing the standard.

Our review indicated that although sufficient research had been performed regarding open standards, the process of issuing the implementation policy for the OpenDocument Format (ODF) and developing a detailed cost analysis to support the initiative was flawed. In addition, at the time of issuing the implementation policy, ITD had not assessed the feasibility of using the office suite products that they were requiring agencies to obtain nor had a comprehensive plan been developed for the implementation of ODF-compliant office applications. Although the initiative to adopt open standards, including open document format, has merit, the process for developing and promulgating the policy for implementing an ODF standard lacked adequate consultation with departmental management and the end user community, clarity of value to be achieved by the initiative, and sufficient information to justify the business case. We also found that the cost analysis submitted to the Senate Committee on Post Audit and Oversight in support of the initiative lacked sufficient detail and explanation to support management decision-making regarding the implementation of ODF. The key results of our three audit objectives are as follows:

### Audit Objective 1

**To determine whether the Commonwealth's Information Technology Division (ITD) undertook an appropriate process to research and adopt the OpenDocument standard.**

### Results

1. While the steps undertaken by ITD to research open standards and the open document format were sound, they had not completed sufficient research on the Commonwealth's operational and IT environment to develop a detailed implementation plan as to how the OpenDocument format standard would be applied and how open source office suite products would interface with Commonwealth application systems.

2. ITD's policy management team did not have sufficient communication with the Supervisor of Public Records and the Chief Archivist from the Office of the Secretary of Commonwealth to identify legal criteria and the level of importance of documents requiring various retention and archival schedules.
3. ITD had failed to adequately test the feasibility of the open office suite products before issuing the September 21, 2005 ODF Implementation Policy. Only after open source office suite product testing had been completed in June 2006 by ITD was it determined that the office suite products initially recommended for installation were found to be unable to meet accessibility user requirements. This highlights the value of the testing and indicates that adequate research had not been performed as of the September 21, 2005 date of approval of the ODF implementation policy.
4. The adoption of open document formats expanded the Enterprise Technical Resource Model (ETRM) by increasing the likelihood that electronic documents created by office applications could be more easily shared and would be reusable in different applications and held the potential for long-term availability.

### **Audit Objective 2**

**To determine whether the Information Technology Division (ITD) undertook an appropriate process to develop, review, and issue the ODF implementation policy for Executive Branch Agencies.**

### **Results**

1. The process for developing and promulgating the policy for implementing the OpenDocument format standard lacked adequate consultation with agency operational management, clarity of value to be achieved by the initiative, and sufficient information to justify the business case. Although the scope of the ODF initiative had been defined, ITD had not, as of September 21, 2005, documented the project methodology for planning, executing, controlling, and completing the overall ODF project. At that time, an implementation plan had not been developed with specific project phases and realistic project milestones. ITD did not clearly delineate how the objectives of the ODF initiative would fit into the overall portfolio of IT-enabled investment initiatives or IT strategic plans.
2. ITD did not seek input or consensus from governmental entities across all branches of government regarding a business case for generating and storing ODF-compliant documents or with agencies to be directly impacted by the implementation policy. The ODF initiative did not have a clear statement of need, and was not supported by a documented business case that included a statement of value to be attained, how the achieved value would be measured, the impact and cost of pursuing the initiative, identified opportunity costs, IT infrastructure impacted, technical and non-technical resource requirements, impact on human resource management, assigned responsibilities and points of accountability, and the cost and impact of not pursuing the proposed initiative.
3. In the absence of adequate collaboration and agreement with the Office of the Secretary of the Commonwealth, ITD issued the ODF implementation policy unilaterally on September 21, 2005. Since the policy is directed toward long-term access to state documents, the Office of the Secretary of Commonwealth's Supervisor of Records for the Commonwealth and the Records

Conservation Board who determine and establish the Commonwealth's records management policy should have been in agreement with the ODF implementation before the policy was issued.

4. The short time period afforded by the exposure and policy approval process combined with the failure to respond to concerns raised by the disability community gave the appearance that the decision to approve the ODF implementation policy had been made prior to seeking comments from an exposure review process. Although ITD sought user feedback, the time periods for responding to the various draft versions of the ETRM were very limited. In addition, regarding ETRM Version 3.5, ITD took little or no action to respond to user feedback received during the exposure period, or even shortly thereafter. Not all responses to the exposure process were posted to the ITD web site.
5. Further effort should have been made before the ODF implementation policy had been approved to define what documents should be saved and for how long, and who should have access to them in the future and by what means. The policy requiring that documents be saved in an open document format to meet the information needs of future generations ignores the fact that not all documents, in any form, are saved for extended periods of time. Furthermore, not all information that could be of value to future generations are generated by office suite products. For example, Commonwealth mainframe computer systems, such as the Massachusetts Management Accounting and Reporting System (MMARS) and the Human Resources/Compensation Management System (HR/CMS), which are outside of this initiative, create and store mission-critical information.
6. A risk analysis regarding the ODF initiative was not conducted as of the implementation policy's September 21, 2005 approval date. The risk analysis would identify and assess the potential adverse impact on agency operations and the integrity, security, and availability of the IT systems impacted.
7. ITD did not allow sufficient time to effectively plan and research the economic and technical feasibility of the ODF initiative, as demonstrated by the fact that software product testing and development of a cost model and an implementation plan was initiated subsequent to formally approving the ODF implementation policy on September 21, 2005.
8. As of the September 21, 2005 approval date for the ODF implementation policy, ITD did not have a documented proof of concept, nor clear acceptance criteria for implementing ODF. A detailed implementation plan had not been developed before the implementation policy was approved on September 21, 2005. It was not until the Spring of 2006 that ITD began an earnest effort to develop a proof of concept and acceptance criteria.
9. As of September 21, 2005, ITD had not established a project framework for the ODF initiative that included requirements for project monitoring and evaluation. A systematic method for documenting and tracking project tasks and providing appropriate assurance mechanisms for the overall project was not in place through January 2006. Project resource requirements, including ITD and agency staff assignments, had not been defined as of that time. As of the end of our audit, performance metrics had not been established or defined for measuring the success of the ODF initiative. It was not until the Spring of 2006 that project management techniques were applied to the ODF initiative with a project manager being assigned and development of a project plan initiated.
10. From September 2005 through April 2006 there was no detailed implementation plan outlining what open source office suite products and supporting technology were to be first installed along with a proposed installation schedule for the remaining systems. There were no documented

details regarding logistics, training requirements, impact on workflow, assigned responsibilities or project or installation milestones.

11. As of September 21, 2005, funding for the implementation of the ODF policy had not been obtained or specifically requested for the fiscal year 2007 budget. Steps had not been taken to ensure that agencies impacted by the policy would have the funding needed for fiscal year 2007 to support ODF implementation.
12. To ITD's credit, in mid-Spring 2006, a Request for Information (RFI) was issued seeking a solution for using translator technology to be plugged into Microsoft Office. The open source development community responded by indicating that plug-in technology would be developed.
13. Eight months after issuing the September 21, 2005 ODF implementation policy, ITD confirmed that the recommended open source office suite products did not meet accessibility requirements.
14. Based upon the likelihood that plug-in technology would become available to support assistive technology on existing office applications, ITD provided a documented change in their implementation strategy. The Chief Information Officer's August 23, 2006 open letter (Appendix Number 5, page 66) outlined the strategy to implement ODF by means of using translator technology plugged into Microsoft Office. The change in strategy was that ITD shifted to a phased-in implementation approach utilizing plug-ins and appropriately extended the ODF implementation deadline for Executive Branch agencies to June 30, 2007. ITD's phased-in approach relies on the fact that the "target dates are not set in stone" as they are dependent on a number of factors.
15. Key deliverables agreed to under the Memorandum of Understanding (MOU) between ITD and the Executive Office of Health and Human Services and the Massachusetts Office on Disability are not likely to be achieved by the deadlines specified in the MOU. The key deliverables related to a cost analysis, IT contract standards, web accessibility standards, and training of all Executive Branch IT designers and developers responsible for application user interfaces and all contract designers and developers in accessible design. The cost analysis is due on August 17, 2007 and all training is to be accomplished by August 17, 2008.
16. State Chief Information Officers (CIOs) tended to view prior versions of the ETRM more as a working draft than as a set of standards to be followed. As a result, the ETRM may not have received the level of scrutiny needed even though input was sought by ITD through the exposure process and at various IT-related meetings.
17. The ODF implementation policy was issued without adequately taking into account objectives and concerns raised by the Massachusetts Office on Disability (MOD), other agencies using assistive technology, and the disability community that the open source office suite products did not work with assistive technology, and that the ODF initiative would disenfranchise employees and other people with disabilities.
18. Although the ODF implementation policy stated that all documents created on office applications were to be ODF compliant, ITD later indicated that only "selected documents" would need to be in ODF format. For example, because adequate document fidelity could not be achieved by the ODF-compliant office applications, ITD decided that those documents would be exempt from the policy requirement. Although the full set of exempted documents has not been defined, it raises the question as to how these documents will comply with the stated objective of being available in the future, free from proprietary system constraints. Over twenty months after the approval of the policy, ITD has not adequately clarified which selected documents must be in the ODF format.

### Audit Objective 3

**To determine whether ITD's cost analysis submitted to the Senate Committee on Post Audit and Oversight on September 20, 2005 was sufficiently comprehensive and verifiable to support management decision making regarding the adoption and implementation of ODF.**

#### Results

1. ITD's September 19, 2005 cost analysis lacked sufficient detail and explanation to support management decision making regarding the adoption of ODF and implementation of ODF-compliant office applications. The projected \$26 million cost savings was not adequately supported with detail documentation.
2. The September 19, 2005 cost analysis did not take into account information regarding the number of legacy applications and whether the applications required interfacing with Microsoft Office or to other document formats and the level of criticality of the data output for archival considerations; exact number of office applications required; workstations requiring basic office applications; workstations requiring advanced office macros; workstations where user documents required visual integrity; workstations requiring collaborative features; workstations or other hardware or software requiring assistive technologies; current office suite version; current workstation configurations; and training requirements for basic, advanced, macro or assistive technology users. In addition, there were no details regarding agencies' help desk functions, software testing, application upgrades, complexity of IT environment, software distribution cost, or opportunity costs for training and productivity.
3. None of the ITD project team members interviewed indicated that they considered the September 19, 2005 cost analysis to be sufficient. Almost as an excuse, they referred to the analysis as a "back of the envelope" cost analysis.
4. ITD's financial staff were not consulted or involved in the cost analysis of the ODF policy initiative or the ETRM as a whole. The September 19, 2005 cost analysis was developed by ITD's CIO.
5. A best value analysis for the ODF-compliant office suite products was not performed by ITD. According to ITD's Enterprise Information Technology Acquisition Policy, "the Commonwealth's procurement philosophy states that it is in the best interest of the Commonwealth for solicitation evaluation criteria to measure factors beyond cost. A best value evaluation should, at a minimum, consider total cost of ownership over the entire period the IT solution is required, fit with identified business requirements, reliability, performance, scalability, security, maintenance requirements, legal risks, ease of customization, and ease of migration."<sup>1</sup> The intended value of the ODF initiative, as well as the shift in direction to open standards-based systems, has not been adequately articulated or assessed. While component-based software development based on open standards allows for a more cost-effective "build once, use many times" approach, additional factors, such as technical support and readily available access to required expertise, need to be assessed. Technology investments, such as widespread implementation of office applications, should be made based on total cost of ownership and best value to the Commonwealth.
6. Return on Investment (ROI) calculations were not performed by ITD for the ODF initiative. ROI financial and operational metrics should be used to measure the higher-level objectives of

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<sup>1</sup> [IT Acquisition Policy](#)

accessibility and transparency that are desired to be attained from shifting to ODF. The cost model developed in the Spring of 2006, was designed to support ROI assessments.

7. A third-party vendor was contracted to develop a comprehensive cost model before ITD had fully assessed the feasibility of the ODF-compliant office applications. We note that the cost model, which cost \$555,000, is not being used to support decisions regarding a change in implementation strategy where plug-ins will be used with existing technology.
8. With respect to the ODF initiative, ITD did prepare a cost analysis in July 2006 of a revised strategy for implementing ODF through plug-ins that would work with existing technology. Although this particular cost analysis was submitted to Secretary Thomas Trimarco, a copy was not forwarded to Senator Pacheco. Our review of the July 2006 cost analysis disclosed two \$12 million calculation errors for the alternative options.
9. The September 19, 2005 cost analysis indicated that 10,000 desktops were so old that their operating systems would not support Office 12 and would need to be replaced. Given this assumption regardless of the office application suite used, the associated replacement costs should be equally applied to the Open Office costs as well as the Office 12 costs. This reasoning would reduce the presented cost variance by \$8,500,000 resulting in a net difference in cost between the two systems of \$17,500,000 instead of the \$26,000,000 as stated in the cost analysis.

## RECOMMENDATIONS

1. A commission should be established to study issues regarding electronic document management, record retention, and electronic archiving.
2. A study should be conducted under the direction of the Office of the Secretary of the Commonwealth, in conjunction with ITD, to update state administrators and other interested parties regarding the objectives, risks, legal requirements, and best practices of document management, record retention and electronic archiving. The discussion regarding the objectives, policies and practices of document retention and long-term document availability should be expanded to include all branches of government. As part of the study, to validate and assess the completeness of the Statewide Record Retention Schedule, we recommend that the Record Retention Schedule be mapped to the state entities that create or manage the listed documents to identify any state entities or electronic documents not already listed. Moreover, a strong effort should be made to ensure that record retention and document availability requirements be aligned with the needs of citizens, businesses, historians, and all branches of government including local government. The Commonwealth's record and document retention policies and procedures should be reviewed and updated as needed to bring into account changes in technology, availability requirements for the disabilities community, future access requirements, and the perspective of historical record requirements.
3. An agreement should be made among the key stakeholders across the three branches of government regarding the nature and extent of transparency sought by retaining user and system-generated documents for long-term availability.
4. Before additional funds are allocated to the ODF initiative, a documented business case should be developed that addresses long-term availability and document reuse objectives of open XML-based documents.
5. We recommend that a detailed statement of value to be achieved be developed based on input attained from ITD's current research efforts and discussion with operational managers throughout the Commonwealth. The business case should include input from agencies with automated systems dependent upon Microsoft Office suite products, Human Resource and the disability community, and the Office of the Secretary of the Commonwealth.
6. Proposed changes to document format and protocols should be evaluated by ITD with respect to the impact on current and future interoperability requirements with other application systems and technology.
7. The Office of the Secretary of the Commonwealth should review the existing statute relative to public records to determine whether the statute needs to be strengthened to ensure the integrity, security and availability of electronic records.
8. Although the Enterprise Technical Reference Model (ETRM) had been subject to revision and exposure over the past couple of years, we recommend that an in-depth review of the ETRM be performed. We recommend that ITD provide a detailed explanation of the model and its components to help ensure adequate understanding and to validate the model's viability for achieving desired value. In addition to ITD's efforts to conduct biannual reviews, the ETRM in

its entirety, including its standards and requirements, should be subject to review in the context of currently available IT resources and a comprehensive IT strategic plan for the Commonwealth.

9. ITD should establish an IT strategic plan that addresses enterprise-based IT initiatives and IT services provided across state government. The IT strategic plan should be aligned with agency business strategic plans and should serve as a backdrop against which all ITD-managed initiatives, such as the implementation of ODF-compliant office applications, can be planned and assessed. The IT strategic plan should be reviewed by the IT Advisory Board.
10. The Commonwealth should be encouraged to continue to consider open source options, but not to the exclusion of evaluating and comparing the costs and potential benefits, as well as delivery of value, of proprietary products.
11. A centralized electronic archive for long-term storage of, and access to, electronic documents should be established under the direction of the Office of the Secretary of the Commonwealth. The electronic archive should include both the scanned version of paper records and electronic documents generated from computer systems. The centralized electronic archive should have adequate controls in effect to ensure the integrity, security and availability of the electronic documents. Appropriate control practices need to be in effect to ensure that unauthorized change is prevented, the archive is properly maintained, and that access to the documents is provided in a managed manner commensurate with data classification requirements and rights of access. The centralized electronic archive should be available for all branches of state government including constitutional offices and independent authorities.
12. ITD should ensure that controls are in place requiring that all IT projects are managed on an investment portfolio basis. The process should require planning, monitoring, and tracking of all projects and that each project be evaluated based upon its proposed and realized value. Project management should require identification of intended value, financial and operational costs, milestones, performance measures, assurance mechanisms and relevant approvals before projects are started and at key points in their life cycles. We recommend that ITD adopt a framework or methodology that requires disciplined practices for developing project initiatives that require a business case, statements of value to be attained, risks and critical success factors, metrics and cost.
13. ITD should complete research on the specifics of the Commonwealth's IT environment in terms of application systems, business process and operational requirements, IT configurations, legal compliance requirements, and user requirements.
14. A concerted effort should be made to ensure that the key deliverables agreed to under the Memorandum of Understanding between ITD and the Executive Office of Health and Human Services and the Massachusetts Office on Disability are achieved. The key deliverables related to the MOU were a cost analysis, IT contract standards, web accessibility standards, and training of all Executive Branch IT designers and developers responsible for application user interfaces and all contract designers and developers in accessible design. The cost analysis is due on August 17, 2007 and all training is to be accomplished by August 17, 2008. We recommend that sufficient resources, such as funding and staffing, be provided to ensure that the above deliverables are attained and that ITD's Assistive Technology Computing Lab is adequately staffed and supported.

