

**A Survey of Current
Best Practices and Utilization of Standards
In the Public and Private Sectors**

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Table of Contents

TABLE OF CONTENTS.....	2
EXECUTIVE SUMMARY.....	3
1 SURVEY PURPOSE AND CONTEXT.....	3
2 HOW THE SURVEY WAS PERFORMED.....	4
3 KEY FINDINGS.....	4
CONSTRUCTION INTEGRITY.....	4
PRODUCT STABILITY AND INTEGRITY.....	4
4 EMERGING TRENDS IN STANDARDS AND BEST PRACTICES	4
APPENDIX A. FEDERAL AND STATE GOVERNMENT RESOURCES	4

Executive Summary

This document presents the results of an extensive survey of the current use of standards and best practices to assure that Information Resource (IR) projects are successfully completed on time, within budget and with the intended benefits. Federal government, state government, and private sector organizations were included in the scope of this survey. Key standards and critical success factors are identified, with excellent correlation of these to the internal QA guidelines and model procedures being developed for Texas agencies. We conclude with a discussion of trends in the standards and best practices, as well how state governments are using them. State governments are seen to be following the pattern set in private sector organizations not too long ago, and continuing today.

1 Survey Purpose and Context

Why This Survey Was Done	<i>What is the reason this survey was done? How should the results be used?</i>
The Legislative Mandate	The Texas Government Code, Chapter 2054, Subchapter G, Sections 2054.151-2054.157 (Information Resources Management Act, IRMA) requires that each state agency “develop and implement its own internal quality assurance (QA) procedures ¹ .” It has been determined that these should “make use of widely adopted, non-proprietary standards, guides, and templates wherever possible ² .” Accordingly, this survey has been performed to determine what is available in the public and private sectors that could be “useful and adaptable for Texas ³ .”
What This Document Does	This document provides an overview of the current best practices and standards assuring that IR projects are successfully completed on time, within budget and with the intended benefits. It summarizes the critical project success factors found in Federal and state agencies, as well as in private sector organizations. These factors set the objectives or desired results that assure a quality project result.
Relationship of this Document to the Internal Quality Assurance Model	The processes, procedures, checklists, guidelines, templates, tools and other descriptive materials found by the survey have been reviewed, evaluated and included as input to the core content of the internal QA guidelines and model procedures, published separately.

¹ Texas Government Code, Chapter 2054, Subchapter G, Section 2054.151(b)

² Department of Information Resources Invitation to Negotiate, August 10, 1999, Section 2

³ *ibid.*

Guidelines The appendix shows the results of the public sector search, listing the web site or other source of each artifact we reviewed. Private sector artifacts are not generally available outside the developing organization for competitive reasons. However, TeraQuest has drawn on its experience with many clients in the private sector to incorporate their best practices into the internal QA guidelines and model procedures.

2 How the Survey was Performed

Where the Information Came From

How was the information collected?

Looking at State and Federal Government Practices

Federal and state government resources were identified using the internet (Appendix A). The web sites of all fifty states were reviewed. The web site of the National Association of State Information Resources Executives (NASIRE) has links to some state sites. However, not all states have web sites listed with NASIRE. In other cases, following related links found additional Information Resources (IR) web sites that proved to be more informative. The nomenclature for naming the agency with IR responsibility varies among states. In some states, it is the Chief Information Officer's (CIO) site. In others, a technology office exists, while others have something analogous to DIR. Only those states having material that is useful to developing the DIR internal QA guidelines and model procedures are listed in Appendix A. In Section 3, we will discuss the wide disparity that exists among states with respect to software QA practices.

Federal Government sites were usually discovered by following links from state sites. Many Federal sites also have links to other related sites. In Appendix A, the wealth of available material can be seen by observing that some of the listings are described as "collections" of material, rather than lists of individual items, thereby keeping the appendix to a manageable size.

Examining the Private Sector

Private sector artifacts come from three sources:

1. Web sites of professional and non-profit organizations, such as the Project Management Institute and the Information Technology Resources Board
2. The library of materials collected by TeraQuest from its clients over years of doing business in the private sector. This material

was generally collected under non-disclosure agreements that preclude identification of the source.

3. Artifacts developed by TeraQuest that reside in the TeraQuest Process Asset Library. These have been developed using industry standards and best practices in support of training classes and client consulting engagements over several years.

What Is Available vs. What's Not Available

The amount of information available from the above mentioned sources is indeed impressive. However, a number of state web sites referenced intra-net sites that are not publicly accessible. This suggests that there is potentially much more information available than we were able to consider in this survey. Access to this information can probably best be arranged directly between peer groups within state agencies. States for which this could prove beneficial include

- Florida
- Georgia
- Maryland
- Missouri
- Washington

3 Key Findings

What State Governments and the Private Sector are Doing

How do successful organizations, both public and private, ensure that they build quality information systems that delight the users, on time and within budget?

