NEW YORK STATE

Project Management Guidebook

Release 2

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PREFACE

The ***New York State Project Management Guidebook*** was developed to document a common methodology for managing projects in New York State government organizations and to provide guidance and advice to Project Managers throughout the life of a project.

In January of 2001, James Natoli, Director of State Operations, announced the creation of a statewide Project Management Office (PMO) within the Office for Technology. The PMO mission: to increase project management competence and foster sustained success for projects carried out by New York State. The top priority of the newly created PMO was, and is, the development of a common project management methodology for use by Project Managers across the state.

A common methodology encourages individual Project Managers across the state to approach each project endeavor with the same discipline and tools. Since the methodology is common to all business areas and across all agencies, state Project Managers moving to new opportunities within and among state agencies will have virtually no learning curve for project management. Roles and expectations are clearly defined for Project Team members, Project Sponsors, and Customers, regardless of the type of project (IT projects, software development projects, engineering projects, business process improvement projects, etc.). All project participants receive the same information regarding deliverables and activities throughout the project. This streamlines project execution, since participants will not need continual direction and education regarding the project process.

The New York State Project Management Methodology also provides a standard for agency staff to use when contracting with private vendors. The state can now provide the methodology for its contractors, rather than requiring New York State staff to adjust to the different performance standards of each firm with whom they contract. Again, utilizing one common framework within which all New York State projects can be carried out improves the state's ability to complete the projects successfully.

Acknowledgements

Under the direction of the New York State PMO, a team of experienced Project Managers developed the ***New York State Project Management Guidebook*** collaboratively. The team, made up of state Project Managers and Project Managers from Keane, Inc., collected and analyzed best practices from New York State agencies as well as practices from the Keane Guide to Project Management®. Generally accepted principles of project management were refined and incorporated into a project lifecycle consistent with New York State policies and practices. At all times, the team worked to align the methodology developed for New York State with the *Project Management Institute's (PMI®) Guide to the Project Management Body of Knowledge (PMBOK®)*, the recognized ANSI standard.

A committee of eighteen agencies, consisting of IT Directors, Project Officers, and Project Managers, participated in the guidance, review, and critique of the methodology over a nine-month development period, resolving issues ranging from the processes to include in the methodology to the selection of appropriate templates and report formats. They provided insight and guidance on the methodology development and its presentation within this ***Guidebook***.

Since its initial publication in September of 2001, the ***Guidebook*** content and direction have been guided by a Guidebook Guidance Committee. This committee is a volunteer effort, with members from New York State agencies, boards, and commissions who meet at least twice yearly to review suggestions and plans for changes to the ***Guidebook***.

The New York State Office for Technology acknowledges the contributions, time commitments, and ongoing support of the following individuals, and their agencies, to the development and ongoing support of the ***New York State Project Management Guidebook***.

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Structure of the Guidebook

Section I, Project Lifecycle, provides a description of the project lifecycle. It is intended to guide a Project Manager through the complete life of a project, from the first formal documentation of the project's concept to its formal termination, detailing the phases of the project lifecycle, the specific processes to be performed within each phase, and defining the tasks that comprise each process. Specific templates are provided to supplement the tasks and processes, including meeting agendas, deliverable templates, checklists, and forms. Tips and techniques for successfully performing the tasks/processes are offered, as are answers to "frequently asked questions". At the end of each phase, common pitfalls faced by Project Managers are described, along with solutions that could be used to successfully deal with those challenges. The hope is that a Project Manager will find useful direction for what to do, when to do it, and how to do it, no matter what stage of the lifecycle his/her project may be in.

Section II, Project Management Topics, provides in-depth advice and direction on selected topics of importance to New York State Project Managers. It is anticipated that this section of the ***Guidebook*** will grow as the state's Project Managers contribute advice on additional topics of common interest. This section is a repository for shared lessons learned from the experience and expertise of the state's Project Managers.

Section III, System Development Lifecycle (SDLC), provides a description of the standard phases and major processes of a generic system development lifecycle. It is intended to guide a Project Manager through the effort of developing a computer system, describing specific system development processes and aligning them with the project management lifecycle. Structured similarly to Secion I, this section also provides specific templates to illustrate format of deliverables and supplement the processes described, including meeting agendas, checklists, and forms. Tips and techniques for successfully performing the SDLC processes are offered throughout the text, supplemented by common pitfalls and answers to "frequently asked questions". While not trying to anticipate every task that may be required by various technology platforms and development techniques, the hope is that a Project Manager will find useful information for how to

direct the project team, what to expect from them at every development checkpoint, and how to interact with other parties interested in the system being developed.

It is expected that other Line of Business Lifecycles will be added to future editions of the ***Guidebook***.

Appendices provides a glossary of the project management and system development terms used throughout the text, a repository of all templates used throughout the ***Guidebook*** (without the annotations, instructions, and field descriptions), and a list of resources used in the compilation of this document, which may be of use to Project Managers as they seek to further their education and skills in project management.

How to Use this Guidebook

The ***New York State Project Management Guidebook*** is intended to be both a "what to do" and a "how to do it" guide for New York State Project Managers. While at first it may appear intimidating, remember that in many cases the ***Guidebook*** is merely formalizing, in process documentation, what is already a fairly standard and generally accepted technique. The value of documenting and standardizing these processes is that it frees the Project Manager from having to define a process to fit a particular situation and/or event occurring during his/her particular project. Instead, standards are already there for the Project Manager to use to manage each process while continuing to focus on key project activities.

Most processes and deliverables are required for all projects, although in smaller projects they may require less formality and a lower level of effort. The End-of-Phase Checklists can be used to ensure that every process defined has been considered, necessary tasks addressed, and required deliverables produced. If recommended tasks or deliverables are skipped, make sure to identify and record why the particular task/deliverable has not been completed and how the objectives of that task/deliverable will otherwise be met.

The compass icon  indicates a tip from an experienced Project Manager, while the life preserver icon  marks advice intended to save the project from pitfalls.

The templates included in the text contain instructions and comments facilitating their use. The same templates can be found in the Appendices, without annotation. These can be photocopied or downloaded from the OFT website http://www.oft.state.ny.us/ for use and customization for your project. For quick reference, a Table of Templates has been provided in the Introductions to both Section I and in Section III that lists each template, its purpose, and page number references to quickly locate the template either within the text of the ***Guidebook*** or in the Appendices.

Finally, use this ***Guidebook*** as a tool to help **you manage** the project. Don't let the process or the project **manage you**!

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SECTION ONE

1

Project Management Lifecycle

SECTION I: PROJECT MANAGEMENT LIFECYCLE
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Section I Introduction

There are two different lifecycles that work in conjunction with one another throughout the course of every project. The ***project*** lifecycle describes the tasks that must be completed to produce a product or service. Different project lifecycles exist for specific products and services. (For example, the lifecycle followed to build a house is very different from the lifecycle followed to develop a software package.) The project ***management*** lifecycle defines how to manage a project. It will always be the same, regardless of the project lifecycle being employed.

One of a Project Manager's challenges is to understand how to align the specific project lifecycle with the project management lifecycle. Project tasks and project management tasks are concurrent and ongoing, and can be associated by project management deliverables. The Project Schedule, for example, contains both project and project management tasks. Phases in the two lifecycles will overlap, depending upon the project lifecycle being employed. The Project Manager needs to be aware of how the inputs and outputs of one lifecycle affect and shape the other.

The material in this section is organized according to the project management lifecycle. While no two projects are exactly alike, all projects should progress through the same five project management phases:

1. In Project Origination an individual proposes a project to create a product or develop a service that can solve a problem or address a need in the Performing Organization. The Performing Organization then submits the proposal to an evaluation and selection process. If selected, a budget or further management commitment for the project may also be required before a Project Manager is actually assigned and the project is authorized to progress to Project Initiation. Depending upon the standards and practices of the Performing Organization, a time delay between the project's proposal and selection and its actual initiation may occur.

2. At the beginning of Project Initiation, a Project Manager is assigned. The Project Manager works with the Project Sponsor to identify the necessary resources and team members needed to further develop the key project parameters – Cost, Scope, Schedule, and Quality (CSSQ). The Project Team documents its charge in the form of a Project Charter, which is based on the Project Proposal, which includes the initial Business Case. Approval of the Project Charter by the Project Sponsor authorizes the designated team to begin the initial planning effort. The initial Project Plan resulting from Project Initiation differs in the level of detail and the validity of its estimates from Project Origination, and must be at a level sufficient to acquire any additional resources needed to progress to the

next phase. The Project Plan also includes plans for involving and communicating with all the parties that are affected by the project, as well as identification of an initial set of foreseeable risks that can threaten the project. At the conclusion of Project Initiation, based on the initial planning documents, the Business Case is revised and re-evaluated and a decision is made to either halt the project, or proceed to Project Planning.

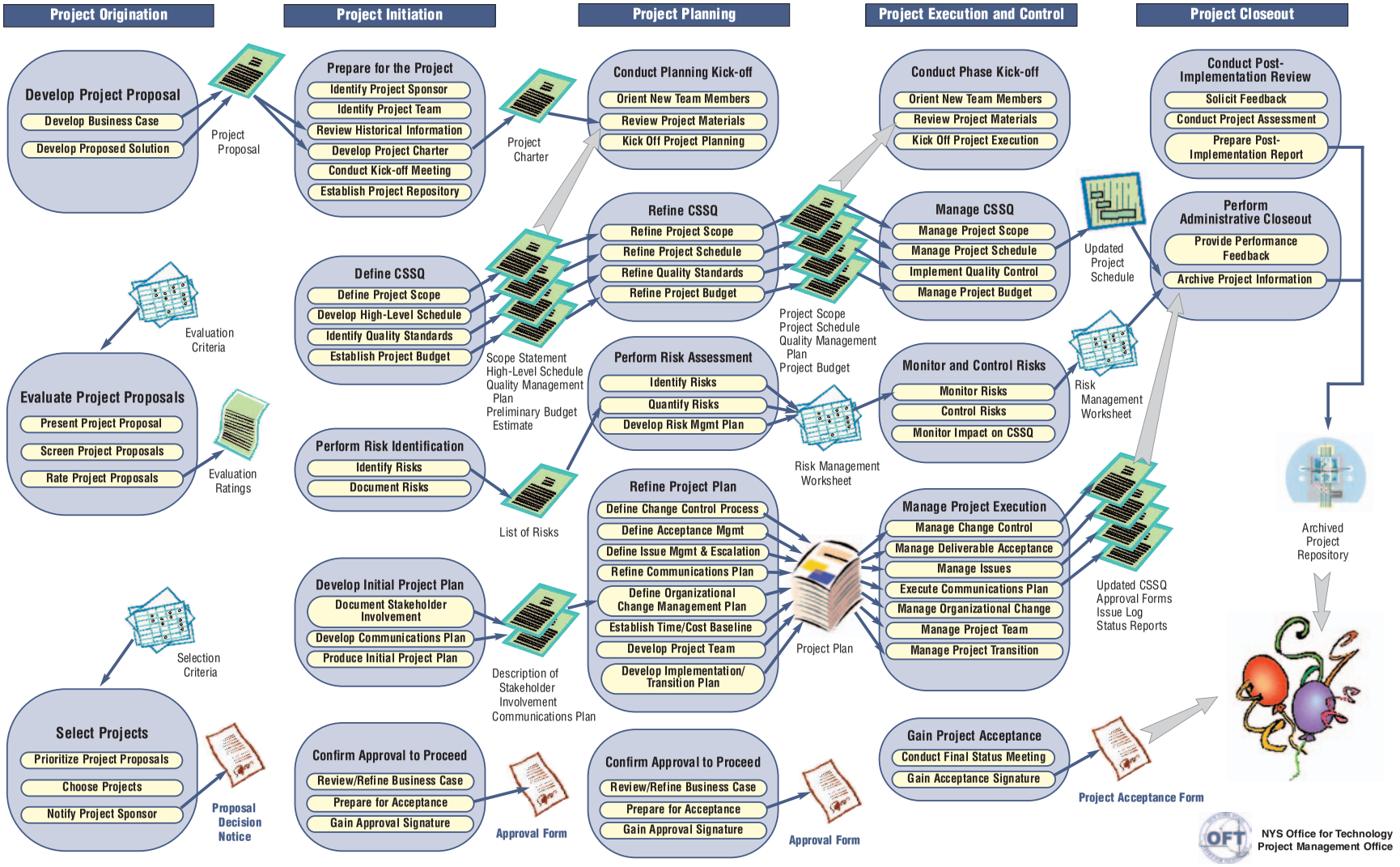
3. Project Planning builds on the work done in Project Initiation, refining and augmenting CSSQ and Project Plan deliverables. Usually, additional members join the Project Team, and they assist the Project Manager in further elaborating the details of the Cost, Scope, Schedule and Quality. A number of key elements are added to the Project Plan, including project-specific items such as change control, acceptance management and issue management, as well as externally-focused items such as organizational change management and project transition. The initial list of project risks is augmented, and detailed mitigation plans are developed. Project Planning marks the completion of the Project Plan – i.e., no work is left uncovered. However, some of the later phases of the project work may continue to be planned in more depth (e.g., Transition and Implementation details may not be developed until later in Project Execution). At the conclusion of Project Planning, the Business Case is revised and re-evaluated based on the completed planning documents and a decision is again made to either halt the project, or to commit the resources necessary for Project Execution and Control.

4. Project Execution and Control is where most of the resources are applied/expended on the project. A significant number of team members will join the project at the beginning of this phase. The primary task of the Project Manager during Project Execution and Control is to enable the Project Team to execute the tasks on the defined Project Schedule and develop the product or service the project is expected to deliver. The Project Manager uses the processes and plans prepared during Project Initiation and Project Planning to manage the project, while preparing the organization for the implementation of the product/service and for transitioning the product/service responsibility from the Project Team to the Performing Organization.

5. In Project Closeout, the Project Team assesses the outcome of the project, as well as the performance of the Project Team and the Performing Organization. This is accomplished primarily through soliciting and evaluating feedback from Customers, Project Team members, Consumers and other stakeholders. The primary purpose of this assessment is to document best practices and lessons learned for use on future projects. Key project metrics are also captured to enable the Performing Organization to compare and evaluate performance measurements across projects.

The following diagram illustrates every phase, process and task in the project lifecycle.

Figure 0-1 *NYS Project Management Guidebook* The Project Management Lifecycle



Project Roles and Responsibilities

Throughout this ***Guidebook***, reference is made to specific roles that must be performed at various times throughout the life of the project. The following section provides an overview of the various roles that are required on projects, what the responsibilities are for each role, and some examples of how organizations have filled those roles on projecs of varying size.

There are many groups of people involved in the project lifecycle.

The **Project Team** is a group that is responsible for planning and executing the project. It consists of a Project Manager and a variable number of Project Team members, who are brought in to deliver their tasks according to the Project Schedule.

- The **Project Manager** is the person who is responsible for ensuring that the Project Team completes the project. The Project Manager develops the Project Plan with the team and manages the team's performance of project tasks. It is also the responsibility of the Project Manager to secure acceptance and approval of deliverables from the Project Sponsor and Stakeholders.
- The **Project Team Members** are responsible for executing tasks and producing deliverables as outlined in the Project Plan and directed by the Project Manager, at whatever level of effort or participation has been defined for them. On larger projects, some Project Team members may serve as **Team Leaders**, providing task and technical leadership.

The **Project Sponsor** is a manager with demonstrable interest in the outcome of the project who is responsible for securing spending authority and resources for the project. Ideally, the Project Sponsor should be the highest-ranking manager possible, in proportion to the project size and scope. The Project Sponsor initiates the Project Proposal process, champions the project in the Performing Organization, and is the ultimate decision-maker for the project. The Project Sponsor provides support for the Project Manager, approves major deliverables, and signs off on approvals to proceed to each succeeding project phase. The Project Sponsor may elect to delegate any of the above responsibilities to other personnel either on or outside the Project Team.

Performing Organization Management (POM) includes all members of the organization's management team that may exert influence on Project Team members or be affected by and involved in the development and implementation of the product of the project. The committees that are formed to evaluate and select proposed projects for the Performing Organization are comprised of members of the Performing Organization Management.

- The **Project Proposal Team** is a group responsible for preparing the Project Proposal in the Origination phase. It is organized by the Project Sponsor.
- The **Project Selection Committee** comprises members of the Performing Organization Management team who meet on a regular basis to evaluate Project Proposals and select projects for initiation. They maintain the Project Proposal rating models and project selection criteria.

Customers comprise the business units that identified the need for the product or service the project will develop. Customers can be at all levels of an organization, from Commissioner to entry-level clerk. Since it is frequently not feasible for all the Customers to be directly involved in the project, the following roles are identified:

- **Customer Representatives** are members of the Customer community that are identified and made available to the project for their subject matter expertise. Their responsibility is to accurately represent their business units' needs to the Project Team, and to validate the deliverables that describe the product or service that the project will produce. Customer Representatives are also expected to bring back to the Customer community the information about the project. Towards the end of the project, Customer Representatives will test the product or service the project is developing, using and evaluating it while providing feedback to the Project Team.
- **Customer Decision-Makers** are those members of the Customer community who have been designated to make project decisions on behalf of major business units that will use, or will be affected by, the product or service the project will deliver. Customer Decision-Makers are members of the POM responsible for achieving consensus of their business unit on project issues and outputs, and communicating it to the Project Team. They attend project meetings as requested by the Project Manager, review and

approve process deliverables, and provide subject matter expertise to the Project Team. On some projects, they may also serve as Customer Representatives.

Consumers include all the people that will use the product or service that the project is developing. Consumers internal to the Performing Organizations may also be Customers.

Internal Stakeholders include all the people that are in any way affected by the new product or service within the Performing Organization. This may include the Project Team, the Performing Organization Management, Customers, as well as Customer co-workers who will be affected by the change in Customer work practices due to the new product or service; Customer managers affected by modified workflows or logistics; Customer correspondents affected by the quantity or quality of newly available information; and other similarly affected groups.

External Stakeholders include all the people outside the Performing Organization that are in any way affected by the new product or service. Within the context of New York State Government, this group may include the Legislature, the Executive Chamber, other agencies, the media, and the citizens. Consumers may also be External Stakeholders.

Vendors are contracted to provide additional products or services the project will require and may be members of the Project Team.

The following examples illustrate how agency titles map to project roles on small, medium and large projects. Each example includes project description, comparison of project roles and agency titles, and a project organizational chart.

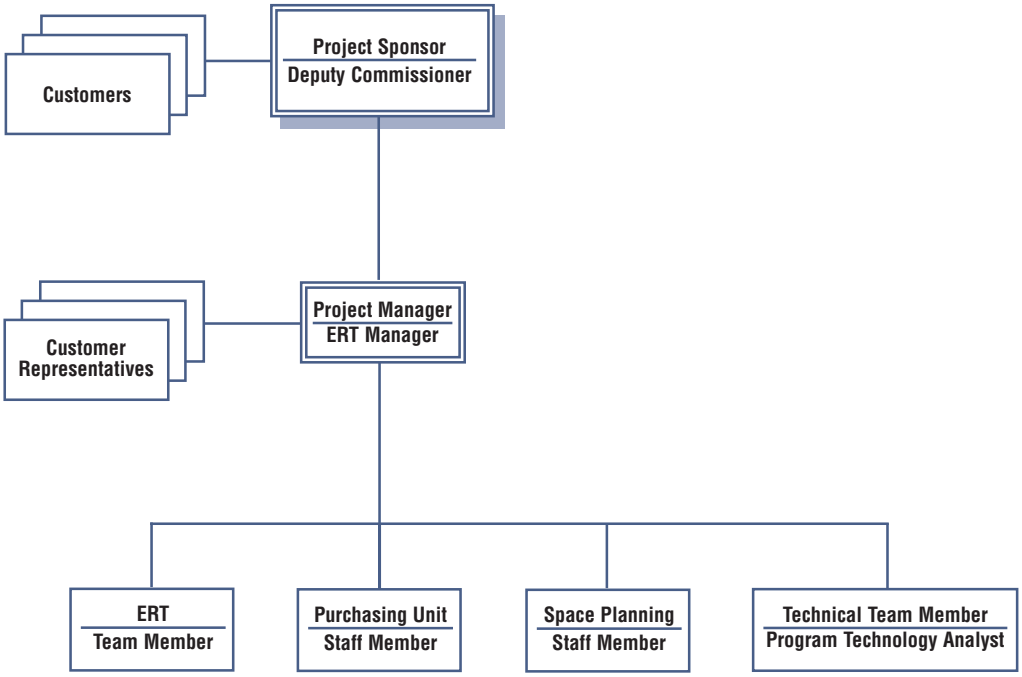
Example 1 – Small Project

Project Description:

The creation of a Security Research Lab is an example of a small project. The following is a summary of the roles filled on the Project Team:

PROJECT ROLE	STATE TITLE
Project Sponsor	Deputy Commissioner for Policy/Standards, OFT
Project Manager	Emergency Response Team (ERT) Manager (Person responsible for development and implementation of the Security Research Lab)
Team Members: Technical Member	Program Technology Analyst
Team Members: Purchasing Unit Staff Member	Purchasing Assistant
Team Member: Space Planning Staff Member	Office Services Manager
Customers	OFT Security, Network and Application units and other state agencies.
Customer Representatives	State Agency Information Security Officers (ISO's)
External Stakeholders	The purpose of the project is to provide an environment for the Emergency Response Team (ERT) to simulate attacks with viruses and hacker tools so that appropriate countermeasures may be developed. Thus, stakeholders include the Legislature, the Executive Chamber, the citizens, and all agencies within NYS.
Internal Stakeholders	Emergency Response Team

Figure 0-2 Organizational Chart for Example 1 – Small Project Example



Example 2 – Medium-sized Project

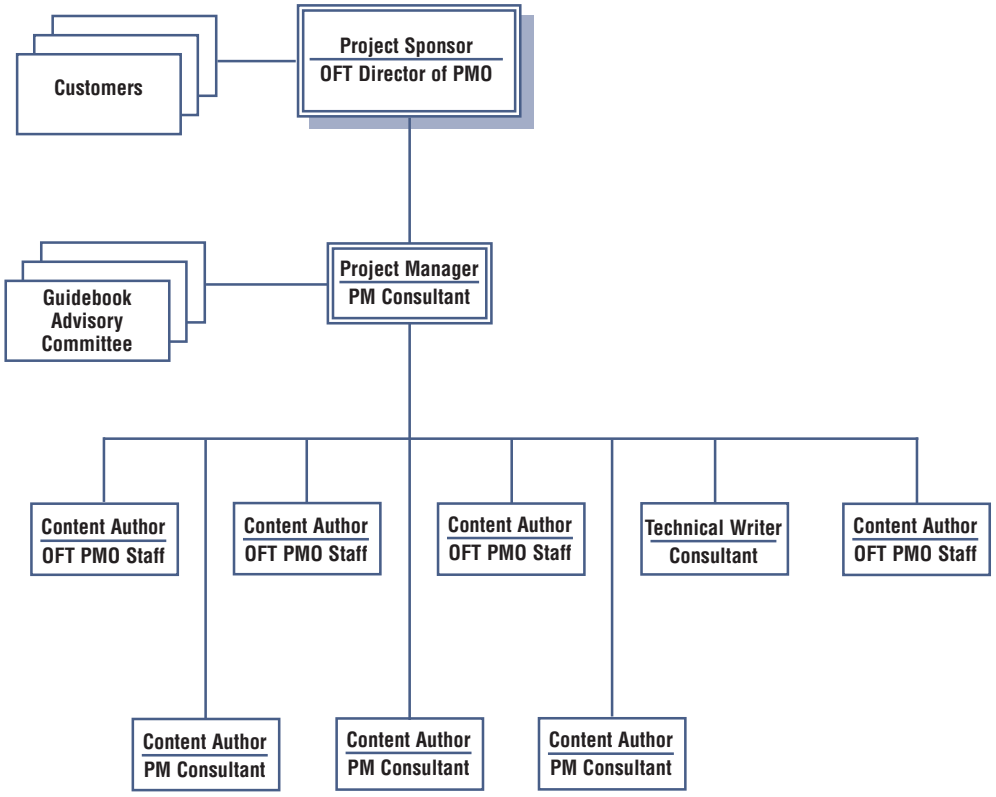
Project Description:

The definition of the New York State Project Management methodology and the creation of this ***Guidebook*** was a medium-sized project. The following roles were filled on the Project Team:

PROJECT ROLE	STATE TITLE
Project Sponsor	Director of Project Management Office, OFT
Project Manager	Contract Project Manager (A contractor was hired to fill this role because the OFT PMO was not staffed when the project was begun.)
Team Members: Content Author (4)	Program Technology Analysts (3), OFT Administrative Analyst Trainee (1), OFT
Team Members: Content Author (3)	Consultant (Experienced professional Project Managers)
Team Member: Technical Writer (1)	Consultant (Experienced professional Technical Writer)
Customers	All New York State government entities, Project Managers in state agencies, in particular.
Customer Representatives	The Guidebook Advisory Committee was made up of representatives from approximately 20 state agencies. Their titles ranged from Directors of IRM (grade level varies by agency) to Managers of DP Services (G27). We also solicited input from several G23 to G25 level staff members that serve in project management capacities.
External Stakeholders	The purpose of the project is to improve the success of projects undertaken in NYS government entities. Thus, stakeholders include the Legislature, the Executive Chamber, the citizens, and all agencies within NYS.
Internal Stakeholders	OFT is the Performing Organization, so by definition internal stakeholders must reside within that organization. All OFT Program Directors are internal stakeholders, as all of their projects will be managed using the product (methodology & ***The Guidebook***) of this project.

Subject Matter Experts — OFT Strategic Assessment and Acquisition Team, OGS Procurement Group, OFT Counsel's Office, OFT Contract Management Office.

Figure 0-3 Organizational Chart for Example 2 – Medium Project Example



Example 3 – Large Project

Project Description:

The New York State Workers' Compensation Board OPTICS project was a large-sized project. The following roles were filled on the Project Team:

PROJECT ROLE	STATE TITLE
Project Sponsors	Chairman of the Workers' Compensation Board Designees in his absence were the Executive Director, the Deputy Executive Director
Project Manager	Director of the Information Management Services Division

Teams

There were many different teams at various points in the project lifecycle. Asterisks mark team members that were dedicated to the project for the duration of their involvement.