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15. We recommend that ITD strengthen the exposure process for proposed or modified IT policies and standards by extending the exposure period, ensuring adequate notice and tracking the receipt and disposition of all exposure comments.
    - ITD should expand their exposure periods for receiving comments to proposed changes on IT policy and standards to 30-day to 90-day periods to allow adequate communication, review, and an opportunity for adequate understanding and response.
    - ITD should ensure that a standard process of informing individuals and organizations of items subject to an exposure process have sufficient public notice.
    - ITD should implement a tracking process to record receipt of comments submitted in response to materials presented through an exposure process. The procedures should require that questions raised should be identified and that a reasonable means of responding to comments be established.
  16. Senior agency management sign-off should be sought for IT projects that significantly impact the operations of the agencies, or require changes in controls to address system integrity, security or availability objectives. For example, projects that change or affect software applications or networks must be reviewed with users of the software applications or networks before project initiation.
  17. Control practices should be established to ensure that estimated costs for all ITD projects be reviewed by relevant project managers and independently validated under the direction of ITD's Chief Financial Officer (CFO).
  18. To strengthen communication and obtain adequate input, ITD should define the requirements to inform and consult with the IT Advisory Board, relevant Legislative committees, key stakeholders, parties of expertise, and interested parties regarding IT initiatives and projects. If feedback is requested from end users, there should be sufficient time for users to respond and documentation on the timing and extent of notification. There should also be a documented process to record the receipt and disposition of feedback and for obtaining verifiable results.
  19. A change in standards should have a business impact analysis performed before a standard is changed. Included in the business impact analysis would be effects on agencies, staff, work flow, customers time to implement and projected costs or cost savings.
  20. The IT Advisory Board should be chaired by an individual selected on a rotating basis from among the members of the board. In order to provide sufficient independence for the IT Advisory Board and to ensure that its role as an advisory body is maintained, the board should either be co-chaired with one chair designated as the Commonwealth's CIO, or not having the Commonwealth's CIO serve as chairperson. In addition, when providing advisory comments, the Board should require a recorded vote of the attending members.

## INTRODUCTION

On September 21, 2005, Administration and Finance's Information Technology Division (ITD) issued a policy that required Executive Branch agencies to migrate from existing proprietary office systems to open source systems that would create documents in a new file format known as the OpenDocument Format (ODF). The significance of the policy was increased by the exclusion of currently installed proprietary office suite products and the presumption that the initiative would save the Commonwealth millions of dollars. In addition, Massachusetts would be the first state in the nation to require that documents generated by office suite products be almost exclusively in open document format.

The policy, which was included in the September 21, 2005 issuance of version 3.5 of an IT architectural model, referred to as the Enterprise Technical Reference Model (ETRM), required Executive Branch agencies to install ODF-compliant office suite products. The policy required that starting on January 1, 2007 all office documents that are created, or saved, are to be in an open document format. The following is the policy statement regarding the OpenDocument format:

*“Given the majority of Executive Department agencies currently use office applications such as MS Office, Lotus Notes and WordPerfect that produce documents in proprietary formats, the magnitude of the migration effort to this new open standard is considerable. Agencies will need to develop phased migration plans allowing them to configure existing applications to save office documents by default in the OpenDocument format with an implementation date of January 1, 2007. Any acquisition of new office applications must support the OpenDocument format natively.”*<sup>2</sup>

ETRM Version 3.5 incorporates a new “Discipline for Data Formats” that addresses the “acceptable formats in which data can be represented and captured.” From a technical perspective, the ETRM's section, entitled “Open Formats”, lists .odt, .ods, .odp, .txt, and .html as acceptable formats and the ETRM's section, entitled “Other Acceptable Formats”, lists .pdf. The open document format is based on the OpenDocument standard v1.0 file format that had been approved by the Organization for the Advancement of Structured Information Standards (OASIS) on May 23, 2005. The standard creates text documents (.odt), spreadsheets (.ods), and presentations (.odp) in a format that provides long-term availability and use. Textual data (.txt) is in the American Standard Code for Information Interchange (ASCII) format is to be used when formatting is not important, hypertext documents (.html) are to be

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<sup>2</sup> Information Domain ([ETRM v3.5](#))

used when presenting data to be put on the Internet and must support HTML v. 4.01 and Portable Document Format (.pdf) is the universal portable document format created by Adobe Systems to provide a degree of document protection and to capture the document's look and feel.

ITD's development of the ETRM was initiated as a result of then Secretary of Administration and Finance Eric Kriss' directive (see Appendix 2, page 61) to ITD's CIO Peter Quinn on September 25, 2003 for a new Open Policy. The new Open Policy was to adopt under the CIO's guidance a comprehensive Open Standards, Open Source policy for future IT investments and operating expenditures. According to the September 25, 2003 memorandum, "Open Standards means that IT applications must be able to communicate and share data with each other through widely available protocols without license fees or use restrictions."

The objective of the ETRM was to provide the foundation for accomplishing Secretary Eric Kriss' goal of shifting the Commonwealth to an open standards, open source IT environment. Although the model is not fully developed in the ETRM, each of the four versions outlines specific standards as part of an open standards framework to be implemented within the Commonwealth. With respect to document formats, ETRM Version 3.5 stated that all agencies within the Executive Branch were to migrate from using proprietary office suite software, such as Microsoft, Lotus or WordPerfect, to non-proprietary office suite software that is open and can operate on Microsoft Windows operating systems. The requirement to save office documents in non-proprietary format, which was the principle change reflected in ETRM Version 3.5, was mandated to take effect on January 1, 2007. The stated intent was to allow future generations access to electronic documents that had been created by the Commonwealth and to be able to open and read those documents without having to purchase proprietary software to do so.

Between September 25, 2003, when ITD first received the mandate to create a new Open Policy, and September 21, 2005, when ITD issued ETRM Version 3.5 incorporating an ODF implementation policy that required all Executive Branch agencies to use office suite products that create and save documents in open document format starting on January 1, 2007, there were a number of significant events (chronology of events provided in Appendix 1 on page 59).

At the Senate Post Audit and Oversight hearing held on December 17, 2003, Secretary Eric Kriss explained in regard to capital budget plans that ". . . whenever practical, we also seek the best-demonstrated methods of procurement and development. For example, design-build construction will be emphasized if it can save us money. In technology, we will adopt open standards to make systems more

interoperable, and open source software, when available, to reduce licensing, programming and maintenance costs.”<sup>3</sup> It was at that time that Senator Marc Pacheco, Chair of the Senate Committee on Post Audit and Oversight, requested that ITD provide details regarding the proposed cost savings to be realized by adopting open software.

Between December 17, 2003 and May 27, 2005, IT developed the ETRM framework through Version 3.0 providing the basis for shifting from proprietary software to open source software products. On August 29, 2005, ITD submitted for public review and comment ETRM Version 3.5, which included a proposed implementation policy for ODF-compliant office suite products.

Subsequent to the exposure period for ETRM Version 3.5 information related to the cost of the ODF implementation was provided to the Massachusetts Technology Leadership Council and to Senator Marc Pacheco. On September 16, 2005, Secretary Eric Kriss and then CIO Peter Quinn addressed the Massachusetts Technology Leadership Council<sup>4</sup> noting that the upgrade to a Microsoft format would cost \$50 million dollars and an upgrade to the Open Office product, which is an ODF-compliant office suite product, would cost \$5 million dollars. The decision to adopt the OpenDocument Format was stated as an IT strategy to keep the sovereignty of Massachusetts inviolate; that a sovereign state must be able to provide unencumbered access to all public documents. Secretary Kriss noted that the cost estimates were “very crude” and did not reflect the possibility of better pricing from vendors. On September 20, 2005, CIO Peter Quinn submitted a two-page cost estimate regarding the ODF initiative to Senator Marc Pacheco. The cost analysis, which stated that the upgrade to a Microsoft format would cost \$34 million dollars and the upgrade to Open Office would cost \$8 million (see Appendix 4, page 63), did not provide details as to the reliability of the estimates or whether better pricing had been sought.

On September 21, 2005, ITD formally issued ETRM Version 3.5 which had been preceded by ETRM versions 1.0, 2.0, and 3.0. The ETRM Version 3.5 contained the January 1, 2007 ODF implementation date for Executive Branch agencies.

A little over a month later, on October 31, 2005, Senator Marc Pacheco, Chair of the Massachusetts Senate Committee on Post Audit and Oversight, held a hearing on the ITD decision to standardize on the OpenDocument Format. While the hearing focused on ITD’s authority and actions taken in developing and issuing the ODF implementation policy, Peter Quinn as the CIO of the Commonwealth testified in

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<sup>3</sup> Eric Kriss, Secretary, Administration & Finance The Capital Budget September 29, 2003

<sup>4</sup> [New England Town Meeting](#)

favor of the ODF implementation policy and the Office of the Secretary of the Commonwealth, Massachusetts Office on Disability and representatives of the disability community voiced their opposition.

Beginning in November 2005 through June 2006, ITD began testing open source office suite products to assess their feasibility and use with assistive technologies. Through the spring of 2006, ITD contracted with a third-party vendor to develop a cost model to support cost analysis regarding the implementation of ODF-compliant systems within the Executive Branch. In addition, ITD issued a Request For Information (RFI) <sup>5</sup> for software plug-ins to be used with then current technology to produce ODF-compliant documents and began developing an implementation plan for ODF-compliant office suite products.

On December 14, 2005 an open meeting was held in the Senate Reading Room of the State House to provide an opportunity for interested parties to learn about the ODF initiative. The meeting, which was entitled "Open Forum on the Future on Electronic Data Formats for the Commonwealth", was hosted by Senator Jack Hart and Representative Dan Bosley of the Joint Committee on Economic Development and Emerging Technologies and by Senator Jack Hart, Representative Cory Atkins, and Secretary Ranch Kimball of the Science and Technology Caucus. Presentations were made at the open forum by representatives from IBM, Microsoft, ITD, Sun Microsystems, Web Accessibility Initiative and the Office of the Secretary of the Commonwealth to address the agenda of "OpenDocument Standard: How did we get here?".

On June 28, 2006, Senator Marc Pacheco issued a report from the Senate Committee on Post Audit and Oversight on ODF entitled, "Open Standards, Closed Government -- ITD's Deliberate Disregard for Public Process"<sup>6</sup>. The report contained findings and recommendations regarding cost, accessibility, and legal authority with respect to the process followed by ITD on the ODF initiative.

On August 17, 2006 a Memorandum of Understanding<sup>7</sup> (MOU) was signed by the Information Technology Division, Executive Office of Health and Human Services and its constituent agencies, and the Massachusetts Office on Disability concerning ITD's research regarding the adoption of the Federal standard "Section 508." The MOU pertained to the Executive Department's acquisition of information technology, enforcement of current web accessibility standards for websites and web-based application

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<sup>5</sup> [ODF Plug-In for Microsoft RFI](#)

<sup>6</sup> [Open Standards, Closed Government](#)

<sup>7</sup> [Memorandum of Understanding](#)

systems, adoption of standards requiring the inclusion of contractual provisions regarding accessibility and usability testing, and the adoption of standards requiring training of developers and designers about accessible design.

The overarching goal of the MOU is to ensure that the Commonwealth's efforts should be the accessibility and usability of technology regardless of disability; maintenance of the technology; and transitions to new or upgraded computer or telecommunication-based technologies that are as seamless for people with disabilities as they are for people without disabilities. It was agreed that a unit devoted to accessible technology would be established within ITD.

In December 2006 development of an interim standard was initiated by ITD and the Massachusetts Office on Disability (MOD), in consultation with Operational Services Division (OSD), that would require that all contracts for information technology solutions entered by Executive Department agencies include, at a minimum, standard language requiring that information technology solutions providers adhere to the information technology standards to be set forth in a standard for Electronic and Information Technology Accessibility.

On December 4, 2006, ITD officially opened the Assistive Technology Computing Lab. The lab is responsible for evaluating and reporting on the accessibility of information technology to be used by the Executive Branch. The lab is also designed to assist ITD in meeting the goal of expanding information technology accessibility for workers and citizens of the Commonwealth of Massachusetts.

#### Subsequent Events:

Subsequent to the end of our audit period on December 8, 2006, ITD issued Enterprise Technical Reference Model (ETRM) Version 3.6 on December 29, 2006 that reflected no changes with respect to the ODF implementation policy. In June 2007, ITD announced that ODF conversion plug-ins had been installed in 250 of the 50,000 desktop computers targeted for installation by June 30, 2007.

On August 1, 2007, ITD issued an updated version of the ETRM Version 4.0. According to ITD, “the major change has been to the Data Formats section, specifically the inclusion of Ecma-376 Office Open XML as an acceptable document format for office applications along with the Open Document Format (ODF).”

## **AUDIT SCOPE, OBJECTIVES, AND METHODOLOGY**

### Audit Scope:

On September 22, 2005, Senator Marc R. Pacheco, Chairman of the Senate Committee on Post Audit and Oversight, requested the Office of the State Auditor to review the cost analysis for the January 1, 2007 implementation of the OpenDocument standard. In addition, Senator Pacheco, at the Committee hearing on October 31, 2005, asked the Office of the State Auditor to review the process by which ITD adopted the OpenDocument standard and developed the policy for implementing the standard.

The scope of our audit consisted of an examination of the process undertaken by the Commonwealth's Information Technology Division (ITD) to adopt the OpenDocument standard and to develop, review, and approve the implementation policy for the standard. The scope also included a review of the September 19, 2005 cost analysis submitted by ITD in support of the ODF implementation policy. We determined the extent to which the cost analysis supported the implementation policy that all office suite products will comply with the OpenDocument standard beginning in January 2007. The review did not assess the overall merit of the OpenDocument standard or validate ITD's Enterprise Technical Reference Model (ETRM). Our audit, which was conducted from November 1, 2005 through February 7, 2007, covered the period of September 25, 2003 through December 8, 2006.

### Audit Objectives:

The first objective of our review was to determine whether appropriate steps were taken by ITD in the process of researching and adopting the OpenDocument standard. The second objective was to determine whether the process undertaken to develop and issue the ODF implementation policy was sufficiently comprehensive and documented to support the implementation of the ODF standard for Executive Branch agencies. Our third objective was to determine whether the September 19, 2005 cost analysis submitted to the Senate Committee on Post Audit and Oversight on September 20, 2005 from ITD's Chief Information Officer (CIO) in support of the implementation policy was sufficiently comprehensive, complete, accurate and verifiable to support management decision making with respect to the adoption and implementation of ODF. In regard to the cost analysis, we sought to determine whether the CIO's projected savings of \$26 million to the Commonwealth to be realized by implementing ODF-compliant office systems, was verifiable and based on appropriate cost and management factors. The implementation policy requiring compliance with the OpenDocument Format was issued as part of ITD's Enterprise Technical Reference Model, Version 3.5, promulgated on September 21, 2005.

Audit Methodology:

To determine the audit scope and objectives, we obtained and recorded an understanding of relevant background material, such as the process ITD followed in issuing the various ETRMs, the events prior to the submission of the CIO's September 20, 2005 letter to the Senate Committee on Post Audit and Oversight, and how the proposed ETRM versions were communicated to Executive Branch agencies. To identify review criteria, we researched best practices on policy administration, project management, and cost analysis. The criteria was then used to evaluate and assess whether ITD conformed to appropriate policy administration guidelines and a comprehensive project management framework and prepared a verifiable cost analysis.

We interviewed ITD's current and former CIOs, Acting CIO, Legal Counsel, Chief Applications Officer, Chief Financial Officer, Chief Technology Officer, Chief Security Officer, Director of Policy and Architecture, and Director of Open Source Development to obtain an understanding of the activities and actions taken regarding the adoption of the ODF file format and the development of the related implementation policy. To gain a more in-depth understanding of how ITD communicated the ETRMs to the agencies it supports, we also interviewed staff at the Massachusetts Commission for the Blind, Department of Workforce Development, Massachusetts Office on Disability, and the Office of the State Comptroller. In addition, since the ETRM could affect other branches of government as well as the private sector, we interviewed staff at the Office of the Secretary of the Commonwealth, Administrative Office of the Trial Court, Office of the State Treasurer, and the Office of Senator Marc Pacheco. To help assess the viability of the ODF initiative and the process of developing and issuing the September 21, 2005 ODF implementation policy, we interviewed representatives from Adobe, EDS, IBM, Microsoft, Red Hat, and Sun Microsystems. To assist our review of the cost analysis, we interviewed staff from EDS, which had been contracted by ITD in the Spring of 2006 to develop an appropriate cost model.

During the interview process, material obtained and reviewed included reports, spreadsheets, user manuals, contracts, ETRM versions, meeting notes, plans, and emails. Because the initiative of moving to an open document standard has been documented extensively on the Internet, our research included reviewing several web sites where the benefits and disadvantages of open standards have been documented. Reference material included Massachusetts General Laws pertaining to the enabling legislation for the Information Technology Division, Office of the Secretary of the Commonwealth, and the State Archivist; public records access regulations; open meeting law; standards for preparing, filing and publishing state agency regulations; the Uniform Electronic Transactions Act, the Enterprise IT

Acquisition Policy; and information related to the Information Technology Advisory Board and the Information Technology Commission.

Our review was conducted in accordance with Generally Accepted Government Auditing Standards (GAGAS) and industry auditing practices. The audit criteria used for our control examinations were based on applicable legal requirements, policies and generally accepted management control practices and IT control objectives and practices. In addition to generally accepted control practices, audit criteria were drawn from CobiT regarding management control practices. CobiT (Control Objectives for Information and Related Technology) is a generally applicable and accepted standard for IT governance and IT security and control practices providing a reference framework for management, business process owners, users, and IT assurance, control and security practitioners.

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## AUDIT CONCLUSION

We found that the ODF initiative lacked a comprehensive business case that provided a single, well-documented statement of value to be achieved by the Commonwealth. Although an array of documented and oral statements providing a range of goals were made prior to and after the ODF implementation policy was issued, an adequate business case was not prepared to justify the necessary change in IT infrastructure required to support the initiative. Sufficient information was not available to explain the value to be attained or how it would be measured, or to identify the impact and cost of pursuing the initiative, opportunity costs, IT infrastructure impacted, technical and non-technical resource requirements, impact on human resource management, assigned responsibilities, points of accountability, and the impact of not pursuing the proposed initiative. In addition, there was no documented strategy to support a managed implementation of ODF-compliant office suite products with specifics that could be measured to set milestones, and demonstrate progress and value achieved.

Stated reasons for the ODF initiative included continued availability of office documents for future generations, avoidance of proprietary product lock-in, and information and document reuse. In addition, according to then Secretary Eric Kriss, the open document format addressed the “need for a sovereign state to provide unencumbered access to all public documents.”<sup>8</sup> ITD staff stated that ODF would ensure that a sovereign state could provide unencumbered access to all public documents well into the future. With respect to the latter, we were not provided with evidence that access to public documents had been, or is likely to be, encumbered. While the risk of encumbered access to all public documents would be reduced by using an open document format, it does not eliminate management’s responsibilities regarding document management, record retention, data classification, compliance with archival requirements, and information or document distribution.