What standards does the industry provide?

How are other states using these?

What is the private sector doing?

Commonly Used Standards and Benchmarks

In both government and private sectors, there are a small number of standards being used to guide the development of information resource projects:

- the Software Engineering Institute's, Capability Maturity Model[®]⁴ for Software
- the Project Management Institute's, Project Management Body of Knowledge (PMBOK)[™]⁵
- the Institute of Electrical and Electronics Engineers', Software

⁴ Capability Maturity Model is registered in the U.S. Patent and Trademark Office.

⁵ "PMBOK" is a trademark of the Project Management Institute, Inc. which is registered in the United States and other nations.

Engineering Standards

- the International Organization for Standardization (ISO), 9000 Quality Management and Quality Assurance Standards.

These are briefly described below, followed by a discussion of the current usage of these standards by other states and the private sector.

In 1995, a significant international standard was issued as ISO/IEC 12207, Standard for Information Technology – Software Life Cycle Processes. This standard is gradually being adopted and tailored to local use by various national groups. In the U.S., the standard was issued in three parts in 1996 and 1997, and is now incorporated in the 1999 IEEE Software Engineering Standards.

Software Engineering Institute, Capability Maturity Model for Software

The Capability Maturity Model for Software is one of several Capability Maturity Models (CMMs) developed at the Software Engineering Institute at Carnegie Mellon University since the mid-1980s. In addition to the model for software, there are also CMMs for managing people, for software acquisition, for personal software process, and for systems engineering (done in collaboration with several other industry groups). These models share some features, while content and intended audiences vary.

Each model provides a structured view of its area of focus, generally in a five-layer model of increasingly sophisticated practices for those working in the area. With the exception of the personal software process, each is intended to be used by an organization to improve its overall capability in an incremental way. Each layer of the model provides a basis for continuous improvement in the practices already established, as well as the basis for the next layer of practices.

Project Management Institute (PMI[®]), Project Management Body of Knowledge (PMBOK)

The Project Management Institute is a thirty-year-old international organization for project management professionals. It has been instrumental in codifying project management practices, known as the Project Management Body of Knowledge, or PMBOK. The PMBOK “is an inclusive term that describes the sum of knowledge within the profession of project management⁷.” International standards groups, such as ANSI and IEEE, are increasingly

⁶ PMI is a trade and service mark of the Project Management Institute, Inc. which is registered in the United States and other nations.

⁷ “A Guide to the Project Management Body of Knowledge”, Project Management Institute, Standards Committee, © 1996, page 3.

recognizing this common body of knowledge, comprising both traditional and innovative practices, as a standard for sound project management.

Additionally, The Project Management Institute certifies individuals as Project Management Professionals (PMP®⁸) through a rigorous program consisting of both experience evaluation and knowledge examination. To date, PMI has certified more than 15,000 individuals worldwide.

Institute of Electrical and Electronics Engineers (IEEE), Software Engineering Standards

The IEEE standards are widely used as models for generating a variety of project artifacts, such as requirements documents, design specifications, test documentation and project plans. Standards covering software acquisition and development processes, and project measurements are also included in the collection.

International Organization for Standardization (ISO), ISO 9000, Quality Management and Quality Assurance Standards

The ISO 9000 collection is a suite of standards and guidelines that help organizations implement effective quality systems for the type of work they do. Two items in the collection are most useful to organizations that design and build software:

- ISO 9001 – Quality Systems Model for Quality Assurance in Design, Development, Production, Installation and Servicing
- ISO 9000-3 – Guidelines for the Application of ISO 9001 to the Development, Supply, and Maintenance of Software

ISO 9001 covers the requirements for a quality system that supports the full product life cycle, from initial agreement on a deliverable, through design, development, and support of the product. ISO 9000-3 provides specific advice for how to interpret the standard for developing a quality system of an organization whose product is primarily software. This guideline has been very useful to software organizations, since the original focus of ISO 9000 was for managing manufacturing and process control types of activities, and interpreting the standards for software was sometimes difficult.

State Usage of Standards

Figure 1 shows the results of our investigation of current state use of the standards described above. It was developed by searching each state's web site for references to the four standards cited here. Because not all information is available on the web, there is some likelihood that usage may be more prevalent than shown in this table.

⁸ "PMP" and the PMP logo are certification marks of the Project Management Institute, which are registered in the United States and other nations.