Team	Sub-team	Team Roles	##	Comments
Re-engineering Procurement Team		Team Lead	1	Project Manager
		Team Members – Technical Evaluators, Customer Representatives	4	Project Manager, Technical Managers
		Team Members – Financial Evaluators, Subject Matter Experts, Finance	2	Financial Analysts
	Selection Committee	Committee Members, Customer Decision-Makers	3	Deputy Executive Director, Senior Managers
Re-engineering Study Team		Team Lead	1	Project Manager
		Team Facilitators, Subject Matter Experts, Re-engineering and Change Management	5	Price Waterhouse Change Management Practice
	Core Team	Team Members, Customer Representatives	15	Individuals from every functional area, ranging from M-4 Managers to Grade 14 Individual Contributors
	Guidance Team	Team Members, Performing Organization Management	25	Mid-level managers from all regions and functional bureaus
	Executive Steering Committee	Team Members, Customer Decision-Makers	6	Chairman, General Counsel, Executive Director, Deputy Executive Director Operations, Deputy Executive Director Administration, Deputy Executive Director Compliance
*Imaging Team		Team Lead	1	Manager, Data Processing Services
		Team Members, Subject Matter Experts, Application Development (contractors)	3	
		Team Member, Subject Matter Expert, Imaging Technical Specialist	1	Systems Programmer
Imaging Outsourcing Procurement Team		Team Lead	1	Project Manager
		Team Members, Technical Evaluators, Customer Representatives	4	Project Manager, Technical and Functional Managers

Team	Sub-team	Team Roles	##	Comments
		Team members, Financial Evaluators, Subject Matter Experts, Finance	2	Financial Analysts
	Selection Committee	Committee Members Customer Decision-Makers	3	Deputy Executive Director, Senior Managers
Application Development Team		Team Lead	1	Chief DPS
	Data Conversion Team	*Team Lead	1	Manager, Data Processing Services
		*Team Members, Subject Matter Experts, Data Conversion Analysts/ Programmers	3-5	Senior Programmer/Analysts
		Team Members, Customer Representatives/ Decision-Makers	2-5	SG-14 up to M-1
	Application Conversion Team	*Team Lead	1	Manager, Data Processing Services
		*Team Members, Subject Matter Experts, Programmer/Analysts	10	Mix of contractors and State staff
		Team Members, Customer Representatives/ Decision-Makers	2-5	SG-14 up to M-1
	Design Team	*Team Lead	1	Manager, Data Processing Services
		*Team Members, Subject Matter Expert, Business Analyst	1	
		Customer Representatives/ Decision-Makers	12	From Grade 6 to M-3
	Development Team	*Team Lead	1	Manager, Data Processing Services
		*Team Members, Subject Matter Experts, Development/Design	15	
Technical Infrastructure Team		Team Lead	1	Director of Technical Services

Team	Sub-team	Team Roles	##	Comments
		Team Members, Subject Matter Experts, Technology Deployment	Up to 30	Technical Services staff were deployed as needed
Facilities Team		Team Lead	1	Director of Facilities Management
		Team Members, Subject Matter Experts, Facilities Management	3-5	Deployed as needed
		Team Members, Subject Matter Experts, Real Estate Specialist	2	OGS
Implementation Leadership Teams	Overall Manager		1	Manager – Continuous Improvement
	One team per district	Team Lead	1	District Manager
		Team Members, Subject Matter Experts in various operational areas	4-10	District Staff
Imaging Conversion Teams		Team Lead	1	Project Manager
	Imaging Rules Team	Team Lead	1	Manager, Data Processing Services
		Customer Representatives/ Decision-Makers	15	From each region
	Imaging Contractor	*Production staff	Peak 300; steady state 100	Specific staff varied as facility and service was developed and then implemented, and peaked, again as conversion and then fell to steady state
Re-engineering Process/ Procedures Development Team		*Team Lead	1	Administrative Analyst
		*Team Members, Subject Matter Experts, Technical Writing	5	
		*Team members, Subject Matter Experts, Application Development	2	
		Customer Representatives/ Decision-Makers	3-5	
Training Team		Team Lead Curriculum Developers	1 3	Manager of Staff Development

Figure 0-4 Organizational Chart for Example 3 – Large Project Example

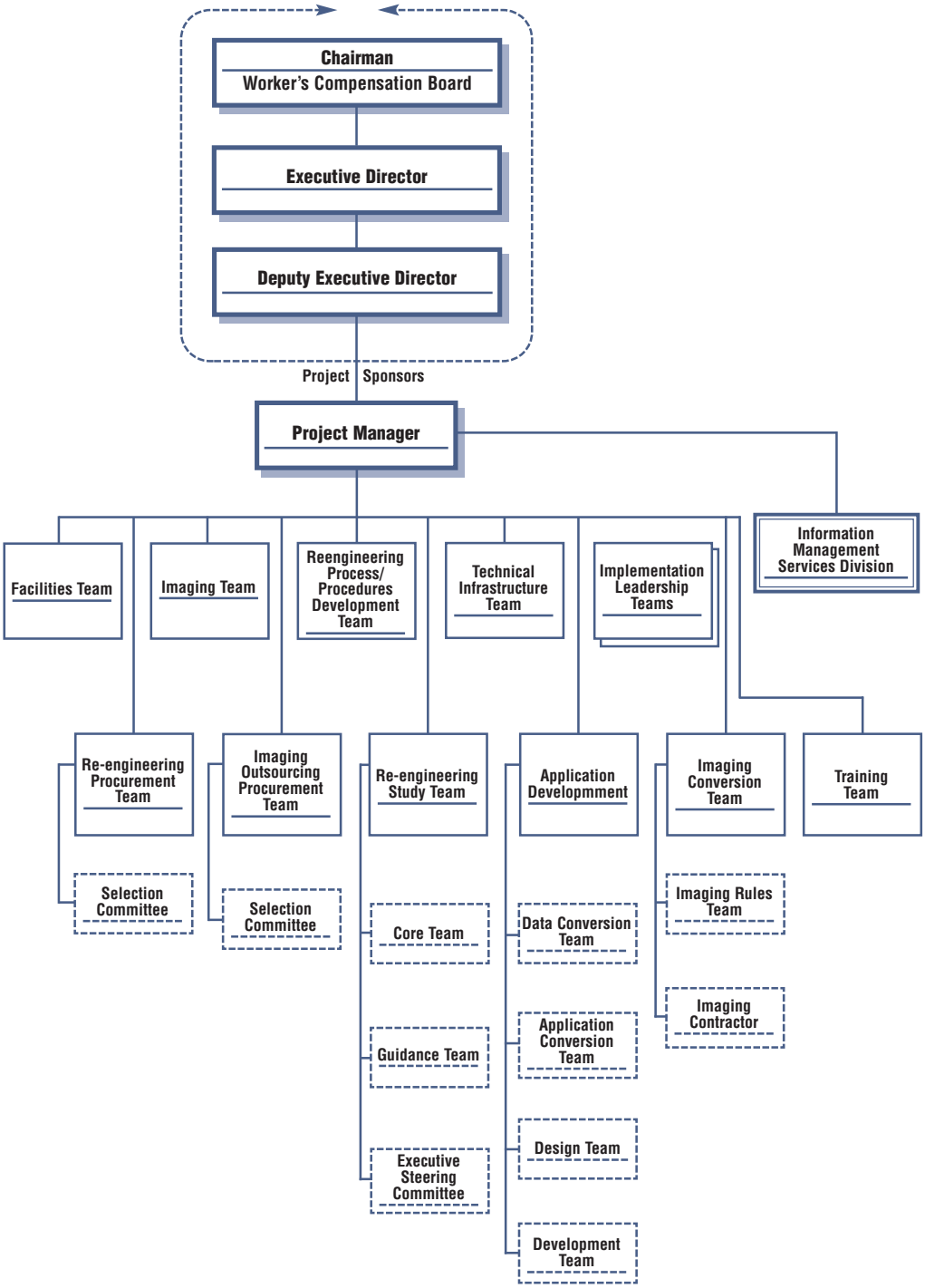


Figure 0-5 New York State Project Management Life Cycle Templates

Phase	Template	Description	Page in Text	Page in Appendix
All Phases	Project Status Report	Written by the Project Manager, this report summarizes project activity and is issued at pre-determined intervals (weekly) throughout the project.	95	39
All Phases	Project Deliverable Approval Form	Indicates Project Sponsor acceptance of deliverables attached and approval to proceed.	110	53
Project Origination	Business Case	Defines the business need for the project and supports the Project Proposal with objective analysis of the costs and benefits of doing the proposed project.	26	17
Project Origination	Project Proposed Solution	Defines the technical solution for how the project's product will support the organization's business need and strategic plan.	29	19
Project Origination	Proposal Decision Notice	Identifies the decision of the Project Selection Committee and communicates that decision to the Project Sponsor and other Stakeholders.	40	21
Project Initiation	Project Charter	Provides authority to establish the project. It is the contract between the Project Team and the Project Sponsor.	61	23
Project Initiation	Project Initiation Kick-off Meeting Agenda	Outlines a meeting agenda for an effective kick-off meeting.	65	27
Project Initiation	Project Scope Statement	Documents the deliverables of the project, its results and/or quantifiable objectives.	72	29
Project Initiation	Project Schedule Worksheet	A preliminary high-level schedule of the entire project.	77	31
Project Initiation	Project Quality Management Plan	Identifies and documents standards for each project deliverable.	81	33
Project Initiation	Preliminary Budget Estimate	Documents a preliminary estimate of the cost to complete the project.	87	37
Project Initiation	Project Communications Plan	Defines how often information will be disseminated, including the format and media to be used to reach the desired audience.	99	45
Project Initiation	Project Plan	The compilation of Project Initiation deliverables that ultimately guides the execution and control of the project.	104	49
Project Planning	Project Planning Kick-off Meeting Agenda	Outlines a meeting agenda for an effective kick-off meeting.	135	57

Figure 0-5 (Continued)

Phase	Template	Description	Page in Text	Page in Appendix
Project Planning	Project Budget	Refines cost estimates based on increased detail in Project Scope and Schedule.	146	59
Project Planning	Project Risk Management Worksheet	Ranks risks based on the likelihood and impact of risk occurrence, and details risk mitigation plans.	150	61
Project Planning	Project Change Request	Documents and defines requested changes.	158	63
Project Planning	Organizational Change Management	Defines and documents a plan to manage the changes that could occur in an organization as a result of implementing the product of the project.	168	67
Project Planning	Project Team Training Plan	Describes the skills required for team members and training target dates.	174	71
Project Planning	Project Implementation and Transition Plan	Describes implementation activities, their timeframes, and the transition of responsibility to the Performing Organization.	179	73
Project Execution and Control	Project Execution and Control Kick-off Meeting Agenda	Outlines a meeting agenda for an effective kick-off meeting.	207	77
Project Execution and Control	Progress Report	Produced by each Project Team member, this report documents time spent on tasks and provides estimates of time needed to complete tasks.	213	79
Project Execution and Control	Project Acceptance Form	Indicates Project Sponsor acceptance of the project deliverables and approval to proceed to the next phase.	250	81
Project Closeout	Post-Implementation Survey	Tool for soliciting feedback on the project.	270	83
Project Closeout	Post-Implementation Report	Summarizes feedback on project effectiveness, lessons learned, best practices and key project metrics.	280	91
Project Closeout	Project Respository Table of Contents	A suggested list of project-related materials to be maintained.	288	97

1 PROJECT ORIGINATION

Purpose

The purpose of Project Origination is to evaluate projects proposed for the next planning cycle and to reach a consensus on the projects to be selected. During this phase, the strength of a project's Business Case is tested, and the viability of the Proposed Solution is explored. A determination is made as to whether the project is consistent with the agency's strategic plan and affordable within budget guidelines.

The Project Proposal process may actually be part of the budget cycle, serving as the justification for budget requests. In this case, Project Proposals may need to be created a full budget cycle prior to the project's anticipated initiation.

Other factors that impact Project Origination include statutory requirements, regulations, legislative restrictions, and civil service rules.

Each organization has its own approach to green-lighting desired projects. The approach outlined below is only one of many possible variations of the evaluation and selection process. There are some general principles, however, that apply to any effective evaluation and selection process:

- The deciding body must have enough information about the merits of the project's Business Case and the viability of its Proposed Solution to make a meaningful evaluation;
- The competing projects' merits must be evaluated and compared using a consistently applied methodology;
- The selection process must take into consideration the project's fit with the organizational mission and strategic plan.

List of Processes

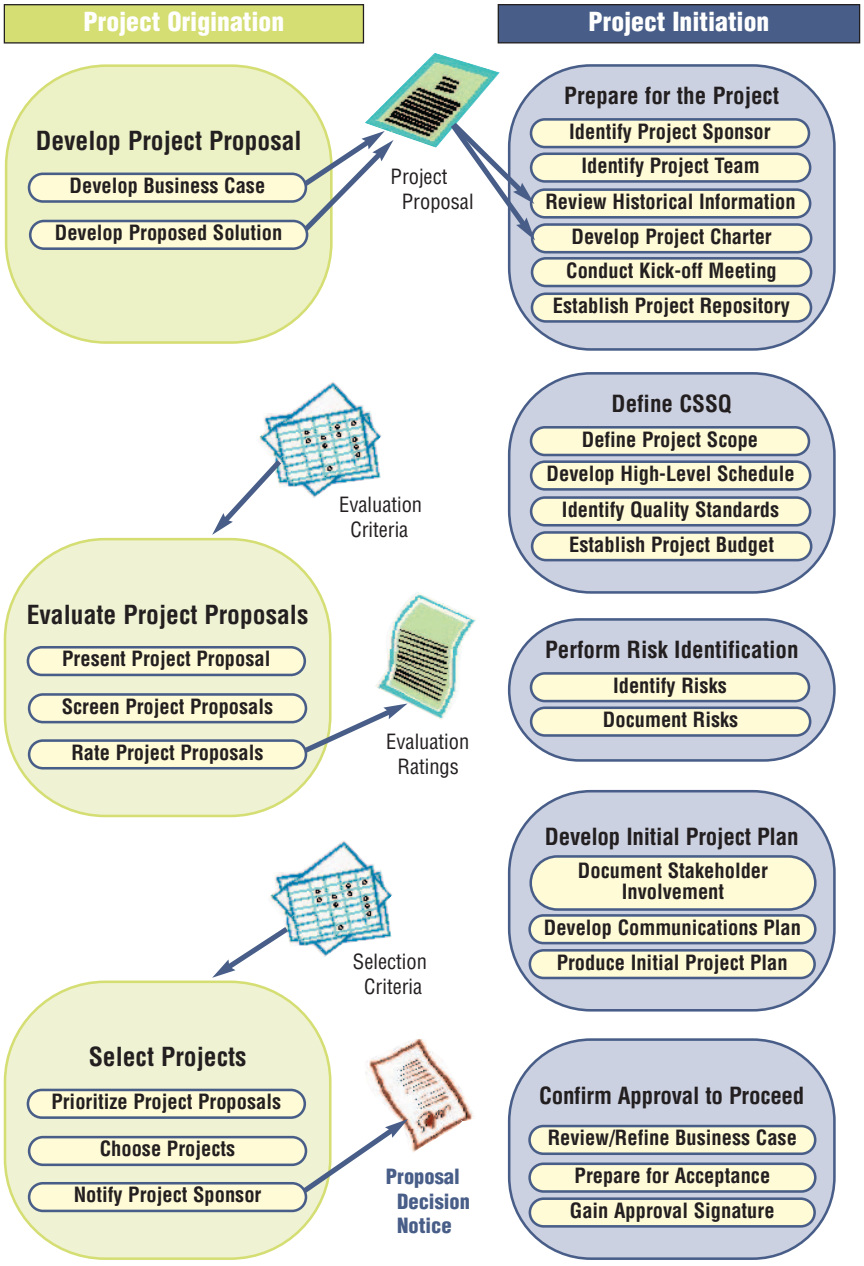
The three major processes in this phase of the project management lifecycle are:

- **Develop Project Proposal**, where the initial Business Case is made, and initial project parameters are defined;
- **Evaluate Project Proposals**, where cost/benefit analysis is performed, and the projects are evaluated against a set of specific business criteria; and

- **Select Projects**, where a consensus is reached on the project's feasibility and relative importance in comparison to other proposed projects, and a decision is formally made regarding the Project Proposal.

The following chart illustrates all of the processes, tasks, and deliverables of this phase in the context of the project management lifecycle.

Figure 1-1



List of Roles

The following roles are involved in carrying out the processes of this phase. The detailed descriptions of these roles can be found in the Section I Introduction.

- Project Sponsor
- Project Proposal Team
- Project Selection Committee

List of Deliverables

Since a Project Manager is not usually assigned to the project at this time, members of the Performing Organization Management prepare and review Project Origination deliverables.

Figure 1-2 lists all Project Origination tasks and their deliverables (or outcomes).

Figure 1-2

Processes	Tasks	Task Deliverables *(Outcomes)*
Develop Project Proposal	Develop Business Case	Business Case
	Develop Proposed Solution	Proposed Solution
Evaluate Project Proposals	Present Project Proposal	*Project Proposal Understanding*
	Screen Project Proposals	*Proposals Removed from Further Consideration*
	Rate Project Proposals	Evaluation Ratings
Select Projects	Prioritize Project Proposals	*Prioritized Proposals*
	Choose Projects	*Selected Projects*
	Notify Project Sponsor	Proposal Decision Notice

1.1 DEVELOP PROJECT PROPOSAL

Purpose

Before a project can be selected for initiation, a persuasive case must be made for its viability given current organizational priorities. In **Develop Project Proposal**, the initial Business Case for the project is formulated, and all information required for project selection is formalized in the Proposed Solution. A proposal for a project may come from any place in the Performing Organization, but someone must be identified as the "owner" of the proposal, and must serve as Project Sponsor, at least through the evaluation and selection process. The Project Sponsor may be in executive management, in a specific functional program area, or a representative of the Customers or the Consumers within the Performing Organization.

Roles

- Project Sponsor
- Project Proposal Team

Since information from the Business Case is included in the Proposed Solution – and vice versa – the tasks to develop those documents should be performed not consecutively, but concurrently, with one document informing and influencing the other.

Tasks

1.1.1 Develop Business Case

The Business Case is one of the defining documents of the project, providing information necessary to support the decision to launch the project at the end of Project Origination and to continue the project in subsequent phases. The Business Case must identify an existing business need and lay the foundation for developing a potential solution to meet that need. The cost of implementing the solution must be estimated and compared to the benefits gained, and justification for the potential project should also depend on whether the project is consistent with the orga-

The tasks to Develop Project Proposal are:

- Develop Business Case
- Develop Proposed Solution

nization's mission. For a sample Business Case template, see Figure 1-3, the New York State Project Business Case.

The Business Case must provide a compelling case for the project. A careful study should be made of expected benefits to the organization implementing the project. An analysis of the costs, benefits and risks associated with the proposed approach can be made, and the justification necessary to obtain the proper level of commitment from the decision-maker(s) can be formulated. Once an original cost estimate for the project is derived during Develop Proposed Solution. The Business Case can also identify special funding sources available for the proposed initiative, and should align the project's costs with the agency budget cycle. If the project is going to span multiple budget cycles, a multi-year strategy for project funding should be discussed with the agency fiscal officer, who may find it useful to review the Business Case with another constituency – the Division of the Budget (DoB).

During Project Origination, any estimates are acknowledged to be high-level at best. As the project progresses through the Initiation and Planning phases, those estimates will become more precise as more is learned about the true parameters of the project, and additional go/no go decisions will be made based on the latest information. It is also important to note that, in order to define project parameters with adequate precision, Initiation and Planning will require substantial resources, and initial estimates should reflect that fact.

Before presenting the proposal for evaluation, the Project Sponsor should have the Business Case reviewed by the people most intimately familiar with its imperatives – Customer Decision-Makers.

The Business Case will continue to be a critical component of the decision-making process throughout the entire project management lifecycle – from the initial decision to proceed with the project to the decisions made at periodic project reviews to continue, modify or terminate the project. At the end of each project management phase and whenever there is a significant change to the project or the business function, the Business Case will be reviewed and re-validated.

Figure 1-3 New York State Project Business Case

New York State
Project Business Case

PROJECT IDENTIFICATION

Project Name: _____ Date: _____
Agency: _____
Business Unit/Program Area: _____
Project Sponsor: _____ Project Manager: _____

*Enter the **Project Name**.*
*Enter the current **Date**.*
*Enter the name of the **Business Unit** or **Program Area**.*
*Enter the name of the **Project Sponsor** and the **Project Manager** (if known).*

Business Need/Problem:

*Briefly describe the **Need** or **Problem** driving the proposed project.*

Solution (as described in Proposed Solution):

*Briefly describe the product of the project that would resolve the Business Need or Problem, and the **Solution** proposed to create it*

Consistency/Fit with Organization's Mission:

Describe how the project is consistent with the mission or provide rationale if it is not .

Figure 1-3 (Continued)

Anticipated Benefits: (both qualitative and quantitative)

*List all **Anticipated Benefits** resulting directly from the project. Specify the ways there will be measurable improvement of new capabilities. Consider the implications of NOT doing the project – what benefits would be missed?*

Original Cost Estimate: (from Proposed Solution)

*Provide **Cost Estimate** for project from proposal.*

Cost/Benefit Analysis:

*Briefly justify the **Costs** for the identified **Benefits**. Include quantitative analysis, e.g., calculations of anticipated savings, costs avoided, Return On Investment, etc.*

Special Fund Sources:

*List and describe any **Sources** for project funding. Are there grants that will be applied for? Are federal funds available? Is a charge-back to the Customers planned?*

1.1.2 Develop Proposed Solution

A Proposed Solution starts with the summary of the business need (abstracted from the Business Case), defines the optimal solution to address that need, and describes how the solution fits into the organization's strategic plan.

The Proposed Solution should include an evaluation of all alternatives considered, and a justification of the solution selected. The basis of time and cost estimates for the Proposed Solution (expert judgment, availability of historical data on similar projects, Request For Information (RFI) responses, etc.), as well as the accuracy of the estimates (+/- 100%, +/- 50%, etc.), should be documented. Some initial risk factors should be considered, along with strategies for mitigation. An initial assessment of the project's impact on the organization is made, laying a foundation for a successful transition at the end of Project Execution and Control.

It may be advisable to include a description of the project's profile/visibility, documenting, for example, whether the project is required as a result of federal or state legislative action, gubernatorial or executive mandates, or agency program priorities. In general, highly visible projects will receive higher priority.

If the Performing Organization uses standard evaluation forms/formats, the Proposed Solution may include a "self-assessment" performed by the Project Sponsor or the Project Proposal Team. Such a self-assessment may assist the Project Sponsor to realize weaknesses in the proposal before formal submission for evaluation and selection.

The Proposed Solution should also identify legislative, regulatory, and policy systems that will facilitate, compel, or constrain the project. For example, the project may be funded by a specific line item in the recently passed state budget, or the project may be constrained by necessary interfaces to state or federal funding and/or control/oversight agencies. All affected Stakeholders should be identified.

It is highly advisable to have an independent party verify the Proposed Solution and associated estimates.

The completed Proposed Solution is combined with the Business Case to complete the Project Proposal, which will be presented to the project evaluation and selection process.

Figure 1-4 New York State Proposed Solution

New York State
Proposed Solution

PROJECT IDENTIFICATION

Project Name: _____ Date: _____

Business Unit/Program Area: _____

Project Sponsor: _____ Project Manager: _____

*Enter the **Project Name**.*
*Enter the current **Date**.*
*Enter the name of the **Business Unit** or **Program Area**.*
*Enter the name of the **Project Sponsor** who is the contact person if more information is needed, and the **Project Manager** if known.*

Summary of Business Need for the Project (from the Business Case):

Briefly summarize the Business Case. This section should include identification of the Customers and anticipated Consumers of the project's product and a description of the particular business problem or need the project will address.

Proposed Solutions / Project Approach:

Alternatives considered	Why chosen/not chosen

*This section should include a description of the **Solution** being proposed and others that have been considered. Describe why this solution was selected instead of the others, and why the others were not. The decision should summarize the strategy that will be used to deliver the project and identify high-level milestones and dates. It is possible that a single solution cannot yet be recommended; in that case, indicate when – and how – the decision is likely to be made.*

Figure 1-4 (Continued)

Project Objectives:

*Briefly describe the **Objectives** of the project.*

Consistency/Fit with Organizational Strategic Plan:

*Describe how this project and its objectives specifically support the organization-wide **Strategic Plan**?*

BUDGET/RESOURCES:

Estimated Costs:			
Type of Outlay	Initial (Development)	Annual (Recurring)	Remarks
Hardware			
Software			
Supplies			
User Training			
Consultant Services			
Other:			
TOTAL			
Estimated Resources/Personnel:			
Program Areas	hours	hours	
	hours	hours	
	hours	hours	
Information Services	hours	hours	
Consultant Services	hours	hours	
	hours	hours	

*Enter the **Estimated Costs** for each of the items listed, both **Initial**, during project development, and **Recurring**. Add any **important** relevant information under **Remarks**. Enter the **Resources/Personnel** estimated for the project and the number of hours required of each resource during the **Initial** project period, and then **Annually**.*

Figure 1-4 (Continued)

Risks:

*List and briefly describe **Risks** to the project that you have identified.*

Organizational Impact:

*Briefly describe the **Impact** the project will have on the organization.*

Additional Comments:

Enter any other information that may be important to the project.

Deliverable

- **Project Proposal** – a document describing the project that is submitted by the Project Sponsor to the selection process. It comprises the **Business Case** and the **Proposed Solution**, which include such items as a description of the product, the benefit to the performing organization, alignment with the organization's mission and strategic plan, a high-level estimate of the required resources, costs and timeframes, and any other information specifically required by the Performing Organization for selection consideration.

1.2 EVALUATE PROJECT PROPOSALS

Many organizations generate multiple proposals for various new initiatives on a continuing basis; however, budgetary and other constraints allow only a fraction of those efforts to occur. Choosing the right projects, which support the organization's mission and assist with the implementation of its strategic plan, becomes a crucial activity, starting with an objective evaluation of proposed initiatives. **Evaluate Project Proposals** presents an approach to rating competing proposals in a methodical, impartial fashion; the results are indispensable to the success of the subsequent project selection process. Organizations may implement this process in a variety of ways – from relying on unilateral decisions of a chief executive or designee, to convening cross-functional deliberative councils. The tasks presented below are designed to illustrate the components of an effective proposal screening and evaluation process, and not to prescribe a particular format required to reach a desired objective.

Roles

- Project Sponsor
- Project Selection Committee

The frequency of an organization's evaluation/selection process may be dictated by many factors, including the size of the proposed projects, the vacillations of the budget cycle, and the occurrence of external mandates and internal imperatives.

1.2.1 Present Project Proposals

Because the quality and level of detail among typical Project Proposals tends to vary a great deal, it is beneficial to allow the Project Sponsor to make a case for the project in person. This also allows decision-makers to ask questions and gather additional information on the spot, without resorting to more formal – and slower – channels of communication. The presentation should be based on the Proposed Solution and the Business Case, but it can take many forms – from a formal slide presentation to an informal run-through of existing material. The objective is to allow the decision-makers to interact with those who best understand the business reasons for the initiative, and its Proposed Solution.

The tasks to Evaluate Project Proposals are:

- Present Project Proposals
- Screen Project Proposals
- Rate Project Proposals

1.2.2 Screen Project Proposals

Before a great deal of effort is expended on rating, prioritizing and selecting presented projects, it may be useful to screen competing proposals by asking some important questions, such as:

- Does the project support the organization's mission?
- Does the Proposed Solution align with the organization's strategic plan/technical architecture?
- Is there an available/plausible funding source for this effort?
- Does the project's cost/benefit analysis justify its initiation?

Unless a project is legislatively (or otherwise) mandated, simply working through these questions will result in elimination of some proposals from further consideration. The Project Sponsor should be notified, and the decision should be documented on the Proposal Decision Notice form (see Figure 1-7).

1.2.3 Rate Project Proposals

Rating of Project Proposals is generally performed by executive management or by a group designated by executive management (Project Selection Committee). The group may meet on a regular or an as-needed basis to perform this function, or the rating of proposals may be an integral part of the organizational strategic/tactical planning and budgeting process.

The process is usually formal, with specific forms/formats and procedures. In smaller organizations, however, it may be more informal, and may even be combined with the selection process. In these cases, a brief presentation to the Commissioner, Director, or other organization head may be all that is required to commit resources (funding, personnel, equipment, etc.) and initiate the project.

Proposals are generally rated according to a set of specific business criteria. The process may include a broad technical review to determine if the proposal follows current agency standards and technical architectures. The funding associated with a project is also a critical component of the rating process. A Performing Organization may have unique rules regarding funding for proposals. During Project Origination, the Project Sponsor must identify whether funds are expected from the Performing Organization's current/future operating budget, or whether additional funding sources are available.

The level of approvals needed may vary depending on whether the project exceeds or falls below defined thresholds. Thresholds may be based on cost, involvement of more than one functional area, project needs within or outside of standards and procedures, or other areas specific to the Performing Organization. The rating process generally assigns a score to each project, to inform the selection process. See Figure 1-5 for a Sample Project Rating Matrix.

Figure 1-5 Sample Project Rating Matrix

SAMPLE PROJECT RATING MATRIX

	Project Name	Project Sponsor	Strategic Alignment*	Risk*	Cost/ Benefit*	Total
1						
2						
3						

*Each of these categories would have a separate matrix or worksheet as supporting documentation, which would typically roll up to a single rating within each category. These worksheets should be standard across projects to provide comparative rankings.

STRATEGIC ALIGNMENT

Mandatory Requirement:

0 Initiative not mandatory
1 Initiative inferred by or strongly suggested in law, regulation
2 Initiative specifically required by law, regulation

Alignment to Mission, Goals, & Objectives:

-1 The initiative does not map to any mission, goal, or objectives
0 Explicit documentation somewhat maps this initiative to missions, goals, and objectives.
1 Explicit documentation clearly maps this initiative to missions, goals, and objectives.
2 Accomplishment of mission, goals, and objectives is highly dependent on this initiative and clear documentation exists which supports this assertion.

Process Improvement:

-1 Initiative does not assist or generate process improvements.
0 There is documented evidence that the initiative will assist or generate process improvements within a workgroup.
1 There is documented evidence that the initiative will assist or generate process improvements across a division.
2 There is documented evidence that the initiative will assist or generate process improvements across the agency.

Other categories that might be included within strategic alignment include:

- Consequences of not doing the initiative
- Impact on Internal and/or External Customers
- Cross-Functional/Organizational Impact
- Scope of Beneficiaries

RISK

-1 The initiative's impact depends on another initiative not yet completed – AND – scheduled risk mitigation actions have not been identified.
0 There are no predicted or foreseen adverse impacts on the initiative's schedule – OR – the initiative's impact does not depend significantly on any other initiative yet to be completed.
1 There are no predicted or foreseen adverse impacts on the initiative's schedule – AND – there are no major interfaces with other initiatives or systems.