Although the initiative undertaken to adopt open standards, and in particular the OpenDocument standard,<sup>9</sup> has merit, the process for developing and promulgating the policy for implementing the standard lacked adequate consultation with operational management, clarity of value to be achieved by the initiative, and sufficient information to justify the business case. While IT experts from open source and proprietary encampments may present significantly different positions on the capabilities to add value

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<sup>8</sup> [New England Town Meeting](#) 9/16/2005

<sup>9</sup> [OpenDocument](#) as OASIS Standard

from the use of open source products, including the OpenDocument standard, the Commonwealth should be encouraged to continue to consider open source options, but not to the exclusion of evaluating and comparing the costs and potential benefits, as well as value delivery, of proprietary products. Understandably, future development and acquisition of IT systems should take into account user and operational requirements, assistive technology requirements, cost, current and future IT standard architectures, and the impact on system integrity, security, maintainability, and availability.

ITD's accomplishments regarding the ODF initiative include: researching open standards and ODF, the decision to move to open standards and open source products, development of the ETRM, requesting feedback on the ETRM, soliciting input from open source and open document community vendors, contracting for the development of a high-level cost model, developing and signing a memorandum of understanding with the Executive Office of Health and Human Services (EOHHS) and the Massachusetts Office on Disability (MOD), issuing a Request for Information (RFI) seeking a solution for using translator technology plugged in to Microsoft Office, testing an available plug-in, and establishing a new accessibility group within ITD.

We found that ITD's cost analysis, dated September 19, 2005, lacked sufficient detail to support decision-making regarding the implementation of ODF and the acquisition after January 1, 2007 of only those office suite products that complied with the open document format. The cost analysis, which was submitted to the Senate Committee on Post Audit and Oversight on September 20, 2005 in response to Senator Marc Pacheco's September 9, 2005 request for cost information, did not provide sufficient explanation to support management decision-making regarding the implementation policy. In particular, the calculations of cost and projected cost savings either used rough estimates or did not adequately take into account basic fundamental factors. The cost analysis was not based upon detailed information regarding the number of users impacted and their level of user requirements, number of configurations and workstations impacted, number of application upgrades, testing requirements, productivity opportunity costs, and training requirements. As a result, for example, the \$26 million of projected cost savings was not adequately supported. Further, by not addressing total cost of ownership, the cost analysis was not in accordance with ITD's own Enterprise Open Standards Policy<sup>10</sup> that stated that "Technology investments must be made based on total cost of ownership and best value to the Commonwealth." The September 19, 2005 cost analysis would have been of more value if it had

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<sup>10</sup> [ITD Open Standards Policy](#)

included additional information, such as assumptions made and further explanation to allow decision makers to place the analysis in perspective. It is also our understanding that the cost analysis related to the ODF initiative was the only cost information related to open source initiatives submitted to Senator Pacheco and the Committee.

ITD failed to respond to the initial request from Senator Pacheco for cost information regarding the open source initiative. Considering that since December 17, 2003 the Committee had requested cost information regarding the changes in IT infrastructure and management outlined in the versions of the ETRM, ITD's submission on September 20, 2005 of a high-level cost analysis of the OpenDocument format initiative was a cursory response to the Committee's initial request. While ODF is only a part of the ETRM, open source products have been acquired to support IT operations, but information related to their cost and benefit were not forwarded to the Committee. With respect to the ODF initiative, ITD did prepare a cost analysis in July 2006 of a revised strategy for implementing ODF through plug-ins that would work with existing technology. This particular cost analysis was submitted to Secretary Thomas Trimarco, but was not submitted to Senator Pacheco. Our review of the July 2006 cost analysis disclosed two \$12 million miscalculations for the alternative options. We believe that presentations of estimated project costs should be subject to review and independently validated. As of the end of our audit period on December 8, 2006, and subsequently as of June 13, 2007, no final set of cost figures had been submitted to Senator Marc Pacheco regarding the change in ODF implementation strategy or for any other area associated with the implementation of open source products by ITD.

We found the exposure and approval process for the ODF implementation policy to be flawed.

- There was no concerted effort to inform or solicit input or comment from agency management or business process owners regarding the ODF implementation policy and the requirements to change office suite products in their operating environments.
- There was limited notification to concerned parties and stakeholders of the exposure process. A request for review and comment was directed to only state CIOs on August 24, 2005 with the posting of the proposed ETRM Version 3.5 on August 29, 2005.
- The exposure period of August 29, 2005 to September 9, 2005 was limited to only 11 business days straddling a major, three-day holiday weekend.
- ITD did not respond to parties who submitted exposure comments questioning the viability, cost, or logistics issues of the initiative prior to issuing the ODF implementation policy.

- The manner in which certain critical tasks were performed regarding the exposure and policy approval process gave the appearance that the decision to approve the ODF implementation policy had already been made in advance of the exposure period.
- Although ITD did post exposure comments to their web site, not all comments were posted. Only positive comments were initially posted to the web site.
- Although it was agreed on September 14, 2005 by ITD's CIO to have his technical staff provide a detailed explanation of the ETRM to members of the IT Advisory Board, no such explanation was ever provided.
- A cost analysis, dated September 19, 2005, was submitted to the Senate Committee on Post Audit and Oversight on September 20, 2005, one day prior to having ITD issue the ODF implementation policy.
- Given that serious concerns were raised by the Massachusetts Office on Disability and the disability community with respect to the viability of the ODF implementation policy, ITD did not research the concerns raised or communicate with the disability community before issuing the policy.
- The policy initiative requiring users to migrate to open source office suite products that were not compatible with assistive technology caused members of the user community to object to the initiative because it would disenfranchise people with disabilities.

From a policy perspective, the ETRM Version 3.5 stated that the open document format must be used for all office documents, such as for text documents (.odt), spreadsheets (.ods), and presentations (.odp). After questions were raised regarding documents that required legal fidelity and other feedback had been received, ITD indicated that only "selected documents" would need to be in ODF format. However, over a year and a half after the approval of the policy, ITD had not adequately clarified which selected documents must be in the ODF format, and which did not other than exempting documents requiring legal fidelity. Furthermore, although ITD agreed after the approval of the ODF implementation policy that consultation with the Office of the Secretary of the Commonwealth would be pursued to resolve differences in opinion regarding document archiving and retention, only a limited number of meetings have taken place over a sixteen-month period without resolving matters of disagreement.

Based on our interviews, a number of CIOs viewed prior versions of the ETRM more as working draft statements of intended direction for IT systems. In this light, the ETRMs were seen as a work-in-progress and considered as a long-term goal. Because the ETRM versions were not anchored in an IT strategic plan for the Commonwealth, there was a tendency not to view the ETRM as something that would be implemented in the near future. As a result, even though input was sought by ITD, the ETRM may not have received the level of scrutiny needed. Although more attention was drawn to the ETRM

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when Version 3.5 included an implementation date for the OpenDocument format, it is likely that the document format section received a far more rigorous review than that of the entire ETRM.

We found that the policy development lacked adequate consultation of operational management and input from state technology users. We acknowledge that ITD sought input from the software vendor community and primarily from some CIOs from large state agencies. On August 29, 2005, CIO Peter Quinn noted, "After receiving comments from the public regarding our proposed Open Formats standards earlier this year we have had a series of discussions with industry representatives and experts about our future direction." However, the process should have included entities and individuals to whom the value of the initiative was intended, those impacted by the use of the ODF-compliant office software, and those having responsibility or accountability for the changes to the IT infrastructure required to support the initiative. For an initiative promoted to be of significant value for all citizens regarding current and future access to information about the business of government, and as some have stated, for the sake of democracy, one would have expected that ITD would have sought input from representatives of all impacted parties. It would be reasonable to expect that the community of interest to be engaged in discussion would have included not just a subset of executive branch agencies, but all agencies, the State Legislature, Judicial Branch, Constitutional Offices and citizen, business, and academic representatives. In particular, the process should have included detailed discussions with the Supervisor of Public Records and the Records Conservation Board comprised of the Commissioner of Administration, Supervisor of Public Records, Attorney General, State Comptroller, State Librarian, and the State Archivist. Our interviews indicated that there was virtually no evidence of consultation with agency department heads. This significantly limited agencies' understanding of the overall goal and the opportunity to assess technical and administrative feasibility.

We believe that ITD should have made a stronger effort to communicate and consult with at least all branches of government to gain support for this initiative. The process of not adequately collaborating with, and seeking support from, all branches of government limits the implementation to executive branch agencies. The strategy, as embarked upon in the September 21, 2005 policy, did not seek adoption and implementation buy-in from other branches of government. By requiring only Executive Branch agencies to comply with the ODF policy places at risk the opportunity to achieve the desired goals of having either documents created in a format to permit reuse in other systems, or having all, or even a defined set of, documents across Massachusetts state government to be available and readable by future generations.

The policy initiative requiring that documents be saved in open document format to allow their availability into the future implies long-term availability, such as to meet the information needs of future generations. However, it ignores the fact that not all documents, in any form, are saved for extended periods of time. To have required that agencies change their office suite products to create ODF-compliant documents without having first assessed archival or long-term availability requirements is evidence of the failure to adequately address document and record retention first. Further effort should have been made to identify and articulate record and document management requirements.

Further effort should have been made to define document retention and access requirements before the ODF implementation policy had been approved. Although the ETRM indicates that a section regarding document retention will be completed in the future, adequate effort has not been made to define the nature and type of electronic documents that should be retained to meet current and future availability requirements. Based on interviews and documentation reviewed, it appeared that key decisions regarding document and information management had not been made. In particular, there was little evidence that consideration had been given to what documents should be saved and for how long, to whom should they be made available, and by what means. The focal point should be on the nature and type of “information” that should be made available well into the future. In addition, the desired value and feasibility of having one or more document warehouses needs to be evaluated.

ITD, nor any other state entity, has an accurate and complete picture of exactly what documents in any format should be ODF compliant. We acknowledge that other government entities around the country on a state and federal level have been struggling with issues surrounding decisions regarding document retention, archiving, and long-term availability.

It is also important to note that not all information contained in records or documents that would be of long-term value are generated by office suite products. For example, important financial-related information is generated via mainframe computer systems, such as from the Commonwealth’s Massachusetts Management Accounting and Reporting System (MMARS) used to manage revenue and expenditures and the Human Resource/Compensation Management System (HR/CMS) used to manage time and labor, human resources, and payroll information. In addition, much of the information that is available through the Commonwealth’s website, [www.Mass.gov](http://www.Mass.gov), is not currently retained in its web page form.

Consideration should also be made for source documents that would need to be retained for long-term availability. Depending on the system of origination, it may be unlikely that these documents would be created or saved in ODF format. For source documents that would be further completed through manual actions and scanned for electronic storage and access, it is also unlikely that these documents would be in ODF format. Currently, while none of the data captured by data management systems would be ODF compliant, neither would the primary systems of record for Commonwealth business.

We view open document format as an important element or component of open standards. Clearly, the stated objectives of open document formats that allow continual and unrestricted document availability are of value as are those of open standards. While open document format is a critically important factor in long-term document accessibility, with associated benefits for shareability and interoperability, the focus to date has been devoid of sufficient discussion regarding electronic data classification, content and document management, and record retention.

The advantages of being able to repurpose XML-based documents and their associated content hold the promise of some significant opportunities in data analysis and how information is provided to citizens and public sector service providers. Such efforts of combining information obtained under differing sets of initial purpose and understanding to satisfy new uses must be tempered by responsible and ethical use considerations. And, as with all new technical capabilities introduced to the market place and implemented within our operating environments, the issues of IT governance and system integrity, security, and availability should be addressed.

Our audit disclosed the following summary points regarding the implementation policy, project management, and cost analysis:

Implementation Policy Administration:

- ITD's policy management team did not have sufficient communication with the Supervisor of Public Records and the Chief Archivist from the Office of the Secretary of the Commonwealth to identify legal criteria as well as the level of importance of documents requiring various retention and archival schedules.
- ITD did not seek input or consensus from the State Legislature and other governmental bodies regarding a business case for generating and storing ODF-compliant documents required by the implementation policy.
- The change in policy requiring ODF-compliant documents and the implementation of systems supporting office suite products that would create ODF-compliant documents

was not discussed with all agencies affected before the approval of the implementation policy.

- As of the September 21, 2005 approval of the ODF implementation policy, ITD did not have a documented proof of concept, nor clear acceptance criteria, for agencies with regard to the implementation of ODF. It was not until the Spring of 2006 that ITD began an earnest effort to develop a proof of concept and acceptance criteria.
- Although ITD sought user feedback, the time periods for response for the various versions of the ETRM were very limited. In addition, regarding ETRM Version 3.5, ITD took little or no action to respond to user feedback received during the exposure period, or even shortly thereafter.
- Not all responses to the exposure process were posted to the ITD web site. The Office of the State Auditor's response was not posted (see Appendix 6, page 67)
- A detailed implementation plan had not been developed before the implementation policy was approved on September 21, 2005 other than setting a January 1, 2007 starting date.
- Although ITD had adopted the international ODF standard, they did not have an implementation plan as to how the standard would be applied or how the standard, or open source office suite products, would interface with Commonwealth application systems.
- There was no detailed plan outlining what open source office suite products and supporting technology were to be installed first along with a proposed installation schedule for remaining systems. There were no documented details regarding logistics, training requirements, impact on work flow, assigned responsibilities or milestones.
- The initially recommended, open source office suite products were found to be unable to meet accessibility user requirements. This was determined only after the testing of the office suite products had been completed in the Spring of 2006. Adequate research had not been performed as of the September 21, 2005 date of approval of the ODF implementation policy.
- Eight months after issuing the ODF implementation policy, the failure of open source office suites to meet accessibility requirements and the potential for forthcoming plug-ins to create ODF-compliant documents has resulted in ITD extending the implementation deadline and to shifting to a phased-in implementation approach to plug-ins.

#### Project Management:

- There was strong senior management commitment on the part of Secretary Eric Kriss and CIO Peter Quinn for the ODF initiative.
- ITD did not clearly delineate how the ODF initiative would fit into the overall portfolio of IT-enabled investment initiatives or strategic plans.

- ITD did not allow sufficient time to effectively plan and research the ODF initiative, as demonstrated by the fact that software product testing and development of a cost model and an implementation plan was initiated subsequent to setting the implementation date of January 1, 2007.
- Although the scope of the ODF project had been defined, ITD had not as of September 21, 2005 documented the project methodology for planning, executing, controlling, and closing the overall ODF project. As of that time, realistic project milestones and specific project phases had not been documented, nor had an implementation plan been developed.
- A risk analysis regarding the ODF initiative had not been conducted as of the September 21, 2005 approval of the ODF implementation policy. The risk analysis would have identified and assessed the potential adverse impact on agency operations and the integrity, security, and availability of the IT systems impacted.
- As of September 21, 2005, funding for the implementation of the ODF policy had not been obtained. Steps had not been taken to ensure that agencies impacted by the policy would have the funding needed for fiscal year 2007 to support the implementation of the policy.
- Prior to proposing the ODF implementation policy, ITD had not identified, or solicited input from agencies regarding, the number of application systems to be effected by the ODF implementation.
- As of September 21, 2005, ITD had not established a project framework for the ODF initiative with monitoring and evaluation requirements to provide appropriate assurance mechanisms.
- A systematic method for documenting and tracking the overall project was not in place through January 2006.
- Project resource requirements, including ITD and agency staff assignments, had not been defined as of January 2006. It was not until late Spring of 2006 that project management techniques were applied to the ODF initiative. A project manager was assigned and a detailed project plan was developed in July 2006.
- As of the end of June 2006, ITD's planning effort was significantly enhanced to coincide with a change in implementation strategy to use plug-ins to be able to adopt ODF.
- Metrics have not been established or defined for measuring the success of the ODF initiative. However, as of July 2006, from a project management perspective, effort had been made by ITD to identify required tasks and activities needed to be completed for the ODF initiative.
- ITD provided a documented change in implementation strategy through CIO Louis Gutierrez's August 23, 2006 open letter that outlined a revised strategy to implement ODF by means of using translator technology plugged in to Microsoft Office.
- The January 1, 2007 implementation date initially established by ITD requiring the use of ODF-compliant office suite products was not supported by an implementation plan or based on adequate information regarding the viability of the office suite products or other implementation factors. Subsequently, ITD adopted a phased in approach that, according to Louis Gutierrez's August 23, 2006 open letter, would "migrate all Executive Department agencies to compliance with the standard, in phases, by June of 2007." The

open letter noted that the “target dates are not set in stone” as they are dependent on a number of factors.

#### Cost Analysis:

- The September 19, 2005 cost analysis submitted to the Senate Committee on Post Audit and Oversight lacked adequate detail to support management decision making regarding the ODF implementation. Our interviews with the ITD project team members indicated that none considered the cost analysis to be sufficient. Almost as an excuse, they referred to the analysis as a “back of the envelope” cost analysis. Some detail elements missing from the cost analysis submitted by CIO Peter Quinn but contained in the analysis provided by Electronic Data Systems (EDS) are: the number of legacy applications and whether these applications output to Microsoft Office or to other formats and the level of criticality of the data output; the number of office suites required; number of workstations requiring basic office, advanced office macros, visual integrity, collaborative features, and assistive technologies; current office suite version; current workstation configuration; training requirements for basic, advanced, macro or assistive technology users; agency help desk requirements; software testing; application upgrades and complexity of IT environment; software distribution cost; and the opportunity cost for training and productivity.
- The September 19, 2005 cost analysis for the ODF implementation policy contained an invalid assumption which overstated the difference between Open Office and Microsoft Office by \$8.5 million. The cost analysis also contained other errors.
- A comprehensive cost model with supporting documentation was not adopted or developed to support the ODF initiative or the implementation policy as issued on September 21, 2005.
- A best value analysis for the ODF compliant office suite products was not performed by ITD. According to the Enterprise Information Technology Acquisition Policy “*the Commonwealth's procurement philosophy that states that it is in the best interest of the Commonwealth for solicitation evaluation criteria to measure factors beyond cost. A best value evaluation should, at a minimum, consider total cost of ownership over the entire period the IT solution is required, fit with identified business requirements, reliability, performance, scalability, security, maintenance requirements, legal risks, ease of customization, and ease of migration.*”<sup>11</sup>
- A total cost of ownership and best value calculation was not performed. Technology investments must be made based on total cost of ownership and best value to the Commonwealth. Component-based software development based on open standards allows for a more cost-effective "build once, use many times" approach.
- Return On Investment (ROI) calculations were not performed by ITD. ROI financial and operational metrics should be used to measure the higher-level objectives of accessibility

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<sup>11</sup> [IT Acquisition Policy](#)

and transparency so desired of the shift to ODF. The cost model developed in the Spring of 2006, if fully implemented, could support ROI assessments.