Figure 1. – States (Other Than Texas) Using Standards and Industry Best Practices

Standard/Industry Best Practice	States Using ⁹
Software Engineering Institute, Software Capability Maturity Model	Kansas, Michigan, Minnesota, North Carolina, Ohio, Tennessee, Washington
Project Management Institute, “A Guide to the Project Management Body of Knowledge”, and/or Project Management Professional certification	California, Missouri, North Carolina, North Dakota, Oregon, Tennessee
The Institute of Electrical and Electronics Engineers, software standards	California, Michigan, North Carolina, Tennessee, Washington
International Organization for Standardization, ISO 9000-3:1997 “Quality Management and Quality Assurance Standards – Part 3: Guidelines for the Application of ISO 9001:1994 to the Development, Supply, Installation and Maintenance of Computer Software”	California, Washington

Information Resources Projects – Critical Success Factors To understand why the standards described earlier are so important to Information Resources (IR) project success, it is necessary to relate their use to commonly observed critical success factors for IR projects. Below are representative studies of best practices and critical success factors in IR projects.

Center for Technology in Government (CTG) In its report “Tying a Sensible Knot: A Practical Guide to State-Local Information Systems”, CTG identifies nineteen best practices that “should go into the design, development, and operation of any state-local information system¹⁰.” They are¹¹

1. “Define purpose and scope (of the project)
2. Choose a well-skilled and respected project leader
3. Recruit the right project team

⁹ **States Using** means the state has

- publicly identified the best practice or standard as the basis for one or more state practices, or
- artifacts describing practices that contain wording from which compliance with the best practice or standard can be strongly inferred.

¹⁰ “Tying a Sensible Knot: A Practical Guide to State-Local Information Systems”, Center for Technology in Government, University at Albany, SUNY, June 1997 (available at www.ctg.albany.edu).

¹¹ Parenthetical comments added by authors.

4. Sell the project to decision makers (based on project benefits)
5. Communicate often and clearly with stakeholders
6. Finance creatively (multiple funding sources)
7. Adopt tools and techniques that can manage complexity (sound management practices)
8. Look for existing models (in both public and private sectors)
9. Understand and improve (business) processes before you apply technology
10. Match the technology to the job
11. Use industry standard technology
12. Adopt and abide by data standards
13. Integrate with related processes and practices
14. Use prototypes to ensure understanding and agreement about design
15. Choose a capable pilot site
16. Make the best use of vendors
17. Train (users) thoroughly
18. Support users
19. Review and evaluate performance (compare system's actual operational performance to expected benefits.)"

These practices map very closely into the areas covered by the Texas Internal Quality Assurance (QA) Guidelines for

- Creating a Project Plan,
- Monitoring and Controlling a Project,
- Developing a Project's Expected Benefits and Budget,
- Analyzing and Managing Project Risk,
- Establishing Project Effectiveness/Efficiency Measurements, and
- Evaluating Project Results

Successful deployment and use of these internal QA guidelines should significantly increase the success rate of IR projects, based on the CTG findings.

Ten Factor Model of Critical Success Factors

Pinto and Millet, in their book "Successful Information Systems Implementation", offer an empirically-based model of ten critical success factors for IR projects¹²:

1. "Project Mission – Initial clearly defined goals and general directions;

¹² "Successful Information System Implementation: The Human Side", Jeffrey K. Pinto and Ido Millet, Project Management Institute, © 1999.

2. Top Management Support – Willingness of top management to provide the necessary resources and authority/power for implementation success;
3. Schedule/Plans – Detailed specification of the individual action steps for system implementation;
4. Client Consultation – Communication, consultation and active listening to all parties impacted by the proposed information system;
5. Personnel – Recruitment, selection and training of the necessary personnel for the implementation project team;
6. Technical Tasks – Availability of the required technology and expertise to accomplish the specific technical action steps to bring the information system online;
7. Client Acceptance – Act of *selling*¹³ the final product to its ultimate intended users;
8. Monitoring and Feedback – Timely provision of comprehensive control information at each stage in the implementation process;
9. Communication – Provision of an appropriate network and necessary data to all key actors in the information system implementation process;
10. Troubleshooting – Ability to handle unexpected crises and deviations from plan.”

Note the close correlation of the ten factors above with the CTG findings. Once again, implementation and use of the internal QA guidelines should significantly enhance the successful completion of agency IR projects.

Software Program Managers Network (SPMN)
“16 Critical Software Practices™ for Performance-Based Management”

One of the best sources for lessons learned and best practices is the SPMN web site (Appendix A). The paper named at left “outlines the 16 Critical Software Practices™ that serve as the basis for implementing effective performance-based management of software-intensive projects. They are intended to be used by programs desiring to implement effective high-leverage practices to improve their bottom line measures – time to fielding, quality, cost, predictability, and customer satisfaction – and are for CIOs, PMs, sponsoring agencies, software project managers, and others involved in software engineering.” The sixteen practices are

Project Integrity

1. Adopt Continuous Program Risk Management

¹³ Italics appear in book.