COST/BENEFIT

-1 The cost estimate is highly dependent upon uncontrolled variables (e.g., availability of external funding sources, changes in component pricing or maintenance contracts) and is therefore subject to significant change (>10%).
0 Situation may arise which may cause this year's costs to vary by no more than 10% of estimates.
1 Measures to identify in a timely manner and reduce variances between the actual cost of work performed and the budgeted cost of work performed are clearly documented.
2 Measures to identify in a timely manner and reduce variances between the actual cost of work performed and the budgeted cost of work performed are clearly documented – AND – cost estimates are not significantly dependent upon identifiable uncontrolled variables.

A simple method to compare projects uses pairwise comparisons. For all projects being considered, make a comparison between two projects and determine which has the most overall value to the organization.

The example below shows a pairwise comparison done for five (5) projects. When a project is compared to itself, the result is NA. (Ex.: row 2, column 2) First, compare Project A across row 2 to each of the other projects. Next, compare Project B across row 3 to each of the other projects, and so on. When done comparing, total the scores across each row and note that number under "Rating" in column 7. The highest number indicates the highest rated project.

A more detailed process could also be developed which evaluates the projects for a variety of specific criteria (priority, cost, benefit, etc.), and then the ratings combine for an overall score.

Figure 1-6 Sample Pairwise Comparison

	Column 1 ____	Column 2 ____	Column 3 ____	Column 4 ____	Column 5 ____	Column 6 ____	Column 7 ____
Row 1 ____	**Project**	**A**	**B**	**C**	**D**	**E**	**Rating**
Row 2 ____	**A**	**NA**	1	1	1	0	3
Row 3 ____	**B**	0	**NA**	0	1	0	1
Row 4 ____	**C**	0	1	**NA**	1	0	2
Row 5 ____	**D**	0	0	0	**NA**	0	0
Row 6 ____	**E**	1	1	1	1	**NA**	4

Project A is of greater value than Project B
Project A is of greater value than Project C
Project A is of greater value than Project D
Project B is of greater value than Project D
Project C is of greater value than Project B
Project C is of greater value than Project D
Project E is of greater value than Project A
Project E is of greater value than Project B
Project E is of greater value than Project C
Project E is of greater value than Project D

Final Ranking:

Priority	Project
4	E has the highest value
3	A
2	C
1	B
0	D has the lowest value

Deliverable

- **Evaluation Ratings** – a score assigned to each project as a result of the project evaluation process. The ratings are used during project selection to rank projects in terms of their overall benefit to the Performing Organization.

1.3 SELECT PROJECTS

Once the Project Proposals have been uniformly and objectively rated, it is necessary to prioritize them to reflect how they compare to one another in various aspects, including supporting current organizational priorities, the mission and the strategic plan. At that point in the **Select Projects** process, a decision can be made as to how many of the top-rated proposals can be accommodated by the agency's budget, resources, and ability to absorb organizational change. Whether the project is approved, declined, or sent back for additional information, the Project Sponsor must be notified, and the decision documented.

Roles

- Project Sponsor
- Project Selection Committee

1.3.1 Prioritize Project Proposals

Quantitative ratings derived through the evaluation process make the prioritization process a simple matter of sorting the higher scores to the top. However, it may be useful to review the generic rating criteria once again and decide if some additional

The tasks to Select Projects are:

- 1.3.1 Prioritize Project Proposals
- 1.3.2 Choose Projects
- 1.3.3 Notify Project Sponsors

measurements are needed. Complying with legislative mandates or executive chamber initiatives, for example, may trump even well conceived process improvement opportunities. These are the factors evaluated to determine a project's feasibility and its relative importance in comparison to other proposed projects. Whatever the final set of criteria, they should be documented and applied equally to each competing proposal, to enable a fair and competent selection process.

1.3.2 Choose Projects

A committee of executives from the Performing Organization usually makes project selection decisions. Even if the Commissioner or other agency head (Chairman, Director, etc.) makes the final decision, a Project Selection Committee generally reviews and develops recommendations. It may be useful to, once again, invite the Project Sponsor to make a presentation to the Committee and answer questions.

The Project Selection Committee must choose projects that, in combination, will provide the best investment for the Performing Organization. The Committee considers competing priorities in determining what is best for the whole. All proposals must be evaluated in the context of other proposals, current projects and ongoing operations in order to set priorities and determine resource availability. This process may be accomplished through discussion and vote, or the Committee may use specific tools (software, spreadsheets, etc.) designed to facilitate comparison of the proposals.

The projects chosen as a result of this process may not necessarily reflect what is best for an individual employee or a single work unit. Sometimes a lower-priority project will be approved simply because it is low-risk or low-cost, and can deliver needed benefits or services. Sometimes a project can be undertaken because it needs few resources, and can be performed while larger initiatives are delayed. Projects may be approved for immediate action or with a delay for obtaining resources. It is also possible that a proposal could be returned to the Project Sponsor for further development without approval or rejection.

Choosing a project does not necessarily guarantee that the project will be undertaken by the Performing Organization. That is generally dependent upon the availability of necessary funding. Each Performing Organization may have a different process whereby chosen projects are actually authorized to proceed to Project Initiation.

1.3.3 Notify Project Sponsors

Once the decisions have been made, it is imperative to document them and to explain their rationale to the Project Sponsors and other Stakeholders. One of three outcomes can occur:

1. A decision is made to proceed with the project. In this case, a determination must be made when Project Initiation can begin. At that point a Project Manager must be assigned to the project. The finance office must be brought on board to ensure adequate funding for the project, and control agencies may be notified that the project is being initiated.
2. A decision cannot be made on the project without some additional information. In this case, the specific information required for an informed decision should be documented, and communicated to the Project Sponsor, along with some guidelines for submitting the proposal again in the next evaluation/selection cycle.
3. A decision is made to decline the proposal. In this case, a detailed explanation for the decision should accompany the message, outlining where the proposal came up short in the screening, evaluation, prioritization and/or selection.

In all three cases, the same Proposal Decision Notice can be used to document and communicate the decision (see Figure 1-7).

Figure 1-7 Proposal Decision Notice

New York State
Proposal Decision Notice

PROJECT IDENTIFICATION

Project Name: _____ Date: _____
Agency: _____
Business Unit/Program Area: _____
Project Sponsor: _____ Project Manager: _____

*Enter the **Project Name**.*
*Enter the current **Date**.*
*Enter the name of the **Agency** requesting the project, and the **Business Unit or Program Area**.*
*Enter the names of the **Project Sponsor** and **Project Manager** (if known).*

Proposal Decision

Decision	Indicator	Date
Project Proposal Approved		
Additional Information is Required for Decision		
Project Proposal Declined		

*Put a check-mark in the **Indicator** box next to the decision made. Enter **Date** of decision. Make sure to fill out corresponding section below and forward back to **Project Sponsor**.*

Project Selection Committee Signatures

Project Selection Committee Member Name	Signature	Date

*Enter **Project Selection Committee** member names in the first column; members **sign** and **date** the form in the corresponding boxes.*

Figure 1-7 (Continued)

Project Proposal Approved

Target Date for Project Initiation start:

Project Sponsor Assigned:

Project Manager Assigned:

If known, indicate target date for start of Project Initiation.
*Enter names of assigned **Project Sponsor** and **Project Manager**.*

Additional Information Required for Decision

Specific Additional Information Required:

Proposal re-submission date for the next Project Selection Cycle:

Other comments:

*Provide guidance to the **Project Sponsor** on specific information required for an informed decision, along with guidelines for re-submitting the proposal again in the next evaluation/selection cycle.*

Project Proposal Declined

Explanation of decision:

Screening results:

Evaluation results:

Prioritization/Selection results:

*Provide a detailed explanation for the decision to decline the Project Proposal. Outline where the proposal came up short in the **Screening**, **Evaluation**, **Prioritization** and/or **Selection**.*

Deliverable

- **Proposal Decision Notice** – a formal document indicating one of the three possible outcomes of the Project Selection process: proposal approval and project selection, request for additional information, or proposal declination. The Proposal Decision Notice is used to document the Project Selection Committee's decision, and to communicate it to the Project Sponsor.

Project Origination End-of-Phase Checklist

How To Use

Use this checklist throughout Project Origination to help ensure that all requirements of the phase are met. As each item is completed, indicate its completion date. Use the Comments column to add information that may be helpful to you as you proceed through the project. If you elect NOT to complete an item on the checklist, indicate the reason and describe how the objectives of that item are otherwise being met.

Figure 1-8

Item Description	Page	Completion Date	Comments	Reason for NOT Completing
Develop Project Proposal:	**24**			
Formulate business need/ problem and anticipated benefits to all parties	24			
Review project's fit with organization's mission	24			
Identify project objectives	28			
Research potential approaches and solutions	28			
Identify and recommend one (or more) chosen solution(s)	28			
Review solution's fit with organization's strategic plan	28			
Estimate costs of all resources and materials required for the project, both initial and recurring	28			
Identify potential project risks	28			
Identify organizational impacts of the project	28			
Identify any legislative, regulatory or policy dependencies or implications of the project	28			
Perform project cost/benefit analysis	28			
Identify project funding strategies	28			
Complete Business Case and Proposed Solution forms	28			

Figure 1-8 (Continued)

Item Description	Page	Completion Date	Comments	Reason for NOT Completing
Evaluate Project Proposals:	**32**			
Submit Project Proposal to the Selection process	32			
Schedule and conduct proposal presentation	32			
Identify and/or utilize proposal screening criteria	33			
Identify and/or utilize proposal rating criteria and methods	33			
Select Projects:	**37**			
Identify and/or utilize proposal prioritization criteria	37			
Evaluate projects' requirements vs. organizational capacity	37			
Recommend projects for selection	37			
Choose projects for initiation	38			
Notify Project Sponsor of unfavorable screening outcome	39			
Document decision process and outcome for each proposal	39			
Complete Proposal Decision Notice forms	40			
Get signatures from Project Selection Committee members	40			
Notify Project Sponsor(s)	41			

Measurements of Success

Success in Project Origination is not only receiving permission to proceed on the proposed project, but also understanding the executive decision, which often results in a greater understanding of the organization's mission.

During Project Origination, certain assumptions and projections are made regarding the main project parameters – cost, benefit, scope, and timeframe. These initial estimates are used to rate the project under consideration against all other competing initiatives. The main measurement of success for Project

Origination is the consensus of the Performing Organization Management that the projects were weighed fairly, and that the ones with the most compelling Business Case received a green light.

Before the final project selection, it is possible to assess how successfully the evaluation process is proceeding by utilizing the measurements outlined below. More than one "No" answer indicates a serious risk to the desired consensus described above.

Figure 1-9

Process	Measurements of Success	Yes	No
Develop Project Proposal	Have the anticipated benefits been reviewed and accepted by the Customer?		
	Does the expected outcome of the project support the organization's mission?		
	Does the Proposed Solution address only the agenda described by the business problem?		
	Has an independent party assessed the estimated costs and resources?		
	Does the Project Proposal make clear how various approaches/solutions were considered and evaluated, and why a particular solution is being proposed?		
Evaluate Project Proposals	Was the project rated on all of the following: ◆ Strategic alignment? ◆ Risk? ◆ Proposed Solution? ◆ Cost? ◆ Benefit? ◆ Funding?		
	Were the evaluation criteria applied equally to all projects under consideration?		
Select Projects	Does the Project Proposal Team understand the reasons for the project's approval or declination, or for additional information that is required?		
	Is there a consensus among the Performing Organization Management that the selection process was objective and fair?		

Phase Risks / Ways to Avoid Pitfalls

Selecting the wrong project is a very costly, and sometimes devastating mistake that many organizations make. Even a great idea may not be worth expending the resources or accepting the associated risk. Or the project may simply need to be delayed until more resources are available or the associated risk can be mitigated. Selecting the right projects in the wrong combination and, therefore, overextending the organization's resources can be just as devastating. It is not always easy to see why good Project Origination procedures, resulting in a well thought out selection of projects, are so critical to the success of the Performing Organization. Hopefully, now that you have read this section, it is easy for you to understand and you can help others see the light!

What are some of the key elements of Project Origination that require the most attention? The following table identifies processes and tasks that are highlighted in this section.

Figure 1-10

Process	Task	Why is it important?
Develop Project Proposal	Develop Business Case	This document is the basis of the project's acceptance or rejection not only in this phase, but throughout the rest of the project lifecycle.
	Develop Proposed Solution	Having the proposed solution approved before launching into project activities protects the project team, the project, and the whole organization from anarchy.
Select Projects	Choose Projects	Selection of the projects with the greatest value and greatest chance for success is key to the success of any organization.

PITFALL #1 – IT'S NOT THAT EXPENSIVE, LET'S DO IT!

A high-level cost/benefit analysis must be included in your proposal. It might initially appear that a wonderful benefit to your employees is to supply donuts every day. It might build morale. It might increase their energy levels from the sugar high. However, what are the costs? Good donuts cost money. Could agency funds be expended elsewhere for greater benefit? Is there a less distracting morale builder? There may be decreased productivity as the post-sugar slump hits. Should fresh fruit be considered instead? Cleaning costs might increase as crumb trails cover the floors. You might need to hire pest control as the ants and mice move in. Should the idea of an agency-provided snack be vetoed, as the outcome would actually be more of a problem than it is a benefit?

Your proposal must clearly show that you have at least considered the cons as well as the pros. It must show that you have examined the costs as well as the benefits. It must exhibit that you've considered the long-term ramifications as well as the short-term gains.

PITFALL #2 – CHICKEN BEFORE EGG, INITIATION BEFORE APPROVAL

It's very tempting to get the project started before you get final approval as a way of showing management what a great idea it is. ("I'll show them what a good idea this is and they won't be able to say no!") For novice Project Managers, and for organizations first implementing a formal methodology, it may be very easy to go too far into Project Initiation and Project Planning while you create the proposal for the project. ("Once we expend the resources to do the planning, it doesn't even make sense to turn down the Project Proposal.")

Moving into Project Initiation and Project Planning before the project has received approval through the project selection process can lead to wasted time and resources, especially if the project is not ultimately approved. If this is done repeatedly, it could lead to a loss of trust in those involved – the originator of the proposal as well as the selection committee and the Project Sponsor. A delicate balance must be maintained between providing enough information to adequately support your Project Proposal and expending too much time and effort (read "expense") at this phase. But don't ever throw anything out! If you accidentally gather more information than you need, save it for Project Initiation and Planning after your proposal IS approved.

PITFALL #3 – ONE-PLUS-ONE DOES NOT EQUAL TWO

Selecting the proper combination of projects to be worked on simultaneously within an organization is often a delicate balancing act. If Project A is going to take six months, and Project B is going to take eight months, you cannot conclude that working on the two projects simultaneously means they will both be done at the end of eight months. Both projects may require the same resource during the first two months. Even if both projects are very high priority, it may make more sense to delay the start of one for several months to allow resources to concentrate in one place. The outcome may very well be that more total work can be accomplished.

For example, if you have one staff person doing a task in two different cities that requires three days each, she can get both tasks done in 10 days if she spends three consecutive days in city A and three consecutive days in city B. However, if you make her do both by spending one day at a time in each city, you add travel days and weekends for a total of seven additional days.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Scenario 1:																			
A		X	X	X															
Travel	X				X			X				X							
B									X	X	X								
Scenario 2:																			
A		X							X							X			
Travel	X		X		X			X		X		X			X		X		X
B				X							X							X	

This may seem to be an extreme example, but it has a similar effect to going back and forth between tasks. It takes time to repeatedly wrap up and pick up new tasks. Too many projects at once can result in so much task thrashing that very little gets done.

Determining the proper combination of projects to be done at the same time requires that each project have clear resource requirements and time schedules. At a high level, this can be determined during Project Origination. Dependencies between projects must be considered at this time.

PITFALL #4 – CONGRATULATIONS! YOUR PROJECT WAS SELECTED. NOW WAIT.

The vagaries of the state budget process are such that months, if not years, may have elapsed between that euphoric moment you learned that your dream project passed its final Origination hurdle, and the day that you, wizened, weary and bedraggled – but infinitely more astute – actually performed the first Initiation task by asking, "Whazzit all about?"

Often, by the time the project actually gets going, original players have either gone to bigger and better things, or have forgotten all about your puny little project, and the only thing that stands between your success and oblivion is good documentation. Dust off that old Business Case; dig out that forgotten Proposed Solution; and shake that Proposal Decision Notice into any face that dares to challenge your authority to proceed.

Anticipate – and mitigate – the consequences of the likely delay by developing good Origination documentation, keeping it ready and up to date, and keeping your eyes peeled for good candidates for the eventual Project Team.

Frequently Asked Questions

Why should project selection be done at the enterprise level? I know how to run my division!

No one has expertise in every area. Division heads do not usually know all of the activities in every other division. How often have you seen more than one division inventing solutions to the same problem? Not only do you waste resources developing multiple solutions, you then continue to waste resources maintaining two solutions to one problem. An enterprise view, with appropriate executive oversight, of all initiatives is vital to coordinate activities and maximize productive use of time.

How am I supposed to make the Commissioner (Chairman, Director, etc.) understand the importance of this proposal? They are just too far removed.

It is your responsibility to provide information that is sufficient to enable the Performing Organization's executive management to understand the value of your project in the written proposal.

Show the benefits. Identify the targeted Customers. Explain the significance of the product. Illustrate the value at the level necessary to promote a clear understanding. Use the proposal to educate the executive management on the merits of your idea.

Why should we expend the time and effort to create a proposal when we could just start doing the work?

If everyone followed this philosophy, the organization would be pulling itself in so many directions that perhaps nothing of value would ever get done. Managers and executives need to manage the work of the organization to ensure its alignment with its mission. Proposals provide executive management with the information they need to manage the organization's resources.

Why should we wait for their approval?

Forging ahead without the appropriate approvals results in wasted resources if the proposal is declined, significantly altered, or delayed. For example, moving ahead without approval could cause you to use technology that executive management has already chosen to replace and you will now have to start over with a new hardware and software platform. The executive staff representatives on the selection committee may be privy to information that is not publicly announced yet. It is the responsibility of the executive staff to determine the priorities that staff is to address.

2 PROJECT INITIATION

Purpose

The purpose of Project Initiation is to begin to define the overall parameters of a project and establish the appropriate project management and quality environment required to complete the project.

Development of the Project Charter is a pivotal starting point for the project, establishing the project definition that will serve as the foundation for all future efforts. The completion of this process is marked by the Project Kick-off Meeting, in which the Project Manager presents the Project Charter.

Successful projects begin with a detailed project definition that is *understood and accepted* by Stakeholders. Putting everything down in writing helps ensure a commitment among Project Team members and between the team and the Stakeholders. As part of Project Initiation, an initial Project Plan is developed, which comprises the Project Charter, Cost/Scope/Schedule/Quality (CSSQ) documents, and preliminary risk identification list. These documents, once approved, ensure a consistent understanding of the project, help to set expectations, and identify resources necessary to move the project to the next level of detailed planning. Potential problems are identified so that they can be addressed early in the project.

Also during Project Initiation, a high-level Project Schedule is developed as the roadmap to more detailed Project Planning and Project Execution and Control. This high-level schedule will be refined over time, and will serve as the primary source of information regarding project status and progress. An accurate, realistic, and complete schedule, rigorously maintained, is essential to the success of a project.

Sponsorship of the project must be confirmed or gained during Project Initiation. Having a Project Sponsor, and securing approval early in the project management lifecycle, helps to ensure a commitment to the project.

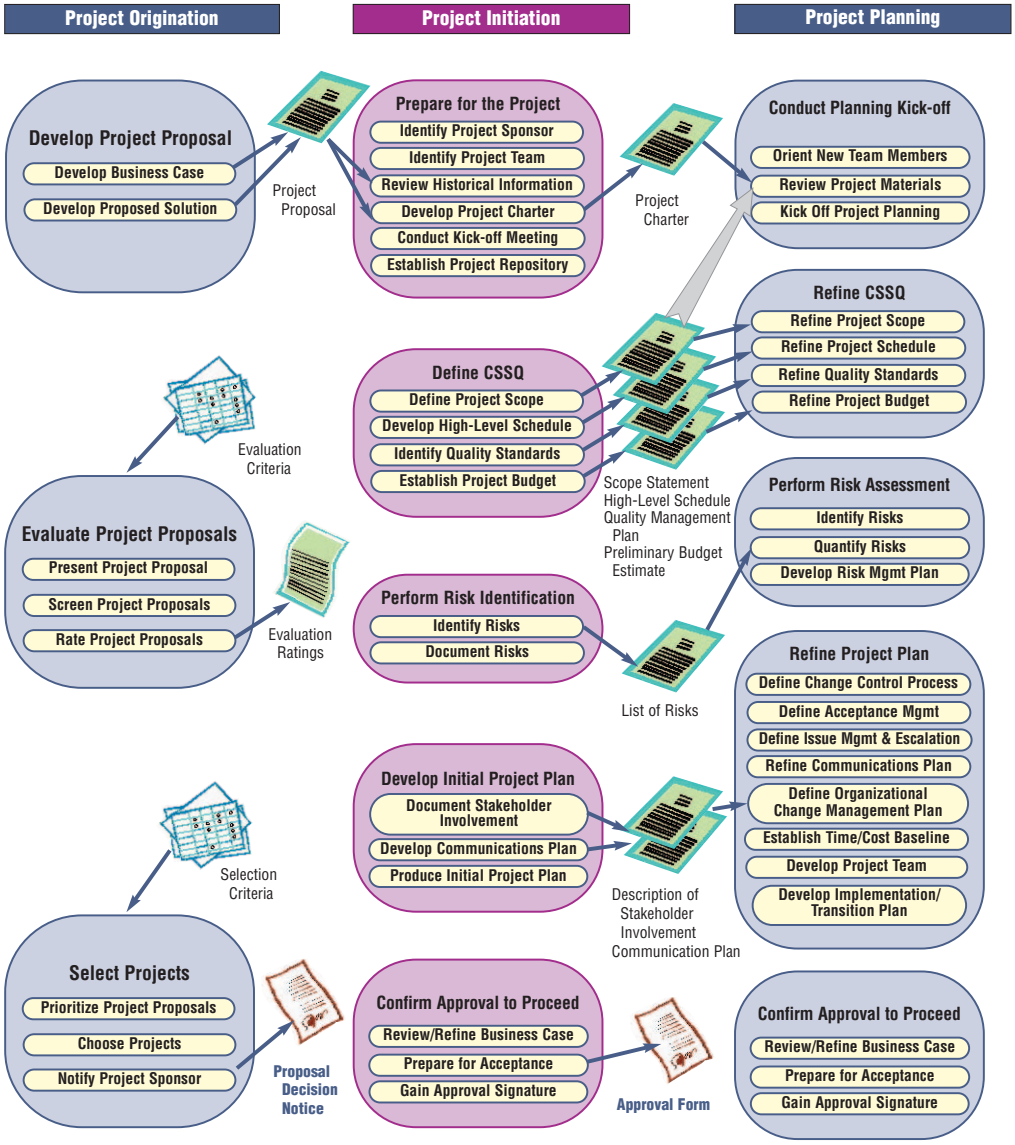
List of Processes

This phase consists of the following processes:

- **Prepare for the Project,** where the Project Sponsor and initial Project Team are identified and work with the Project Manager to create the Project Charter.
- **Define Cost/Scope/Schedule/Quality (CSSQ),** where the Project Manager, along with the Project Team define the scope of the project and identify the preliminary budget, high-level schedule and quality standards to complete the project.
- **Perform Risk Identification,** where the Project Manager and Project Team begin to identify and document any risks associated with the project.
- **Develop Initial Project Plan,** where the Project Manager and Project Team identify all Stakeholders and document their involvement in the project, develop means of communicating with them, and compile all documentation created during Project Initiation to produce the Initial Project Plan.
- **Confirm Approval to Proceed to Next Phase,** where the Project Manager reviews and refines the Business Case, secures resources required for Project Planning and prepares the formal acceptance package for review and approval by the Project Sponsor.

The following chart illustrates all of the processes and deliverables of this phase in the context of the project management lifecycle.

Figure 2-1


Project Origination
Project Initiation
Project Planning
Develop Project Proposal
Develop Business Case
Develop Proposed Solution
Project Proposal
Prepare for the Project
Identify Project Sponsor
Identify Project Team
Review Historical Information
Develop Project Charter
Conduct Kick-off Meeting
Establish Project Repository
Project Charter
Conduct Planning Kick-off
Orient New Team Members
Review Project Materials
Kick Off Project Planning
Refine CSSQ
Refine Project Scope
Refine Project Schedule
Refine Quality Standards
Refine Project Budget
Define CSSQ
Define Project Scope
Develop High-Level Schedule
Identify Quality Standards
Establish Project Budget
Scope Statement
High-Level Schedule
Quality Management Plan
Preliminary Budget Estimate
Evaluation Criteria
Evaluate Project Proposals
Present Project Proposal
Screen Project Proposals
Rate Project Proposals
Evaluation Ratings
Perform Risk Assessment
Identify Risks
Quantify Risks
Develop Risk Mgmt Plan
Perform Risk Identification
Identify Risks
Document Risks
List of Risks
Refine Project Plan
Define Change Control Process
Define Acceptance Mgmt
Define Issue Mgmt & Escalation
Refine Communications Plan
Define Organizational Change Management Plan
Establish Time/Cost Baseline
Develop Project Team
Develop Implementation/ Transition Plan
Develop Initial Project Plan
Document Stakeholder Involvement
Develop Communications Plan
Produce Initial Project Plan
Description of Stakeholder Involvement
Communication Plan
Selection Criteria
Select Projects
Prioritize Project Proposals
Choose Projects
Notify Project Sponsor
Proposal Decision Notice
Confirm Approval to Proceed
Review/Refine Business Case
Prepare for Acceptance
Gain Approval Signature
Approval Form
Confirm Approval to Proceed
Review/Refine Business Case
Prepare for Acceptance
Gain Approval Signature

List of Roles

The following roles are involved in carrying out the processes of this phase. Descriptions of these roles can be found in the Section I Introduction.

- Project Manager
- Project Sponsor
- Project Team Members
- Customer
- Customer Representatives
- Stakeholders
- Performing Organization

List of Deliverables

Project deliverables for this phase fall into three categories of importance and formality:

- **Phase deliverables** – major deliverables approved by the Project Sponsor or a designated alternate that allows the project to proceed to the next phase.
- **Process deliverables** – drafts of major deliverables or minor deliverables that may or may not require a formal sign-off but nevertheless must be reviewed by Project Team members, Customer Decision-Makers, and the Project Sponsor. The review validates the project's progress, and allows the Project Manager to move on to the next process in confidence.
- **Task deliverables** – drafts of process deliverables or works-in-progress that are verified within the Project Team, and may or may not be reviewed by the Project Sponsor or Customer Representatives. Each task culminates with the production of one or more tangible deliverables, which allows the Project Manager to monitor project progress using concrete and real results.