- ITD Financial staff were not consulted or involved in the cost analysis of the ODF policy initiative or the ETRM as a whole.

While we found that ITD's knowledge and understanding of the viability of the ODF-compliant office suite products, user requirements for the disability community, and the specific IT infrastructures in place was lacking when the implementation policy was issued, ITD had taken constructive steps to gain a more in-depth understanding and assess technical feasibility during calendar year 2006.

At the time that the disability community raised serious concerns about the shift to open source office suite products, ITD did not know exactly how many people in terms of employees, clients, or citizens would be directly impacted. By December 2005, CIO Peter Quinn had begun an earnest effort to gain a better understanding of the nature and extent of the impact on current and prospective employees with disabilities, as well as the larger disability community, as a result of the shift to ODF-compliant office suite products. At that time, he began an effort to establish a memorandum of understanding with EOHHS and MOD. The effort was finalized by Secretary Thomas Trimarco and CIO Louis Gutierrez and the disability community and signed on August 17, 2006 by the Secretary of Health and Human Services, ITD, and Massachusetts Office on Disability.

During the course of our audit, ITD acknowledged that additional information was needed to prepare a detailed cost analysis regarding the ODF initiative. During this period, ITD contracted with Electronic Data Systems (EDS), a third-party vendor to develop a comprehensive cost model to be used to conduct cost analysis under various implementation scenarios for ODF-compliant office suite products. ITD's strategy for preparing a more detailed cost analysis for the ODF implementation was to obtain specific information from state agencies after the cost model was developed and pilot tested. After developing the cost model, ITD began soliciting detailed information from agencies with respect to their operational and IT environments. As of the end of our audit period, information had been solicited from 12 of 157 (7.6%) of the Executive Branch agencies.

Based on our observations and review of documentation, we believe that the vendor's initial consulting team had the knowledge and skill to develop a comprehensive cost model, but that ITD's six-week deadline for the first phase of the project appeared arbitrary rather than being based on the necessary steps required to develop the cost model. In addition, we note that a final report regarding the cost

model and estimated costs, which had been contracted for \$555,000 was never prepared and submitted to the Senate Committee on Post Audit and Oversight.

Although at the close of our audit, ITD did not have a detailed understanding of the actual number of individual employees and clients impacted, the need to identify the actual number of individuals requiring assistive technology may have been reduced due to the change in the ODF implementation strategy. The amended strategy is to install plug-ins designed to make existing technology ODF compliant without causing an adverse impact to current assistive technology.

Subsequent to the audit period, in a January 25, 2007 meeting with ITD staff, their legal counsel stated that it was not ITD's responsibility to determine the costs associated with the ETRM as a whole and that they did not have the expertise to do so.

At the close of our audit, ITD was engaged in implementing plug-ins to existing office applications to meet ODF requirements for text documents only. As of February 2007, ITD was waiting for the open source vendor community to complete work on plug-ins for database applications, presentations and spreadsheets. As of June 7, 2007, text from the draft ETRM Version 4.0 states that "there are no office applications that natively support ODF that also provide sufficient accessibility for persons that used assistive technology devices."

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## AUDIT RESULTS

While the steps undertaken to research open standards and the open document format were sound, the process by which the ODF implementation policy was developed, supported and issued was flawed. Rather than placing the policy initiative on hold after serious questions were raised by the disability community, ITD held fast to the initiative and the policy's implementation date, even though the office suite products had not been tested and that a sufficient business case had not been developed.

The management processes associated with each of the three audit objectives are intrinsically linked together. It is important to note that unacceptable, or less than adequate, execution of the processes for one objective would jeopardize the overall goal of ensuring that IT-generated or stored documents will be electronically available well into the future. Under the first objective of examining the process undertaken by ITD to adopt the ODF standard, we determined whether ITD had adequately researched the benefit and applicability of the ODF standard to the state's IT environment. For the second objective of examining the process undertaken by ITD to develop, review, and approve the implementation policy for the standard, we determined whether ITD had developed an adequate business case, conducted business impact analysis, and developed a detailed implementation strategy. The third objective of having a well-founded cost analysis is to a large degree a key element of the business case. Our evaluation included the perspective of whether the cost analysis, as presented on September 20, 2005, demonstrated a good faith effort to respond to Senator Marc Pacheco's request for sufficient, objective information that would support decision making regarding the ETRM and the ODF implementation.

### Process to Research and Adopt the Open Document Standard

Audit Objective 1: To determine whether the Commonwealth's Information Technology Division (ITD) undertook an appropriate process to research and adopt the OpenDocument standard.

Our audit determined that although ITD had conducted sufficient research regarding the intended benefit of the ODF standard to the Commonwealth, they had not adequately researched the applicability of the standard to the state's operational and IT environments. Rather than obtaining a detailed understanding of the environment within which the ODF standard would be used and developing a strategy of where and how the standard would be applied, a "blanket" approach was taken where all Executive Branch agencies were to install ODF-compliant office suite products. The latter implies that all word processing, spreadsheet, and presentation documents generated by office suite products had to be ODF compliant. While there are

circumstances under which a shift to ODF-compliant, open source office suite products may hold recognized benefit for the Commonwealth, blanket adoption irrespective of implementation impact and cost places the realization of intended value at risk.

Research on Open Standards:

Our audit found that ITD had taken steps to research open standards and open source products at the beginning of developing the ETRM. We found that there was evidence of background research conducted by ITD staff, that the Enterprise Architecture Council had researched open standards, and that there was a good faith effort to research the OpenDocument format standard. Beginning in 2003, ITD created the position of Chief Technology Officer who hosted an Enterprise Architecture Council (EAC) comprised of members of various Executive Department agencies who provided input to the development of the ETRM. In addition, there was evidence that there was strong management support for the open standards initiative and that the initial draft and subsequent versions of the ETRM had been reviewed by senior ITD management.

The adoption of an XML-based open document standard has significant merit given the changes in technology and its associated capabilities. In addition to increased document availability, the standard holds great potential for document reuse and improved data management. Documents that are created in an OpenDocument format (ODF) can be exchanged, accessed and edited in an open, non-proprietary document format without the licensing restrictions that would be associated with proprietary software products. Documents created in proprietary formats, however, would only be accessible in the future if IT vendors were to provide backward compatibility to address technological and product changes and enhancements, or if vendor-supplied document converters were available.

ITD's stated advantage of the ODF format is that ODF-compliant documents can be made available to future generations by means of any technology that employs the ODF standard. In theory, ODF, as an international open standard supported by multiple vendors, frees the user from being locked into a single technology vendor. As such, documents created in an ODF protocol significantly reduce the risk of being unavailable, or unreadable, should the vendor not provide sufficient backward compatibility or go out of business. Although the marketplace may provide document conversion products, their use generally results in additional cost and operational overhead.

Considering that the use of ODF relies on technology, and as significant technological changes occur the protocols that would allow access to, or continued communication with, ODF-compliant documents, or any other technology, would be apt to change, it is likely that the ODF standard 1.0 and Microsoft Open XML,

which are two slightly different versions of XML-based document protocols, will both be modified over time to meet changes in technology.

Data and document management issues surrounding backward compatibility, hardware components, and electronic media are not eliminated by adopting ODF. By the nature of advances in technology, long-term availability of data files and documents will continue to revolve around document management, record and document retention requirements, and conversion mechanisms should open standards be inconsistently applied. It is possible that documents created in one technology now found to be obsolete may pose barriers to the continued availability of the documents unless the documents are upwardly converted to the new technology. However, unlike a protocol standard used by a single vendor, the advantage of the ODF standard is its multi-vendor adoption as an internationally-approved open standard which should, in turn, help extend the life cycle of the standard and ODF-compliant documents.

ITD's assumption that all documents need to be ODF compliant is not correct for all circumstances. There is an implication that only those documents created on open source XML-based systems will be available for future generations. It is possible that documents created on other systems, which may or may not be XML-based, could be available for future generations depending on the technology and the continued use of the protocols by which the documents were created. Understandably, not unlike ODF-compliant documents, the availability of these documents will depend on the combination of document management, retention, and archival policies and practices.

Adoption and use of the most current technological approach, such as XML-based documents, should be based on adequate research and architectural direction. The shift of an IT infrastructure to a different IT architecture should also be based on a sound business case with defined measurable outcome. In addition, the objective of archiving documents is to provide access at a later time to previously-generated documents, which is generally measured in years. The decisions regarding what is to be archived are usually based upon the perceived value of the document and its contents, and are reflected in Massachusetts state government by the archival requirements from the Office of the Secretary of the Commonwealth. In addition, documents are saved for extended periods to meet legal and operational requirements. It is important to recognize that the creation of electronic documents often extends beyond the life cycle of office suite products and that transparency and access to required information transcends final or summary documents. As such, achievement of long-term transparency through the adoption of the standard needs to be assessed in relation to the set of documents that are likely to be generated and requiring access in the future.

Although ITD appears to have taken appropriate steps in adopting the open document standard, a clear understanding of what is meant by “open” had not been attained by the time the implementation policy had been issued. It was apparent from the August 29, 2005 to September 9, 2005 exposure process and the feedback received and discussions that followed that there was not a clear picture of what was meant by “open.” ITD’s Legal Counsel even acknowledged at the December 14, 2005 hearing that a more specific definition of “open” needed to be established. There also appeared to be confusion among stakeholders as to the difference between open standards and the open document standard. The degree of openness with respect to the use of the document format protocols depends on the level of restrictions in the license agreements. To ITD’s credit, efforts to identify and resolve license-specific issues were addressed with the assistance of legal counsel. Based on our interviews and documents reviewed, it is our understanding that openness could be best portrayed as a range or continuum rather than a specific point.

Interviewees indicated during our audit that there was an evolving, but inconsistent, understanding as to what was meant by “open.” For some decision makers and IT users, the term “open” pertained more to one’s ability to access and open a document than the absence of license restrictions on the use of the document.

#### Research on the Commonwealth’s IT Environment:

We also found that adequate research regarding the Commonwealth’s IT environment had not been conducted by the time that the proposed ODF implementation policy had been drafted. As of November 2005, which was over a month after the ODF implementation policy was issued, ITD staff did not know or have documentation on:

- The actual number of microcomputer workstations or users to be impacted,
- Details on the September 19, 2005 cost estimate’s stated number of 50,000 users,
- The actual application systems accessed and used through the user microcomputer workstations,
- Whether or not those application systems interfaced with Microsoft Office suite,
- What percent of the staff could not change office suite products based upon disability requirements,
- The extent to which users required office suite functions assuming that a large portion of users did not need the entire office suite products and could get by with only one or two application functions,
- How much time and cost that had been invested in templates or macros for Microsoft Office,
- Whether or not the templates or macros could be imported into the proposed ODF compliant office suite products,
- Which features of the Microsoft Office suite were mission critical that were not included in the proposed ODF compliant office suite,

- Which agency documents would be requested by the general public, oversight entities or other parties, and
- Which agency documents should be archived.

ITD had not adequately assessed the impact on state agencies' operational and IT environments of shifting to open source office suite products to support the ODF initiative. Consequently, the ODF implementation policy was issued without having a detailed assessment of who would be directly and indirectly impacted by the required technology changes. The original assessment was based on the ITD's statement that not all the software, or software features, were being used by employees and that a cost savings could result if only a subset of an office suite were purchased. However, this ignores the fact that a suite by its very nature is a bundling of similar products at a reduced cost. Furthermore, ITD did not adequately assess the extent to which Microsoft's suite features were mission critical or essential to users that would not be included in the new ODF-compliant office suite products.

The proposed Version 3.0 of the ETRM that was released on March 22, 2005 contained two open document protocols; one that was proprietary based from Microsoft and the other, the OpenDocument format. At that time, neither protocol had been approved by an international standards body. The ODF protocol was subsequently approved as an international standard by OASIS on May 23, 2005. The Microsoft Open XML protocol was subsequently approved as an international standard by Ecma International in December 2006.

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Process to Develop, Review, and Issue the ODF Implementation Policy

**Audit Objective 2:** To determine whether the Information Technology Division (ITD) undertook an appropriate process to develop, review, and issue the ODF implementation policy for Executive Branch agencies.

The process undertaken by ITD was not sufficiently comprehensive and documented to support the issuance of the ODF implementation policy. Based on our review, we found that appropriate policy administration and project management techniques were not consistently followed for the process that ITD used to develop and issue the ODF implementation policy outlined in ETRM Version 3.5. Moreover, initially the ODF project was not subject to the same project management oversight and control practices as were other ITD initiatives.

The viability of the open office suite products, implementation logistics, business impact, training requirements, and total cost were not sufficiently understood at the time the ODF implementation policy was issued. While it could be argued that the January 1, 2007 implementation date provided an adequate window to conduct the necessary research, except for the concerns raised by MOD, the external disability community, and other users of assistive technology, the problems and drawbacks were not really known. It is important to note that some of the open source, office suite products were relatively new to the market place, some of which were still in Beta status.

While the direction and the stated objectives had merit, not enough was known at that time that the ODF implementation policy was issued about the Commonwealth's ITD environment to assess impact and identify the full scope of implementation logistics, including cost. Further, the operational viability of the selected open source, office suite products had not been validated. In addition, the questions raised during the exposure process should have been researched and evaluated rather than allowing the perception that they were sidestepped so as not to delay the policy's issuance. At the very least, the questions raised by the disability community should have delayed the issuance of the policy.

While it is unrealistic to think that for all IT projects of merit, especially those that transform technology itself or the business processes that it enables, that all of the specifics to the charted course will be known in advance, ITD should have made a stronger effort to answer fundamental questions and develop a sound strategy before issuing the ODF implementation policy.

The following had not been adequately addressed by ITD before issuing the ODF implementation policy on September 21, 2005:

- Clearly define what is to be achieved by implementing the ODF policy, and how it will be measured,
- Sufficiently define and ensure adequate understanding among stakeholders as to what was meant by “open” with regard to the ODF initiative,
- Develop consensus among those directly impacted by the ODF implementation policy as to the value to be achieved by the initiative,
- Perform technical and economic feasibility studies and conduct business impact analysis
- Develop a detailed cost analysis,
- Test ODF-compliant office suite products,
- Adequately identify who should be informed and consulted regarding the ODF initiative and its proposed implementation,
- Consult with Office of the Secretary of the Commonwealth to achieve understanding and agreement regarding document retention and archiving requirements,
- Consult with ITD customers and business process owners regarding the overall objective and impact to operations,
- Identify the number of servers and workstations impacted by the policy,
- Identify the number and relative importance of all application systems that require an interface with Microsoft Office,
- Identify user training requirements, and
- Develop a project plan outlining IT installation and related training programs.

ITD began to address some of the above items subsequent to issuing the ODF implementation policy and Senator Marc Pacheco’s October 31, 2005 hearing on ITD’s decision to standardize on the OpenDocument format. In November and early December 2005, ITD began to take appropriate steps to more fully understand the issues raised by the disability community and evaluate the recommended office suite products. In early 2006, with the appointment of Louis Gutierrez as CIO, ITD increased its effort to test the open source office suite products, contract with a third party to develop a cost model, release a Request for Information (RFI) regarding the development of plug-ins, revise the implementation strategy in line with the possible development of plug-ins, and begin to obtain information about the IT processing environments of Executive Branch agencies.

#### Policy Development Process:

The initial proposal of implementing office suite products other than what was currently installed in the vast majority of state agencies would not only impact the agencies themselves, but could impact the ability of external users to access and share electronic information with those agencies. While the long-term impact to agency operations may be minimal, short-term barriers and logistics requirements should have been identified to enable appropriate workarounds and contingency plans to be developed. If the ODF implementation had been completed as of January 2007, Executive Branch agencies would have been saving documents only in ODF format. The result would have been that most users outside of state government would have had to have translators to use those documents.

Open discussion and collaborative efforts should have been conducted between ITD and the Office of the Secretary of the Commonwealth and among other stakeholders regarding record retention, types of information and documents, current and future availability requirements, and the impact of the proposed initiative on business operations and supporting technology before issuing the ODF implementation policy. We acknowledge that ITD included the state's CIO community, and to a more in-depth basis a smaller subset of the CIO community referred to as the Kitchen Cabinet CIOs, in discussion regarding open standards, open source products, and open documents. However, two concerns were raised by CIOs during our interviews. First, all CIOs may not have adequately represented the operational mandates, human and technical resource capabilities, management objectives, and the concerns of the entities within which they reported. Second, some interviewees commented that the ITD initiative as presented at CIO meetings appeared more as a directive rather than an initiative for open discussion.

We acknowledge the importance of ITD's CIO to have the authority (Massachusetts General Law, Chapter 7 Section 4A(d)) to issue policies and standards regarding the use and management of information technology under the direct charge of the CIO and for implementation within the Executive Branch. Development of such policies and standards must take into account requirements from other existing laws and regulations and relevant parties, such as the Office of the Secretary of the Commonwealth regarding record retention. Although changes in technology may necessitate development of policies and standards significantly different from what is in place, the Commonwealth would benefit from adopting, or incorporating, generally accepted de jure or de facto standards. Included would be policies and standards governing the management of technology under the charge of ITD or other Executive Branch agencies that is used by other branches of government. Understandably, the policies and standards issued should not conflict with legal requirements or other policies, such as those that address the acquisition or management of IT resources. For example, the adoption of an Open Standards, Open Source policy for "all future IT investments and operating expenditures" whereby only open source products are considered may not adequately take into account best value when extended to all available products, such as, for example, enterprise-based application systems.