2. Estimate Cost and Schedule Empirically
3. Use Metrics to Manage
4. Track Earned Value
5. Track Defects Against Quality Targets
6. Treat People as the Most Important Resource

Construction Integrity

7. Adopt Life Cycle Configuration Management
8. Manage and Trace Requirements
9. Use System-Based Software Design
10. Ensure Data and Database Interoperability
11. Define and Control Interfaces
12. Design Twice, Code Once
13. Assess Reuse Risks and Costs

Product Stability and Integrity

14. Inspect Requirements and Design
15. Manage Testing as a Continuous Process
16. Compile and Smoke Test Frequently

For an in-depth discussion of each practice, and its implementation, please see the paper at the web site. However, looking at the first six items, a strong correlation is evident between those items and the internal QA guidelines.

4 Emerging Trends in Standards and Best Practices

Where Use of Best Practices and Standards is Going

How are standards and best practices evolving?

How is state use of standards and best practices changing?

Evolution of Process Maturity Standards and Frameworks

The SEI's Capability Maturity Model for Software is currently evolving toward CMM IntegrationSM (CMMI^{SM 14}). The integration referred to in the model's name is the combination of software and systems engineering CMMs into one model. The CMMI project "is a collaborative effort sponsored by the Office of the Secretary of Defense/Acquisition and Technology (OSD/A&T) with participation by government, industry, and the Software Engineering Institute (SEI). The project's objective is to develop a product suite that provides industry and government with a set of integrated products to support process and product improvement.¹⁵". CMMI is scheduled

¹⁴ CMM Integration and CMMI are service marks of Carnegie Mellon University.

¹⁵ SEI web site

for release in the mid-2000 time frame. Information is available at the SEI's web site.

The next efforts to evolve CMMI are expected to focus on software acquisition practices, extending the relatively new and undeveloped Software Acquisition Capability Maturity Model to the realm of systems projects and incorporating it into the integrated model.

Internationally, we expect to see, in the near term, a common framework for performing software process capability assessments. This will be independent of the process improvement framework being followed (of which CMMI is an instance) This standard, ISO/IEC 15504, will provide, if approved, a way of evaluating assessment approaches, assuring that a given approach is a valid measure of software process capability. This standard is currently undergoing field trials.

Evolution of Project Management and Commercial Software Development Standards

The Project Management Institute Standards Committee is continuing to evolve the PMBOK, with extensions specific to information systems currently being drafted and evaluated. Other related elements under development include an Organization Project Management Maturity Model, Project Manager Competencies, Project Taxonomy, and a Work Breakdown Structure (WBS) Practice Standard. PMI's web site has a Standards section containing further information.

The IEEE standards collection has been growing rapidly, while integrating other standards into its overall structure. Notable examples of this are the inclusion of PMI's PMBOK Guide and ISO/IEC 12207 "Standard for Information Technology – Software Life Cycle Processes." In addition, all of the software standards in the 1999 IEEE collection related to the life cycle processes and work products have been harmonized with the 12207 standard. Each of the relevant standards has either been re-written to comprehend the processes as defined in 12207, or an appendix has been added to the standard showing how its elements map to corresponding elements of ISO/IEC 12207.

Evolution of Military Software Standards

Most of the software industry standards trace their ancestry to the Department of Defense (DoD) military standards. There has been a lot of change in military standards over the last several years, culminating in the current recommendation that military software development be done with commercial standards, specifically 12207-

based standards.

- For many years, the defense industry and other government organizations used Military Standard 2167A, Defense System Software Development, last updated in 1998.
- In the late 1980s, the DoD decided to consolidate 2167A and their information systems standard into a single standard known as Military Standard 498, Software Development and Documentation. As this standard was being completed in the mid-1990s, DoD began working under new defense acquisition regulations that removed acquirer-mandated standards, allowing the supplier to follow commercial standards. 498 was recommended as an interim standard, while an appropriate commercial standard was created.
- In 1995, a joint effort of the IEEE and the Electronics Industries Association (EIA) produced an interim standard for both military and commercial use, known as Joint Standard 16 (J-016, Standard for Information Technology Software Life Cycle Processes, Software Development) based on technical content in ISO/IEC 12207. This functioned as an appropriate standard for military acquisitions for several years, until the 3-volume IEEE/EIA 12207 standard was issued in 1996 and 1997 as the U.S. version of the international standard. At this point, the U.S. Department of Defense recommends use of IEEE/EIA 12207 for work done by defense agencies and as the default for suppliers seeking advice.