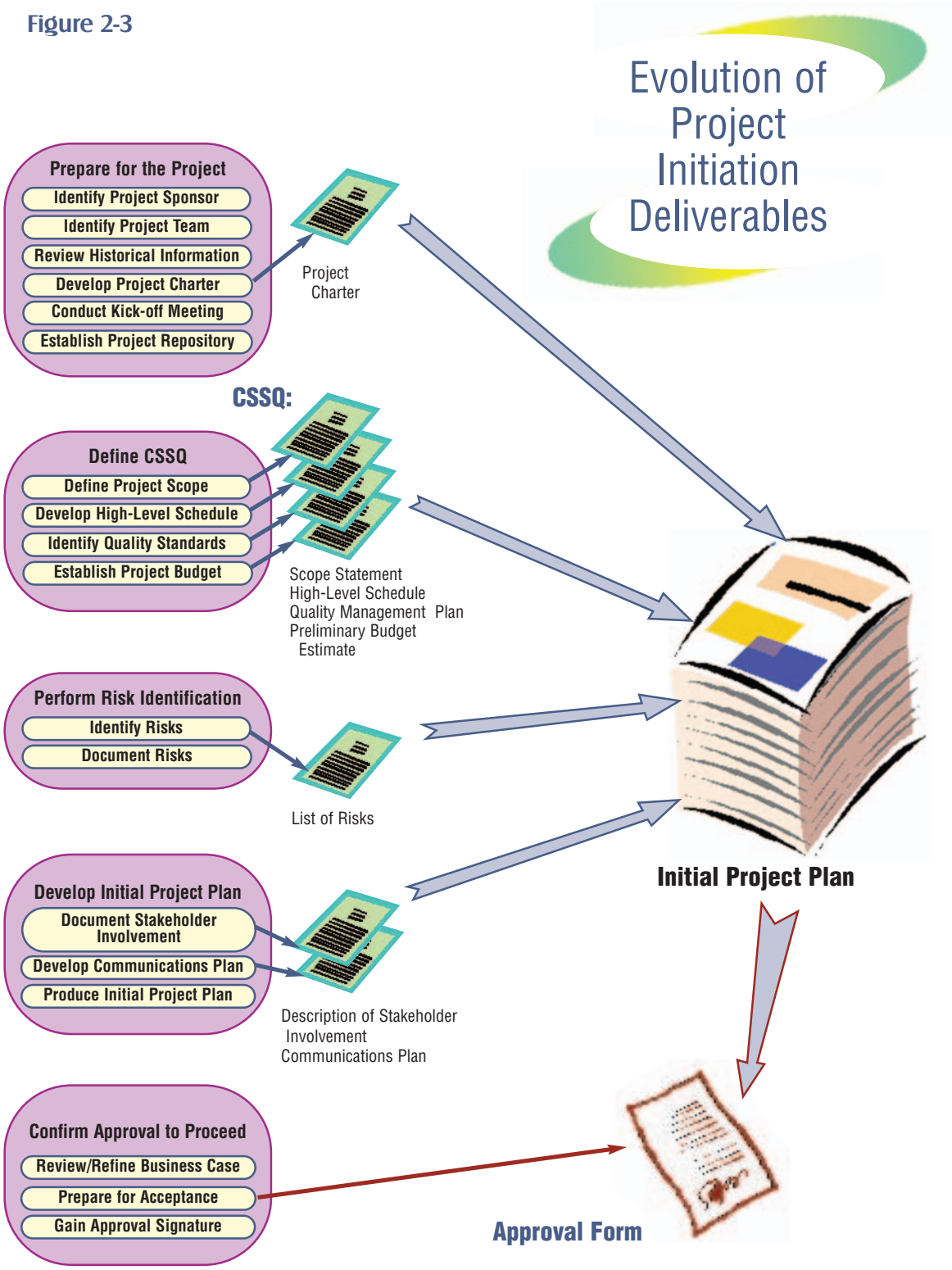
Figure 2-2 lists all Project Initiation tasks and their outcomes and deliverables.

Figure 2-2

Processes	Tasks	Task Deliverables *(Outcomes)*
Prepare for the Project	Identify Project Sponsor	*Project Sponsor*
	Identify Initial Project Team	*Project Team*
	Review Historical Information	*Information Reviewed*
	Develop Project Charter	Project Charter
	Conduct Project Kick-off Meeting	Kick-off Meeting
	Establish Project Repository	Project Repository
Define CSSQ	Define Project Scope	Scope Statement
	Develop High-Level Schedule	High-level Project Schedule
	Identify Quality Standards	Quality Management Plan
	Establish Project Budget	Preliminary Budget Estimate
Perform Risk Identification	Identify Risks	Risks and Impacts
	Document Risks	List of Risks
Develop Initial Project Plan	Identify and Document Stakeholders' Involvement	Description of Stakeholder Involvement
	Develop Communications Plan	Communications Plan
	Compile All Information to Produce the Initial Project Plan	Initial Project Plan
Confirm Approval to Proceed to Next Phase	Review/Refine Business Case	Refined Business Case
	Prepare Formal Acceptance Package	Approval Form
	Gain Approval Signature from Project Sponsor	Signed Approval Form

Figure 2-3 illustrates the evolution of deliverables from task through process to phase output.

Figure 2-3


Evolution of Project Initiation Deliverables
Prepare for the Project
Identify Project Sponsor
Identify Project Team
Review Historical Information
Develop Project Charter
Conduct Kick-off Meeting
Establish Project Repository
Project Charter
CSSQ:
Define CSSQ
Define Project Scope
Develop High-Level Schedule
Identify Quality Standards
Establish Project Budget
Scope Statement
High-Level Schedule
Quality Management Plan
Preliminary Budget Estimate
Perform Risk Identification
Identify Risks
Document Risks
List of Risks
Initial Project Plan
Develop Initial Project Plan
Document Stakeholder Involvement
Develop Communications Plan
Produce Initial Project Plan
Description of Stakeholder Involvement
Communications Plan
Confirm Approval to Proceed
Review/Refine Business Case
Prepare for Acceptance
Gain Approval Signature
Approval Form

2.1 PREPARE FOR THE PROJECT

Purpose

After formal project approval, the project is assigned to a Project Team whose first responsibility is to **Prepare for the Project**. The Project Manager must work to ensure that the Performing Organization's expectations and all available project information are effectively conveyed to the Project Team. This can be done collaboratively with the Performing Organization's management team.

Roles

- Project Manager
- Project Sponsor
- Project Team Members
- Stakeholders

Tasks

2.1.1 Identify the Project Sponsor

If a Project Sponsor has not been identified, the Project Manager must work with Performing Organization management to identify and formally appoint someone to that position. Because the Project Sponsor will champion the project within the organization, secure spending authority and resources, and provide support to the Project Manager, it is imperative that he/she be identified as early in the project management lifecycle as possible. Building the relationship between the Project Manager and the Project Sponsor is critical to project success.

2.1.2 Identify the Initial Project Team

The extent to which the Project Team has been defined at this point may vary. At a minimum the manager for the project and certain individuals who can provide support in preparing for the project should be identified.

The tasks to Prepare for the Project are:

- 2.1.1 Identify the Project Sponsor
- 2.1.2 Identify the Initial Project Team
- 2.1.3 Review Historical Information
- 2.1.4 Develop the Project Charter
- 2.1.5 Conduct Project Kick-Off Meeting
- 2.1.6 Establish the Project Repository

During Project Origination, a Project Proposal was created. During Project Initiation, the Proposal is reviewed to determine the roles required to staff the project. With the help of appropriate Stakeholders, the Project Sponsor should take the lead in identifying the names of individuals within the Performing Organization who could fill the roles and become Project Team

members. Names of the individuals needed to complete Project Initiation tasks will be documented in the Project Charter. In selecting the Project Team, definition of the skills required to perform current tasks as well as skills for future project tasks is needed. Immediate project needs should be met first. After Project Team members have been identified, the Project Manager should provide them with a project orientation and review with individual team members their current and future roles on the project. This establishes a baseline understanding of team members' project responsibilities, which will be useful for conducting performance reviews later in the project.

Some agencies hold a meeting at the beginning of Project Initiation, where all potential Stakeholders come together to review the Project Proposal, discuss required roles, and assign Project Team members. In other agencies, establishing a Project Team is a less formal process. You should choose and use the method to identify your Initial Project Team that will work best for your project and within your organization.

Take the opportunity, from the outset, to establish the concept of a Project Team that comprises not only the folks reporting directly to you, but also your Project Sponsor, Customer Representatives, Customer Decision-Makers, and all other players participating in the Project Schedule.

2.1.3 Review Historical Information

Development of the Project Charter will require review of documentation compiled or presented during Project Origination. Materials and information reviewed may include:

- the strategic plan, a formal document produced by the Performing Organization that outlines the business goals and direction over a designated number of years
- the Project Proposal, including the initial Business Case, which describes the project objectives and how they support the Performing Organization's strategic business direction
- project selection criteria, defining the parameters used in determining whether or not to undertake a project and identifying its business justification and measurements of its success
- information from a previous project similar in size, scope and objectives
- project knowledge and experience of the individuals on the Project Team

2.1.4 Develop the Project Charter

The purpose of developing the Project Charter is to document critical success factors and define and secure commitment for the resources required to complete Project Initiation. The charter also documents the project's mission, history, and background, describes the business problem the project is intended to resolve, and lists the benefits to be realized by the Performing Organization as a result of implementing the product or service.

Information compiled during Project Origination is used and applied in the development of the Project Charter. To further understand how the project was selected and to write an effective, comprehensive charter, the Project Manager must work with the Project Sponsor and any appropriate subject matter experts and Stakeholders.

If issues or conflicting project expectations are uncovered while developing the Project Charter, the Project Manager must communicate with Stakeholders to resolve the discrepancies, elevate the issues when appropriate, and obtain consensus. Decisions that impact project expectations significantly should be thoroughly documented.

The Project Charter contains the following sections:

- Background
- Objective
- Critical Success Factors
- Required Resources
- Constraints
- Authority

(see Figure 2-4, the New York State Project Charter)

Developing the Project Charter is a collaborative effort. Working with the Project Sponsor, the Project Manager should document the outcomes that must be achieved in order for the project to be considered a success. These critical success factors should correlate with the goals and objectives of the project.

An effective way to define a critical success factor is to complete the following sentence, "The project will be a success if _____."

Various areas of the Performing Organization may be required to provide resources to the project in order to complete Project Initiation. The Project Sponsor and Project Manager must determine specific resource requirements and effort estimates, and include them in the charter. The Project Sponsor must communicate with the affected areas of the Performing Organization, proactively gaining agreement and securing the necessary resources.

Once the Project Charter has been developed, the Project Manager should schedule a meeting to review its contents, secure necessary resources, and gain formal approval. Meeting attendees should always include the Project Sponsor and the members of Performing Organization Management whose resources are affected. Attendees may also include other members of the Performing Organization who are able to provide resources that will add value to the project. During the meeting, the Project Manager presents the Project Charter for review. Resources are formally secured by gaining the signatures of the appropriate Performing Organization managers. At the conclusion of the meeting, the Project Sponsor will formally approve or reject the charter. Should the Project Sponsor reject the charter, he/ she must provide the reasons for rejection to allow the Project Manager to make necessary adjustments.

Based on the contents of the Project Charter, the Project Manager should have a general understanding of the amount of effort that will be required to complete Project Initiation and produce an initial Project Plan. It is imperative that the Project Manager begins to track the remaining Project Initiation efforts and communicate status. Items to discuss during status meetings include accomplishments, progress against schedules, work to be done, and any open issues that need resolution. As part of the Communications Plan for the project, a Project Status Report should be prepared and reviewed during the meetings. See 2.4.2, Develop a Communications Plan and Figure 2-10, the Project Status Report template, for more information.

At this early stage in the project management lifecycle, the Project Manager needs to ensure that only Project Initiation resources are secured. Resources required in subsequent project management lifecycle phases will be determined and documented later, in the Project Plan.

Figure 2-4 New York State Project Charter

New York State
Project Charter

PROJECT IDENTIFICATION

Project Name: _____ Date:_____

Project Manager: _____ Project Sponsor: _____

*Enter the **Project Name**.*
*Enter the current **Date**.*
*Enter the name of the **Project Sponsor**.*
*Enter the name of the assigned **Project Manager**.*

Figure 2-4 (Continued)

PROJECT DESCRIPTION

Project Background:

Explain the events leading up to the project request. Describe any related projects that have or could have led to this project. Identify who has been involved, how they have been involved, and the current state of the project.

Project Objective:

*The **Project Objectives** identified in the Proposed Solution should serve as the basis for this Section. Be explicit as to how the expected outcome of the project will benefit the organization and help it achieve its business needs or fix the business problem. Provide details relative to the business cost benefit. It may be advantageous to provide a one-to-one correlation as follows:*

Business Need or Problem:	*Project Objectives:*
● *Business Need 1*	● *Project Objective 1*
● *Business Need 2*	● *Project Objective 2*
	● *Project Objective 3*

In developing this list, consider that a business need may be addressed by multiple project objectives and the same project objective may address multiple business needs.

Critical Success Factors:

*Provide a list of at least five (5) project **Critical Success Factors**. Critical success factors are outcomes that must be achieved in order for the project to be considered a success. They should correlate with the **Project Objectives** described in the section above.*

Required Resources:

List the names of all individuals needed to perform Project Initiation and whose participation must be approved by Performing Organization Management.

Constraints:

*List any known factors that limit the project's execution. The most frequent **Constraint** is the project end date. For each **Constraint** listed, be sure to elaborate on how it is limiting the project and how the project would benefit from its removal.*

Project Authority:

*This section of the Project Charter describes the levels of **Authority** to the project. It identifies who is involved with the project and their expected authority, who has the ability to resolve decision conflicts, and who will provide overall direction to project efforts.*

This section should contain, at a minimum, the roles and responsibilities of the Project Team and the Stakeholders. It should also identify any known governing body or steering committee to which the project is accountable and how they are accountable.

Figure 2-4 (Continued)

PROJECT CHARTER APPROVAL

Project Sponsor Name: _____

Action: Approve: ☐ Reject: ☐

Comments:

Project Sponsor Signature: _____

Date: _____

*Enter the **Project Sponsor Name**. The Sponsor should indicate approval or rejection of the Project Charter by checking the **Approve** or **Reject** box. If the Sponsor is rejecting the charter, he/she must indicate the reason in the **Comments** field.*

*The Sponsor indicates final acceptance of the Project Charter (including securing individual resources) by providing his/her signature on the **Project Sponsor Signature** line and the approval date on the **Date** line.*

AGREEMENT TO SECURE REQUIRED RESOURCES

Approver Name: _____ Role: _____

Approver Comments:

Approver Signature: _____

Date: _____

*Enter the **Approver Name** and **Role**. The approver is a member of Performing Organization Management. He/she indicates his/her agreement to provide required resources for the project by providing his/her **Approver Signature** and the approval **Date**.*

***NOTE:** Duplicate the Approver Information section on this template if more than one approval signature is required.*

2.1.5 Conduct Project Kick-off Meeting

When the Project Charter is complete, the Project Kick-off Meeting is conducted. The Project Kick-off Meeting is the event that formally marks the beginning of the project. It is most likely the first opportunity for the Project Sponsor to assemble the entire Project Team to discuss his/her vision of the project, demonstrate support, and advocate project success. Project Team members are introduced to each other and given the opportunity to discuss their areas of expertise and how they will contribute to the project. The Project Charter is presented by the Project Manager and discussed in an open forum, to foster a mutual understanding of and enthusiasm for the project. At the conclusion of the meeting, Project Team members will understand their "next steps," and will leave the meeting ready and excited to begin work.

Prior to the meeting, an agenda and a presentation highlighting the contents of the Project Charter should be prepared by the Project Manager. The Project Manager should designate one of the Project Team members as the scribe for the session, to capture decisions, issues, and action items. The Project Charter and any applicable supporting materials are distributed to attendees for their review. The review of the charter contents ensures that expectations for the project and its results are in agreement. If not already done, the Project Manager must ensure that the Project Sponsor has provided his/her signature on the Project Charter, indicating his/her approval of the contents of the document. If the Project Sponsor does not approve the charter, he/she must indicate the reason, to allow the Project Manager to make necessary adjustments.

Following the session, the notes and action items should be compiled into meeting minutes and distributed to all attendees. (See Figure 2-5 for a sample agenda.)

Figure 2-5 Project Initiation Kick-off Meeting Agenda

Project Initiation Kick-off Meeting Agenda

Project: _____

Date:_____

Time: From: _____ To: _____

Location: _____

Invitees: List the names of individuals invited to the meeting

Invitees *should include the Project Manager, Project Team, Project Sponsor, and any Customers with a vested interest in the status of the project.*

Attendees: During the meeting, note who actually attended. If attendees arrived late or left early, indicating they missed some of the topics discussed, note their arrival or departure time.

AGENDA

Use the following suggested times as guidelines–the time you need to cover agenda topics will vary depending upon the needs of the project.

	Presenter Name	Time (minutes)
Introductions	Project Manager	5 min.
Project Manager welcomes everyone and briefly states the objective of the meeting. Allow individuals to introduce themselves, and provide a description of their role within the Performing Organization and their area of expertise and how they may be able to contribute to the project efforts. The material to be presented by the following agenda topics should come right from the Project Charter.		
Sponsor's Statement	Project Sponsor	5 min.
After brief introductions, the Project Sponsor should describe the vision for the project, demonstrate support, and advocate for its success, setting it as a priority for all parties involved.		
Project Request & Background	Project Manager	5 min.
Project Goals & Objectives	Project Manager	10 min.
Project Scope	Project Manager	10 min.
Roles & Responsibilities	Project Manager	10 min.
When reviewing roles and responsibilities be explicit about expectations relative to stakeholder availability and Project Sponsor commitment and support for the project.		
Next Steps	Project Manager	5 min.
Questions	Project Manager	10 min.

ADDITIONAL INFORMATION:

Handouts:

Provide a list of the material to be distributed to the attendees.

Figure 2-5 (Continued)

Project Initiation Kick-off Meeting

Project: _____

Date:_____

Time: From: _____ To: _____

Location: _____

Be sure that one of the Project Team members in attendance is scribing for the session, capturing important project-specific information that requires further review or discussion as well as potential issues that could impact the project. At the end of the meeting, the Project Manager and Project Team should review these points as well as any other notes captured by other team members to identify any additional actions required. The notes will be compiled into meeting minutes to be distributed to all the attendees and retained in the project repository.

DECISIONS

Decision Made	Impact	Action Required?

Document each project decision reached and its impact. Also indicate if the decision requires follow-up actions. If so, these should be captured below.

ISSUES

Issue Description	Impact	Action Required?

Document any project issues identified and its impact. Also indicate if the issue requires follow up actions. If so, these should be captured below.

ACTION ITEMS FOR FOLLOW UP

Action	Responsible	Target Date

Capture any follow up activities and the individual responsible for them as well as set a date as to when the action needs/should be completed.

At the end of the meeting, the scribe should recap the action items. These should also be included in the meeting notes to be distributed.

2.1.6 Establish the Project Repository

Maintaining information about the project in an organized fashion facilitates new team member transitions and creates a central point of reference for those developing project definition documents. Most importantly, it provides an audit trail documenting the history and evolution of the project.

All relevant project-related material, documents produced, decisions made, issues raised and correspondence exchanged must be captured for future reference and historical tracking. The project repository can be kept as hard copy in a binder or notebook, or as electronic files and email folders, or both, at the discretion of the Project Manager, in accordance with organizational records management policies. All files related to the project should be grouped by categories within project-specific folders. The structure should be intuitive so that anyone browsing the directory can easily locate needed information. Within the primary hard copy repository, information should be organized in indexed volume(s) to enable easy access. An index should provide reference to all material maintained electronically (e.g., a file directory or email folder by drive, directory, and filename). The most current hard copy of documentation should be kept in the primary hard copy repository, with earlier versions in the electronic file.

By the end of the project, a project repository may include the following materials:

- Project Proposal and supporting documentation, including the Business Case
- Project description/definition documents such as the Project Charter, the CSSQ, and the Project Plan
- Any working documents or informal documents defining Cost, Scope, Schedule and Quality (CSSQ) of the project
- Project Schedules (baseline and current)
- Project financials
- Project Scope changes and requests log
- Project Status Reports
- Team member Progress Reports and timesheets
- Issues log and details (open and resolved)

- Project acceptance log by deliverable
- Products
- Risk identification/model documentation
- Audit results, if encountered
- Correspondence, including any pivotal or decision-making memos, letters, email…etc.
- Meeting notes, results, and/or actions

The project repository should be available to everyone involved in the project and must, therefore, be considered "public information." It is not advisable to keep sensitive information concerning individuals on the project, such as salaries or evaluations, in the project repository. Some project-related documents may also be regarded as confidential. A confidential project repository should be established in a separate location to secure sensitive information.

Deliverable

- **Project Charter** – this is a document that provides authority to establish the project, broadly defining its purpose, goals, and objectives. Resources required to complete Project Initiation are also identified and secured. The charter serves as a contract between the Project Team and Project Sponsor. The Project Charter is the first in a series of project definition documents defining the business goals and objectives the project will meet. Information within the Project Charter is provided at a general level that will be further refined in documentation produced during subsequent project activities.

DEFINE CSSQ

CSSQ is the acronym derived from a project's quadruple constraints: Cost, Scope, Schedule, and Quality. Because the constraints are interdependent, they are defined and managed together. The CSSQ concept is incorporated throughout all project management lifecycle phases and is, therefore, documented throughout this ***Guidebook***. The CSSQ work products are first created during Project Initiation.

Roles

- Project Manager
- Project Sponsor
- Project Team Members
- Customer Representatives
- Stakeholders
- Performing Organization
- Customer Decision-Maker

The purpose of **Defining CSSQ** is to:

- Develop a written Project Scope statement to define the project. The scope statement will be used as the foundation for scope and schedule refinement during Project Planning.
- Establish a preliminary Project Schedule to define, at a very high level, the activities that must be accomplished at certain points in the project in order to deliver the product described in the scope statement.
- Define the quality processes and standards that will be used throughout the project.
- Determine the appropriate approaches for staff and materials acquisition, and establish a preliminary budget for the project.

Tasks

2.2.1 Define Project Scope

The tasks to Define CSSQ are:

- 2.2.1 Define Project Scope
- 2.2.2 Develop High-Level Schedule
- 2.2.3 Identify Quality Standards
- 2.2.4 Establish Project Budget

The written scope statement is a document that serves as input to future project planning efforts. The scope statement (see Figure 2-6) should include:

- the business need the project will address.
- what the project will accomplish, how it will be accomplished and by whom.
- what the end result of the project will be (e.g., a product, service, other).
- a list of project deliverables, which, when produced and accepted, indicate project completion. Also included is a list of those items/deliverables that are not in scope for the project. The Project Manager must be **specific** about what is in scope and what is not in scope, as the weaker the boundaries between the two, the more difficult it will be to effect the change control process if required later in the project. Also, the details regarding what is in and what is out of scope are critical input to the creation of a detailed Project Schedule.
- critical success factors (usually cost, schedule, and quality measurements) that determine whether or not a project was successful.

The Project Charter, including the project outcome description, provides necessary information for defining the Project Scope relative to the business need and benefit for the organization undertaking the project. The scope statement will build on the outcome of the project described in the Project Charter by developing an approach to deliver that result, and by developing additional detailed information about the scope of work to be done. Interviews with other Project Managers who have had experience developing scope statements for similar projects can also be helpful.

"Scope creep" is a major bane of project management. How do you combat it? By pre-empting it with a thorough, accurate, precise, and mutually agreed upon Scope Statement. Avoid words and statements that require judgment or invite interpretation, such as 'improve," "enhance," "better," "more efficient" and "effective." Use numbers, facts, and concrete results. Use quantifiable terms, and provide target values or ranges. Emphasize outcome, not process. "We will work very hard for a long time to improve our response capability and enhance our effectiveness" belongs in a Dilbert cartoon.

While writing the Project Scope, the Project Manager and Customer Representatives must consider the effect the outcome of the project may have on the Performing Organization. The organization must be prepared to support the product once it is transitioned. If implementing the product will result in a change to the way the organization will conduct business, the Project Manager, Project Sponsor, and Customer must anticipate impacts and communicate them proactively to the Consumer community. Sometimes people are resistant to change. Selling the positive aspects of the project and the benefits of its product throughout the project's duration will facilitate acceptance. If adaptation to the new environment requires new skills, the Project Manager will need to identify appropriate training opportunities and include them in the Project Scope and Project Plan. (for information regarding training and training plans, see Develop Project Team, 3.4.7)

Figure 2-6 New York State Project Scope Statement

New York State
Project Scope Statement

PROJECT IDENTIFICATION

Project Name: _____ Date: _____

Project Sponsor: _____ Project Manager: _____

*Enter the **Project Name**.*
*Enter the current **Date**.*
*Enter the name of the **Project Sponsor**.*
*Enter the name of the assigned **Project Manager**.*

Figure 2-6 (Continued)

New York State
Project Scope Statement

A. BUSINESS NEED/PROBLEM:

*State the **Business Need/Problem** the project will address. This should be consistent with the Project Business Case developed during Project Origination. Tie the business need to the agency's mission.*

B. PROJECT OBJECTIVES (FROM PROJECT CHARTER):

Include a description of the deliverables that will be produced as part of the project. Be specific when describing what is in scope and out of scope. Note: This section will most likely be several pages in length.

C. PROJECT RESULTS:

State what will signify that the project is complete. Include the measures that will determine whether or not the project was successful from a cost, schedule and quality standpoint.

D. PROJECT CONTENT:

*Describe the **Contents** of the project, listing all deliverables of the project in detail. Also include items NOT in scope.*

2.2.2 Develop High-Level Schedule

A Project Schedule is a calendar-based representation of work that will be accomplished during a project. Developing a schedule means determining the start and end dates for all tasks required to produce the project's product, and the project management deliverables.

At this early stage in the project management lifecycle, information required to complete a Project Schedule is known only at an overview level, often based solely upon the expert judgment of the Project Manager or other individuals with experience managing projects with similar lifecycles. Even at a high level, this information still provides insight into preparing the first draft of a Project Schedule. The activities documented in the schedule at this early stage will be further broken down during Project Planning, when the schedule will be refined to include the specific individuals assigned and the amount of time required to complete the work.

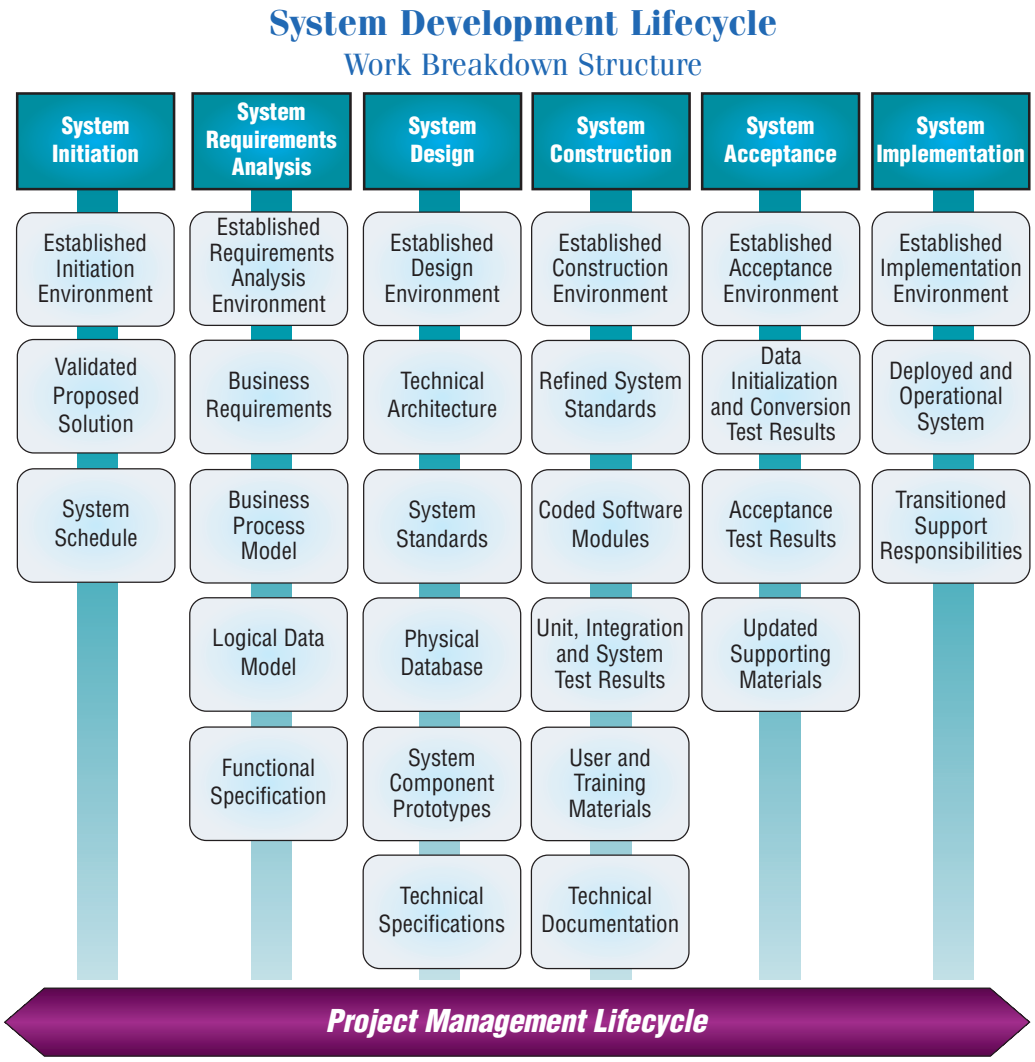
A Work Breakdown Structure (WBS) is a very useful work product that a Project Manager should create to facilitate development of a Project Schedule. A WBS is a graphical representation of the hierarchy of project deliverables and their associated tasks. As opposed to a Project Schedule that is calendar-based, a WBS is deliverable-based, and written in business terms. All tasks depicted are those focused on completion of deliverables. There are no dates or effort estimates in a WBS. Using a WBS, Project Team members are better equipped to estimate the level of effort required to complete tasks, and are able to quickly understand how their work fits into the overall project structure.