On January 15, 2005, Secretary Eric Kriss stated at a presentation at the Massachusetts Software Council's annual meeting that *"The Open Format policy has been developed with the full cooperation and collaboration of, William Galvin, the Commonwealth's Secretary of State."* (see Appendix 3, page 62) We note, however, that at the October 31, 2005 oversight hearing held by Senator Pacheco, the Supervisor of Public Records from the Office of the Secretary of the Commonwealth testified that Secretary William Galvin was not in support of the Open Format policy.

ETRM Framework:

ITD has through the ETRM provided an architectural framework of standards, specifications, and technologies to support a change in direction for the Commonwealth's IT environment. In this light, the "ETRM uses the concepts of domains, disciplines, technology areas and technology specifications to define the enterprise architecture." According to ITD, the goal of the ETRM is to establish a web-based service oriented architecture that relies on the acquisition and development of technology based on open standards.

On January 13, 2004, the Commonwealth of Massachusetts had initiated an Open Standards policy regarding the planning, development, and implementation of IT systems. According to then Secretary Eric Kriss, "these initial 2004 Open Standards began a continuous evolutionary process to better define and understand the issues, not only for those of us in state government, but for the wider vendor community and citizens as well." He noted at that time that the Commonwealth "will extend the definition of Open Standards to include what we will be calling Open Formats. . . . Agencies are expected to migrate towards compliance with the ETRM as they consider new information technology investments or make major enhancements/replacement to existing systems." The objective of the ETRM is to provide an IT architectural framework that positions the Commonwealth to migrate from siloed application centric IT operations to enterprise-based applications that better utilize technology to share and reuse data across state government.

The ETRM states that its enterprise goals include:

- Ease of integration of applications, application services and data to enable inter-agency collaboration and sharing,
- Increase level of application interoperability within the Commonwealth, with other states and municipalities, and with the Federal government, and
- Efficient sharing and re-use of current information technology assets.

Efforts to adopt an architectural framework to be consistently applied across state government should add value to enterprise-based IT initiatives and management. It is important to recognize that document formats are one part of a much larger set of standards to be incorporated in the framework.

We note that by incorporating Microsoft Office's XML and ODF into ETRM, Version 3.0 set the stage for a broader level of openness in the creation and editing of documents generated by office suite products installed on state systems. Initially, adoption of ODF presupposed that the document protocol would be implemented at state agencies that would be using only systems that support ODF. With the potential advent of plug-ins to generate ODF-compliant documents, this supposition has changed such that the current

IT system configurations will be retained for the immediate future and support of ODF will be achieved through the use of the plug-in.

Business Case for ODF Implementation:

A detailed business case was never fully developed to support the implementation of ODF. A comprehensive business case with stated value and objectives to be achieved, justification for the initiative, options considered, resources required, time tables, critical success factors, expected costs, and associated risks was unavailable to support the September 21, 2005 ODF implementation policy. We acknowledge that a number of worthy objectives were stated by ITD over the period of August 2005 through December 2005 that mostly focused on long-term availability of state documents. The objectives were not presented in a single document with an explanation of purpose and how each objective would be realized and measured. The stated objectives at that time included the following:

- Unrestricted access or availability to government documents by future generations,
- Provide full availability of documents to ensure transparency of the processes and functions of government,
- Protect the sovereignty of Massachusetts by not being held hostage to vendors' proprietary license agreements for exchanging and editing documents,
- Protect democracy by having citizens able to access information regarding the workings of government, and
- Attain cost savings by shifting to open source office suites that created and saved documents in ODF.

While each of the bulleted objectives above holds the promise of benefit, sufficient research had not been performed, especially in software product viability, implementation logistics, and cost analysis. The business case, or proposal, would have articulated the stated value and objectives to be achieved, justification for the initiative, options considered, resources required, time tables, how the initiative will be measured, critical success factors, expected costs, and associated risks. In addition, the business case should include a statement of the expected result of not taking action on the proposed initiative. With respect to the overall objective of the ETRM, one would expect that open standards/open source initiatives to follow would be supported by a business case with statements of value to be attained and be subject to economic, operational and technical feasibility studies. With respect to the latter objective, ITD had touted in 2003 potential cost savings to be realized by the Commonwealth by shifting to open source-based systems. In addition, the CIO's September 19, 2005 cost analysis in support of the ODF initiative outlined cost savings to be attained by using open source office suite products.

The business case should answer the question of what ODF does for the Commonwealth. We acknowledge that the objective of being able to ensure that future generations can access documents prepared by

government has significant merit. Its success requires, however, that decisions be made regarding record or document retention and determinations of exactly what documents are to be archived. If document availability were based on transparency and long-term access for all of state government, then all branches of government, constitutional officers, independent authorities, and possibly local government should have been consulted.

Given the interdependencies of technology and electronic information flows within the public sector, then the enterprise perspective for IT management promoted by CIO Peter Quinn that included all of state and local government was on target. Moreover, one could argue that the evaluation of the intended value of the ODF initiative should extend the community of interest to those served by, or who interact with, state government. In addition, given that the goal is to have electronically-generated state documents available in an open document format to ensure their availability for future generations, it is shortsighted to proceed without having the necessary document retention and archival policies to adequately support the objective, as well as to impose the ODF requirement solely on the Executive Branch.

If the intent, on the other hand, were to promote transparency through long-term access to state documents, or further the adoption of open standards and the use of open source products, a significantly more robust process should have been conducted before issuing the ODF implementation policy. Instead, the process undertaken placed the intent of the overall initiative at risk. Adequate input was not sought from state administrative and operational staff, feedback provided from the exposure process was not fully responded to or seemingly ignored, and sufficient research, testing, and vetting of what was feasible, logistically sound, and cost effective was not performed.

From an IT governance perspective, it is difficult to determine the extent to which the ODF initiative is aligned with strategic objectives in the absence of an overall IT strategic plan for the Commonwealth, or a integrated IT strategic plan for ITD. In addition, adequate details regarding the Executive Branch's, not to mention the Commonwealth's, IT infrastructure had not yet been identified prior to the proposed Version 3.5 update to the ETRM or the issuance of the ODF implementation policy. Moreover, the failure to take into account during the exposure process questions raised by the disability community regarding software product accessibility and usability and by other parties regarding cost and functional capabilities further jeopardized the validity of the implementation policy decision.

While the most pronounced benefit falls more to the potential contribution for achieving a desired goal or business vision, the level of controversy or concern surrounding the initiative could have been lessened significantly through improved knowledge of the business process/IT environment and communication and collaboration with key stakeholders.

A cornerstone to ITD's stated position was that the installation of open source, office suite products that were ODF compliant would be at a significantly lower cost than replacing or refreshing current systems. Although it was understood that the open source, office suite products did not provide the same capabilities, ITD's position was that most state workers did not need the level of functionality provided by current systems. The argument that most state employees could perform their duties with far less office suite functionality was a key element for implementing open source office suite products that, at the time, did not provide the same level of functionality as proprietary products. Although this may be valid for certain business functions, there was no empirical evidence to support the position. In fact, ITD lacked a detailed understanding of exactly how office suite technology was being used across all agencies, including the extent of document creation and the requirements for document transfer within and external to state government. In addition, no argument was presented as to the impact on future IT benefit to be gained as a result of developer or vendor-generated advances in technology given that the state would have an installed base of office suite technology that did not as yet reflect the same level of functionality as the technology already installed.

There has always been the need to match IT resource capabilities to workforce requirements in a manner that sufficiently enables tasks and activities supported by technology to be conducted in an effective and efficient manner. The goal of allocating technology and provisioning other work-based productivity tools to meet current and future user needs requires a detailed understanding of the functions to be performed and how the technology will be used.

ITD's stated position that the vast majority of state employees who use technology do not create electronic documents, or do not need all the functionality provided by proprietary office suite products or even an office suite itself, was not supported by agency data and was an assumption that should not have been lightly made. Without consulting with department heads, business process owners and users regarding the current and projected use of technology, ITD did not have a detailed understanding as to exactly how users relied upon technology, where documents were created or amended, and what documents were stored or transmitted to other parties or systems. Despite the lack of a detailed understanding, ITD maintained the position that a significant portion of the state workforce did not need all the functionality provided by proprietary office suite products. While it may be correct that certain office staff do not create documents, but rather only read or transmit documents, ITD did not have hard evidence as to the agencies and number of staff to which significantly-reduced office suite functionality would be applicable.

It is possible that a well-founded business case could have been articulated for the implementation of ODF given that the goals regarding document and information management, record retention, archiving, and long-

term document availability could have been agreed upon by interested parties and those legally charged with the responsibility to ensure that appropriate state records are retained and are available in the future. Unfortunately, sufficient research and discussion by all stakeholders on these matters did not occur. Merely creating documents in ODF does not guarantee long-term availability unless further decisions are made regarding document retention and archiving. Clearly, an increased effort to formulate a business case, refine it over time, and ensure that it was adequately understood would have benefited the Commonwealth.

Record/Document Retention:

We found no evidence that ITD analyzed the record retention policy and procedures as established by the Office of the Secretary of the Commonwealth. We further found that ITD had not analyzed the impact of the ODF initiative against the backdrop of the record retention policies and procedures as agreed to between individual agencies and the Record Retention Board of the Office of the Secretary of the Commonwealth as documented in the Massachusetts Statewide Records Retention Schedule. The Schedule, which is issued by the Records Conservation Board, is developed in conjunction with Massachusetts Archives and the Supervisor of Public Records Office.

ITD's ODF initiative was established without clarifying the objectives and requirements of document retention and archival policies. The lack of sufficient collaboration between ITD and the Supervisory of Records and the State Archivist from the Office of the Secretary of the Commonwealth resulted in not having a clear definition of which documents were to be retained for future generations and which were to be destroyed per the Statewide Records Retention Schedule. If the objective were to ensure full transparency of the inner workings of state government then further analysis was needed to identify the types of documents, including supporting materials, exception reports, and management trails that should be saved. Although ITD would not be deciding on what documents would be archived, ITD determined that all electronic documents generated from office suite software shall be saved in ODF format to ensure future availability.

The value to be attained by generating and saving ODF-compliant documents for long-term access is placed at risk by having not addressed record and document retention objectives and related policy. There is a disconnect between which documents are saved for archival purposes at the State Archives and documents that would provide future generations of readers with adequate insight into the workings of state government. According to the State Archives, archival documents are generally "permanently valuable records of the state" that would be saved "for the benefit of state agencies, the Commonwealth, and its citizenry". In this light, saving documents for future generations implies that the documents are saved for

more than seven years. Moreover, the Commonwealth's Statewide Records Retention Schedule <sup>12</sup> indicates that after seven years most documents would be destroyed and that only documents requiring permanent storage would be retained at the State Archives. ITD had not provided guidance to agencies as to how documents no longer needed for current operations are to be maintained nor the mechanism by which future generations are to access these documents.

During the course of the audit we requested copies of documentation to support the actions taken by ITD regarding the ODF initiative. Although we received a significant amount of documentation, ITD could not provide copies of emails received or generated by Secretary Kriss and Peter Quinn regarding open standards and the ODF initiative. Upon our request for the emails, we were informed by ITD that Eric Kriss and Peter Quinn had their emails deleted before leaving state service. It is an interesting point, from a record retention perspective, that the two individuals who had touted the transparency of government actions and the importance of saving documents for future generations should have all of their emails deleted from the state systems.

We note that as of the end of our audit period, the Office of the Secretary of the Commonwealth and ITD had broached the topic of electronic archives, but had not come to any specific conclusion.

#### Testing Office Suite Products:

In an effort to comply with Secretary Eric Kriss' memo of September 25, 2003 regarding open standards, ITD developed the ETRM versions 1.0 through 3.5. The development process ran from January 13, 2004 to September 21, 2005, with ETRM Version 3.5 including the ODF implementation policy and the directive regarding the installation of open source, office suite products. However, it was not until November 2005 that the Director of Open Source Development at ITD began the testing of the open source, office suite products that had been recommended in the September 21, 2005 ETRM Version 3.5. ITD's Open Source Development Group installed OpenOffice, Star Office and IBM Workforce with different groups of staff at ITD to determine if there were any operational or compatibility issues with how the products performed in comparison to currently installed office suite products. At this time development of a draft ODF implementation plan was initiated.

Based on interviews with ITD staff, it was apparent that an earnest strategy to review and test open source, office suite products did not begin until after the ODF implementation policy had been issued. According to ITD staff and documentation reviewed, testing of office suite products began in November 2005 and

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<sup>12</sup> [Massachusetts Statewide Records Retention Schedule](#)

progressed through the second quarter of 2006. Initially, ITD decided to test OpenOffice, Star Office, K Office, IBM Workforce, and Abey Word, but then eliminated testing of those products that would not operate on Microsoft's Operating Systems. ITD, as of December 2006, was in the process of installing and testing Open Office at ITD and having meetings with agencies promoting Open Office. When ITD determined that the open office suites evaluated were not sufficiently compatible with assistive technology to support the disability community as was Microsoft Office suite, ITD began to look for another alternative. On May 3, 2006 ITD released a Request For Information ([ODF Plug-In for Microsoft RFI](#)) pertaining to the existence or development of a plug-in or converter to allow Microsoft Office to read/write ODF files.

#### Exposure Process and Response to Comments:

There was little evidence that ITD considered the issues and concerns that had been raised raised resulting from the exposure process of ETRM Version 3.5 that included the proposed ODF implementation policy, or even responded to those who questioned the viability or costs of the initiative. This was in sharp contrast to how ITD took into account issues raised largely by the open source vendor community for the prior update to the ETRM document. We note that ITD had removed Microsoft's XML from ETRM Version 3.0 as a result of a "firestorm" of negative comments generated during the exposure process of ETRM Version 3.0. However, although there were significant questions raised during the exposure period by the disability community with respect to ETRM 3.5, ITD did not substantively change ETRM 3.5 when it was formally approved on September 21, 2005, nor delay the issuance of the ODF implementation policy until the questions raised could be adequately researched.

#### Length of Exposure Periods Used to Solicit Comments on Proposed TERM Versions

	Start of Exposure Period	Deadline for Requesting Comments	Number of Calendar Days	Number of Business Days
ETRM 1.0	ITD Internal	ITD Internal	-	-
ETRM 2.0	April 21, 2004	May 5, 2004	15	11
ETRM 3.0	March 22, 2005	April 1, 2005	11	9
ETRM 3.5	August 29, 2005	September 9, 2005	11	9

Although there is no policy in place requiring ITD to solicit feedback through an open or targeted exposure process, ITD's efforts to solicit input through an exposure process demonstrates a willingness to use generally accepted practices and to consider input from stakeholders and experts. However, since the exposure period for ETRM Version 3.5 of August 29, 2005 to September 9, 2005 was an eleven-calendar-day period that included a three-day holiday weekend, it is problematical whether the shortness of the

response period was because of ITD's unwillingness to change course or their belief that the ETRM and the proposed ODF implementation policy were fine as is and needed no adjustment. It should be noted that ETRM 2.0 had a response period from April 21, 2004 to May 5, 2004 and ETRM 3.0 had a response period of March 22, 2005 to April 1, 2005. The brevity and timing of the exposure period did not allow for widespread comment.

As of late Spring 2006, ITD was beginning to develop a more realistic strategy for addressing ODF since none of the office applications that supported ODF also provided sufficient accessibility with assistive technology for persons with disabilities. The strategy entailed a phased-in approach rather than an across the board shift as of a specific date. Implementation was based upon the use of plug-ins as they became available and were tested. The intent was to enable currently-installed office suite products to generate ODF-compliant documents without adversely impacting the disability community. The strategy also included increased monitoring and evaluation of each phase of the implementation. Furthermore, ITD began to resolve the failure to finalize a memorandum of understanding (MOU) with representatives of EOHHS and MOD, which led to an agreement and the issuance of an MOU on August 17, 2006.

#### Technical and Financial Assistance to Agencies:

Regarding implementation, we determined that ITD had not established a project budget for the development, review and implementation of the ODF initiative. Per ITD's web page, based upon CIO Meeting Notes as of October 27, 2005, ITD's CIO stated:

*"ITD is committed to providing financial and technical support for this effort, and we will work closely with each agency as you move towards implementation. We are in the early stages of developing full Implementation Plan which includes the timing and resource allocation for whatever training, support, and integration services are required at the agency level. Our in-house efforts will provide a basis for estimating all the costs of the Implementation process across all agencies."*

Based on our audit, we found that as of November 2005, ITD had not developed an implementation plan nor had they developed the capability to estimate all the costs of the implementation process across all agencies. As of March 2006, Open Office was still being installed at ITD along with other ODF compatible software, testing the office applications, determining a gap analysis of features, creating a cost model, and requesting information from agencies to better determine final costs. An implementation plan had not at that time been finalized.

We found that funding had not been adequately addressed for the ODF initiative project. Although funds were made available within ITD to contract with a third-party provider to develop a cost model, a detailed budget to support the overall initiative was not developed. As a result, funds were not targeted for training

and addressing all required deliverables agreed to in the August 17, 2006 MOU with the Executive Office of Health and Human Services and the Massachusetts Office on Disability. In addition, detailed cost tracking, including recording of cost on a total cost ownership basis, was not in place. Given that the contract for the third-party provider was \$555,000, a conservative estimate of costs for the ODF initiative on a total cost ownership basis would exceed \$1 million over the audit period.

Electronic Media:

If we are to consider transparency into the future, we need to consider what types of information are likely to be captured, stored and available in electronic form. Electronic records can be saved onto many forms of magnetic and optical media. There are tape, card, disk and other media all of which can record and play back what is stored on them. In addition to the forms this media takes they can also record a vast variety of information, speech, music, text, video as well as other formats. When we look at this information, we need to consider various factors if we wish to intelligently manage this information. One way would be to divide the entire management process into layers and establish controls over each layer.

Implementation – Value of Pilot Testing:

We believe that it was unreasonable for ITD to insist that 50,000 employees change how they accomplish their work using technology without first analyzing how the employees' work was conducted. While new standards and procedures can be adopted, pilot testing a new approach in conjunction with existing standards and procedures for a trial period often provides valuable information regarding the operating environment and the viability of the proposed change.