Trends in State Government Use of Best Practices and Standards

The table shown in Figure 1 is, perhaps, a little surprising. It indicates a rapidly expanding effort in state governments to establish and maintain control of IR projects. In most cases this has been mandated by legislation. In some, it is being driven by Y2K project requirements. In sifting through the documentation and web site content we have reviewed, several key trends emerge:

1. The SEI's CMM for Software is an increasingly popular framework for establishing sound IR project processes. Even without formal assessments, state agencies are finding value in the structured approach to establishing good engineering and management practices;
2. The PMBOK is being similarly used to develop internal project management skills and capabilities. While PMP certification is not customarily mandated, there is a lot of emphasis being placed on project management training that is PMBOK-compliant;

3. Both the CMM for Software and the PMBOK make frequent reference to key documentation elements as the basis for establishing and maintaining project control. The IEEE software standards provide readily available models for such documentation. Such models are easily tailored to fit specific organization and/or project needs;
4. Usually, ISO 9000-3 is imperative only for those organizations wishing to do business outside the United States. However, as an external benchmark for quality information systems products and development processes, it offers valuable guidance in establishing appropriate processes and documentation.

The trends mentioned above are very much parallel to what has been going on in the private sector at a somewhat faster pace of adoption. Driven by unacceptably large numbers of failed information systems projects, and the harsh realities of Y2K compliance, there has been a dramatic increase in the number of private sector organizations that are aggressively pursuing the use of the standards and best practices mentioned here as a core survival strategy.

Appendix A. Federal and State Government Resources

State or Agency	URL	Document Title	Document Type	Document Description
1. Arizona	www.gita.state.az.us/	Information Technology Project and Investment Monitoring	PR	Descriptions of how major projects are centrally monitored and reported on.
2. Arizona	www.gita.state.az.us/	Monthly status report	BP	A monthly report form for monitored projects
3. Arizona	www.gita.state.az.us/	Policies, Standards, and Procedures	PY	Ten categories of items; none are SW acquisition or development-related guidance
4. Arizona	www.gita.state.az.us/	Project Justification and Oversight	BP	Descriptions of how projects are launched and reviewed by state oversight team (much like Texas QAT)
5. Arizona	www.gita.state.az.us/	Web Practices Guideline	GL	under development – set of practices and guidelines for putting material on the Web
6. Arkansas	www.dis.state.ar.us/workgroups/SP_WG/ITPLAN.htm	Strategic Information Technology Plan	OT	Outlines the goals and objectives of IT in AR
7. Arkansas	www.dis.state.ar.us/workgroups/SP_WG/P/S.htm	Technology Policies and Standards	PY	Policies about security, privacy, interoperability of systems, technology purchases, etc. Not software development related
8. California	www.doit.ca.gov/Reports/DecemberReport.asp	Information Technology: Project Initiation and Approval Report	BP	A narrative summary of the uniform process for initiating, approving, and changing state IT projects
9. California	www.doit.ca.gov/SIM	Overview of Project	PY	High level description of what's expected of

Survey of Current Best Practices and Utilization Standards

State or Agency	URL	Document Title	Document Type	Document Description
	M/ProjectManagement/ProjManPolicies.htm	Management and Oversight Policies		projects in the areas generally found in CMM L2; SAM is missing
10. California	www.doit.ca.gov/SIMM/default.asp	Statewide Information Management Manual (SIMM)	PY, PR	Manual of policies and procedures, including Risk Assessment model, Project management Methodology, Y2K materials, policies, guidelines (also includes a Quality Planning procedure)
11. Center for Technology in Government	www.ctg.albany.edu	A Survey of System Development Process Models	BP	A survey of widely used software development processes, useful for project planning purposes.
12. Center for Technology in Government	www.ctg.albany.edu	Tying a Sensible Knot: A Practical Guide to State-Local Information Systems	BP	A collection of best practices drawn from a study of successful state-local government partnership IT projects.
13. Colorado	www.state.co.us/gov_dir/gss/imc	Systems Development Methodology Policy	PY	Policy governing the creation of an appropriate methodology covering new application development, application maintenance or modifications/enhancements, and/or new software acquisitions.
14. Colorado	www.state.co.us/gov_dir/gss/imc	Systems Documentation Policy	PY	Policy governing the creation of appropriate documentation for new application development, application maintenance or modifications/enhancements, and/or new software acquisitions.
15. DoD, Office of the Under Secretary of	http://www.acq.osd.mil/sa/se/index.htm	Pointers to a number of documents on various	BP	Covers, among other things, policies and guidelines for software engineering,