The first hierarchical level of a WBS usually contains the phases that are specific to the lifecycle of the project being performed. (For example, the first level of the WBS for a software development project would most likely contain System Initiation, System Requirements Analysis, System Design, etc.) For this reason, a WBS may be reused for other projects with the same lifecycle. Once the first level has been completed, it is broken down into more detailed sub-levels, until eventually all tasks are depicted. When defined to the appropriate level of detail, a WBS is very useful as input to both creating and refining a Project Schedule, including estimating required resources, level of effort, and cost.

In Project Initiation, the information required to illustrate a complete WBS representing the entire project will not be known in sufficient detail. There will be enough information, however, to illustrate the tasks required to produce Project Initiation deliverables. The WBS is not static - the Project Manager should work with the Project Team during each project lifecycle phase to refine the WBS and use it as input to refining the Project Schedule.

Figure 2-6A is a sample High-Level Work Breakdown Structure organized by lifecycle phase for a software development project.

Figure 2-6A High-Level Work Breakdown Structure for Software Development Project



A preliminary list of the roles and skills required to perform the necessary work (e.g., Architect, Team Leader) should be created at this stage in the project. This list will be refined in subsequent phases, as more becomes known about the project. Additional constraints, such as completion dates for project deliverables mandated by the Project Sponsor, Customer, or other external factors, will most often be known early in the project management lifecycle and should be noted. There may be financial, legal, or market-driven constraints that help dictate a project's high-level timeline.

Using the information from the WBS as input, the Project Manager should begin to document effort estimates, roles and dependencies, in preparation for creating a Project Schedule using a project management tool. It may also be helpful to solicit input from past Project Managers, Project Team members and subject matter experts for insight into past project performance, and to help uncover required activities, dependencies, and levels of effort. Researching and documenting this information first will not only help organize thoughts on paper, but may bring new information to light. (See Figure 2-7, New York State Project Schedule Worksheet.)

Figure 2-7 New York State Project Schedule Worksheet

New York State
Project Schedule Worksheet

PROJECT IDENTIFICATION

Project Name: _____ Date: _____

Project Sponsor: _____ Project Manager: _____

*Enter the **Project Name**.*
*Enter the current **Date**.*
*Enter the name of the **Project Sponsor**.*
*Enter the name of the assigned **Project Manager**.*

Figure 2-7 (Continued)

New York State
Project Schedule Worksheet

PROJECT SCHEDULE INFORMATION

Phase	Process	Task	Estimated Hours	Dependent Upon	Role

*Enter the name of the project **Phase**. Identify the **Process** within that Phase, and then list the **Tasks** that make up that Process.*

*Enter the **Estimated Hours** needed to complete each Task. If the current Task is dependent upon the completion of a prior Task, identify that prior Task under **Dependent Upon**.*

*Enter the **Role** and/or individual(s) to complete the activity, if known (e.g., Architect, Programmer, Civil Engineer).*

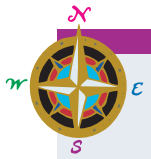
Information entered on this worksheet will be used as input to the High-Level Schedule.

Once the worksheet has been completed and reviewed, the Project Manager should enter the information into a project scheduling tool (e.g., Microsoft Project® or PlanView®) to produce the high-level Project Schedule. Information typically required for a project management tool includes activities, effort estimates to complete the activities, the role or individual assigned to them, and any known dependencies among them. The activities entered into the tool should be those required to complete the deliverables described in the Project Scope statement. Information will only be known at a very high level at this point, but will be refined during Project Planning.

2.2.3 Identify Quality Standards

If the Performing Organization has established quality standards, the Project Manager can reference the document containing the quality standards the organization already has in place. In most cases, however, this document does not exist, or the quality standards are not in place. The Project Manager and Customer Representatives must identify and document standards for each project deliverable during Project Initiation. If quality standards are not identified and documented, the Project Manager will have no way to determine if deliverables are being produced to an acceptable quality level.

The Project Scope statement documents what the outcome of the project will be, and will help determine the appropriate quality standards to use. Additional information discovered when defining your project approach (e.g., your materials acquisition strategy) that is above and beyond that contained in the scope statement may aid in identifying quality standards. Performance of a cost/benefit analysis can show whether the benefits of implementing the desired quality standards outweigh the cost of implementing them. Research of past projects that implemented quality standards similar to those that are candidates for the current project can also be helpful.



The amazing thing about quality standards is that nobody has them available when the project starts, but everybody knows what they were supposed to be when the product is delivered. Do not accept lack of documentation as an excuse to skimp on your homework. On the contrary, dig down through organizational layers to discover what was used in the past (here's another way your historical data research pays off!) and what will be expected in the future. And if you can't find anything – create it, document it, publicize it, and put it in your Project Status Report and your project repository.

Compliance to specific New York State standards and regulations may be required and could dictate the quality standards to be measured against for a particular project. Preliminary standards should be reviewed again and modified or refined during Project Planning. (See Figure 2-8, the New York State Project Quality Management Plan.)

Figure 2-8 New York State Project Quality Management Plan

New York State
Project Quality Management Plan

PROJECT IDENTIFICATION

Project Name: _____ Date: _____

Project Sponsor: _____ Project Manager: _____

*Enter the **Project Name**.*
*Enter the current **Date**.*
*Enter the name of the **Project Sponsor**.*
*Enter the name of the assigned **Project Manager**.*

Figure 2-8 (Continued)

New York State
Project Quality Management Plan

PART A. QUALITY PLANNING – IDENTIFIED QUALITY STANDARDS

*List the **Quality Standards** that have been identified for each deliverable of the project.*

Figure 2-8 (Continued)

New York State
Project Quality Management Plan

PART B: QUALITY ASSURANCE ACTIVITIES

Describe the processes that will be implemented to evaluate project performance on a regular basis, and validate that the quality standards defined in Part A are appropriate and able to be met.

(To be defined during Project Planning and refined during Project Execution and Control.)

Figure 2-8 (Continued)

New York State
Project Quality Management Plan

PART C: QUALITY CONTROL ACTIVITIES

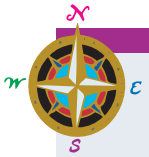
Describe the processes that will be implemented to measure project results, compare results against the Quality Standards defined in Part A, and determine if they are being met. This also identifies ways to minimize errors and improve performance.

(To be defined and implemented during Project Execution and Control.)

2.2.4 Establish Project Budget

Using available tools, the Project Manager calculates the preliminary budget that will be required to complete project activities. All aspects of the project, including the cost of human resources, equipment, travel, materials and supplies, should be incorporated. At this point information will be presented at a summary level, to be refined during Project Planning, as more detailed information becomes known. However, the budget should be more detailed and more accurate now than it was during Project Origination. The Project Manager should use manual or automated tools to generate a Preliminary Budget Estimate. The budgeting tools may be simple spreadsheets or complex mathematical modeling tools. (See Figure 2-9 for the Preliminary Budget Estimate.) For historical purposes, and to enable the budget to be refined, the Project Manager should always maintain notes on how this preliminary budget was derived. Cost estimating checklists help to ensure that all preliminary budgeting information is known and all bases are covered.

The Project Manager must also have a general understanding of the cost of both the human resources and the equipment and materials required to perform the work. The method by which staff and products will be acquired for the project will directly affect the budgeting process.



In coming up with the project's budget, many Project Managers fall into either of the two extremes, depending on their temperaments and prior experience: those that are risk-averse or have been burned in the past "aim high," inflating the Project Budget to protect against all eventualities; and those that are "green," optimistic, or afraid of rejection "aim low," underestimating the risks and realities. Neither approach, of course, is optimal: both put the whole project at risk, the former by either disqualifying the project in view of limited funds or inviting uninformed wholesale cuts, the latter by setting unrealistic expectations and guaranteeing multiple additional requests for more money. The best approach is to use organizational experience, your own expertise, and the best advice you can muster, to predict with the greatest possible accuracy what the project will actually cost, and then set up a separate change budget.

Above all, document the basis of your estimates!

A number of constraints, financial, political, and organizational, may dictate the methods by which required individuals, equipment, and materials are acquired. The Project Manager needs to be aware of existing resource acquisition policies, guidelines, and procedures. In addition, the preferences of the Performing Organization's management team and/or the

Customer Representatives may influence acquisition decisions. In any case, the strategies defined should satisfy the needs of project Stakeholders. Information from similar past projects can be used to gain an understanding of acquisition strategies; those that were successful and applicable may be considered for implementation on the current project.

Once the Project Manager assesses the needs of the project, financial considerations, time constraints, and individual skills and availability, a method is defined for acquiring project staff. Depending on the way different organizations relate to one another, strategies used to acquire staff may vary. It is important for the Project Manager to understand the reporting relationships, both formal and informal, among different organizations, technical disciplines, and individuals. Staff may be allocated from within an organization or from an outside source using an established staff procurement procedure. The Project Manager should work with the Project Sponsor to determine staffing options.

The skills required for the project influence the means by which staff members are acquired. If there are limited qualified in-house resources available to staff a project or if a Project Manager has had positive experiences with contract staff, for example, he/she may elect to retain contractors to fill the positions rather than allocating resources from within. If it is determined that it is necessary to recruit staff from outside the Performing Organization, the Project Manager should work with the agency Human Resource office. The Human Resource office can assist in the recruitment of qualified staff in accordance with Civil Service Rules. If the decision is made to utilize private consultants or contractors, the Project Manager should contact the agency Contract Management office for assistance regarding State Contract vendors, and Procurement Guidelines, as established by the NYS Office of General Services.

As is the case with human resources, a method is defined by which equipment, materials, and other non-human resources will be obtained. The Project Manager, in conjunction with the Project Sponsor, should determine the method to be used to acquire these resources. Section II:3 contains more information regarding Procurement and Contractor Management.

Regardless of how staff and products are acquired for the project, the Project Manager must add the estimated cost of all resources to the Preliminary Budget Estimate.

Figure 2-9 New York State Preliminary Budget Estimate

New York State
Preliminary Budget Estimate

PROJECT IDENTIFICATION

Project Name: _____ Date: _____

Project Sponsor: _____ Project Manager: _____

*Enter the **Project Name**.*
*Enter the current **Date**.*
*Enter the name of the **Project Sponsor**.*
*Enter the name of the assigned **Project Manager**.*

Figure 2-9 (Continued)

New York State
Preliminary Budget Estimate

BUDGET INFORMATION

Phase	Process/Task	Labor Cost	Material Cost	Travel Cost	Other Cost	Total Cost	Planned Date of Expenditure
	TOTAL Budget						

*The **Phase**, **Process**, and **Task** Names come from the High-Level Schedule.*
*The **Labor Cost** is the cost of human resources required.*
*The **Material Cost** is the cost for equipment and supplies.*
*The **Travel Cost** is any predicted cost that will be incurred if travel is required.*
*Enter any costs outside person, material, and travel costs under **Other Costs**.*
*Total the costs for each activity and enter the total under **Total Cost**. Then enter the **Planned Date** the expenditure will be made.*

*Calculate the total of all rows in the table and enter the values in the **TOTAL Budget** row at the bottom of the worksheet.*

COMMENTS: *(List any assumptions pertaining to the costs entered above.)*

Deliverables

- **Project Scope Statement** – documents a description of the project's deliverables, results, and critical success factors, and defines what is out of scope.
- **High-Level Project Schedule** – a representation of tasks, durations, dependencies, and resources, to the extent that is currently known about the project. It should be produced using an automated project management tool. This schedule should be reviewed and approved by the Project Sponsor and Customer Decision-Makers.
- **Quality Management Plan** – describes how the Project Team will implement the identified quality standards, the plan can be a very informal or highly detailed document, based on the needs of the project. It defines how project reporting will work, controls to be used in managing the project, audit needs, communication commitments, and any other quality processes that will be used throughout the course of the project. The Quality Management Plan will become part of the final Project Plan created during Project Initiation and revised during Project Planning. At the end of Project Initiation, the Quality Management Plan should include a description of the policy and standards the organization has put in place to address quality. Any type of structured tool or checklist can be used to ensure that all quality measures have been considered. It may be a complex, industry-standard tool, or a simple "To Do" list.
- **Preliminary Budget Estimate** – documents a preliminary estimate of the cost to complete the project.

2.3 PERFORM RISK IDENTIFICATION

Purpose

Risks are events that can potentially affect the cost, schedule, and/or efforts of a project. **Risk Identification** begins during Project Initiation with the documentation of known project risks so that early planning can mitigate their effects. Throughout the duration of the project, risks must continue to be identified, tracked and analyzed to assess the probability of their occurrence, and to minimize their potential impacts on the project.

Roles

- Project Manager
- Project Sponsor
- Project Team Members
- Customer Representatives

Tasks

2.3.1 Identify Risks

The Project Manager solicits input from the Project Team, Project Sponsor, and from Customer Representatives, who try to anticipate any possible events, obstacles, or issues that may produce unplanned outcomes during the course of the project. Risks to both internal and external aspects of the project should be assessed. Internal risks are events the Project Team can directly control, while external risks happen outside the direct influence of the Project Team (e.g., legislative action).

The tasks to Perform Risk Identification for Project Initiation are:

2.3.1 Identify Risks

2.3.2 Document Risks

A list of risks is started, and as the scope, schedule, budget, and resource plan are refined during Project Planning, it is updated to reflect further risks identified.

The project should be analyzed for risk in areas such as:

- culture of the Performing Organization
- anticipated impact on the Performing Organization of the resulting product or service
- the level to which the end result is defined (the more complete the definition, the lower the possibility of risk)
- technology used on the project (proven vs. new)
- relationships among team members
- impact on work units

Documentation associated with Project Initiation can also be used to help identify risks. Some examples are:

- the Project Scope Statement may uncover previously unidentified areas of concern (again, the more complete the scope definition, the lower the possibility of risk);
- project constraints indicate likely risk sources;
- the High-Level Project Schedule may produce extremely aggressive or unrealistic scheduling
- preliminary staffing requirements may be problematic if required resources have limited availability or unique skills that would be hard to find and/or replace should they leave the project.

Refer to the parts of this document concerning CSSQ and Project Charter information, to review for possible areas of risk.

Historical information can be extremely helpful in determining potential project risks. Data and documentation from previous projects, or interviews with team members or other subject matter experts from past projects provide excellent insight into potential risk areas and ways to avoid or mitigate them.

2.3.2 Document Risks

The Project Manager documents identified risks to inform the risk identification and assessment process. Risk identification lists are typically organized by source of risk to help the Project Manager organize and record ideas. These lists may be generic or industry-specific. The Project Manager may even decide to create risk identification lists specifically geared toward the current project. At this point, the Project Team is simply identifying and listing risks. During Project Planning, the items on the list will be transposed to a Risk Management Worksheet, where they will be quantified and plans will be developed to mitigate them should they occur.

Deliverable

- **The List of Risks** – a listing of identified sources of risk and potential risk events. Risk Assessment will be performed during Project Planning using the list of risks.

2.4 DEVELOP INITIAL PROJECT PLAN

Purpose

The Project Plan is a collection of information used to describe the environment that will govern the project. The work products previously produced during Project Initiation become part of the **Initial Project Plan**. In addition to compiling these work products, developing the Initial Project Plan involves identifying the Stakeholders that will be involved in the project and establishing and documenting a plan for project communications. The Project Plan is an evolving set of documents - new information will continue to be added and existing information will be revised during Project Planning.

Roles

- Project Manager
- Project Sponsor
- Project Team Members
- Customer Representatives

Tasks

2.4.1 Identify and Document Stakeholders' Involvement

The Project Manager defines the organization of the Project Team and outlines Stakeholders' roles and responsibilities. All Stakeholders who will be involved in some capacity on the project should be identified. Some may be indirectly involved in an ancillary agency unit, a Steering Committee, or as external vendors or suppliers. Necessary contacts with agencies such as the Department of Civil Service, Division of the Budget, Office For Technology, CIO's office, and Office of the State Comptroller must be included. Members of these agencies are key Stakeholders in many projects and interaction with them should be coordinated and planned.

The tasks to Develop Initial Project Plan are:

2.4.1 Identify and Document Stakeholders' Involvement

2.4.2 Develop a Communications Plan

2.4.3 Compile All Information to Produce the Initial Project Plan

In defining the high-level schedule for Define CSSQ, a preliminary list of roles and skills required for the project was produced. This list may be useful when creating the list of stakeholder roles needed to perform the tasks leading to the desired project outcome and the responsibilities for each role. Even if the information is known only at a preliminary level, it is helpful to the Project Manager. When docu-

menting roles and responsibilities, the Project Manager should evaluate whether the individuals being assigned are in appropriate roles, if this information is known. If it is decided that assigned individuals may be weak in certain areas, or there are no individuals to fill certain roles, the Project Manager documents this information.

One of the greatest challenges in project management is getting the work done by individuals and business units that do not report to the Project Manager, or even to the Project Manager's entire chain of command. The earlier you can identify whom you need cooperation from, and the more detail you can provide as to the extent and outcome of that cooperation, the better your chances of actually influencing the work done. Make your case early and convincingly (emphasizing how the folks that DO have influence will benefit), and you may actually get them to do what your project requires.

2.4.2 Develop a Communications Plan

The Communications Plan is a document describing the means by which project communications will occur. The communication process must be bi-directional. The Project Manager must receive input from Project Team members and Stakeholders about their information and communications requirements, determine the best and most cost effective way in which the requirements can be met, and record the information in a formal, approved document. Similarly, the Project Manager must provide details to the team and the Stakeholders regarding the communications he/she expects to receive, and document these requirements in the plan.

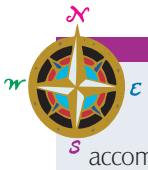
The Communications Plan is developed early in the project management lifecycle. It must be reviewed regularly throughout the course of the project and updated as necessary to ensure it remains current and applicable.

Some of the requirements the Project Manager and Stakeholders will need to communicate and understand, and which should be documented in the Communications Plan include:

- How often and how quickly information needs to be disseminated.
- By what means the Project Manager and Stakeholders prefer to receive information (via phone, email, paper).

- The communication mechanism currently used in the organization, and how it might be leveraged or improved.
- The effectiveness of communications in past projects and whether specific improvements were recommended.

The methods and technologies used to communicate information may vary among departments or organizations involved in the project, and by Stakeholders. These differences must be considered when creating a Communications Plan. For example, will all departments have access to email, or will exceptions need to be made? Are there any other considerations that may affect or limit communication? For example, there may be regulatory or contractual obligations that will affect the means by which communication can take place.



A great way to communicate with the Project Sponsor and the Customer Representatives is to conduct a status meeting. Some items to discuss during the meeting include accomplishments, progress against schedules, work to be done, and any open issues that need resolution. A Project Status Report should be prepared and reviewed during the meeting. Use Figure 2-10, the Project Status Report template, as a guide.

Figure 2-10 New York State Project Status Report

Agency Name
Project Name

Project Status Report

As of (Date)

Distribution:

Original Copy
Project Repository

Project Team
(List names)

Stakeholders
(List names)

Prepared By:
(Project Manager name)

Figure 2-10 (Continued)

Project Status Report

STATUS SUMMARY:

*Summarize the project's **Status**. This section should be brief, presenting a few major accomplishments or possibly a critical issue. On large projects with many teams it may present the points you most want noticed. Remember, the point(s) in the Status Summary will be repeated in the appropriate section of the Status Report. If possible, present a high level Gantt chart of deliverables to visually represent the schedule below.*

SCHEDULE:

Project Phase	Project Process	Planned Start	Actual Start	Planned End	Actual End	Explanation of Variance

Enter planned and actual start and end dates pertaining to each Phase and Process of the project. Explain variance when planned and actual dates are not in agreement.

FINANCIAL INFORMATION:

A	B	C	D	E	F	G
Original Project Estimate	Total Approved Changes	Total Current Estimate	Amount Expended to Date	Estimated Amount to Complete	Forecast Total	Project Variance
Explanation of Variance:						

*Enter the dollar amount of the **Original Project Estimate**.*
*If any changes have been approved, enter the **Total Approved Changes** in dollars.*
*Total the dollar amounts in columns A and B and enter the result as **Total Current Estimate**.*
*Enter the dollar **Amount Expended** on the project as of the date of this report.*
*Enter the dollar **Amount Estimated to Complete** the project.*
*Total the dollar amounts in columns D and E and enter the result as **Forecast Total**.*
*Subtract the dollar amount in column F from the dollar amount in column C and enter the result for **Project Variance**.*

Figure 2-10 (Continued)

Project Status Report

ISSUES AND ACTION ITEMS:

Issue Identification					Action Plan			
Issue #	Date	Priority	Issue Name	Description	Action	Owner	Due Date	Status
1.								
2.								
3.								

*Develop an **Action Plan** for each identified Issue, and track its progress via the Activity Log.*
*Assign an **Issue #** to each Issue on the report, for easy reference.*
*Enter **Date** when the Issue was originally raised.*
*Record **Priority** (High, Medium or Low) that the Issue was assigned.*
*Assign a short but descriptive **Issue Name**, and provide a detailed **Description of the Issue** and its impact on the project.*

*Describe an **Action** (or a series of Actions) that will be performed to resolve the Issue.*
*Assign an **Owner** to that Action, and establish a **Due Date** by which the Action should be complete.*
*Record action **Status** (Open or Closed). As long as any Actions for an Issue are open, the Issue itself stays on the Issues and Action Items page of the Project Status Report; when all Actions are Closed, the Issue moves to the Closed Issues page for one reporting period, and subsequently is removed from the report.*

There are likely to be multiple Actions per issue.

Figure 2-10 (Continued)

ACCOMPLISHMENTS THIS REPORTING PERIOD:

For Reporting Period of xx/xx/xxxx – xx/xx/xxxx

*Enter project **Accomplishments** for the reporting period, identifying activities, meetings, and any deliverables produced.*

PLANNED ACTIVITIES FOR NEXT REPORTING PERIOD:

For Reporting Period of xx/xx/xxxx – xx/xx/xxxx

List project activities planned for the next reporting period. Use the Project Schedule as a basis for this information, adding meetings, presentations, etc. as necessary.

ACCEPTANCE AND CHANGE MANAGEMENT:

Deliverable Acceptance Log

Deliverable Name	Sent for Review (Date)	Sent for Approval (Date)	Action Approve/Reject	Action Date

*List the **Deliverable Name** of each deliverable completed, the **Date** it was **Sent for Review**, the **Date** it was **Sent for Approval**, the **Action** taken and the **Date** the action was taken.*

Change Control Log

Change #	Log Date	Initiated By	Description	Action Accept/Reject	Action Date	Reject Description

*As change requests are received, indicate the **Change Number**, the **Date** it was received in the **Log Date** column, the name of the person who **Initiated** the change request, a **Description** of the change, the status of the change (whether **Accepted** or **Rejected**), the **Date** it was **Accepted** or **Rejected**, and a brief **Description** of the reason for **Rejection**.*

Lost Time

If there was time on the project during the report period when no productive work could be done by the Project Team due to actions outside of their control, explain how much time and why. For example, if there was a power outage necessitating leaving the building, this is considered lost time. This period of inactivity may result in project variance. It is important to note that this is not due to the inability of the team to meet work estimates. Change control may be instituted to cover the effort and cost impact for this lost time.

Closed Issues

*This follows the same format as open issues. Use the table for Issues and Action Items above. Identify **Closed Issues** and retain only until the next Status Reporting period.*

Staffing

Team Member	Role	Information/Notes

*Identify the name of each **Team Member**, their **Role** on the project, and any pertinent **Information** relative to the project, such as availability, pre-planned absences, etc.*

Figure 2-11 New York State Project Communications Plan

New York State
Project Communications Plan

PROJECT IDENTIFICATION

Project Name: _____ Date: _____

Project Sponsor: _____ Project Manager: _____

*Enter the **Project Name**.*
*Enter the current **Date**.*
*Enter the name of the **Project Sponsor**.*
*Enter the name of the assigned **Project Manager**.*

Figure 2-11 (Continued)

New York State
Project Communications Plan

Stakeholder	Message/Information Need	Delivery Vehicle	Frequency
Project Sponsor			
Project Manager			
Project Team Member			
Quality Team Member			
Procurement Team Member			
Other Stakeholder			

*Enter the Stakeholder role in the **Stakeholder** column. Sample stakeholders are provided for your use. Describe the different types of information needed in the **Message/Information Need** column, and how each type of information will be delivered to the stakeholders in the **Delivery Vehicle** column. (Phone, email, formal documentation, etc.) Describe how often and how quickly the project stakeholders will need information in the **Frequency** column.*

Figure 2-11 (Continued)

New York State
Project Communications Plan

EXISTING SYSTEMS:

Discuss any communications vehicles (or methods) already in place, and how they will be leveraged on this project.

METHOD FOR UPDATING THE COMMUNICATIONS PLAN:

Describe how and when the plan will be updated throughout the project.

OTHER COMMUNICATIONS INFORMATION:

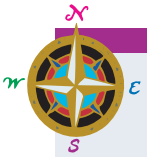
Discuss any communications information not yet covered.

2.4.3 Compile All Information to Produce the Initial Project Plan

All work products and deliverables from Project Initiation processes will be compiled for the Initial Project Plan. At this point in the project management lifecycle, the Project Plan will consist of the following information:

- Project Charter
- CSSQ
- List of Risks
- Description of Stakeholder Involvement
- Communications Plan

This information will be refined and supplemented in later project phases as the Project Manager and team become more knowledgeable about the project and its definition. The Project Plan is not a static document; it requires iterative refinement.



"Don't judge the book by its cover." Hogwash! While we are not advocating style over substance, the format, style, and presentation do mean a lot. During the few minutes that most decision-makers will spend reviewing your written deliverables you want them to be well disposed towards you, and able to abstract the most information in the least amount of time. A professional-looking document will make a good first impression; a well-organized text that clearly and logically builds your case will solidify that impression. So don't just slap some papers together, snap a rubber band around them, and submit it as the deliverable; treat your Project Plan as a repository of your brightest hopes for the future.

Deliverables

- **Description of Stakeholder Involvement** – a document describing, to the level of detail currently known, the roles and responsibilities of all Stakeholders, internal and external, who will in any way be involved in the project. This document is part of the Project Plan. This document will most likely be updated later as more about the project becomes known.

- **Communications Plan** – a document written by the Project Manager that describes:
  - How often and how quickly information will be needed by internal and external Stakeholders
  - How different types of information will be disseminated to the Stakeholders (via email, phone, spreadsheets, formal documentation, etc.)
  - The communications systems already in place and how they may be leveraged on the current project
  - How the Communications Plan will be updated throughout the course of the project
  - Any other information regarding the means by which information will be communicated to all project Stakeholders

- **Initial Project Plan** – the key deliverable produced during Project Initiation. The initial plan will be refined iteratively throughout the entire project management lifecycle and will serve as the main guide to follow during Project Execution and Control. The Initial Project Plan incorporates the deliverables above and is used to:
  - Document project planning assumptions
  - Document project planning decisions regarding alternatives chosen
  - Facilitate communication among internal and external Stakeholders
  - Define key management reviews as to content, extent and timing
  - Provide a baseline for progress measurement and project control

For an example of a Project Plan, see Figure 2-12, the New York State Project Plan.

Figure 2-12 New York State Project Plan

New York State
Project Plan

PROJECT IDENTIFICATION

Project Name: _____ Date: _____

Project Sponsor: _____ Project Manager: _____

*Enter the **Project Name**.*
*Enter the current **Date**.*
*Enter the name of the **Project Sponsor**.*
*Enter the name of the assigned **Project Manager**.*

REVISION HISTORY

Revision #	Revision Date	Section Revised	Revision Description

Once the Project Plan has been approved, changes to any component of the plan should be tracked for historical purposes. Prior to applying the change, the previous version(s) should be retained. The Project Manager should append the following revision information to the new version being created:

***Revision #** is the next sequentially generated number based on the method established by the Project Manager.*

***Revision Date** is the date on which the revisions were started.*

***Section Revised** highlights which component of the plan was updated. This could include the Project Charter, the Communications Plan, the Quality Plan…etc. A revision could affect more than one component of the Plan. If a revision affects all components, the use of "ALL" would suffice.*

***Revision Description** provides a brief account as to why the component required updating, and what was changed. This could be the same for each component listed (i.e., all components require updating as a result of completing Project Initiation) or could be very specific.*

Figure 2-12 (Continued)

New York State
Project Plan

EXECUTIVE SUMMARY

Describe, at a summary level, what is presented within this document, to allow the reader to understand its contents at a glance.