The failure to develop a logistically sound implementation plan meant that the impact of change within state agencies had not been adequately assessed. For example, it was incorrect for ITD to state that their new policy would just affect Executive Branch employees. The ripple effect could transcend the Executive Branch to all branches of government, local government, and in certain circumstances, Commonwealth citizens.

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Cost Analysis to Support ODF Implementation Policy

**Audit Objective 3** To determine whether ITD’s cost analysis submitted to the Senate Committee on Post Audit and Oversight on September 20, 2005 was sufficiently comprehensive and verifiable to support management decision making regarding the adoption and implementation of ODF.

We found that ITD’s September 19, 2005 cost analysis lacked sufficient detail to support the adoption of ODF and the acquisition and implementation after January 1, 2007 of only those office suite products that complied with the open document format. We further note that the projected \$26 million cost savings was not adequately supported. The cost analysis, which was submitted to the Senate Committee on Post Audit and Oversight on September 20, 2005 in response to the Committee’s September 9, 2005 request for cost information, did not provide sufficient explanation to support management decision-making regarding the implementation policy. In particular, the cost calculation and projected cost savings did not adequately take into account basic fundamental factors, such as total cost of ownership, detailed training costs, number of configurations and workstations impacted, application upgrades, testing requirements, productivity opportunity costs, and procurement costs. By not addressing total cost of ownership, the cost analysis was not in accordance with ITD’s own Enterprise Open Standards Policy <sup>13</sup> that required that “technology investments must be made based on total cost of ownership and best value to the Commonwealth.”

At the time that ITD issued ETRM Version 3.5, the only cost analysis that ITD had prepared was the two-page analysis submitted by the CIO to the Chair of the Senate Committee on Post Audit and Oversight. No other detailed analysis regarding cost/benefit had been prepared at that time by ITD regarding the ODF initiative or the shift to an open source environment. The failure to adequately take into account cost resulted in the absence of an appropriate cost model or reliable cost information. ITD did not have a sufficient or accurate understanding of the dimensions of the proposed implementation strategy with respect to basic underlying factors, such as the actual number of workstations, applications requiring proprietary office suite products, and the number of staff to be trained. It was not until a contract was entered into on February 3, 2006 for a cost model that ITD began to more adequately identify the key elements that would impact the total cost of the ODF initiative.

Senator Marc Pacheco, Chairman of the Senate Committee on Post Audit and Oversight, originally asked ITD for a cost analysis at a December 17, 2003 public hearing when an earlier version of ETRM was being

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<sup>13</sup> [ITD Open Standards Policy](#)

discussed. Subsequently in a letter, dated September 9, 2005, Senator Pacheco asked again for a cost analysis of the ETRM which included the Open Document standard and the process ITD used to develop the ETRM and the Open Document standard. Senator Pacheco's September 9, 2005 letter also stated that "the Committee remains concerned about the process in which ITD developed the ETRM." On September 20, 2005, CIO Peter Quinn delivered to Senator Pacheco a two-page analysis dated September 19, 2005 of the "Open Formats Transition Cost Matrix" which included a proposed savings of \$26 million.

The September 19, 2005 cost analysis did not reflect an adequate response to the Senate Committee on Post Audit and Oversight's initial request for detailed cost information. With respect to the prior request to ITD from Senator Pacheco, Chair of the Senate Committee on Post Audit and Oversight, on December 17, 2003 for cost information related to projected savings to be realized by the ETRM strategy, ITD has failed to respond to the Committee except for the two-page analysis regarding the ODF initiative. Although ITD has acquired open source products to support data center operations, no cost related information has been submitted to the Committee. Considering that since December 17, 2003 the Senate Committee on Post Audit and Oversight had requested cost information regarding the changes in IT infrastructure outlined in the versions of the ETRM, ITD's submission on September 20, 2005 of a high-level cost analysis of the OpenDocument format initiative was a cursory response to the Committee's requests for cost information.

Secretary Eric Kriss and CIO Peter Quinn's decision to implement ODF-compliant office suite products was made without an adequate analysis of the costs involved. Furthermore, in statements made by Secretary Kriss, the decision to support ODF was based more upon the sovereignty of Massachusetts to be able to access its own records. Based upon the delay in developing a detailed cost estimate for Senator Pacheco and in the absence of supporting documentation to the September 19, 2005 cost analysis, there appears to be little evidence to indicate that costs were adequately considered in the decision to implement ODF. In addition, we believe that the September 19, 2005 cost analysis should have also included supporting information, such as the assumptions made and further explanation to enable the reader to place the analysis in proper perspective. Furthermore, we found that none of ITD's ODF team could provide supporting information regarding the September 19, 2005 cost estimate that had been submitted to Senator Marc Pacheco. We were informed by ITD that they did not have staff with the financial expertise to adequately estimate costs associated with the ETRM. We also determined that ITD did not involve their own Chief Financial Officer or seek the assistance of financial analysts from the Administration and Finance's Fiscal Affairs Division.

The September 19, 2005 cost analysis did not estimate costs on a total cost of ownership (TCO) basis. Although ITD agreed in discussions with the Committee in December 2003 that TCO provided an

appropriate manner in which to evaluate the real cost of the proposed ETRM, the September 19, 2005 analysis did not include TCO. The objective of TCO is to provide a more realistic estimate of the actual cost of an IT initiative. By including the costs of training, maintenance, support services and any reallocation of staff or other resources, a far more accurate accounting over the life cycle of the initiative can be provided to enable evaluation and decision making. Total cost of ownership takes into consideration direct acquisition and development costs and indirect costs associated with the initiative or project. Indirect costs would include staffing, training, maintenance, consulting, and associated opportunity and downtime costs over the life of the project or product. As agreed to by ITD, TCO is a valuable measurement for the ETRM, which invites participation of non-proprietary software companies that may not have acquisition costs, but for which the project or product would require other costs, such as training and consulting associated with the customization of the application and migration from a legacy system.

It would be reasonable to expect that a cost analysis submitted in concert with ETRM Version 3.5 for the ODF initiative would have provided detailed costs for implementation; conversion when necessary; IT resource procurement, training, and maintenance in light of the desired value to be attained. In addition, the cost analysis should provide supporting information regarding how the total cost was calculated, identification of the underlying factors or elements of the cost formula, details of the assumptions made, and how the value to be attained for the Commonwealth will be measured.

The lack of adequate cost analysis was also evidenced by significantly different cost estimates presented on September 16, 2005 and in the September 19, 2005 cost analysis. On September 16, 2005, while addressing the Massachusetts Technology Leadership Council <sup>14</sup>, Secretary Kriss stated that an upgrade to Microsoft 12 with the XML format would cost the Commonwealth \$50 million dollars and that an upgrade to Open Office with an ODF format would cost \$5 million dollars. However, three days later in the September 19, 2005 cost estimate to be presented to Senator Pacheco, the cost to upgrade to a Microsoft format was \$34 million dollars and the cost of a transition to Open Office would cost \$8 million dollars. At the September 16, 2005 meeting, Secretary Kriss noted that the estimates were “very crude”, e.g., and did not reflect the possibility of better pricing from vendors. The absence of a documented detailed cost analysis precludes the validation of either set of the stated cost numbers. In addition, when interviewed, none of ITD’s ODF team could provide supporting information on the cost estimate provided by ITD. We note that input from Division of Fiscal Affairs staff was not sought by ITD in preparing the cost estimates.

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<sup>14</sup> [New England Town Meeting](#)

At our audit's entrance conference CIO Peter Quinn introduced the ODF team which consisted of ITD's Legal Counsel, Chief Technology Officer, Chief Applications Officer, Director of Open Source Development, Director of Policy and Architecture, and Chief Financial Officer. Although ITD's Chief Financial Officer (CFO) was introduced as a member of the ODF team, when interviewed the CFO stated that he was not involved in any cost analysis regarding the ETRM or the cost analysis submitted by the CIO to the Senate Committee on Post Audit and Oversight. Our interviews of other ODF team members indicated that none had contributed to the two-page cost analysis nor had they developed any other analysis of cost.

Our initial interviews regarding the September 19, 2005 cost analysis, ETRM development process, and the ODF standard revealed that the Chief Financial Officer was not involved in the cost analysis and that a documented project plan had not been prepared. Although introduced at the beginning of our audit as a member of the ODF team, ITD's CFO was never asked to perform a financial review of the ODF initiative and implementation policy. We also found that the September 19, 2005 cost analysis was repeatedly referred to by ITD staff as a "back of the envelope calculation." Furthermore, the cost analysis was not supported by a sufficiently comprehensive cost model. In addition, members of the ODF team were unable to provide answers to basic questions that would have been researched to support the cost analysis presented to the Committee. For example, no specific information was available for the following:

- Identification of the 50,000 users in the cost estimate and what applications they used,
- Whether or not those applications required interfacing with Microsoft office suite,
- What percent of the staff could not change office suite products based upon disability requirements,
- Which users did not need the whole office suite, but could get by with only one or two applications,
- Which applications users needed and which they did not,
- How much time and cost had been invested in templates or macros for Microsoft Office,
- Whether or not the templates or macros could be imported into the new ODF suite,
- Which features of the Microsoft suite were mission critical that the new ODF suite would not include,
- Which agency documents would be requested by the general public, and
- Which agency documents should be archived.

The inadequacy of the September 19, 2005 cost analysis was further evidenced by having ITD contract with a third party on February 3, 2006 to develop a cost model and analysis. Since ITD did not have an appropriate cost methodology, contract effort was focused on developing a cost model that ITD could use identify and generate valid cost estimates for various implementation strategies.

Since ITD had not solicited input from the business process owners at the agencies, they did not have sufficiently detailed information regarding the hardware and software installed and used at each agency. In addition, the team did not have an understanding of what the customers needed in the way of hardware and software nor how easy, or difficult, it would be for the agencies to convert from one office suite to another. This degree of difficulty, which had not been assessed or quantified, would be one factor in assessing business impact and in determining cost to the individual agencies and the Executive Branch as a whole.

The vendor selected to develop the cost model indicated to ITD that to research key factors at individual agencies, such as those listed above, would require at least three months. The urgency to complete a more detailed cost analysis seemed to drive ITD's requirement that the vendor complete the cost model and a cost estimate in six weeks.

ITD and the vendor selected to develop the cost model decided on a three phase analysis for developing a cost model. Phase one was completed on March 17, 2006 with a 152-page report released by ITD that contained more detail than the initial cost estimate of September 19, 2005.

#### September 19, 2005 Cost Analysis:

The September 19, 2005 cost analysis not only lacked sufficient detail, but it also included errors in calculation. The errors that were identified on the two-page cost analysis reflect a lack of detailed review. ITD's September 19, 2005 cost analysis shows training costs for MS and ODF to be the same, which is an unreasonable assumption, and on page two, "technicians and PC building costs" do not appear to be used. The analysis indicates that replacement cost would be \$34 million for MS Office and \$8 million for ODF. Acknowledged by ITD staff as a "back of envelope" cost analysis, none of the ITD staff had any backup documentation to support the September 19, 2005 cost analysis which included the estimated savings of \$26 million.

A review of the September 19, 2005 cost analysis revealed the following:

- On page one of the cost analysis the desktop replacement cost is stated at \$2,500. Since the multiplication formula uses \$250, there is either a typo on page one and the \$2,500 should be \$250 or there is a multiplication error and the total of \$2,500,000 should be \$25,000,000.
- There is a difference in the desktop replacement cost between page one and page two. Page one refers to \$250 for the desktop replacement cost while page two lists a \$500 desktop replacement cost. There is no explanation for the difference.
- The cost analysis data suggests that there are 10,000 desktops that are so old that their operating systems cannot support Office 12 and need to be replaced. Given the assumption that the 10,000 desktops are that old then they will need to be replaced regardless of the office application suite used and the associated replacement costs should

be equally applied to the Open Office costs as well as the Office 12 costs. The associated costs are as follow:

\$2,500,000	For Operating System Replacement
\$5,000,000	For Desktop Replacement
<u>\$1,000,000</u>	For Training for Operating System
\$8,500,000	

- This reasoning would reduce the cost variance as presented by \$8,500,000 resulting in a net difference in cost between the two systems of \$17,500,000 instead of the \$26,000,000 stated in the analysis.
- It was further noted that the cost comparison was only performed between the Open Office suite application versus the MS Office 12 application. However, the ITD RFQ 6-06, soliciting quotes for a qualified vendor to perform a cost analysis to deploy an enterprise-wide office application suite that supports the open document standard, states in part “. . . In addition to the applications listed [Open Office, Star Office, IBM’s Workplace, and K. Office] . . . bidders are encouraged to provide an analysis on any other office suite application that supports the open document standard...” Such an analysis was not included in the analysis submitted by CIO Peter Quinn to Senator Marc Pacheco.
- Page two shows detail of hourly rates of technicians’ salaries, which are not used in the transition cost matrix of the September 10, 2005 cost analysis.

#### Collection of Data for Estimating Costs:

ITD contracted with Electronic Data Systems (EDS), a third-party vendor, in February 2006 to develop a cost model to assist decision making regarding the ODF implementation with open source Office Suite products. One of the key deliverables of the EDS contract was to provide a final cost estimate. This was not fully realized because of the change in strategy to use plug-in translators, since the recommended open source office suite products had failed the accessible tests, and because the model had not been calibrated, final figures were never generated.

With the assistance of EDS, ITD has gathered information regarding agency IT environments from twelve state agencies within the Executive Branch. The information obtained was to identify the applications that were currently in place and to attempt to determine the ease or difficulty of connecting currently-installed applications with an ODF-compliant office application. Phase I and II of the contract with EDS has been completed at a total cost of \$555,000. It was decided not to continue with phase III, which was the full assessment of Executive Branch agencies, since the ODF implementation strategy had changed to installing plug-ins.

The cost model developed by EDS was more comprehensive addressing a number of key elements. Each of the following elements was further broken down into various attributes. The twelve key elements of the EDS cost model were software, training, help desk, testing, application upgrades, software distribution,

training opportunity cost, productivity opportunity cost, heterogeneous environment opportunity cost, procurement cost, legal cost and contingency opportunity cost. Each of the cost elements was calculated as to the following four software variations:

- Variant #1 – Remain/Upgrade to Office XP/2003
- Variant #2 – Remain/Upgrade to Office XP/2003 but using a Plug-In
- Variant #3 – Migrating to Office 12
- Variant #4 – Migrating to Office 12 with a Plug-In

In a subsequent cost analysis prepared by ITD in July 2006, ITD outlined the cost of alternative strategies. The cost analysis, which was distributed among the ODF team and submitted to Secretary Thomas Trimarco in August 2006, contained errors, including a \$12.7 million error and a \$12 million error in the aggregate costs for the high-end total of the alternative strategies. The spreadsheet did not provide an explanation as to why help desk cost would be double the amount listed for remaining on XP, or XP with plug-in for each of the fiscal years. There was also no explanation as to why heterogeneous environment cost and legal cost were both a factor of ten between the low-end costs and the high-end costs. We also note some inconsistency in how formulas were applied in the spreadsheet cells for the methods used in calculating totals. In discussions with the staff member who developed the spreadsheet, it was clear that the spreadsheet formulas had not been subject to independent verification.

ITD provided no explanation to Senator Pacheco regarding the difficulty or status of developing cost estimates for any other area of the open source initiative. There was no explanation of the key factors that one would need to consider when making investment decisions around efforts to shift to an open source IT environment. Because of the shift in the implementation strategy to plug-ins, no further effort has been made to track costs or revise cost estimates.

**CRITERIA****Government Structure****[MGL Chapter 7: Section 3](#)**

“The executive office for administration and finance shall serve as the principal agency of the executive department of the government of the commonwealth for the following purposes: (1) Developing, coordinating, administering and controlling the financial policies and programs of the commonwealth; (2) Supervising the organization and conduct of the business affairs of the departments, commissions, offices, boards, divisions, institutions and other agencies within the executive department of the government of the commonwealth.” Within A&F per Mass. Gen. Law Ch. 7 section 4A(d) is enabled the Information Technology Division whose duties include, “setting information technology standards, reviewing and approving secretariat and department information technology strategic plans, reviewing and approving the planning, design, acquisition and operation of information technology systems, assessing the performance of information technology systems and operations, managing central information technology systems, and managing the commonwealth’s mailing operations.”

**Information Technology Division Enabling Legislation****[MGL Chapter 7: Section 4A](#)**

(d) The information technology division shall be headed by the chief information officer who shall also serve as assistant secretary for information technology. He shall be appointed by the secretary. The chief information officer shall carry out such functions as the commissioner may from time to time deem necessary for the efficient and economical administration of information technology systems within the executive departments including, but not limited to, setting information technology standards, reviewing and approving secretariat and department information technology strategic plans, reviewing and approving the planning, design, acquisition and operation of information technology systems, assessing the performance of information technology systems and operations, managing central information technology systems, and managing the commonwealth’s mailing operations. He may establish such bureaus, offices and other functional units within the division as he may deem appropriate.

**Information Technology Division****[Enterprise IT Acquisition Policy](#)**

The Commonwealth has a responsibility to ensure that information technology solutions are selected based on best value after careful consideration of all possible alternatives including proprietary, public sector code sharing<sup>1</sup> and open source solutions. The purpose of this policy is to ensure that those solutions that may not be otherwise represented by IT vendors during the procurement process are identified and evaluated by agencies as part of their best value selection of IT solutions.

**Public Records Access Regulations****[950 CMR 32.00](#)**

“Public records” shall mean all books, papers, maps, photographs, recorded tapes, financial statements, statistical tabulations, or other documentary materials or data, regardless of physical form or characteristics, made or received by any officer or employee of any agency, executive office, department, board, commission, bureau, division or authority of the commonwealth, or of any political subdivision thereof, or of any authority established by the general court to serve a public purpose,

**Open meetings of governmental bodies****[MGL Chapter 30A, Sections 11A-1/2](#)**

All meetings of a governmental body shall be open to the public and any person shall be permitted to attend any meeting except as otherwise provided by this section.

No quorum of a governmental body shall meet in private for the purpose of deciding on or deliberating toward a decision on any matter except as provided by this section.