Survey of Current Best Practices and Utilization Standards

State or Agency	URL	Document Title	Document Type	Document Description
Defense for Acquisition and Technology – Systems Acquisition		systems engineering topics		configuration management, quality assurance and risk management. Also has a link to the Defense Acquisition Handbook, an exhaustive reference for systems acquisition activities.
16. DoD, Data & Analysis Center for Software	www.dacs.dtic.mil/data/bases/url/key.hts?keycode=14:124:170&islowerlevel=1	Pointers to a number of documents used by DoD/NASA for inspections	BP	Includes <ul style="list-style-type: none"> • Software Formal Inspections Guidebook • Software Formal Inspections Standard • Software Technology Reference Guide – Software Inspections
17. Florida	http://mail.irm.state.fl.us/	Controls & The Information Technology Project	GL	Describes recommended controls for both the IT project and the system being built.
18. Florida	http://mail.irm.state.fl.us/	Cost/Benefit Analysis Worksheet	TL	A set of Excel spreadsheets for estimating the costs and benefits of proposed IT projects.
19. Florida	http://mail.irm.state.fl.us/	Feasibility Study Guidelines	GL	A set of guidelines for conducting feasibility studies associated with new IT projects.
20. Florida	http://mail.irm.state.fl.us/	Information Systems Development Methodology Policy	PY	Policy mandating each agency to create an Information Systems Development Methodology (ISDM). The ISDM includes, minimally, strategic planning, project management and quality assurance.
21. Information Systems Audit and Control	http://www.isaca.org/cobit.htm/	COBIT Control Objectives	PS	Information Systems Audit and Control Foundation’s attempt to define a generally applicable and acceptable standard for good

Survey of Current Best Practices and Utilization Standards

State or Agency	URL	Document Title	Document Type	Document Description
Association				IT security and control practices. This is an expanded and more detailed treatment of the Framework.
22. Information Systems Audit and Control Association	http://www.isaca.org/cobit.htm/	COBIT Executive Summary	PS	Information Systems Audit and Control Foundation’s attempt to define a generally applicable and acceptable standard for good IT security and control practices. This document is an overview of the entire set of practices.
23. Information Systems Audit and Control Association	http://www.isaca.org/cobit.htm/	COBIT Framework	PS	Information Systems Audit and Control Foundation’s attempt to define a generally applicable and acceptable standard for good IT security and control practices. The Framework is a set of high-level control objectives and an associated classification structure.
24. Information Technology Resources Board	www.itrb.gov	Assessing the Risks of Commercial-Off-The Shelf Applications	BP	A “tool to assist Federal organizations in clarifying the myriad risks their organization will encounter when facing a COTS implementation.”
25. Information Technology Resources Board	www.itrb.gov	Lessons Learned	BP	A collection of best practices reflecting “each ITRB member’s own experience, and the Board’s unique perspective based upon assessments of Federal information systems projects.”
26. Information	www.itrb.gov	Managing Information	BP/CK	...“contains a broad array of questions in nine

Survey of Current Best Practices and Utilization Standards

State or Agency	URL	Document Title	Document Type	Document Description
Technology Resources Board		Systems: A Practical Assessment Tool		areas from which to evaluate information technology systems: mission and vision, customers, business focus, executive direction, capital planning, project management, performance management, acquisition, and architecture.”
27. Information Technology Resources Board	www.itrb.gov	Project Management Handbook	BP	A “handbook derived from reviews of mission critical Federal information systems projects. Describes a concise, high-level framework for project management. Provides practical suggestions for Federal executives involved in management of mission critical information systems.”
28. Kansas	www.ink.org/public/kir_c	Policies	PY	A collection of policies, including project planning and monitoring.
29. Massachusetts	www.state.ma.us/osc	A Guide to System Implementation	BP	Provides “an outline for system implementation and is based on the experiences of the implementation teams who have worked to successfully roll-out new or enhanced systems to users throughout state government.”
30. Massachusetts	www.state.ma.us/osc	Information Technology –Project Management Resource Book	BP	This Resource Book has been developed for OSC project managers, or Project Drivers, to give them specific guidelines and explain adopted standards for IT project management at the Comptroller’s Office.

Survey of Current Best Practices and Utilization Standards

State or Agency	URL	Document Title	Document Type	Document Description
31. Michigan	www.state.mi.us/dmb/oas/itsd	Year 2000 Project Office Quality Assurance Review Procedures	PR	Describes the procedures used by the State of Michigan Year 2000 Project Office to conduct Agency Year 2000 project quality assurance reviews.
32. Michigan	www.state.mi.us/dmb/oas/itsd	Year 2000 Software Quality Assurance Program Manual	BP	“Provides insights and guidance to agency Year 2000 Quality Assurance Analysts with respect to ensuring that critical software applications are remediated and operate in the Year 2000 and beyond. It outlines the components and salient issues relevant to designing and implementing an effective quality assurance program.”
33. Minnesota	www.ot.state.mn.us	Information Resource Development: Management Framework	GL	“Explains how the information resource development (IRD) management framework for Minnesota government can be used to control IRD. State agencies can use this guideline to improve the quality of their information resources and manage the processes used to develop those information resources.”
34. Minnesota	www.ot.state.mn.us	Project Management Budget Request Guideline FY 1998 - 1999	GL	“Provides a recommended organizational guide for project management and describes the OT (formerly IPO) information resource budget request requirements for project management.”
35. Missouri	www.oit.state.mo.us	Configuration Management Guidelines and Best Practices	GL	Guidelines and best practices for implementing configuration management in IT projects.