The Executive Summary may include, but is not limited to:

- *Purpose of the document*
- *Structure of the document*
- *Material presented – provide a short description of each component of the Project Plan and its relevance*

Figure 2-12 (Continued)

New York State
Project Plan

DESCRIPTION OF STAKEHOLDER RESPONSIBILITY

Name/Title	Agency/ Department	Project Role	Responsibility	Phone	Email

*List all **Stakeholders** involved in the project, with their associated **Agencies**, **Roles**, **Responsibilities**, **Phone** numbers and **Email** addresses. Be sure to include NYS Employees, contractors and consultants.*

Figure 2-12 (Continued)

New York State
Project Plan

PROJECT PLAN DOCUMENTS SUMMARY

When compiling information to produce the Project Plan, prepare the following documents in a consistent, comprehensible format. Be sure to provide a logical flow between documents, to enable the reader to follow and understand the collection of material being presented.

Documents to be Created in Project Initiation	**Documents to be Created in Project Planning**
Project Charter	
Project Scope Statement	*Refined* Project Scope
Project Schedule Worksheet	Project Schedule
Project Quality Management Plan	*Refined* Project Quality Management Plan
Preliminary Budget Estimate *Including Staff Acquisition Plan and Materials Acquisition Plan*	Project Budget
List of Risks	Risk Management Worksheet
Description of Stakeholder Involvement	*Refined* Description of Stakeholder Involvement
Communications Plan	*Refined* Communications Plan
	Change Control Process
	Acceptance Management Process
	Issue Management and Escalation Process
	Organizational Change Management Plan
	Project Team Training Plan
	Project Implementation and Transition Plan

2.5 CONFIRM APPROVAL TO PROCEED TO NEXT PHASE

Purpose

The purpose of **Confirm Approval to Proceed to Next Phase** is to formally acknowledge the completion, review and acceptance of all deliverables produced during Project Initiation. Formal acceptance and approval by the Project Sponsor or an authorized designee also signifies that the project can continue into its next phase, Project Planning.

Roles

- Project Manager
- Project Sponsor
- Project Team Members
- Customer Decision-Makers

Acceptance and approval are ongoing. The Project Manager should review and gain approval from the Project Sponsor and Customer Decision-Makers for all interim deliverables upon their completion. Interim acceptances should streamline final acceptance.

Tasks

2.5.1 Review/Refine Business Case

At the completion of Project Initiation, the Project Manager must review the Business Case that was created during Project Origination. Because more information is now known about the project, the Project Manager will need to refine the Business Case to include the new information. The refined Business Case will be presented to the Project Sponsor as part of gaining approval to proceed.

The tasks to Confirm Approval to Proceed to Next Phase are:

- 2.5.1 Review/Refine Business Case
- 2.5.2 Prepare for Formal Acceptance
- 2.5.3 Gain Approval Signature from Project Sponsor

2.5.2 Prepare for Formal Acceptance

At this time, the Project Manager should schedule a meeting to discuss and gain agreement to secure Project Planning resources. Meeting attendees should always include the Project Sponsor and the members of Performing Organization Management whose resources will be affected. Attendees may also include members of other agencies who are able to provide resources that will add value during Project Planning. During the meeting, resources are formally secured by gaining the signatures of the appropriate Performing Organization managers

on the Project Deliverable Approval Form. (See Figure 2-13 for an example of a Project Deliverable Approval Form.)

In addition to reviewing the Business Case, all other deliverables produced during Project Initiation should be reviewed by the Project Manager to ensure that Customer and Project Sponsor approvals have been received. Once the review has been completed, the Project Manager should organize the refined Business Case and all other deliverables into a cohesive package and prepare a formal approval form.

2.5.3 Gain Approval Signature from Project Sponsor

The Project Manager must review the revised Business Case and the Initial Project Plan with the Project Sponsor. Based upon changes to the Business Case and policies within the Performing Organization, the Project Sponsor must decide if a project re-approval cycle is warranted. If project re-approval is necessary, the Project Manager should ensure the appropriate Project Origination processes are followed.

At this point in time, the Project Sponsor may decide to terminate the project. This "go/no-go" decision may be based upon factors outside the control of the Project Manager (i.e., the organization may have new priorities that are in direct conflict with the project or increased risk may have been introduced to the project.) Realistically, termination of a project could happen at any point during the life of a project and is something a Project Manager should always keep in mind.

At the end of this task, the Project Manager must present the deliverable acceptance package to the Project Sponsor or an authorized designee and obtain his/her signature on the Project Deliverable Approval Form, indicating approval to proceed to Project Planning. If the Project Sponsor does not approve the contents of the acceptance package, he/she should indicate the reason for rejecting it. It is then the responsibility of the Project Manager to resolve any issues regarding the deliverables and to present the updated package to the Project Sponsor again.

Deliverable

- **Signed Project Deliverable Approval Form** – a formal document indicating that the deliverable has been reviewed and accepted.

Figure 2-13 New York State Project Deliverable Approval Form

New York State
Project Deliverable Approval Form

PROJECT IDENTIFICATION

Project Name: _____ Date: _____

Project Sponsor: _____ Project Manager: _____

*Enter the **Project Name**.*
*Enter the current **Date**.*
*Enter the name of the **Project Sponsor**.*
*Enter the name of the assigned **Project Manager**.*

DELIVERABLE INFORMATION

Project Phase: _____ Date: _____

Deliverable Name: _____ Author: _____

*Enter the current **Project Phase**.*
*Enter the current **Date**.*
*Enter the **Name** of the **Deliverable** being presented for approval and the **Author's** name.*

If appropriate, information for multiple deliverables may be included for approval on a single acceptance form.

ACCEPTANCE CRITERIA

Criteria:

*For each deliverable being presented, describe the **Criteria** that must be met in order for the deliverable to be considered acceptable. The text from the Project Plan can be used.*

Figure 2-13 (Continued)

New York State
Project Deliverable Approval Form

REVIEWER INFORMATION

Reviewer Name: _____ Role: _____

Deliverable Name: _____

Recommended Action: Approve: ☐ Reject: ☐

Reviewer Comments:

Reviewer Signature: _____

Date: _____

*Provide the above information for each individual designated as a **Reviewer** for a deliverable. The **Reviewer** should include his/her recommendation for **Approval** or **Rejection** of the deliverable, any **Comments**, and the **Date** reviewed. If the recommended action is rejection of the deliverable, the reviewer must explain the reason. NOTE: If the deliverable being presented for approval is a project MANAGEMENT deliverable, the reviewer is most likely a member of Performing Organization Management who is agreeing to secure required resources for the next project management phase. If the deliverable being presented for approval is a PROJECT deliverable, the reviewer is most likely a subject matter expert who is providing subject expertise and recommending that the approver either approve or reject the deliverable. Duplicate the above if more than one reviewer is required.*

APPROVER INFORMATION

Approver Name: _____ Role: _____

Action: Approve: ☐ Reject: ☐

Approver Comments:

Approver Signature: _____

Date: _____

*Provide the above information for each individual designated as an **Approver** for a deliverable. The **Approver** should check whether he/she is **Approving** or **Rejecting** the deliverable and include any **Comments**. If the approver is rejecting the deliverable, he/she must provide the reason. If the deliverable is being approved, the approver should sign the form and enter the **Date** approved.*

*Duplicate the above section if the signature of more than one **Approver** is required.*

Figure 2-13 (Continued)

New York State
Project Deliverable Approval Form

PROJECT MANAGER INFORMATION

_____
Name (Print)

_____ _____
Signature Date

*Once a deliverable has been approved, the **Project Manager** should indicate his/her agreement by providing a **Signature** and **Date**.*

Project Initiation End-of-Phase Checklist

How To Use

Use this checklist throughout Project Initiation to help ensure that all requirements of the phase are met. As each item is completed, indicate its completion date. Use the Comments column to add information that may be helpful to you as you proceed through the project. If you elect NOT to complete an item on the checklist, indicate the reason and describe how the objectives of that item are otherwise being met.

Figure 2-14

Item Description	Page	Completion Date	Comments	Reason for NOT Completing
Prepare for the Project:	**57**			
Identify and assign the Project Manager	57			
Identify and appoint the Project Sponsor	57			
Identify Project Team Members	57			
Identify Customer Representatives	58			
Review historical information	58			
Document how issues were resolved and decisions made	59			
Review Project Charter template	60			
Work with Project Sponsor and Project Team to gain consensus on project expectations	60			
Write the Project Charter document	60			
Schedule time and location of Kickoff meeting	60			
Invite appropriate attendees	64			
Prepare meeting presentation and agenda	64			
Designate meeting scribe	64			
Prepare materials for distribution at meeting	64			

Item Description	Page	Completion Date	Comments	Reason for NOT Completing
Conduct Kick-off meeting	64			
Distribute notes to all attendees	64			
Establish the project repository	67			
Update the repository with all project correspondence	67			
Define CSSQ:	**69**			
Write the Project Scope Statement	70			
Create preliminary list of roles and skills required	76			
Complete the Project Schedule Worksheet	76			
Create High-Level Schedule	79			
Identify organization's existing quality standards, if any	79			
Identify and document quality standards for each deliverable	79			
Develop staff and materials acquisition plans	85			
Estimate costs of all resources	86			
Calculate the preliminary project budget estimate	86			
Perform Risk Identification:	**90**			
Solicit input on risk identification from Project Team, Project Sponsor, and Customer Representatives	90			
Analyze scope, charter, historical information	91			
List all risks identified	91			
Develop Initial Project Plan:	**92**			
Identify Internal and External Stakeholders	92			
Outline Stakeholders' roles and responsibilities	92			

Item Description	Page	Completion Date	Comments	Reason for NOT Completing
Understand Stakeholder communication requirements	93			
Write Communications Plan	94			
Compile all documentation and deliverables from Project Initiation	102			
Produce Initial Project Plan	103			
Confirm Approval to Proceed to Next Phase:	**108**			
Review and refine the initial Business Case	108			
Review all other deliverables from Project Initiation	108			
Obtain buy-in from other managers	108			
Organize deliverables into package	109			
Prepare formal approval form	109			
Present approval package to Project Sponsor for signature	109			
Resolve any issues	109			
Update package as needed to resubmit to Project Sponsor	109			
Get Approval Signature	**109**			

Measurements of Success

The main measurement of success for Project Initiation is the decision to proceed with – or to halt – the project. While in the majority of cases, a well-executed Project Initiation leads to a transition to Project Planning, in some cases the organization is best served by deciding that the project should not continue.

Before the final sign-off, however, the Project Manager can assess how successfully the project is proceeding through its processes by utilizing the measurement criteria outlined below. More than one "No" answer indicates a serious risk to the continued success of your project.

Figure 2-15

Process	Measurements of Success	Yes	No
Prepare for the Project	Do you have a committed, interested and influential Project Sponsor attached to the project?		
	Did you verify that your Project Charter reflects the vision of the areas of the Performing Organization affected by/involved in the project?		
	Did you identify specific benefits the product or service developed by your project will bring to the Customer?		
	Do you have a clear structure for the project repository?		
Define CSSQ	Has your Scope Statement been reviewed and accepted by Customer Representatives who will benefit from your project?		
	In your High-Level Project Schedule, do you know if the effort allocated to various project phases correlate to industry-accepted norms?		
	Has your Quality Management Plan been approved by the member of your organization responsible for quality assurance?		
	Did you review the impact your project costs will have on upcoming fiscal year budgets with the Finance office?		
	Have your staff and materials acquisition plans been reviewed with the Performing Organization who will be paying for the staff and products being acquired?		
Perform Risk Identification	Has the Project Sponsor reviewed your list of risks?		
Develop the Initial Project Plan	Are your Internal and External Stakeholders satisfied with the frequency and content of communications you are providing (consistent with your Communications Plan) as evidenced by a lack of complaints?		
	Have you proactively sought to gauge Stakeholders' satisfaction level?		
Confirm Approval to Proceed to Next Phase	Do you have an approval form signed by your Project Sponsor authorizing you to proceed to Project Planning, or halting the project?		
	Have you provided sufficient information in your Initial Project Plan to allow the Project Sponsor to take the necessary action?		

Phase Risks / Ways to Avoid Pitfalls

Project Initiation lays the foundation for the rest of the project management lifecycle. In the same way that a faulty foundation will result in an unstable and eventually unusable building, an incomplete or improperly executed Initiation will result in a flawed project.

What are some of the key elements of Project Initiation that require the most attention? The following table identifies processes and tasks that are highlighted in this section.

Figure 2-16

Process	Task	Why is it important?
Prepare for the Project	Identify Project Sponsor	A project without a Project Sponsor is like a ship without a rudder – no matter how sleek the hull or how tall the masts, it just can't get anywhere useful.
	Conduct Kick-off Meeting	To continue with a ship metaphor, it's important to get everybody on board before setting sail!
Define CSSQ	Develop High-Level Schedule	Can't sail the seven seas without a map!
Perform Risk Identification	Identify and Document Risks	Identifying and documenting risks is like putting up lighthouses. Fewer wrecks.
Develop Initial Project Plan	Develop Communications Plan	Frequent and comprehensive communications is one of the key project success factors.
Confirm Approval to Proceed to Next Phase	Gain Approval Signature	Just how far out on the plank are you willing to walk? Thought so.

PITFALL #1 – NO SPONSOR, NO CHAMPION

In Prepare for the Project, the first imperative is securing a Project Sponsor. Without the Project Sponsor to guide and support the project, the Project Manager has an impossible choice of either trying to take on the responsibilities of a Project Sponsor – for which he has no authority, or trying to secure the commitment of unwilling or uninterested executives – over whom he has little influence.

Having one Project Sponsor who is high enough in the organization to be of help, and interested enough in the outcome to be involved, is ideal. However, in many cases, the organization insists on two people – usually managers from two main business functions involved in the project – serving as joint Project Sponsors. This situation is not a disaster – unless the managers are severely at odds with each other, especially about what the project ought to accomplish. In most cases, the Project Manager can sit down with the Project Sponsor(s) (as early as possible), and hammer out a common vision of what the project is supposed to do. Some of the useful questions to ask to gain consensus are:

- What are we trying to accomplish? What is the desired outcome?
- Who will benefit, and in what ways?
- Why is the project important to YOU?
- How is it going to change the way people do their work?
- How will the organization adjust?

However, when the number of Project Sponsors exceeds two, trouble may be afoot. There will be so many more delays getting everyone to the same place, or chasing everyone down, so many more difficulties achieving a consensus, so many more corrections to deliverables, so many more minds to convince, so many more personalities to please. You'd better add lots of time to your schedule for securing necessary approvals!

The effort you will expend in securing an interested, influential Project Sponsor now will pay dividends throughout the duration of the project. In some organizations, often those with a defined project selection method, projects may only be requested by someone willing to be the Project Sponsor.

PITFALL #2 – INEFFECTIVE KICK-OFF MEETING

The importance of selecting an effective Project Team and writing a comprehensive Project Charter is self evident and well understood. However, the other key, but frequently overlooked or lightly regarded task in Prepare for the Project is the kick-off meeting. When conducted, the kick-off meeting is often wasted in a pro-forma, listless exercise of bringing unwilling participants together and stultifying them with boring recitations of project objectives, replete with industry buzzwords and technical jargon. Instead, you should look at the kick-off meeting as your opportunity to ignite interest in the project, secure enthusiastic participation in crucial activities later on, and set accurate expectations about what the project is – and is not – likely to accomplish.

How? First of all, the kick-off meeting should be a creative, participatory exercise, involving all attendees. Second, it should emphasize and focus on how the project and its eventual product will benefit each attendee. And third, it should be a showcase for the Performing Organization's commitment – and interest – in this project, and your team's enthusiasm for it.

To make it a creative, joint exercise, you may consider asking the attendees to share ideas on why the project is important and how it will benefit the organization as a whole. To involve self-interest, you may also want to ask participants to explain how the project will benefit each of them specifically, making their jobs better, easier or more fulfilling; and if they can't come up with anything, have the Project Sponsor make appropriate suggestions. To showcase executive commitment, develop a draft of "talking points" for the Project Sponsor to use in a statement at the beginning of the kick-off meeting, explaining why the organization is making a significant investment in this project, from both budgetary and human resource standpoints. Finally, this is a great opportunity to showcase yourself and your team, and demonstrate great enthusiasm for the project, which will be contagious and will set the tone for the activities to come.

PITFALL #3 – CHICKEN BEFORE EGG, SCHEDULE BEFORE TASKS

The task that gives Project Managers the most trouble is coming up with a Project Schedule before the project tasks are well defined and before many important project decisions are made. It is a lucky Project Manager who is not seized by "analysis paralysis" at this stage of the game. How can I commit myself to an estimate (and let's not kid ourselves – the estimate you do put down will become a commitment, which the Performing Organization will immediately embed in whatever budgetary or strategic plan they are developing) without knowing enough about the project? This paradox is easily resolved if you can estimate as you go along – one phase at a time. Unfortunately, that is a luxury afforded few, if any, Project Managers. The budgeting process demands answers well ahead of the game, and there is no avoiding it.

The one thing that can help at this stage is experience – either personal, or in the form of organizational historical data. If you have been involved in similar projects in the past, you develop a feel for how long things take, and what obstacles – other than product-related – must be overcome and accounted for in the schedule. However, if you are new to project management, to the Performing Organization, or to the technology, you need to fall back on organizational knowledge. If you are lucky, the organization captured lessons learned from prior projects, and you can find out how long similar efforts have taken. More likely, no such knowledge base exists other than in people's heads, and your Project Sponsor can perform an important service in helping identify and recruit Project Managers who may have been involved in similar efforts. Make sure those efforts were actually successful – after all, you do not want to make the same mistake twice. Ask to see their initial and final Project Schedules. If they don't have either one (or worse, both) move along – anecdotal evidence is of very limited use in real life.

Armed with all applicable knowledge, the moment finally comes to grab a mouse and start scheduling. Most of the time, the end date for the project will be pre-defined by some event outside your control – executive commitment, governmental mandate, or some physical constraint. In that case, "backing into" an estimate is eminently reasonable. Walk through the entire project lifecycle backwards, making informed "guesstimates" along the way, and see if you end up at the beginning with today's date.

Keep in mind that most early estimates tend to be on the optimistic side, before reality sets in. Consider your first attempt optimistic. Now make a second, more pessimistic attempt, assuming Murphy's law. This will provide you with the worst-case scenario. The truth is probably somewhere in the middle.

In other cases, there is a budget limit that must be adhered to. Once again, you can back into your schedule by estimating how many weeks, months or years of effort by a reasonably-sized team the expected budget would support, and from there you can use the industry-standard percentages for product development lifecycles to approximate what your effort is going to be. Decide whether you will schedule according to effort, which is defined as the number of hours, days, or weeks per person, versus duration, which is defined as the number of work days or work weeks per task regardless of number of people. For a phase for which you have the most data (or experience), run a "reasonableness" check to see if the estimate makes sense. Finally, you may have a completely blank slate – freedom to commit necessary resources over a reasonable time frame to get the job done in quality fashion. And when you wake up from that pleasant dream, you will go back to the first two options.

But most of all, do not obsess over your preliminary schedule (that's why it's called "high-level"). Document carefully all your estimating assumptions, and run it by as many experienced and knowledgeable people as you can – not the least, your Project Sponsor (that's also why it's called "high-level").

PITFALL #4 – PRETENDING NOTHING WILL GO WRONG

The one process that shockingly few organizations engage in despite the fact that it can provide the most "bang for the buck" is risk management, which consists of risk identification, assessment, and mitigation. Notice, there is nothing here that says "risk avoidance." You can't avoid risk – stuff will happen, and most of it will negatively impact your project, if you let it. What you can do is anticipate it, and be ready with a solution before the problem arrives. Once again, either your own experience, or organizational knowledge (captured as historical data in a repository, or as knowledge in people's heads) is the

key. What obstacles, problems and disasters did other projects run into before? How were they dealt with? What was the impact on the schedule?

Consider every aspect of your project. Ask yourself, what can possibly go wrong? What assumptions am I making that may not be accurate, or consistent? Then, for every risk factor that you identify, you need to determine how it can affect your project.

PITFALL #5 – NOT ENOUGH TALK

Another activity that costs very little, but can provide enormous benefits, is communication. In fact, one of the few success factors consistently cited by the majority of New York State agencies in analyzing successful projects was frequent and comprehensive communication. Communication keeps all the players in the loop, avoids unpleasant surprises, and builds confidence in project progress and success. Nobody ever complains that they are being told too much, but they usually resent being told too little.

Building an effective Communications Plan starts with accurately accounting for all the players. Don't forget the Project Team, the Project Sponsor(s), all of the Customers, and internal and external Stakeholders. Anyone who will be in any way affected by the product or service that your project will develop must be communicated to at some point, and most likely throughout, the project lifecycle. For every player involved, determine how frequently the communication should occur (hint: early and often) and what it should contain (hint: the more the merrier). Of course, make sure it's OK with your Project Sponsor(s), but if you run into opposition on that front, remind them that even the old Soviet Union did end up discovering glasnost (openness).

PITFALL #6 – IS THE PROJECT OFFICIAL?

Finally, you are all done with Initiation. Your schedule is a work of art. Your Project Charter inspires masses to commit great deeds. Your Project Plan is correct and complete. You think you are done? Not until you have a signature of someone that matters on a piece of paper that certifies that your opinion of your

work is justified, and that you have authorization to proceed to the next phase.

Remember that unless you are in the highly unusual situation of being your own boss, you do not have the authority to certify your own work, or the clout to commit resources to continue. And unless you want to go very far out on that proverbial limb, you need to have proof that someone with proper authority – most likely, your Project Sponsor – is on board with what you have done, and what you are about to do.

No matter how happy your Customers and your Project Sponsor may be with your approach and your schedule, no matter how enthusiastic your Project Team, or your whole department, is with your plans, the only cover that you will have when things go terribly wrong (which, of course, if you've done everything correctly – including getting the approval form – will not happen) is that signature on that piece of paper. So please, do yourself a favor, and get that bulletproof vest before venturing into the shooting gallery known as The Rest of the Project.

PITFALL #7 – WE DON'T REALLY NEED TO FOLLOW ALL THESE STEPS, DO WE?

Skipping tasks and their documentation in Project Initiation can cause serious consequences affecting all of the subsequent phases of your project. Project Management (as well as just basic Management) methodologies were developed not because people had nothing better to do with their time, but in response to crises and disasters that resulted precisely from seat-of-the-pants approaches. (See PITFALL #5 in Project Planning.)

Frequently Asked Questions

What if no one will agree to be the Project Sponsor?

Although no one may have assumed the official role of Project Sponsor, someone secured the funding for this project, and someone appointed you to manage it. Talk to that person, explain the role of the Project Sponsor, and notify him that you will consider him your Project Sponsor unless someone else is identified to fill that position. (See Pitfall #1, No sponsor, no champion.)

What happens later on if my time/money estimates are off by 50 to 100 percent?

Accurate estimating takes a lot of effort, knowledge, available historical data, and a bit of luck. Chances are, your estimates are going to be off; the only questions are, by how much, and what will you do about it.

Your lack of accuracy could be due to one or both of the following: (1) you did a lousy job estimating (usually due to lack of historical comparative data) and/or (2) things changed. In the first case, take responsibility for your mistake, use it as a "learning opportunity," and make sure everyone realizes what you are doing. In the second case, make sure everyone's aware of the changes as soon as they occur, and use the change control umbrella to cover you. Remember – management hates "surprises." It is better (for your career, at least!) to be off by a lot if everyone knows about it well ahead, than to be off by a little – and have it be a total surprise to the decision-makers. In both cases, it behooves you to document your estimating process and assumptions, and reforecast on a regular basis. If an underestimate becomes apparent, identify root causes, define corrective actions and alternatives, and work back with the Project Sponsor to head off any significant degradation of Project Schedule.

And finally, if your project is in real trouble, it may be time to initiate Project Triage. (See Section II:1, Project Triage.)

How do I justify the initiation time to the Project Sponsor or Customer who just wants it done?

It's called "Customer education." Encourage your Project Sponsor and your key Customers to read (or at least peruse)

this ***Guidebook***. Explain to them the benefit they will derive from proper planning. Illustrate your arguments by pointing to other projects (hopefully, disastrous) and explaining why they failed (hopefully, due to lack of planning). Seek persuasive allies among their colleagues. And finally, use it as a continuous improvement opportunity: explain what has to be accomplished, and ask for a creative way of getting the same result using some other means. Who knows, they may actually come up with a process improvement that you can use as a best practice later on. (See Pitfall #7 for more details.)

What can you do if the Performing Organization doesn't recognize the importance of project management or feels that they can do it better?

This is a kind of variation on the theme of the previous question. You can either try to persuade the folks that it's the right thing to do, or lead by example and just do it the right way. It is unlikely that everyone doesn't understand project management; seek out people with similar ideas, and have them bolster your arguments. Seek assistance from OFT PMO with justifications and examples of successful projects done right. Brandish this ***Guidebook*** and follow the practices it advocates.

Is the Project Manager expected to perform all of the tasks required of the role? Can some tasks be delegated in whole or in part?

Great question! Management means "getting work done through others." Delegation is one of its principal tenets. Depending on the size of the project, the Project Manager may be physically unable to perform some of the duties outlined in this book. For example, take new team member orientation. Ideally, the Project Manager would spend a chunk of time with every team member, inculcating proper disciplines and techniques. However, what if the Project Team comprises hundreds of members? Project Team Leaders must be identified to take on those responsibilities. But remember, it is still the Project Manager's responsibility to verify that delegated tasks are being executed correctly.

The most succinct way to answer this question is this: the Project Manager must do whatever it takes to have every task

done right, on time, and within budget. Whether you accomplish this by sitting on the beach and firing off occasional e-mails (improbable), or by spending all your waking moments in the office (undesirable), you are still doing a fine job.

What do you do if the Project Sponsor doesn't fulfill his/her role to the level of satisfaction expected by the Project Manager?

The first thing to remember is it doesn't pay to fight your Project Sponsor. The Project Sponsor is your principal ally and benefactor. Reason, persuasion and education are the way to go.

First, make sure your Project Sponsor knows that you are both trying to accomplish the same goal: to solve a business issue with the product of the project. Second, make sure the Project Sponsor understands – and agrees with – the approach the project is taking. Finally, once you have established commonality of interests, you can gently educate your Project Sponsor on the responsibilities of the position, and if his understanding differs, try to come to terms to which you both agree. Always argue from the benefit standpoint, explaining how a particular action on her part will benefit the project – and eventually the Project Sponsor.

3 PROJECT PLANNING

Purpose

The purpose of Project Planning is to define the exact parameters of a project and ensure that all the pre-requisites for Project Execution and Control are in place.

Project Planning builds upon the work performed during Project Initiation. The project definition and scope are validated with appropriate Stakeholders, starting with the Project Sponsor and Customer Decision-Makers. Project Scope, Schedule and Budget are refined and confirmed, and risk assessment activities advance to the mitigation stage. The Initiation deliverables – CSSQ, and Initial Project Plan – are further developed, enhanced, and refined, until they form a definitive plan for the rest of the project.

Additional Project Team members are brought on board and familiarized with the project objectives and environment, and additional resources are ready to be brought in following the finalized staff and material acquisition plans.

Project Planning is an opportunity to identify and resolve any remaining issues and answer outstanding questions that may undermine the goals of the project or threaten its success. It is an opportunity to plan and prepare, as opposed to react and catch up.

Project sponsorship and commitment are re-confirmed at the end of the phase, with approval signifying authorization to proceed and commit funds for Project Execution and Control.