No executive session shall be held until the governmental body has first convened in an open session for which notice has been given, a majority of the members of the governmental body have voted to go into executive session and the vote of each member is recorded on a roll call vote and entered into the minutes, the presiding officer has cited the purpose for an executive session, and the presiding officer has stated before the executive session if the governmental body will reconvene after the executive session.

Nothing except the limitations contained in this section shall be construed to prevent the governmental body from holding an executive session after an open meeting has been convened and after a recorded vote has been taken to hold an executive session. Executive sessions may be held only for the following purposes:

(1) To discuss the reputation, character, physical condition or mental health rather than the professional competence of an individual, provided that the individual to be discussed in such executive session has been notified in writing by the governmental body, at least forty-eight hours prior to the proposed executive session. Notification may be waived upon agreement of the parties. . . .

**Attorney General's Office****[Open Meeting Law Guidelines](#)**

The overriding intent of the Open Meeting Law is therefore to foster and indeed require open discussion of governmental action at public meetings. . . . Other critical procedural requirements are that records be maintained of all meetings (including executive sessions) and be made available to the public, and that notice of all meetings be publicly posted.

**Secretary of the Commonwealth Enabling Legislation****[MGL Chapter 9: Section 1](#)**

Section 1. There shall be a department of the state secretary under his supervision and control, organized as provided in this chapter. . . .

**Archivist of the Commonwealth****[MGL Chapter 9: Section 2](#)**

Section 2. He may appoint a first deputy, a second deputy, and a third deputy and a fourth deputy each of whom shall perform the duties of a division head, a director of the corporation division who shall be an attorney at law, a cashier for whose conduct he shall be responsible and from whom he may require a bond, and a chief of the archives division who shall be a qualified archivist and shall be known as the archivist of the commonwealth. The secretary shall operate and supervise the archives museum and he shall utilize those records of historic value which are in the custody of the archivist for exhibition and education purposes. The archivist of the commonwealth shall, under the direction of the secretary, have charge of the non-current records of the commonwealth, particularly with regard to their custody, preservation, management and, when authorized, their destruction, and shall supervise the operation of the archives museum. The secretary shall provide for guided tours of the state house and for such purpose may employ such personnel as he may deem necessary. He may, under the direction of the secretary, prepare material for publication. The secretary may also appoint clerks, messengers and other assistants

necessary for the prompt dispatch of public business. He may also employ such clerical assistance as he may deem necessary to carry out the laws relative to primaries and elections. The secretary shall establish the salaries, duties and personnel regulations of all officers and employees within the department of the state secretary; provided, however, that the salaries of said officers and employees shall not exceed the sum annually appropriated therefore by the general court. The provisions of sections nine A and forty-five of chapter thirty, chapter thirty-one and chapter one hundred and fifty E shall not apply to officers and employees within the department of the state secretary.

**Secretary of the Commonwealth Preparing and Filing Regulations** [950 CMR 20.00:](#)

950 CMR 20.00 establishes standards for preparing, filing and publishing state agency regulations and is applicable to all regulations filed pursuant to [M.G.L. c. 30A, §§ 1 through 6a.](#) Any change in text would be considered a change in regulations so as to require compliance with [M.G.L. c. 30A.](#) It establishes the organization and numbering system used in the Code of Massachusetts Regulations and the requirements that must be met by every agency filing regulations with the Secretary. The purpose of 950 CMR 20.00 is the promotion of uniformity, clarity and coherence in form; timeliness and economy in printing and distribution, and public accessibility at reasonable cost.

**Information Technology Advisory Board** [Acts of 2004, Ch. 149, Section 390](#)

The board shall annually, by July first of every year, draft, recommend and present for signature to the governor, the speaker of the house of representatives, the president of the senate, the chief justice of the supreme judicial court and the constitutional officers, a memorandum of understanding among and acceptable to the executive department, legislature, judiciary and constitutional offices that shall include information technology standards and a strategic plan for the signatories' acquisition and use of information technology. In addition, the advisory board shall advise the executive department's chief information officer on information technology issues, including the development of an enterprise vision, strategy and direction for the use of information technology in the executive department, the development of policy, strategic planning, and project selection criteria, and information technology architecture, infrastructure, information technology investments and security. The advisory shall also file annually, on July first of every year, a report with the governor, the speaker of the house, the president of the senate, the constitutional officers, and the chief justice of the Supreme Court, including its analysis and recommendations during the previous year.

**Information Technology Commission** [Acts of 2002, Ch. 142, Section 6](#)

Notwithstanding any general or special law to the contrary, there shall be a special commission to recommend an enterprise-wide strategy, including all 3 branches of government and the constitutional offices, for the commonwealth's information technology infrastructure, system development and governance. The report shall identify all of the commonwealth's management information systems, their general condition and the populations served and shall review the list of mission critical systems as defined by the state information technology division. The report shall examine all of the commonwealth's networks and data centers to determine if they satisfy the goal of operating in the most secure, redundant and cost-effective manner. Said commission shall identify methods that facilitate the availability of broadband and wireless network services. The commission shall recommend any changes necessary to meet the goals established by it, including recommendations to ensure that agencies work effectively with

one another, that similar systems and processes are developed and shared across agencies and that new systems meet the needs of citizens, business and other governmental agencies.

The commission shall be co-chaired by the secretary of administration and finance or his designee and the chairmen of the house and senate committees on science and technology. The information technology division shall provide the necessary staff to the commission.

The governor, the speaker of the house of representatives and the president of the senate shall each appoint 5 members to the commission, 2 of whom shall not be employed by the commonwealth. One appointee of the speaker and 1 appointee of the president shall be from the minority party. Other members of the commission shall include the commonwealth's chief information officer, the comptroller, the director of economic development, the director of the Massachusetts Technology Collaborative, the president of the University of Massachusetts or his designee, the state auditor or his designee and the chief justice of the supreme judicial court or her designee. The commission shall file a report with the house and senate clerks by December 15, 2002.

**Brief of The Information Technology Division Regarding Adoption of Open Document Format**  
[Page 15](#), “Beginning in late August of 2005, and based on comments and responses received by it in response to its posting of the draft version of ETRM 3.0, ITD learned for the first time from the comments filed with it . . . of the accessibility problems associated with applications that support ODF 1.0.”

**Brief Of The Information Technology Division Regarding Adoption Of Open Document Format**  
[Page 20](#), Prior to both the September meeting of the Advisory Board, or the commencement of the public comments period for ETRM that commenced on August 29, 2005, ITD notified the IT staff of each Board member so that they would have additional time to provide commentary.

### **Massachusetts Public Library Trustees Handbook**    [Policy Development](#)

Policy development and changes are major decisions affecting established practice and policies. Trustees should allow adequate time for policy consideration and avoid incomplete assessment of possible options. If undocumented recommendations are rubber stamped by the board without due consideration, the trustees will waste time reconsidering prior decisions, acting in crisis situations and rebuilding lost confidence of the staff and community.

While trustees have the legal responsibility and authority to make policy, experience shows that the decision process works best when the library director and other staff are involved in researching options, preparing draft policies and presenting them for board consideration. In medium and large libraries, the staff usually assumes responsibility for submitting policy analysis to the appropriate board committee. In small libraries, trustees may often prepare the analysis of policy options

### **ISACA's [CobiT](#) PO 10, AI7**

COBIT is an IT governance framework and supporting toolset that allows managers to bridge the gap between control requirements, technical issues and business risks. COBIT enables clear policy development and good practice for IT control throughout organizations. ITGI's latest version— COBIT® 4.0—emphasizes regulatory compliance, helps organizations to increase the value attained from IT, enables alignment and simplifies implementation of the COBIT framework.

**Uniform Electronic Transactions Act, [MGL Chapter 110G Section 17](#)**

(a) The supervisor of records under section 1 of chapter 66 and clause Twenty-sixth of section 7 of chapter 4, the records conservation board under section 42 of chapter 30, and the information technology division under section 7 of chapter 4A, shall determine whether, the extent to which and the manner by which each executive department agency shall create, maintain and preserve electronic records, signatures and contracts and the method of converting paper government records to electronic format. Nothing in this chapter shall affect the existing authority of the supervisor of records, the records conservation board or the information technology division under the cited sections.

### Chronology of Events Associated with ITD Adoption of ODF Standard

September 25, 2003	Eric Kris issues new Open Policy memo
November 17, 2003	MS publishes Office 2003 XML reference schema copyright license
December 3, 2003	MS Office 2003 XML reference schema patent license issued
December 17, 2003	Senate Post Audit and Oversight hearing based upon language in Eric Kriss' Capital Budget plans
January 13, 2004	ITD publishes and adopts Enterprise Open Standards Policy
January 13, 2004	ITD publishes and adopts IT Acquisition Policy
January 13, 2004	ETRM Version 1.0 published online (short list of standards)
April 21 to May 5, 2004	Draft ETRM Version 2.0 posted online for public comment
May 18, 2004	ETRM Version 2.0 published online (with document formats section listing XML)
January 15, 2005	Secretary Kriss discusses Open Formats at Mass. Software Council says "We will increasingly rely on the promulgation of Open Standards for file formats by national and international standards bodies. The Oasis OpenOffice XML format technical community would be one example of that." Appendix 3
January 27, 2005	MS issues revised version of Office 2003 XML reference schema patent license and clarification letter following negotiations with Commonwealth
March 22 to April 1, 2005	Draft ETRM Version 3.0 posted online for public comment (with ODF and MS XML as standards). Substantial negative comments received from public regarding inclusion of MS XML as an "open" format.
May 11, 2005	ITD General Counsel presentation to the IT Advisory Board re: MS negotiation and fact that ITD is dissatisfied and still considering what to do with the issue of formats.
May 23, 2005	ODF Standard 1.0 issued by OASIS
May 27, 2005	Email from ITD to CIOs informing them that the review cycle for the new version of the ETRM version 3.0 is complete and published
May 27, 2005	ETRM Version 3.0 published online (without ODF as standard)
June 9, 2005	Open Format Summit
July 1, 2005	ITD creates position of Director Open Source Development
July 28, 2005	Meeting with Microsoft to advise them that MS XML Reference Schema would be deleted from list of acceptable formats.
August 24, 2005	Email from ITD to CIOs requesting review and comments for ETRM Version 3.5
August 29 to September 9, 2005	Draft ETRM Version 3.5 posted online for public comment (with ODF as standard for office documents)

September 14, 2005	ODF discussed at IT Advisory Board Meeting
September 16, 2005	Discussion of ODF at Mass. Technology Leadership Council
September 20, 2005	Peter Quinn delivers 2 page cost estimate to Senator Pacheco
September 21, 2005	ETRM Version 3.5 published online (with ODF as standard)
October 31, 2005	Senator Pacheco hearing on ODF and Quinn cost estimate
November 2005	Director of Open Source Development starts testing of Open Office at ITD
December 14, 2005	On December 14, 2005 an open forum regarding the ODF initiative was held in the Senate Reading Room of the State House, a discussion entitled "Open Forum on the Future on Electronic Data Formats for the Commonwealth" was hosted by Senator Jack Hart and Representative Dan Bosley of the Joint Committee on Economic Development and Emerging Technologies and by Senator Jack Hart, Representative Cory Atkins, and Secretary Ranch Kimball of the Science and Technology Caucus.
January 12, 2006	Director of Open Source Development begins to develop a draft ODF implementation plan.
May 8, 2006	The International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) approved the OpenDocument Format (ODF) for release as ISO/IEC 26300.
June 2006	Estimated end of testing ODF-compliant open source office suite products
August 17, 2006	Memorandum of Understanding with Mass. Office on Disability and Health and Human Services
December 6, 2006	ITD establishes Assistive Technology Lab
June 2007	Estimated completion for plug-in for text documents for Executive Branch agencies

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MEMORANDUM

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TO: PETER QUINN, CIO (ITD)  
FROM: ERIC KRISS, SECRETARY (A&F)  
SUBJECT: INFORMATION TECHNOLOGY POLICY  
DATE: 9/25/2003

Our choices concerning information technology will increasingly impact the cost and delivery of government services. We can no longer afford a disjointed and proprietary approach that locks in legacy systems, generates excessive use of outside consultants, and creates long, often misguided, project plans.

NEW "OPEN" POLICY

Effective immediately, we will adopt, under the guidance of the Commonwealth's Chief Information Officer Peter Quinn, a comprehensive Open Standards, Open Source policy for all future IT investments and operating expenditures. This policy will be reflected in both the FY04 capital and FYOS capital and operating budgets, and beyond.

WHAT DOES THIS MEAN (IN PLAIN ENGLISH)?

Open Standards. Open Standards means that IT applications must be able to communicate and share data with each other through widely available protocols without license fees or use restrictions. An example of an everyday "open standard" is electricity: any plug-in electrical device can use any wall socket (at least in the U.S.). As with certain electrical products, "adapters" may be required for existing IT systems. Adapters should, whenever possible, utilize open standards or open source.

Open Source. Open Source refers to software that can be redistributed free without use restrictions, including all source code. In other words, the software is not proprietary. An example of open source software is the Linux computer operating system.

IMPLEMENTATION

Implementing a full Open Standards, Open Source policy will take time, energy, and money. We have a large installed base of systems, many using obsolete technology, which cannot be quickly converted or replaced. We will follow two possible development paths: 1) *new* applications must follow Open Standards, Open Source, while 2) *existing* applications will be evaluated for "encapsulation" or migration to Open Standards, Open Source.

One impact of this policy is that many FY04IT capital projects, some with preliminary vendor discussions (RFI, RFR RFP) and/or prior project work, will be reviewed for Open Standards, Open Source compliance. While this may delay projects initially, the improved speed of Open Standards, Open Source will likely shorten overall IT implementations.

## Administration and Finance

April 12, 2006

[Mass.Gov Home](#)[State Agencies](#)[State Online Services](#)

[Home](#) [http://www.mass.gov/eoaf/open\\_formats\\_comments.html](http://www.mass.gov/eoaf/open_formats_comments.html)

### Informal comments on Open Formats

**Eric Kriss, Secretary, Administration & Finance  
Commonwealth of Massachusetts**

January 15, 2005

Massachusetts Software Council annual meeting

(Edited and condensed from a transcription of the original oral comments)

It was exactly a year ago - January 13, 2004 - that the Commonwealth of Massachusetts launched a new Open Standards policy regarding the planning, development, and implementation of IT systems. These initial 2004 Open Standards began a continuous evolutionary process to better define and understand the issues, not only for those of us in state government, but for the wider vendor community and citizens as well.

We are now ready to extend the concept of Open Standards to the next stage in an informal announcement today. As always, we look forward to your feedback; one of the best assets that we have is the collective brainpower of the software industry in Massachusetts.

We will extend the definition of Open Standards to include what we will be calling *Open Formats*. Open Standards, as you know, are specifications for systems developed by an open community and affirmed by a standards body. An example is XML, a method of exchanging data.

Open Formats are specifications for data file formats based on an underlying open standard, developed by an open community, and affirmed by a standards body; or *de facto* format standards controlled by other entities that are fully documented and available for public use under perpetual, royalty-free, and nondiscriminatory terms. An example is TXT text and PDF document files.

We plan to formally promulgate in February 2005 an additional list of approved Open Formats. The Open Format policy has been developed with the full cooperation and collaboration of, William Galvin, the Commonwealth's Secretary of State. The Secretary of State and I share responsibility for public records.

Why do we care about formats? Electronic file formats sit at the core of concern about future access to today's public records. Simply put, the question is whether, when we look back a hundred years from now, we will be able to read the records of what we did today.

It should be reasonably obvious for a lay person who reflects on the concept of public records that the government must keep them independent and free forever. It is an overriding imperative of the American democratic system that we cannot have our public documents locked up in some kind of proprietary format, perhaps unreadable in the future, or subject to a proprietary system license that restricts access.

Our public policy focus is to insure that public records remain independent of underlying systems and applications, insuring their accessibility over very long periods of time. In the IT business a long period of time is about 18 months. In government it's over 300 years, so we have a slightly different perspective.

Open Formats will insure minimal restrictions imposed on the use of applications needed to access those records and files. And finally, Open Formats will support the integrity of public records as we conduct file conversions in the normal course of technological evolution. So, if we have a record in a format of 2005, and it's must be converted in 2038 into something not yet invented, we need to be able to do that without losing the integrity in the underlying information.

Given the fragmented legal status of proprietary formats, the Commonwealth will only certify an Open Format designation when minimal legal restrictions exist on the reading and dissemination of public records.

We will increasingly rely on the promulgation of Open Standards for file formats by national and international standards bodies. The Oasis OpenOffice XML format technical community would be one example of that. As we look to the future, we will require full support of Open Formats, as well as already released Open Standards.

We published our initial Open Standards policy, as I indicated, one year ago. The latest version (although we're going to revise the language we use to describe formats) designates TXT, RTF, HTM, PDF and XML - to the extent XML is used to specify a format - as Open Formats.

We have been in a conversation with Microsoft for several months with regard to the patent that they have on, and the license surrounding their use of, XML to define the schema of DOC files in Microsoft Office 2003.

They have made representations to us recently they are planning to modify that license, and we believe, if they do so in the way that we understand that they have spoken about (we will leave it obviously to them to describe exactly what they are going to do), it is our expectation that the next iteration of the Open Format standard will include some Microsoft proprietary formats. These formats, like DOC files, will be deemed to be Open Formats because they will no longer have restrictions on their use.

That would potentially include (again, we need to wait for the final designation of this by Microsoft) Word Processing ML, which is the wrapper around DOC files, Spreadsheet ML, which is the wrapper around XLS files, and the form template schemas.

We plan to talk with other entities that may have restrictions around the use of other proprietary formats to get them removed as well.

We are going to insure, that at least in terms of public records, we will be able to reference documents a hundred years from now, so they won't perish forever.

MITT ROMNEY  
Governor

KERRY HEALEY  
Lieutenant Governor

ERIC KRISS  
Secretary

PETER J. QUINN  
Chief Information Officer

September 20, 2005

Senator Marc R. Pacheco  
State House, Room 312 B  
Boston, MA 02133

Dear Senator Pacheco:

Relating to your conversation with Secretary Kriss regarding the Open Format issue, I have attached two documents that delineate our costs estimates for the transition to the Open Office Suite, which supports the Open Formats, versus migrating to the new Microsoft offering.