Survey of Current Best Practices and Utilization Standards

State or Agency	URL	Document Title	Document Type	Document Description
36. Missouri	www.oit.state.mo.us	Decision Item Requirements	GL	Requirements for projects needing formal approval to proceed.
37. Missouri	www.oit.state.mo.us	Project Management – 1998 Project Charter	OT	The charter of the project responsible for building project management guidance for state agencies.
38. Missouri	www.oit.state.mo.us	Project Planning Guidelines and Best Practices	GL	Guidelines and best practices for implementing project planning in IT projects.
39. Missouri	www.oit.state.mo.us	Project Tracking Guidelines and Best Practices	GL	Guidelines and best practices for implementing project tracking in IT projects.
40. Missouri	www.oit.state.mo.us	Requirements Management Guidelines and Best Practices	GL	Guidelines and best practices for implementing requirements management in IT projects.
41. Missouri	www.oit.state.mo.us	Risk Management Guidelines and Best Practices	GL	Guidelines and best practices for implementing risk management in IT projects.
42. NASA	www.ivv.nasa.gov/SWG/resources/	NASA Guidebooks and Standards	GL	A collection of guidelines for building large projects.
43. NASA	satc.gsfc.nasa.gov/crm/	NASA Publications – Software Assurance Technology Center	TL	NASA developed publications, papers, and reports pertaining to risk management and risk assessment. (This site also has a link to IV&V)
44. New Mexico	www.cio.state.nm.us	Project Management Policy	PY	Policy for use of formal project management. Includes project classification based on risk.

Survey of Current Best Practices and Utilization Standards

State or Agency	URL	Document Title	Document Type	Document Description
45. North Carolina	www.state.nc.us/irm	Example of Composite Project Status Report	BP	An overview report of major agency IT projects showing not only project status, but also major QA activities planned and completed.
46. North Carolina	www.state.nc.us/irm	Individual Project Status Report	BP	A template for use by an agency to report the status of a project.
47. North Carolina	www.state.nc.us/irm	Project Proposal Checklist	CK	A checklist for assuring that “essential activities have been planned or performed”, used as part of independent QA reviews during the project.
48. North Dakota	www.state.nd.us/isd	Guidelines for Developing a Project Business Case	GL	Guidelines to “help agencies document the business case for large projects.”
49. Software Program Managers Network	www.spmn.com/critical_software_practices.html	16 Critical Software Practices™ for Performance-based Management	BP	The "16-Point Plan™ and Templates for Critical Software Practices™" contain the 16 practices (9 best and 7 sustaining) that are the key to avoiding significant problems for software development projects. These practices have been gathered from the crucible of real-world, large-scale, software development and maintenance projects.
50. Tennessee	www.state.tn.us/finance/oir	IT Methodology Project Intranet page	BP	Defines technical approach for the IT Methodology Project
51. Tennessee	www.state.tn.us/finance/oir	IT Methodology Project – Project Plan	BP	A project plan for implementing formal project management processes in state agencies
52. U.S. Dept. of Energy	http://cio.doe.gov/sqs/e/ [link updated 08/22/01]	Analysis of Benefits and Costs (ABC's) Guideline, Volumes 1-3	GL	These guidelines “explain the usefulness of ABC's in making choices among competing alternatives concerning Information Resources Management (IRM).”

Survey of Current Best Practices and Utilization Standards

State or Agency	URL	Document Title	Document Type	Document Description
53. U.S. Dept. of Energy	http://cio.doe.gov/sqs/e/ [link updated 08/22/01]	Automated Office Systems Support Quality Assurance Plan	BP	“Describes the standards, processes and procedures used to support the consistent delivery of high-quality, professional products and services.”
54. U.S. Dept. of Energy	www.ornl.gov/pbm/documents/documents.html [link updated 08/22/01]	How to Measure Performance: A Handbook of Techniques and Tools	GL	A guide to “assist in the development, utilization, evaluation, and interpretation of performance measurement techniques and tools”.
55. U.S. Dept. of Energy	http://cio.doe.gov/sqs/e/ [link updated 08/22/01]	In-stage Assessment Process Guide	GL	Defines the process for planning and conducting independent reviews of system development and maintenance projects.
56. U.S. Dept. of Energy	http://cio.doe.gov/sqs/e/ [link updated 08/22/01]	Project Planning Questionnaire	TL	A tool to “enable project teams (immediate and extended) to be cognizant of the disparate planning activities which can affect project outcome. Provide early notification to the stakeholders that a new project may involve their area, and information to help plan resource estimates and identify risks.”
57. U.S. Dept. of Energy	http://cio.doe.gov/sqs/e/ [link updated 08/22/01]	Software Project Planning Checklist	CK	This checklist is intended to “provide system owners, project managers, and other information system development and maintenance professionals with guidance in identifying and planning software project planning activities. The checklist reflects recognized software project planning activities to be performed throughout the information system (IS) life cycle.”