List of Processes

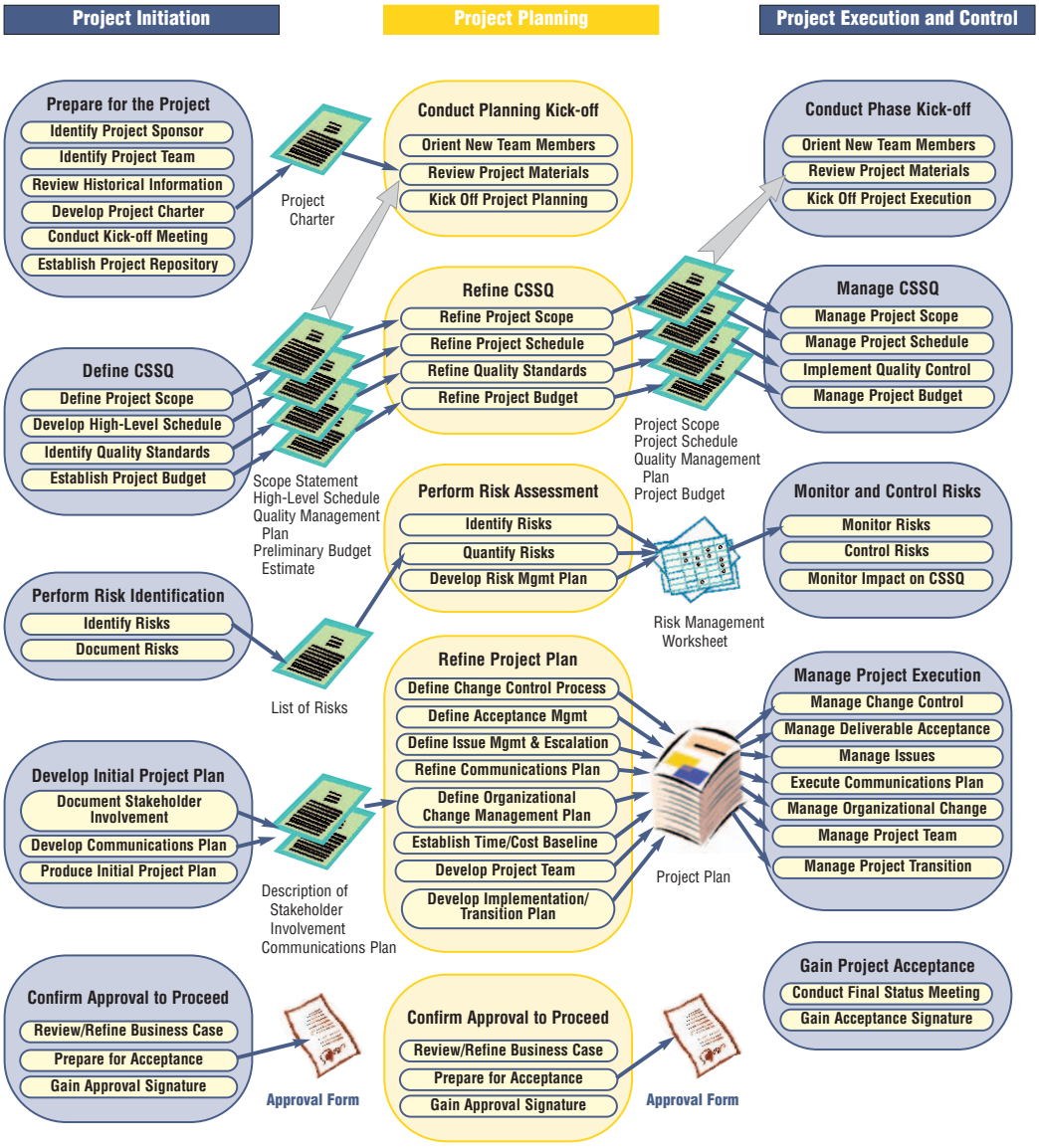
This phase consists of the following processes:

- **Conduct Project Planning Kick-off,** where the Project Manager conducts a meeting to formally begin the Project Planning phase, orient new Project Team members, and review the documentation and current status of the project.

- **Refine CSSQ,** where the Project Team refines the cost, scope, schedule and quality components of the project to more accurately reflect the additional information is learned about the project.
- **Perform Risk Assessment,** where the Project Team and Project Manager review the list of risks identified in Project Initiation, identify new risks, evaluate each risk based on the likelihood of its occurrence and magnitude of its impact, and develop a plan to respond to each risk.
- **Refine Project Plan,** where additional management procedures and plans are developed and all updated documents created during Project Planning are compiled into the Project Plan to be utilized in Project Execution and Control.
- **Confirm Approval to Proceed to Next Phase,** where the Project Manager reviews and refines the Business Case, secures resources required for the Project Execution and Control phase and prepares the formal acceptance package for review and approval by the Project Sponsor.

The following chart illustrates all of the processes, tasks, and deliverables of this phase in the context of the project management lifecycle.

Figure 3-1


Project Initiation
Project Planning
Project Execution and Control
Prepare for the Project
Identify Project Sponsor
Identify Project Team
Review Historical Information
Develop Project Charter
Conduct Kick-off Meeting
Establish Project Repository
Project Charter
Conduct Planning Kick-off
Orient New Team Members
Review Project Materials
Kick Off Project Planning
Conduct Phase Kick-off
Orient New Team Members
Review Project Materials
Kick Off Project Execution
Define CSSQ
Define Project Scope
Develop High-Level Schedule
Identify Quality Standards
Establish Project Budget
Scope Statement
High-Level Schedule
Quality Management Plan
Preliminary Budget Estimate
Refine CSSQ
Refine Project Scope
Refine Project Schedule
Refine Quality Standards
Refine Project Budget
Project Scope
Project Schedule
Quality Management Plan
Project Budget
Manage CSSQ
Manage Project Scope
Manage Project Schedule
Implement Quality Control
Manage Project Budget
Perform Risk Identification
Identify Risks
Document Risks
List of Risks
Perform Risk Assessment
Identify Risks
Quantify Risks
Develop Risk Mgmt Plan
Risk Management Worksheet
Monitor and Control Risks
Monitor Risks
Control Risks
Monitor Impact on CSSQ
Develop Initial Project Plan
Document Stakeholder Involvement
Develop Communications Plan
Produce Initial Project Plan
Description of Stakeholder Involvement
Communications Plan
Refine Project Plan
Define Change Control Process
Define Acceptance Mgmt
Define Issue Mgmt & Escalation
Refine Communications Plan
Define Organizational Change Management Plan
Establish Time/Cost Baseline
Develop Project Team
Develop Implementation/ Transition Plan
Project Plan
Manage Project Execution
Manage Change Control
Manage Deliverable Acceptance
Manage Issues
Execute Communications Plan
Manage Organizational Change
Manage Project Team
Manage Project Transition
Confirm Approval to Proceed
Review/Refine Business Case
Prepare for Acceptance
Gain Approval Signature
Approval Form
Confirm Approval to Proceed
Review/Refine Business Case
Prepare for Acceptance
Gain Approval Signature
Approval Form
Gain Project Acceptance
Conduct Final Status Meeting
Gain Acceptance Signature

List of Roles

The following roles are involved in carrying out the processes of this phase. The detailed descriptions of these roles can be found in the Section I Introduction.

- Project Manager
- Project Sponsor
- Project Team Member
- Customer
- Customer Decision-Maker
- Customer Representative
- Performing Organization Management
- Stakeholders

List of Deliverables

Project deliverables in this phase fall into three categories of importance and formality:

- **Phase deliverables** – major deliverables signed by the Project Sponsor or a designated alternate that allow the project to gain approval to proceed to the next phase.
- **Process deliverables** – drafts of major deliverables or minor deliverables that may or may not require a formal sign-off but nevertheless must be reviewed by Project Team members, Customer Decision-Makers, and the Project Sponsor. The review validates the project's progress, and allows the Project Manager to move on to the next process in confidence.
- **Task deliverables** – drafts of process deliverables or works-in-progress that are verified within the Project Team, and may or may not be reviewed by the Project Sponsor or Customer Decision-Makers. Each task culminates with the production of one or more tangible deliverables, which allows the Project Manager to monitor project progress using concrete and real results.

The following table lists all Project Planning tasks and their deliverables or outcomes. Starting with CSSQ, all task deliverables are eventually included as part of the Project Plan and the final acceptance package for this phase. Depending on available resources, some of these processes can be performed in parallel. The initial Project Schedule produced in Project Initiation will include the detailed schedule for the processes and tasks in Project Planning.

Figure 3-2

Processes	Tasks	Task Deliverables *(Outcomes)*
Conduct Project Planning Kick-off	Orient New Project Team Members	*Team Members Oriented*
	Review Outputs of Project Initiation and Current Project Status	*Project Outputs Reviewed*
	Kick Off Project Planning	Kick-off Meeting Agenda Kick-off Meeting Notes
Refine CSSQ	Refine Project Scope	Project Scope Statement
	Refine Project Schedule	Project Schedule
	Refine/Define Quality Standards and Quality Assurance Activities	Quality Management Plan
	Refine Project Budget	Project Budget Refined Staff/Materials Acquisition Strategy
Perform Risk Assessment	Identify New Risks, Update Existing Risks	Risk Management Worksheet
	Quantify Risks	Risk Management Worksheet
	Develop Risk Management Plan	Risk Management Worksheet
Refine Project Plan	Define Change Control Process	Change Control Process
	Define Acceptance Management Process	Acceptance Management Process
	Define Issue Management and Escalation Process	Issue Management and Escalation Process
	Refine Communications Plan	Communications Plan
	Define Organizational Change Management Plan	Organizational Change Management Plan
	Establish Time and Cost Baseline	Time and Cost Baseline
	Develop Project Team	Project Team Training Plan
	Develop Project Implementation and Transition Plan	Project Implementation and Transition Plan
Confirm Approval to Proceed to Next Phase	Review/Refine Business Case	Refined Business Case
	Prepare Formal Acceptance Package	Approval Form
	Gain Approval Signature from Project Sponsor	*Signed Approval Form*

3.1 CONDUCT PROJECT PLANNING KICK-OFF

Purpose

Conduct Project Planning Kick-off formally marks the beginning of Project Planning and facilitates the transition from Project Initiation. It ensures that the project remains on track and focused on the original business need. New Project Team members are thoroughly prepared to begin work, the current project status is reviewed, and all prior deliverables are re-examined. All deliverables produced during Project Initiation are used in Project Planning.

Roles

- Project Manager
- Project Sponsor
- Project Team Members
- Stakeholders

Tasks

3.1.1 Orient New Project Team Members

The goal of orientation is to enhance the ability of new team members to contribute quickly and positively to the project's desired outcome. If individuals have recently joined the team, it is imperative they have adequate workspace, equipment, security access, and supplies necessary to perform their required tasks. The Project Manager (or Team Leader, if appropriate) must convey to each new team member, in a one-on-one conversation, what his/her role and responsibilities are related to the project. In order to streamline interaction among the team, new team members must also become familiar with the roles and responsibilities of all other Project Team members and Stakeholders as soon as possible, and immediately receive copies of all project materials, including any deliverables produced so far. It is usually the Project Manager's responsibility to get new members of the team up to speed as quickly as possible. On large projects, however, if the team is structured with Team Leaders reporting to the Project Manager, it may be more appropriate to assign a Team Leader to "mentor" the new individual.

The tasks in Conduct Project Planning Kick-off are:

Information that would be useful to new team members includes:

- All relevant project information from Project Origination and Initiation
- Organization charts for the Project Team and Performing Organization
- Information on project roles and responsibilities
- General information about the Customer and Performing Organization
- Logistics (parking policy, work hours, building/office security requirements, user id and password, dress code, location of rest rooms, supplies, photocopier, printer, fax, refreshments, etc.)
- Project procedures (team member expectations, how and when to report project time and status, sick time and vacation policy)

Orientation sessions can be held for new members to ensure that they read and understand the information presented to them.

Some Project Managers make use of orientation checklists to ensure that nothing is forgotten during orientation sessions. It's a good idea to retain a package containing a checklist, an orientation meeting agenda, project materials and logistical information. Then, when a new member joins the Project Team, you can just copy its contents. Remember to keep the contents of the package current.

3.1.2 Review Outputs of Project Initiation and Current Project Status

Before formally beginning Project Planning, the Project Charter and all components of the Initial Project Plan should be reviewed. This is a checkpoint process – to recap what has been produced so far and analyze what will most likely be refined as Project Planning takes place. It is especially useful for any new members joining the team during this phase. The review of materials may spark innovative ideas from new team members since they bring different and varied experiences to the project.

3.1.3 Kick Off Project Planning

As was the case for Project Initiation, a meeting is conducted to kick off Project Planning. At this meeting the Project Manager presents the main components of the Initial Project Plan for review. Suggested items on the agenda (see Figure 3-3, Project Planning Kick-off Meeting Agenda) to highlight during the Project Planning kick-off include:

- Introduction of new team members
- Roles and responsibilities of each team member
- Restating project background and objective(s)
- Most recent Project Schedule and timeline
- Identified risks
- Communications plan
- Current project status, including open issues and action items

The goal of the kick-off meeting is to verify that all parties involved have consistent levels of understanding and acceptance of the work performed to date and to validate and clarify expectations of each team member in producing Project Planning deliverables. Attendees at the Planning Kick-off Meeting should include the Project Manager, Project Team, Project Sponsor, and any other Stakeholders with a vested interest in the status of the project.

As in Project Initiation, the Project Sponsor should reinforce his/her support for the project and the value it will provide to the organization. The Project Manager should also be sure one of the Project Team members in attendance is designated as the scribe for the session, to capture pertinent project decisions, issues, and action items. Following the session, the information captured should be compiled into meeting notes to be distributed to all attendees for review and approval. Meeting materials should be added to the project repository.

Figure 3-3 Project Planning Kick-off Meeting Agenda

Project Planning Kick-off Meeting Agenda

Project: _____

Date: _____

Time: From: _____ To: _____

Location: _____

Invitees: List the names of individuals invited to the meeting

Invitees *should include the Project Manager, Project Team, Project Sponsor, and any Customers with a vested interest in the status of the project.*

Attendees: During the meeting, note who actually attended. If attendees arrived late or left early, indicating they missed some of the topics discussed, note their arrival or departure time.

AGENDA

Use the following suggested times as guidelines–the time you need to cover agenda topics will vary depending upon the needs of the project.

	Presenter Name	Time (minutes)
Introductions	Project Manager	5 min.
Project Manager welcomes everyone and briefly states the objective of the meeting. Allow individuals to introduce themselves, and provide a description of their role within the Performing Organization and their area of expertise and how they may be able to contribute to the project efforts. The material to be presented by the following agenda topics should come right from the Project Charter.		
Sponsor's Statement	Project Sponsor	5 min.
After brief introductions, the Project Sponsor should describe the vision for the project, demonstrate support, and advocate for its success, setting it as a priority for all parties involved.		
Project Request & Background	Project Manager	5 min.
Project Goals & Objectives	Project Manager	10 min.
Project Scope	Project Manager	10 min.
Roles & Responsibilities	Project Manager	10 min.
When reviewing roles and responsibilities be explicit about expectations relative to stakeholder availability and Project Sponsor commitment and support for the project.		
Next Steps	Project Manager	5 min.
Questions	Project Manager	10 min.

ADDITIONAL INFORMATION:

Handouts:

Provide a list of the material to be distributed to the attendees.

Figure 3-3 (Continued)

Project Planning Kick-off Meeting

Project: _____

Date:_____

Time: From: _____ To: _____

Location: _____

Be sure that one of the Project Team members in attendance is scribing for the session, capturing important project-specific information that requires further review or discussion as well as potential issues that could impact the project. At the end of the meeting, the Project Manager and Project Team should review these points as well as any other notes captured by other team members to identify any additional actions required. The notes will be compiled into meeting minutes to be distributed to all the attendees and retained in the project repository.

DECISIONS

Decision Made	Impact	Action Required?

Document each project decision reached and its impact. Also indicate if the decision requires follow-up actions. If so, these should be captured below.

ISSUES

Issue Description	Impact	Action Required?

Document any project issues identified and its impact. Also indicate if the issue requires follow up actions. If so, these should be captured below.

ACTION ITEMS FOR FOLLOW UP

Action	Responsible	Target Date

Capture any follow up activities and the individual responsible for them as well as set a date as to when the action needs/should be completed.

At the end of the meeting, the scribe should recap the action items. These should also be included in the meeting minutes to be distributed.

3.2 REFINE CSSQ

CSSQ is the acronym for a project's quadruple constraints: Cost, Scope, Schedule, and Quality. During Project Initiation, the Project Team created the initial CSSQ, a set of formal documents defining the project and how its desired outcome(s) will be reached. During Project Planning, each section of the CSSQ will be refined as more information becomes known about the project. The CSSQ is not static – some of the components will continue to change throughout the life of the project.

Roles

- Project Manager
- Project Sponsor
- Project Team Members
- Customer
- Customer Representative

It should be noted that refining CSSQ occurs in parallel with other project-specific tasks. Project Execution and Control tasks are not put on hold while the Project Team waits for the plan to be finalized. In fact, the execution of project-specific tasks usually provides additional information necessary to further elaborate the planning efforts.

The purpose of **Refine CSSQ** is to use additional knowledge about the product of the project and the approach to be taken to:

- Improve the definition of Project Scope.
- Refine the Project Schedule by more accurately defining and sequencing project activities, estimating their durations, determining the dependencies among them, and assigning resources to them. The schedule will need to be adjusted according to the approach that will be used to produce the product and the availability of resources.
- Improve the understanding and definition of the processes and standards that will be used to measure quality during Project Execution and Control.
- Refine the appropriate approaches for staff and material acquisition defined during Project Initiation, implement the plans, and more accurately define the budget required to produce the desired outcome of the project. The project budget will be affected based upon the approach that will be used to produce the product and the availability of resources.

When refining CSSQ, the Project Manager should create a revised version of each document while maintaining the integrity of the original documents. This will provide an audit trail as to how CSSQ has evolved throughout the project lifecycle.

Tasks

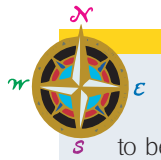
3.2.1 Refine Project Scope

It is important to remember that refinements to the Project Scope must include discussions and interviews with the Customer and other appropriate Stakeholders. The scope document, therefore, will reflect a mutual agreement between all parties, which is more likely to ensure that buy-in is achieved.

The tasks for Refine CSSQ are:

- 3.2.1 Refine Project Scope
- 3.2.2 Refine Project Schedule
- 3.2.3 Refine/Define Quality Standards and Quality Assurance Activities
- 3.2.4 Refine Project Budget

A clearly defined Project Scope is critical to the success of a project. Without a clear definition, work already performed may be subject to rework, resulting in lower team productivity. During Project Initiation, a scope statement was written to document a basic description of the project and its deliverables. (See Figure 2-6, New York State Project Scope Statement.) Refining the Project Scope breaks deliverables into smaller pieces of work, allowing the scope and the existing Project Budget, Schedule, and quality measurements to be more accurately defined. Where the initial Project Scope statement highlighted the deliverables to be produced in support of the desired project outcome, the revised Project Scope must go one step further. Using the information learned during Project Initiation, and based upon input gained by communicating regularly with the Customer and other appropriate Stakeholders, the Project Team must refine the Scope statement to clearly define each deliverable – including an exact definition of what will be produced and what will not be produced.



Break each deliverable described in the Project Scope statement down into smaller, more manageable components. Repeat this until the components are small enough to be defined in the greatest possible detail. Questions to ask to determine if each deliverable has been broken down sufficiently are:

- Am I able to clearly define the component?
- Am I able to clearly state what will be done to complete the work and what will NOT be done?
- Am I able to estimate the time needed to complete the component? Am I able to assign an individual who will be responsible for completing the work?
- Am I able to assign a dollar value to the cost of completing the work?

If the answer to any of these questions is "No," that particular component needs to be further broken down. This "decomposition" exercise assists project staff to better understand and properly document the Project Scope. It also provides information needed for Project Schedule and budget revision.

The nature of the specific line of business associated with the product of each project will drive how the Project Scope is refined. For example, for building construction projects, architectural drawings will be completed; for application software projects, detailed requirements definition and design will be completed. (See Section III, SDLC.)

Anything that impacts the team's ability to perform the work required by the project may be important to consider when refining the Project Scope. For example, impacts may occur due to a Legislative decision. Both formal deliverables and less formal documents created during the Project Initiation, such as status reports, memos, and meeting minutes will be of assistance to the Project Team in revising the scope definition.

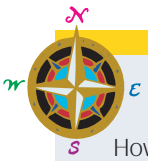
Changes to a Project Scope document must be made using a defined change control process. This process should include a description of the means by which scope will be managed and how changes to scope will be handled. Once documented, the process becomes part of the Project Plan. It is vital to document a clear description of how to determine when there is a change in scope to facilitate change control during Project Execution and Control. Documenting how to determine what constitutes change is a difficult process, but one that is critical to the change control management process. Additionally, while updating the Project Scope, the Project Manager and Customer must consider the effect the updates may have on the organi-

zation, anticipate impacts, and communicate them proactively to the user community. As in Project Initiation, selling the positive aspects of the project, the benefits of its product, and the value of changes to the scope during the entire duration of the project will facilitate acceptance down the road. (See 3.4.1 Define Change Control Process).

Once again, communication between the Project Manager and the Customer is crucial in creating a scope document that clearly reflects what the Customer needs and ensuring a mutual agreement between all parties. If the Project Scope is not accurately described and agreed upon, conflict and rework is almost certain to occur.

3.2.2 Refine Project Schedule

Using the Project Scope revised in the previous task, the Work Breakdown Structure created during Project Initiation must be revised. Deliverables illustrated in the Work Breakdown Structure should be broken into smaller components, until each component is defined to the level of detail currently understood, or is small enough to allow the Project Manager to accurately estimate the time and cost required for its completion (using the Project Schedule Worksheet). Using information from the Project Schedule Worksheet as input, the Project Manager should update the Project Schedule to more accurately define required activities, dependencies, levels of effort, and deliverable due dates.



You probably will not have sufficient information to break each and every component down into excruciating detail, especially if your project spans a long period of time. How can you predict the amount of work required to produce a deliverable that is scheduled to begin two years from now? You can, however, provide an estimate for the entire project at a high level, and should be able to provide accurate detail for the level of work required for the next 3 to 6 months. Describe the entire project to the level of detail you currently understand. Remember, as the project progresses, you will gain the information you need to break components down and provide estimates for the NEXT 3 to 6 months!

A good rule of thumb to follow is the "eighty-hour rule": if the task requires more than two weeks duration to complete, it should be broken down further. This provides a solid basis for estimating level of effort, task planning, assignment of work, and measurement of performance in Project Execution and Control. Use of the "eighty-hour rule" not only greatly facilitates scheduling, but also lays a foundation for accurate tracking of actuals; reporting on progress is reduced to an objective, binary mode: each task (and its deliverable) is either done or not done.

On smaller projects a Project Manager works directly with Project Team members to obtain individual input on effort estimates. On larger projects with multiple components, the Project Manager most likely relies on the input of Team Leaders or individuals who are expert in the specific subject areas. In either case, the Project Manager should gain input from individuals who will actually perform the work or who have performed similar work in the past. This will not only make the effort estimates more accurate, but will help generate excitement and buy-in from the Project Team, as they will feel more a part of the process.

Estimating the time to complete an activity is directly influenced by the capabilities of the individual assigned to perform it. The skill level of each person on the team should, therefore, be considered when doing effort estimates. A good practice is to base estimates on an assumed level of skill. This will allow the Project Manager to adjust his/her estimates up or down when the actual team is in place and the exact skill levels are known. It is imperative that all assumptions used in estimates are documented.

An experienced Project Manager also takes into account absenteeism, meetings, discussions, and staff interaction. A successful schedule builds in reality factors. Specific team members may have ongoing responsibilities occupying a portion of their time, and this must be factored into the schedule. Once effort estimates have been determined for each activity, the Project Schedule must be revised to reflect them. Any revisions or refinements that were made to the Project Scope will directly affect the Project Schedule and must be reviewed and incorporated into the schedule as needed.

Dependencies among tasks can be defined now, or adjusted as necessary. The Project Manager must recognize:

- **mandatory dependencies** – those dependencies that are inherent to the type of work being done. They cannot and will not change, no matter how many individuals are working on a task or how many hours are allocated to a task (e.g., the frame of a building cannot be built until the foundation is in place). The Project Manager must recognize mandatory dependencies since they will dictate the way certain pieces of the schedule will need to be structured.

- **discretionary dependencies** – those dependencies that are defined by the Project Team or Customer that force the Project Manager to schedule tasks in a certain way. For example, the Project Team may be required to use an in-house "best practice" to complete an activity that forces other activities to be completed in a specific sequence.
- **external dependencies** – outside the realm of the project or outside the control of the Project Manager or Customer, these dependencies may direct how portions of the project schedule must be defined. For example, a project activity may be dependent upon an outside vendor delivering a piece of equipment. This is something neither the Project Team nor the Customer can control, but it must be defined and considered when revising the schedule.

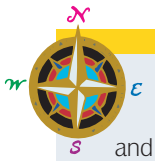
Project Schedule revision must also take into account:

Calendars – the hours and days when project work is allowed, including seasonal restrictions, holidays, labor contract restrictions, vacation or training schedules.

Constraints – completion dates for project deliverables mandated by the Project Sponsor, Customer, or other external factors, which will most often be known early in the project. Additionally, there may be financial, legal, or Legislative-driven constraints that help dictate a project's timeline.

Once the schedule has been revised to include tasks, effort estimates, resources, and dependencies, the Project Manager should study the schedule to determine its critical path. The critical path is the sequence of tasks in the schedule that takes the longest amount of time to complete. If any task on the critical path is delayed, the entire project will be delayed.

A Project Manager can determine the critical path in a Project Schedule by looking at all tasks that run in parallel and computing the total amount of estimated time to complete them. The path that takes the most time to complete is the critical path. Tasks on the critical path that are completed late will delay the project, unless the Project Manager takes proactive steps to finish subsequent critical tasks ahead of schedule. Because of the important relationship between critical tasks and the project end date, the Project Manager must always be cognizant of the critical path and understand how it is affected when changes are made to the Project Schedule.



Work with an experienced Project Manager, if you can, to learn tips and techniques for breaking work down, estimating time required to complete certain pieces of work, and refining the Project Schedule. Someone familiar with the process and the scheduling tools can save a more inexperienced Project Manager a lot of time and frustration!

If experienced Project Managers are not available, consider getting effort estimates from multiple sources, comparing results and estimating the duration based on the multiple inputs. Involving the Project Team in the planning process will not only help ensure estimates reflect reality, but will also help gain team buy-in and acceptance.

And remember...always document any and all assumptions made when deriving estimates or updating the Project Schedule. This "audit trail" will prove invaluable if you need to retrace your steps down the road or must explain why schedule revisions are necessary!

3.2.3 Refine/Define Quality Standards and Quality Assurance Activities

The Project Manager and Customer must determine if changes have occurred to the Project Scope, Customer requirements, external standards or regulations, or any other aspect of the project that will affect the quality standards established for each deliverable during Project Initiation. If the standards are no longer valid, the quality policy must be changed appropriately to refine existing standards or define additional ones.

Also during Project Planning, the Project Manager communicates with the Customer to establish and document all quality activities to be implemented during the course of the project to ensure the defined quality standards will be met. This is called quality assurance. Sometimes quality assurance for specific types of deliverables is performed by a separate Quality Assurance Department. If an organization does not have the luxury of a Quality Assurance Department, the required activities will need to be performed by designated Project Team members or Customers. Examples of quality assurance activities include:

- Collecting project documentation
- Conducting audits
- Verifying business requirements
- Performing testing

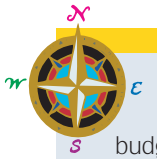
A description of all quality activities to be implemented during the course of the project should be included in the Quality Management Plan. (See Figure 2-8, New York State Quality Management Plan.)

3.2.4 Refine Project Budget

Based on the information now known about the project as a result of Project Planning activities, the Project Manager recalculates the budget required to complete project activities and tasks. (See Figure 3-4, New York State Project Budget.) As in the previous phase of the project, all costs must be considered including the cost of human resources, equipment, travel, materials and supplies. In addition, the following project components must be taken into account:

- **Project Schedule** – the schedule created during Project Initiation has been revised during Project Planning to include more detail and greater accuracy regarding project activities, tasks, and durations. This information will be used as direct input to the refined cost budget.
- **Staff Acquisition** – the Project Manager must identify additional staffing requirements. Strategies defined in Project Initiation need to be changed accordingly. Note that if the reporting relationships among different organizations, technical disciplines, and/or individuals have changed in any way, the strategy used to acquire human resources may need to be changed. Also, if the skills required to staff the project are different from those known during Project Initiation, the means by which staff members are acquired could be different. The Project Manager must update the Project Schedule to include all tasks needed to acquire Project Team members. (See Section II:3, Procurement and Contractor Management, for more information.)
- **Resource Requirements and Costs** – at this point in the project, a more detailed understanding of the resources required to perform the work and their associated costs is most likely known and can be used in refining the budget.
- **Materials Acquisition** – the Project Manager must verify whether product requirements have changed since Project Initiation. If changes have occurred, the product acquisition strategies need to be changed accordingly. The Project Manager must update the Project Schedule to include all tasks needed to acquire equipment, materials, and other non-human resources. (See Section II:3, Procurement and Contractor Management, for more information.)