Implicit in both documents is the requirement for training in deploying either suite. Open Office is free and downloaded off the web. The Microsoft expenditures assumes no price increase for the new product.

I have not included any maintenance costs for either suite because it has been the recommendation and standard practice to not purchase software maintenance for the suite products.

Please contact me at your earliest convenience should you have any questions regarding these documents.

Sincerely,



Peter J Quinn  
Chief Information Officer  
Commonwealth of Massachusetts

Attachments

**Open Formats Transition Cost Matrix  
September 19, 2005**

**Approximate number of desktops: 50,000**

**Training costs using HRD training:**

- **Word:**
  - Introduction \$80.00
  - Intermediate \$80.00
- **Excel:**
  - Introduction \$80.00
  - Intermediate \$80.00
  - Advanced \$80.00
- **Operating Systems:**
  - Introduction \$100.00 (estimated because it is not offered by HRD)

**Assumption:**

- All users would need, at a minimum, introduction to Word and Excel type products and, with a replacement Operating System, training for the new Operating System.

**Training costs:**

- **Open Office:** 50,000 (desktops) x \$160.00 (introduction 2 products) = \$8,000,000.00
- **Office 12:** 50,000 (desktops) x \$160.00 (introduction 2 products) = \$8,000,000.00

**Acquisition costs assumptions:**

- **Open Office:** \$0.00 x 50,000 (desktops) = \$.00
- **Office 12:** \$350.00 (Assumes price is the same as the we pay for Office 2003 today) x 50,000 (desktops) = \$17,500,000.00

**Desktop replacement required (because new operating system cannot be supported):**

- **Open Office:** Zero required because Open Office supports our existing environment
- **Office 12:** \$2500.00 (current cost of latest Windows OS) x 10,000 (desktops that cannot support the new environment) = \$2,500,000.00

**Training for new Operating System:**

- **Training costs:** 10,000 (Operating System replace copies) x \$100.00 = \$1,000,000.00

## Sheet 1

## Open Formats Transition Cost Matrix

Assumptions:	#	Costs	
Total # of Desktops	50000		
Product Training		\$160.00	
Operating Systems Training		\$100.00	
Office 12 Cost		\$350.00	
Open Office Cost		\$0.00	
Operating System Cost		\$250.00	
Desktop Replacement Cost		\$500.00	
Training:			
Open Office		\$8,000,000.00	
Office 12 Cost		\$8,000,000.00	
Acquisition Cost			
Open Office		\$0.00	
Office 12		\$17,500,000.00	
Desktop Replacement Cost			
Open Office		\$0.00	
Office 12 (10,000)		\$5,000,000.00	
Operating System Cost			
For Open Office		\$0.00	
For Office 12		\$2,500,000.00	
Training for Operating System			
For Open Office		\$0.00	
For Office 12		\$1,000,000.00	
Open Office Total Transition Costs			\$8,000,000.00
Office 12 Total Transition Costs			\$34,000,000.00
	Hours	Hourly Rate -	# of Desktops
Labor to build a new PC and	1.5	\$30.00	10000
Replace an existing PC ranges	3	\$30.00	10000
From 1.5 to 3 hours depending on			
The complexity of the desktop			
		Estimated Labor Costs	
Average technician's salary	1.5		\$450,000.00
\$45,000.00 + 30% Fringe \$13,500	3		\$900,000.00
Equates to \$58,500.00 which			
Works out to \$30.00 an hour			

August 23, 2006

Dear Recipient:

On January 13, 2006, Thomas Trimarco, Secretary of the Executive Office for Administration and Finance, wrote to you in response to concerns raised by the community of people with disabilities regarding the Information Technology Division (ITD)'s intention to move the Commonwealth's Executive Department to an Open Document Format (ODF) standard. Secretary Trimarco promised that, if by mid-2006 no accessible application supported ODF, ITD would adjust the January 1, 2007 implementation date for adoption of that standard. On Secretary Trimarco's behalf, I am writing this letter to follow up on his commitment.

I am pleased to report that technology that was unavailable at the time that Secretary Trimarco wrote to you is under development, and upon public release and validation will enable ITD to meet the goal of implementing ODF while maintaining current levels of accessibility.

Earlier this year, alternative ODF-supporting office suites were being considered by ITD. The accessibility of these applications, and their ability to work with assistive technology, has improved steadily. Over time these suites will improve the options available to people with disabilities. However, it is our judgment that they are unlikely to be fully supported by assistive technology vendors, or alternatively to include fully functional adaptations in the packaged product, by January 1, 2007, the original target date for ODF implementation.

But promising new projects are underway this year to create translator software that will enable the Microsoft Office suite to translate documents from Microsoft formats to ODF and vice versa. Upon public release and validation, these tools will enable Executive Department agencies to begin implementing ODF while leveraging the installed base of Microsoft Office and available assistive technologies. We anticipate one or more of these projects to allow ODF adoption to commence before January 1, 2007.

Specifically, we plan to implement ODF, using translator technology plugged in to Microsoft Office, in a group of early adopter agencies, including the Massachusetts Office on Disability, by January 1, 2007. Thereafter, we plan to migrate all Executive Department agencies to compliance with the standard, in phases, by June of 2007. These target dates are not set in stone; they are dependent on a number of factors, including the adoption by the OASIS standard setting organization of ODF Version 1.1 (which will address minor accessibility issues related to the format itself), the timely delivery of completed translators by one or more of the multiple vendors that are currently developing this technology, and the validated accessibility of the translators themselves. In order to meet our implementation timetable, the Commonwealth requires delivery of a translator suitable for use by early adopters by November of this year. At each stage of this implementation, accessibility will be our first priority.

When the alternative, ODF-supporting office suites become more accessible in the future, they too will provide a means by which the Executive Department can meet its long-term goal of implementing open document standards.

ITD intends to revise the Enterprise Technical Reference Model (ETRM) Version 3.5 so that its language is consistent with the implementation process described in this letter. We further plan to review the ETRM every six months thereafter to take into account changes in information technology, evolving standards, and new accessibility concerns, any one of which may warrant changes to the ETRM.

This approach to ODF implementation will fulfill our legal and moral obligations to the community of people with disabilities, acknowledges the practical requirements of implementation, and enables the Executive Department to continue to pursue the benefits of using open standards for information technology. The successful adoption of ODF next year will not be the end of the story, but an early step in our multi-year journey towards a service-oriented architecture.

I want to assure you that ITD has heard your concerns, and that the Administration is committed to addressing them. The law and simple justice require that people with disabilities have equal access to public sector information technology. By putting accessibility first among the priorities for ODF implementation, we are signaling a deeper commitment to accessibility for all future information technology projects undertaken by ITD and Executive Department agencies.

Integral to this direction are two other key initiatives. I am pleased to report the initiation of a new accessibility group within ITD headed by Joe Lazzaro and the execution of a Memorandum of Understanding (MOU) by ITD, the Massachusetts Office on Disability, and the Executive Office of Health and Human Services. The MOU memorializes our understanding that the goals of the Commonwealth's efforts in this area should be the accessibility and usability of technology and the transition to new or upgraded systems that are as seamless for people with disabilities as they are for people without disabilities. I encourage you to read the entire MOU posted on ITD's web site at [www.mass.gov/itd](http://www.mass.gov/itd) (click on the Accessibility Memorandum of Understanding link under "News").

Should you have any questions about these matters, please contact me at [Louis.Gutierrez@state.ma.us](mailto:Louis.Gutierrez@state.ma.us).

Sincerely,  
Louis Gutierrez  
Chief Information Officer  
Information Technology Division

Beveridge, John W.

To: Quinn, Peter J. (ITD)  
Subject: RE: Open Document Standards

Dear Peter:

I have read through the Enterprise Technical Reference Model, Version 3.5, regarding the open document standard and proposed implementation and want to provide some initial feedback. The objective of being able to create, store, and archive documents for which long-term access and integrity is guaranteed is of significant merit. Clearly, access to data that has been stored for a lengthy period of time, within which major technology changes have occurred, will be a factor of document formats and the IT hardware resources used. My questions, however, are probably a bit more basic.

I agree with the premise that there is an opportunity for ROI on IT assets to be improved by being able to reuse information and services based on open standards. I would like to see the analysis taking into account the impact on existing (and ongoing) IT investments, where our array of infrastructure stands in regard to its life cycles, and the probable impact on total cost ownership. To what extent has your crew analyzed the logistics involved in the shift to open source and open documents and the overall cost? Before setting a target date for change, do we have a sufficient understanding of the current IT environment across the Commonwealth and the impact of the change to be addressed through the migration strategies? Certainly in theory, where appropriate there is tremendous value to enterprise-based management of systems and data/information.

Careful attention is needed to not only implement the "right" technology and standards, but to consider the change required in the culture of information use and management needed for an enterprise framework. The internal environment and the vendor/third-party provider communities need to be assessed as to their capacity to do this. Careful consideration is needed for the product suite selected (e.g. OpenOffice) and how we set the stage for meeting future information systems and supporting software and technology. While there are convincing arguments for the use of open source tools for application system development and similar IT functions, I have always been concerned about how one would ensure sufficient, cost-effective maintenance of open source programs that meet adequate integrity, security and availability objectives.

The "current state" presentation on page 2 that highlights the absence of a standard information classification system is a valid point. For the Commonwealth, as a single enterprise of three branches with constitutional offices and quasi-independent authorities, the development of an enterprise-based information model that addresses syntax, format, ownership and respective security categories is a daunting objective. Going forward, adoption of XML data standards and use of data/information models, should prove of value. The effort, considering the current IT environment, would be substantial. Have you considered starting this on a pilot basis, possibly something where the value could be tested? The guidelines listed on pages 6-7 seem to follow a well-managed process.

Under data management, I would suggest that data/information qualities need to include security and validity. The document could also expand the bulleted data management problems to include loss of data integrity (completeness, verifiability, accuracy, neutrality and validity) and data availability. Regarding the targeted shift to open documents, have any case studies been developed that provide a detailed analysis of the required migration steps necessary to move organizations using multiple document formats to an open document environment? On the legal side, are there any contract agreements in place that would be adversely impacted (cost, capability to meet intended deliverables, data sharing/transfer, etc.)? In that same area, are there any barriers from an upstream or downstream data or document transfer perspective? We certainly need to take into account newly-developed systems and initiatives that would not meet the standard.

I hope that you receive some good input regarding the initiative to move toward open document formats., I suspect that a healthy, open-minded discussion with good supporting analysis is needed.

Thank you for the opportunity to comment.  
John Beveridge

**ELECTRONIC REFERENCES**

<b>Reference</b>	<b>Web Address</b>
Chapter 110, MGL Uniform Electronic Transactions	<a href="http://www.mass.gov/legis/laws/mgl/gl-110g-toc.htm">http://www.mass.gov/legis/laws/mgl/gl-110g-toc.htm</a>
Enterprise Technical Reference Model - Version 3.5	<a href="http://www.mass.gov/Aitd/docs/policies_standards/etrm3dot5/etrmv3dot5intro.pdf">http://www.mass.gov/Aitd/docs/policies_standards/etrm3dot5/etrmv3dot5intro.pdf</a>
Ecma International (ECMA stands for European Computer Manufacturers Association)	<a href="http://www.ecma-international.org/">http://www.ecma-international.org/</a>
OASIS (Organization for the Advancement of Structured Information Standards)	<a href="http://www.oasis-open.org/home/index.php">http://www.oasis-open.org/home/index.php</a>
ISO & IEC approve OpenDocument	<a href="http://www.iso.org/iso/en/commcentre/pressreleases/2006/Ref1004.html">www.iso.org/iso/en/commcentre/pressreleases/2006/Ref1004.html</a>
OpenDocument as OASIS Standard	<a href="http://www.oasis-open.org/news/oasis_news_05_23_05.php">http://www.oasis-open.org/news/oasis_news_05_23_05.php</a>
OpenDocument v1.0 specification	<a href="http://www.oasis-open.org/committees/download.php/12572/OpenDocument-v1.0-os.pdf">www.oasis-open.org/committees/download.php/12572/OpenDocument-v1.0-os.pdf</a>
Eric Kriss, Secretary, Administration & Finance The Capital Budget September 29, 2003	<a href="http://www.mass.gov/eoaf/CapitalBudget.html">http://www.mass.gov/eoaf/CapitalBudget.html</a>
Statewide Records Retention Schedule	<a href="http://www.sec.state.ma.us/arc/arcrmu/rmurds/0707.doc">http://www.sec.state.ma.us/arc/arcrmu/rmurds/0707.doc</a>
ODF Plug-In for Microsoft RFI	<a href="http://www.mass.gov/?pageID=itdsubtopic&amp;L=4&amp;L0=Home&amp;L1=Open+Initiatives&amp;L2=OpenDocument&amp;L3=ODF+Plug-In+for+Microsoft+RFI&amp;sid=Aitd">www.mass.gov/?pageID=itdsubtopic&amp;L=4&amp;L0=Home&amp;L1=Open+Initiatives&amp;L2=OpenDocument&amp;L3=ODF+Plug-In+for+Microsoft+RFI&amp;sid=Aitd</a>
Senator Pacheco October 31, 2005 ODF Hearing	<a href="http://www.groklaw.net/article.php?story=20051114103034350">www.groklaw.net/article.php?story=20051114103034350</a>
Peter Quinn's Testimony to Senate Post Audit & Oversight Committee October 31, 2005	<a href="http://www.mass.gov/?pageID=itdterminal&amp;L=3&amp;L0=Home&amp;L1=Open+Initiatives&amp;L2=OpenDocument&amp;sid=Aitd&amp;b=terminalcontent&amp;f=open_odf_cio_hpao_testimony&amp;csid=Aitd">www.mass.gov/?pageID=itdterminal&amp;L=3&amp;L0=Home&amp;L1=Open+Initiatives&amp;L2=OpenDocument&amp;sid=Aitd&amp;b=terminalcontent&amp;f=open_odf_cio_hpao_testimony&amp;csid=Aitd</a>
Senator Pacheco June 28, 2006 report on ODF	<a href="http://www.mass.gov/legis/bills/senate/st02/st02612.htm">http://www.mass.gov/legis/bills/senate/st02/st02612.htm</a>
Memorandum of Understanding	<a href="http://www.mass.gov/Aitd/docs/legal/mod_mou_final.pdf">www.mass.gov/Aitd/docs/legal/mod_mou_final.pdf</a>

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## GLOSSARY OF TERMS

The **OpenDocument** format (**ODF**), short for the **OASIS Open Document Format for Office Applications**, is an [open document file format](#) for saving and exchanging editable office documents such as text documents (including memos, reports, and books), [spreadsheets](#), charts, and presentations. This standard was developed by the [OASIS](#) industry consortium, based upon the [XML](#)-based file format originally created by [OpenOffice.org](#), and ODF was approved as an OASIS standard on [May 1, 2005](#).

The standard was publicly developed by a variety of organizations, is publicly accessible, and can be implemented by anyone without restriction. The OpenDocument format is intended to provide an open alternative to [proprietary](#) document formats including the popular but undocumented [DOC](#), [XLS](#), and [PPT](#) formats used by [Microsoft Office](#), as well as [Microsoft Office Open XML](#) format (this latter format has various licensing requirements that prevent some competitors from using it). Organizations and individuals that store their data in an open format such as OpenDocument avoid being [locked in](#) to a single software vendor, leaving them free to switch software if their current vendor goes out of business, raises its prices, changes its software, or changes its [licensing](#) terms to something less favorable.

OpenDocument is the only standard for editable office documents that has been vetted by an independent recognized standards body, has been implemented by multiple vendors, and can be implemented by any supplier (including proprietary software vendors as well as developers using open source software licenses such as the [GNU LGPL](#) or [GNU GPL](#)).

Source: <http://en.wikipedia.org/wiki/OpenDocument>

**Open source** describes practices in production and development that promote access to the end product's sources. Some consider it as a philosophy, and others consider it as a pragmatic methodology. Before *open source* became widely adopted, developers and producers used a variety of phrases to describe the concept; the term *open source* gained popularity with the rise of the [Internet](#) and its enabling of diverse production models, communication paths, and interactive communities.<sup>[1]</sup> Subsequently, [open-source software](#) became the most prominent face of open source.

The open source model can allow for the concurrent use of different agendas and approaches in production, in contrast with more centralized models of development such as those typically used in commercial software companies.<sup>[2]</sup>

Source: [http://en.wikipedia.org/wiki/Open\\_source](http://en.wikipedia.org/wiki/Open_source)

The **Extensible Markup Language** (**XML**) is a [W3C](#)-recommended general-purpose [markup language](#) for creating special-purpose markup languages, capable of describing many different kinds of [data](#). In other words: XML is a way of describing data and an XML file can contain the data too, as in [database](#). It is a simplified subset of [Standard Generalized Markup Language](#) ([SGML](#)). Its primary purpose is to facilitate the sharing of data across different systems, particularly systems connected via the [Internet](#). Languages based on XML (for example, [Geography Markup Language](#) ([GML](#)), [RDF/XML](#), [RSS](#), [MathML](#), [Physical Markup Language](#) ([PML](#)), [XHTML](#), [SVG](#), [MusicXML](#) and [cXML](#)) are defined in a formal way, allowing programs to modify and validate documents in these languages without prior knowledge of their form.

Source: <http://en.wikipedia.org/wiki/XML>

A **software license** is a type of proprietary or gratuitous [license](#) as well as a memorandum of [contract](#) between a producer and a user of [computer software](#) — sometimes called an **End User License Agreement** (EULA) — that specifies the perimeters of the permission granted by the owner to the user.

Source: [http://en.wikipedia.org/wiki/Software\\_license](http://en.wikipedia.org/wiki/Software_license)

A **business case** is a structured proposal for business change that is justified in terms of costs and benefits. It is a typical prerequisite for the initiation of a large [project](#) and is explicitly required by many [Project Management Methodologies](#). The Business Case addresses, at a high level, the business need that the project seeks to resolve. It includes the reasons for the project, the expected business benefits, the options considered (with reasons for rejecting or carrying forward each option), the expected costs of the project, a [gap analysis](#) and the expected risks. The business case should identify the risks and costs of not taking the recommended actions. <http://encyclopedia.thefreedictionary.com/Business+case>