Survey of Current Best Practices and Utilization Standards

State or Agency	URL	Document Title	Document Type	Document Description
58. U.S. Dept. of Energy	http://cio.doe.gov/sqs/e/ [link updated 08/22/01]	Software Project Tracking Checklist	CK	This checklist is intended to “provide system owners, project managers, and other information system development and maintenance professionals with guidance in identifying and planning software project tracking activities. The checklist reflects recognized project tracking activities to be performed throughout the information system (IS) life cycle.”
59. U.S. Dept. of Energy	http://cio.doe.gov/sqs/e/ [link updated 08/22/01]	Software Quality Assurance Checklist	CK	This checklist is intended to “provide system owners, project managers and other information system development and maintenance professionals with guidance in identifying and planning software quality assurance (SQA) activities. The checklist reflects recognized SQA activities to be performed throughout the information system (IS) life cycle.”
60. U.S. Government Accounting Office	www.gao.gov	Assessing Risks and Returns: A Guide for Evaluating Federal Agencies’ IT Investment Decision-making	GL	Provides a structure for evaluating and assessing how well an agency selects and manages IT resources.

Survey of Current Best Practices and Utilization Standards

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61. U.S. Government Accounting Office	www.gao.gov	Executive Guide: Measuring Performance and Demonstrating Results of Information Technology Investments	GL	A suggested framework for developing and implementing IT performance management.
62. U.S. Government Accounting Office	www.gao.gov	Information Technology: An Audit Guide for Assessing Acquisition Risks	GL	Provides a “logical framework for evaluating” IT acquisitions, focusing on risk assessment.
63. Virginia	www.cim.state.va.us	Mission Focused Information Management	BP	A collection of best practices for developing information systems for state government agencies.
64. Virginia	www.cim.state.va.us	Model Standard for Large-Scope Projects	GL	Provides a “model structured approach for defining, developing and implementing large-scope information systems projects in state agencies.”
65. Virginia	www.cim.state.va.us	Model Standard for Maintenance and Enhancement Projects	GL	Provides a “model structured approach for managing maintenance and enhancement projects for existing information systems.”
66. Virginia	www.cim.state.va.us	Model Standard for Small-Scope Projects	GL	Provides a “model structured approach for defining, developing and implementing small-scope information systems projects in state agencies.”
67. Washington	www.wa.gov/dis	Cost Benefit Analysis Worksheet	TL	An MS Excel spreadsheet for performing cost benefit analysis of state IT projects.
68. Washington	www.wa.gov/dis	Feasibility Study Guidelines	GL	Provides guidance in performing feasibility studies for IT projects.

Survey of Current Best Practices and Utilization Standards

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69. Washington	www.wa.gov/dis	Information Technology Portfolio Structure and Content Standard	BP	Describes the details of portfolio management for state agencies.
70. Washington	www.wa.gov/dis	Portfolio-based Information Technology (IT) Management and Oversight	BP	A description of Washington’s portfolio-based approach to IT project selection and management.
71. Washington	www.wa.gov/dis	Portfolio Management Training	TL	A MS PowerPoint management briefing on portfolio management.
72. Washington	www.wa.gov/dis	Project Management Guideline	GL	Guidance for state agencies on performing project management.
73. Washington	www.wa.gov/dis	Quality Improvement Plan	BP	The overall plan for improving the quality of information systems, including a discussion of the rationale for using portfolio management.
74. Washington	www.wa.gov/dis	Responsibilities and Obligations for Quality Assurance	GL	“This document is intended to serve as a model for procurement and contract language, facilitating a consistent approach across state government. The goal is to establish common expectations among state agencies, QA vendors, the Department of Information Services (DIS) and the Information Services Board (ISB), about the role of QA under Portfolio-based Information Technology (IT) Management and Oversight.”

Survey of Current Best Practices and Utilization Standards

State or Agency	URL	Document Title	Document Type	Document Description
75. Washington	www.wa.gov/dis	Software Life Cycle Management Guideline	GL	This guideline describes “the software life cycle management concept, the need for change to the current software development model, current initiatives, benefits, applicability to agencies, and critical success factors.” It “sets forth a description of essential steps to be taken to implement a life cycle process.” It also includes a “brief description of establishing a software performance improvement measurement and change management process, and the need for teamwork.”