- **Preliminary Budget Estimate** – also produced during Project Initiation, this spreadsheet should be the place to start to refine information pertaining to the budget. The Project Manager should add to this spreadsheet the more detailed cost estimates for the project defined in the Project Schedule, and revise the hours and cost columns based upon the revised Project Schedule, resource rates and requirements, and cost estimates. The Project Manager can use cost estimating checklists to ensure all preliminary budgeting information is known and all bases are covered.



It is also recommended that you take the time to document a preliminary disbursement schedule. This will help you and the Project Sponsor understand how the total budget will be expended over the course of the project.

Figure 3-4 New York State Project Budget

New York State
Project Budget

PROJECT IDENTIFICATION

Project Name: _____ Date:_____

Project Sponsor: _____ Project Manager: _____

*Enter the **Project Name**.*
*Enter the current **Date**.*
*Enter the name of the **Project Sponsor**.*
*Enter the name of the assigned **Project Manager**.*

Figure 3-4 (Continued)

New York State
Project Budget

BUDGET INFORMATION

Phase/Process/Task	Labor Cost	Material Cost	Travel Cost	Other Cost	Total Cost per Activity	Planned Date of Expenditure
TOTAL Budget						

*The **Phase**, **Process**, and **Task** Names come from the High-Level Schedule.*

*The **Labor Cost** is the cost of human resources required.*

*The **Material Cost** is the cost for equipment and supplies.*

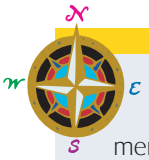
*The **Travel Cost** is any predicted cost that will be incurred if travel is required.*

*Enter any costs outside person, material, and travel costs under **Other Costs**.*

*Total the costs for each activity and enter the total under **Total Cost**. Then enter the **Planned Date** the expenditure will be made.*

*Calculate the total of all rows in the table and enter the values in the **TOTAL Budget** row at the bottom of the worksheet.*

COMMENTS: (List any assumptions pertaining to the costs entered above.)



Consult with past managers of similar projects to gain their perspectives on the actual time/costs to produce their projects' outcomes. Solicit input from past Project Team members to gain insight into the actual effort required to perform similar project tasks.

Again, for historical purposes, and to enable the budget to be further refined during Project Execution and Control, the Project Manager should maintain notes on how the budget was revised.

Deliverables

- **Project Scope** – the document that describes in detail the project boundaries, including defining the deliverables: how they will be produced, who will produce them during the course of the project, and the means by which changes to the deliverables will be identified and managed.
- **Project Schedule** – a revised, definitive representation of activities, durations, dependencies and resources to the level understood at this point in the project lifecycle. The schedule has multiple uses. It is both a task list for further planning, if necessary, and a structure for reporting status during Project Execution and Control. As individual tasks are completed, project progress can be assessed. It also serves as a useful management communication tool by which results can be compared with expectations. Because it is critical to the success of the project going forward, the schedule must be reviewed and accepted by both the Customer and the Project Team during Project Planning.
- **Refined Quality Management Plan** – the quality standards defined during Project Initiation and refined during Project Planning become part of the Quality Management Plan. The Quality Management Plan will be expanded during Project Execution and Control and is included as part of the Project Plan.
- **Project Budget** – a revised, more accurate estimate of the dollars required to complete the project. It includes the cost of all required human resources, equipment, travel, and supplies, and the anticipated timing of expenditures.

3.3 PERFORM RISK ASSESSMENT

Purpose

Risks require continual review and assessment throughout the project management lifecycle. The goals of **Risk Assessment** are to predict the likelihood that a risk will occur, to quantify its potential impact on the project, and to develop plans for risk management. Risks documented during Project Initiation should be reassessed during Project Planning.

Roles

- Project Manager
- Project Sponsor
- Project Team Members
- Customer Representatives

Next, an approach for risk management is developed. Actions can be taken to avoid, mitigate or accept each risk, depending upon the probability of its occurrence and the magnitude of its impact on the project. If a risk event can be anticipated, there should be sufficient opportunity to weigh consequences and develop actions to minimize its negative impacts or maximize its positive ones.

The list of risks created during Project Initiation is entered into a Risk Management Worksheet (see Figure 3-5, New York State Project Risk Management Worksheet) and supplemented by any additional risks identified in Project Planning. Within the worksheet, information is added to describe the risk probability, impact, and the timeframe in which the impact may occur. Based on these factors, the priority level of the risk event can be derived. Last, and most important, risk management plans must specify the individuals responsible for the mitigation actions, the timing of the actions to be implemented, and the expected results of the actions.

In addition to quantifying risk probability and impact and formulating risk responses, the risk assessment process facilitates establishment of an agreement for the Project Team, Project Sponsor and Customer Representatives to collaborate in managing risks as they arise during the project.

Figure 3-5 New York State Project Risk Management Worksheet

New York State
Project Risk Management Worksheet

Order Risks Risk Probability/Impact: Very Low - Low - Medium - High - Very High Priority Level: 1.00 - 10.00

Project Duration: Less Than 3 Month 3–6 Months 6–12 Months 1–3 Years More Than 3 Years

Baseline As-of Date: _____

Risk	Risk Probability	Impact Description	Level of Impact	Date of Impact	Priority Level	Risk Management Plan

Figure 3-5 (Continued)

*There are two templates available to assist you in managing project risks. The first, which is in the Appendices of the **Guidebook**, is a Word document that will walk you through the risk management process. The second template is an automated tool that can be found on OFT's website.*

The following instructions apply to the Risk Management Worksheet Microsoft Excel tool. You can also use this tool in hardcopy form, without making use of the automated Order or Print functions. You can download the Microsoft Excel tool from the OFT web site (see Guidebook templates at www.oft.state.ny.us).

1) Select the appropriate Project Duration using the Project Duration drop down box at the top of the page.

2) The Baseline As-of-Date field defaults to today's date. Change this date if you wish.

3) Transfer the current list of risks (identified and documented in Project Initiation and augmented as needed) to the Risk column

4) Determine the Risk Probability on a five-point scale (Very Low - Low - Medium - High - Very High), and record it in the Risk Probability column. Be sure to enter either the WORDS Very Low, Low, Medium, High or Very High, or the corresponding abbreviations VL, L, M, H or VH. Do NOT enter numbers in the Risk Probability column.

5) Identify the Impact that each risk event may have on the project, and record a textual description in the Impact Description column

6) Determine the impact magnitude on a five-point scale (Very Low - Low - Medium - High - Very High), and record it in the Level of Impact column. Again, be sure to enter either the WORDS Very Low, Low, Medium, High or Very High, or the corresponding abbreviations VL, L, M, H or VH. Do NOT enter numbers in the Impact column

7) Ascertain the date of impact and record it in the Date of Impact column, in the format MM/DD/YY. This is the date on the Project Schedule when you expect a risk event to start affecting CSSQ. It is not the date of the event itself.

8) Click on the Order button to order risks according to Priority Level calculated by the tool

Tasks

3.3.1 Identify New Risks, Update Existing Risks

The tasks for Performing Risk Assessment during Project Planning are:

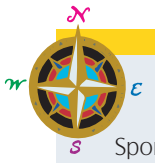
- 3.3.1 Identify New Risks, Update Existing Risks
- 3.3.2 Quantify Risks
- 3.3.3 Develop Risk Management Plan

The Project Manager must review the list of risks initially identified for the project to determine if all risks remain applicable. As a result of Project Initiation and Planning, the Project Manager and team members should be considerably more knowledgeable about the project and, therefore, better able to recognize and predict risk events.

Through other activities taking place in Project Planning specific to Cost, Scope, Schedule and Quality (CSSQ), additional risk variables may be introduced to the project. Further refinement of the Project Scope may uncover areas of concern that were previously unknown. A more detailed schedule may introduce a new level of complexity and interdependencies to the project, possibly producing more risk. More accurately defined staffing requirements may call for resources with unique skills whose availability may be diminishing. These are only a few examples of how risks in a project evolve over time, with the focus shifting from one risk source to another.

The Project Manager verifies the updated list of risks with the Project Team and Project Sponsor. As in Project Initiation, the Project Manager must consider both internal and external risks, internal risks being those events the Project Manager can directly control (e.g., staffing), and external risks, those that happen outside the direct influence of the manager (e.g., legislative action).

Once again, data and experiences from previous projects may provide excellent insight into potential risk areas and ways to avoid or mitigate them. If the organization has a list of common project risks, it can be useful to ensure that the Project Manager has considered all potential risk elements in the current list. The Project Manager should update the organization's list as necessary based on the results of the current project.



Solicit input from experienced Project Team members and/or the Project Sponsor to uncover potential areas of risk and to help you identify what types of risks the Project Sponsor views as relevant. Jointly identifying and updating the risk variables for a project results in the sharing of risk awareness by all parties involved.

3.3.2 Quantify Risks

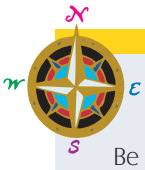
The Project Manager and Project Team members evaluate each risk in terms of the likelihood of its occurrence and the magnitude of its impact. Both criteria should be quantified using a five-point scale: very high, high, medium, low and very low. These measurements are used as input into the Risk Management Worksheet for further analysis when determining how the risk threatens the project.

There are many tools available to quantify risks. The Risk Management Worksheet presented here has been selected for its simplicity and ease of use. More sophisticated tools may be necessary for large-scale high-risk projects.

A factor to be considered when quantifying risks is stakeholder risk tolerance, the threshold to which the Performing Organization will assume risk, which is dependent on its attitude toward and motivation for the project. For example, an agency may view a 15% chance of a project overrun as acceptable since the cost benefit for the organization to do the project far outweighs this factor. The Project Manager's understanding of the organization's strategic direction and the motivation of both the Project Sponsor and the Customer will help determine the level of risk tolerance for the project.

3.3.3 Develop Risk Management Plan

The Project Manager evaluates the results of the previous task to determine an appropriate response for each risk: avoidance, mitigation or acceptance. Each case will require a decision by the Project Team. The Project Manager is then responsible for communicating the steps necessary to manage the risk and following up with team members to ensure those steps are taken.



Identifying the risk is good; but planning a wise course of action around it is infinitely better.

Be aware that by addressing one risk, you may be introducing another. For example: you identified a risk that your cost estimates may be off by as much as 15%. Your mitigation plan is to request a 20% increase in funds to cover the increased cost. You may have introduced a new risk, because a red flag may be raised, inviting an audit.

Since each risk may have more than one impact, the Risk Management Plan must describe the actions to be taken to avoid, mitigate or accept each risk impact, including contingency plans. It should also specify the individuals responsible for the mitigation actions or contingency plan execution. Attention should be directed to those risks most likely to occur, with the greatest impact on the outcome of the project. On the other hand, a conscious decision can also be made by the Project Team to accept or ignore certain risks. These decisions must be documented as part of the Risk Management Plan for subsequent re-evaluations.

Some commonly employed risk mitigation strategies may include:

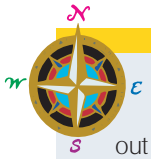
Procurement – some risks can be mitigated through procurement. For example, if the project requires staff with particular skills it may be advisable to retain resources through an outside organization. Unfortunately, this may introduce other risk factors such as the resource's unfamiliarity with the agency.

Resource Management – it may be beneficial to leverage a lead resource that has already worked on a project with similar characteristics by assigning that resource as a mentor to more junior team members. This will mitigate delays in the schedule due to the learning curve of more junior resources.

Use of Best Practices/Lessons Learned – some organizations already have repositories of project specific or business function best practices, which may help you to prepare for unanticipated risks. Taking advantage of other project best practices, whether they are process or tool based, will help to mitigate risk. Implementing processes that have worked successfully on other projects will save time.

The frequency with which the Risk Management Plan will be monitored, reviewed and maintained, and the method of communicating progress of risk mitigation actions, must be incorporated in the Project Schedule and Project Plan. The Risk Management Worksheet should be reviewed at every status meeting, and updated with each change to the project.

At the end of this task, the Risk Management Worksheet should be complete.



When updating the Risk Management Worksheet, maintain the original. Each revision should be kept to provide an audit trail demonstrating how the risks evolved throughout the project management lifecycle.

Deliverable

- **Risk Management Worksheet** – An updated record of risk variables, impact, probability, date of impact, level of priority and risk response actions. The review and update cycle for risk assessment should be built into the Project Plan and Schedule.

3.4 REFINE PROJECT PLAN

Purpose

Refining the Project Plan includes development of all required management processes and plans for team development and project execution and implementation. All updated work products and deliverables produced during Project Planning are compiled and included in the Project Plan.

Roles

- Project Manager
- Project Sponsor
- Project Team Members
- Customer Decision-Maker

Tasks

3.4.1 Define Change Control Process

Every aspect of the project defined during Project Initiation and Planning has the potential to change. In fact, change should be expected to occur throughout every project phase; but if an effective change control process is defined and agreed upon during Project Planning, any change should be able to be handled without negative effect on the project outcome.

The tasks for Refine Project Plan are:

- 3.4.1 Define Change Control Process
- 3.4.2 Define Acceptance Management Process
- 3.4.3 Define Issue Management and Escalation Process
- 3.4.4 Refine Communications Plan
- 3.4.5 Define Organizational Change Management Plan
- 3.4.6 Establish Time and Cost Baseline
- 3.4.7 Develop Project Team
- 3.4.8 Develop Project Implementation and Transition Plan

Project change is not defined simply as a change to the cost, end date, or Project Scope. Change should be defined as ANY adjustment to ANY aspect of the Project Plan or to ANY already approved deliverable(s). This includes anything formally documented in the Project Charter, Project Plan, or any deliverable produced during the course of the project.

The Project Manager and Customer Decision-Maker must agree on the change control process, which then must be formalized, documented, and included as a section in the Project Plan. Items that must be defined are:

- Identification of the individual(s) authorized to request a change.

- Identification of the person responsible for analyzing the request to understand its impact on the Project Cost, Scope, Schedule, and Quality, as well as the Customer Representative who has authority to approve the request. The Project Manager should never give the Project Team the go-ahead to begin work until a change request form has been signed by the Customer Decision-Maker. (See Figure 3-6, New York State Project Change Request.) It should be noted that the impact to the Project Schedule must take into account time spent to analyze the change request.
- The timeframe (number of business days) allowed for a change request to be approved or rejected by the Customer. It is important to document the fact that approval or rejection by default is not permitted, so acceptance or rejection cannot be assumed if there is no response to a submitted change request.
- The process to follow if no timely decision on approval or rejection of a change request is made. The Project Manager should follow up with the person to whom it was submitted to determine why the change request has not been processed. If its identification as a change is disputed, the situation should become an open issue in the Project Manager's status report. The Project Manager should attempt to negotiate a compromise, but, if there is no resolution, executive intervention may be required.
- The percentage of the overall Project Budget that has been reserved for project changes. It is important to pre-determine a change budget to prevent project work from being interrupted while funds are secured to do the work.

Should you advise your Project Sponsor to set up a change budget – set aside a pot of money (10 to 20% of the project total) for unforeseen eventualities? Let's see. Does your Project Sponsor enjoy "going to the well" time and time again to ask for additional funds? Do you enjoy writing justifications and groveling repeatedly? Enough said.

Figure 3-6 New York State Project Change Request

New York State
Project Change Request

PROJECT IDENTIFICATION

Project Name: _____

Project Manager: _____

*Enter the **Project Name**.*
*Identify the assigned **Project Manager**.*

CHANGE REQUEST INFORMATION

Request Date: _____

Requested By: _____ Agency: _____

Description of Change:

Scope Impact:

Schedule Impact:

Quality Impact:

Cost Impact:

Figure 3-6 (Continued)

New York State
Project Change Request

*This form is likely to pass through several hands. The person who is requesting the change will initiate the form, entering the **Change Request Date** and his or her **Name** and **Agency**. This person should then include a detailed description of the change being requested in the **Description** area. (If more space is required for a thorough justification, attach additional documentation to this form.)*

*The designated **Reviewer** (usually a subject matter expert) should then analyze the request being made, and communicate to the Project Manager the estimated impact to the project. The Project Manager will include this information on this form, along with his/her estimate of the cost and schedule impact. When completed, this form should describe the impact to the quadruple constraints, CSSQ.*

Once the impact has been documented, this form is presented to the appropriate approvers.

REVIEWER INFORMATION

Reviewer Name: _____ Role: _____

Recommended Action: Approve: ☐ Reject: ☐

Reviewer Comments:

Date: _____

*Provide the above information for each individual designated as a **Reviewer** for the change request. The **Reviewer** should include his/her recommendation for **Approval** or **Rejection** of the request, any comments, and the date reviewed. If the **Recommended Action** is to reject the change request, the reviewer must explain the reason.*

Figure 3-6 (Continued)

New York State
Project Change Request

APPROVER INFORMATION

Approver Name: _____ Role: _____

Action: Approve: ☐ Reject: ☐

Approver Comments:

Approver Signature: _____

Date: _____

*Provide the above information for each individual designated as an **Approver** for a change request. The **Approver** should check whether he/she is **Approving** or **Rejecting** the request and include any **Comments**. If the approver is rejecting the change request, he/she must provide the reason. If the request is being approved, the approver should sign the form and enter the date approved.*

PROJECT MANAGER INFORMATION

_____

Name (Print)

_____ _____

Signature Date

*Once a change request has been approved, the **Project Manager** should indicate his/her agreement by providing a **Signature** and **Date**.*

3.4.2 Define Acceptance Management Process

A detailed definition of each deliverable that will be produced during the course of the project is included in the Project Scope. A deliverable is considered complete when it has been accepted by the Customer. The Project Plan must be revised to include a definition of the acceptance management process to be used for the project.

It is recommended that "acceptance" be defined as an authorized Customer Decision-Maker's written approval signifying that a deliverable meets expectations. It should be clearly stated that verbal acceptance or acceptance by default is not sufficient. To expedite the acceptance process, it is recommended that one individual per deliverable be given final decision-making authority. This person will be responsible for obtaining feedback from and representing the Customer.

In order for a deliverable to be considered "complete" and "acceptable," it must be measured against pre-determined acceptance criteria. The Project Manager and Customer must agree on the required criteria and the criteria must be documented and included in the Project Plan.

To ensure timely acceptance of deliverables, the Project Manager and Customer Decision-Makers should agree on the format, content and appearance of deliverables before they are produced. This information should be documented and included in the Project Plan. This helps to prepare the Customer to receive deliverables, and to avoid situations where deliverables are rejected because they do not meet Customer expectations. It is also important for the Project Manager to solicit feedback on deliverables throughout their development. Interim reviews of deliverables will streamline final acceptance.

In addition to acceptance criteria, the Project Manager and Customer Decision-Maker must agree on, formalize, and document the deliverable acceptance process. Items that must be defined are:

- The number and identity of Customer Representatives who may be required to review deliverables before final approval from the designated individual(s) is sought. A reviewer is usually an expert who is very knowledgeable about the details of the subject matter in the deliverable. In many organizations a Customer Decision-Maker with approval authority will not sign an approval form until a deliverable is thoroughly reviewed by an expert.

Don't be afraid to list the names of several reviewers, as different experts may need to be consulted depending upon the contents of the deliverable being produced.

- The number of business days in which deliverables must be either approved or rejected by the Customer. When establishing an agreement regarding the acceptable number of business days for deliverable review, the Project Manager must consider that the process is iterative and may take more time than initially thought. The amount of time for deliverable acceptance must be included in the Project Schedule, and should be sufficient to include the following activities:
  - Presentation of the deliverable by the Project Manager to the appropriate Customer Representative.
  - Independent review of the deliverable by subject matter expert(s). The more experts, the more time it will take.
  - Independent review of the deliverable by Customer Representatives. Again, the more decision-makers, the more time it will take.
  - Group review sessions, if required.
  - Rework of portions of the deliverable, if required.
  - Resubmission of the deliverable.
  - Re-review by the subject matter expert and Customer Representatives.
  - Pursuit of approval signature by the Project Manager.
- The number of times a deliverable can be resubmitted to the Customer for approval. It is very important for the Customer to include reason(s) when rejecting the deliverable so the Project Team can address them when resubmitting. If the number of iterations exceeds the number defined in the deliverable acceptance process, further work on the deliverable will require a change request. If the number of iterations becomes unreasonable, the Project Manager should recognize that a bigger problem most likely exists. Setting the maximum number of deliverable revisions and iterations will avoid the situation where a deliverable is "never quite done." Whatever the number of iterations that is agreed upon, the Project Manager must build time to accommodate them into the Project Schedule.

- The escalation process that will be followed if a timely decision on approval or rejection of a deliverable is not met. Will the situation simply become an open issue in the Project Manager's status report? Will executive intervention be required? Or will it be a combination of both?

Maintain an "Acceptance Log" in your Project Status Report to track the status of a deliverable as it goes through iterations of the acceptance process. (See the Project Status Report, Figure 2-10.)

3.4.3 Define Issue Management and Escalation Process

Issue management involves capturing, reporting, escalating, tracking, and resolving problems that occur as a project progresses. A process must be in place to manage issues, since they can potentially result in the need for change control and can become major problems if not addressed. The following items must be agreed upon between the Project Manager and Project Sponsor and must be documented and included as a section of the Project Plan:

- How issues will be captured and tracked – many Project Managers make use of some type of repository to ensure that issues are not lost. This repository may be either electronic or manual, depending upon the needs and size of the project. At a minimum, an issue repository must contain a description of the issue, its potential impact, the date it is recorded, its anticipated closure date, its priority, and the name of the person responsible for resolving it or getting it resolved. The due date for closure must be a specific date (i.e., the date cannot be "ASAP"). The responsible party must be a specific individual, not a functional group (i.e., an issue should not be assigned to the "IT Department"). As progress occurs on the resolution of an issue, the Project Manager should update the issue repository to reflect what has occurred. An issue log (whether electronic or paper-based) should be updated regularly, possibly as often as daily depending upon the needs of the project and issue resolution progress. (See Figure 2-10, Project Status Report.)
- How issues will be prioritized – the characteristics about the issue that will determine whether its resolution will be

a high, medium or low priority. Impact to the schedule, level of effort, or cost are usually the factors that determine the priority.

- How and when issues will be escalated for resolution – whether they will be escalated if they are not resolved in a given period of time or when a delivery date is missed or only when the Project Budget is severely affected. Whatever the decision, details of the escalation process need to be clearly stated. It is also vital to document to whom issues will be escalated.

3.4.4 Refine Communications Plan

A preliminary Communications Plan was developed for inclusion in the Initial Project Plan during Project Initiation, and describes how communications will occur. (See Figure 2-11, New York State Project Communications Plan.) As a project progresses, certain events may occur that alter the way information is accessed or change communication requirements. For example, a department may move to a new building, allowing Project Team Members access to email for the first time. Or a change in personnel may dictate a change in the frequency of communications. During Project Planning and subsequent phases, the Project Manager should review the Communications Plan with the Project Team to be sure it is still viable. If it is determined that any portion of the plan is no longer applicable, the Project Manager must develop appropriate revisions to the plan.

Also, at this point in the project, sufficient information is most likely known to allow the Project Manager to describe in further detail what the distribution structure will look like. Part of the Communications Plan describes how communications will be managed. Depending on the project, communications management may be very informal or highly sophisticated. When deciding how to manage communications on a project, a Project Manager solicits information from the Project Team and Stakeholders and together they decide:

- How project information will be collected and stored, and what procedures will be followed to disseminate the information. If an electronic filing structure will be used, someone must be responsible for its setup and maintenance. Information access should be defined.
- The distribution structure, specifically detailing what, how, and when information will flow to Stakeholders. For

Internal Stakeholders, communication channels currently established in the organization should be used. For External Stakeholders, different channels may be required for each discrete Stakeholder group. The team must decide when it should occur, what information should be communicated, and how it should be delivered. The distribution structure for External Stakeholders must take into account how the particular Stakeholder group will be affected by this project. New York State projects also have to be concerned with the Freedom of Information Law (FOIL) and the potential impact of the release of project information.

- The method by which information will be accessed if it is needed between regularly scheduled communications.

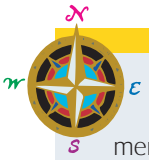
Sometimes communications break down. To try to avoid these disconnects, you should:

- Be as concise and clear as possible in both written and verbal messages.
- Solicit feedback to determine if your messages have been received by the appropriate parties and interpreted correctly.

When there are problems, try to learn from them so that you can do better in the future. (See Communication, Section II:2.1.)

Information requiring communication comes from different sources. Sometimes it is already documented in hard copy or electronic form, but sometimes it is conveyed during formal meetings, informal gatherings, or simple conversations. The Project Manager must be aware that this information exists and be prepared to convey it using the communications management system. Some sources of project information that may require communication include:

- Status Meetings
- Status Reports
- Memos
- Newsletters
- Executive Correspondence
- Meeting Notes
- Executive Meetings
- Steering Committee Meetings



Conducting a status meeting regularly with your Customer is a great habit to adopt. If you plan to discuss a certain subject area during the meeting, don't be afraid to invite members of the Project Team with expertise in that area. It's also not a bad idea to invite other Stakeholders who have something constructive to contribute. Use the status report to drive the meeting discussion points. (See Figure 2-10, Project Status Report.) Remember, there can never be TOO MUCH communication!

3.4.5 Define Organizational Change Management Plan

When planning the project, the Project Manager and Customer must consider the impact the resulting product will have on the Performing Organization. The organization must be prepared to accept and use the product once it is implemented.

The Project Manager needs to define and document a plan to manage the changes to the organization that could occur as a result of implementing the product. This Organizational Change Management Plan becomes part of the Project Plan. Organizational change management must be explicitly planned if it is to be effective. (See Figure 3-7, Organizational Change Management Plan template.)

Items to include as part of an Organizational Change Management Plan are:

- **People:** The plan must consider how the individuals using the product will be affected by its implementation. The organization may initiate reductions or expansions in the workforce, and shift rote clerical activities to automated processing; decision-making power may be distributed further down the chain of command, or even regionally. If specific job duties are being added or removed, staff reductions or increases are anticipated, or the organizational structure itself will change, the plan must identify the steps to be taken. For example, the human resources manager in the Performing Organization must be involved in planning for and performing many of these change management tasks. Labor/management committees, union representatives, the external agencies involved, such as Civil Service and the Governor's Office of Employee Relations, may all need to be included in planning for such changes, depending on the scope of the changes.
- **Process:** The plan must consider how the product of the project will affect already existing business processes in the Performing Organization. Business processes may take advantage of streamlined workflows to reduce the flow of

paper, or technology advances may enable electronic communications to more quickly deliver information. Procedures will need to be redesigned to align with the change. The new procedures may effect changes in the way the Performing Organization develops, documents, and trains staff, and must be addressed in the Organizational Change Management Plan.

- **Culture:** The plan must consider how severe the project's "culture shock" will be. The Project Manager must determine how much the project will affect the Performing Organization's business strategy, established norms for performance, leadership approach, management style, approach to Customers, use of power, approach to decision making, and the role of the employee. Plans might include performing an assessment of the Performing Organization's "readiness for change," and include development of action plans to increase the organization's readiness and ability to adapt to change through education and training.

In cases where implementing a project will result in a significant change to the way an organization will conduct business, the Project Manager, Customer, and Project Sponsor must be able to anticipate when and how the major impacts will occur, and plan for the specific activities that will adequately prepare the Performing Organization. (See Leading the Change Management Effort, Section II:2.2 for additional information on change management.)

Figure 3-7 New York State Organizational Change Management Plan

New York State
Organizational Change Management Plan

PROJECT IDENTIFICATION

Project Name: _____ Date: _____

Project Sponsor: _____ Project Manager: _____

*Enter the **Project Name**.*
*Enter the current **Date**.*
*Enter the name of the **Project Sponsor**.*
*Enter the name of the assigned **Project Manager**.*

Figure 3-7 (Continued)

New York State
Organizational Change Management Plan

PEOPLE CHANGE MANAGEMENT

Organizational Change Activities	Individual/Group(s) Affected	Individual/Group(s) Responsible for Implementation	Required Completion Date	Status

*Describe any **Organizational Change Management Activities** specific to **PEOPLE** that must be completed in order to ensure that the organization is ready to accept and use the product once it has been implemented. Examples of **PEOPLE** activities include: developing a plan for timing and interaction with Civil Service and Unions; decreasing staff in a specific unit; preparing unit for reduction in workforce.*
*Identify the **Individual/Group(s)** that will be affected by the activity and the **Individual/Group(s) Responsible for Implementation** of the activity. Include the **Required Completion Date**.*

*When managing this Organizational Change Management Plan during Project Execution and Control, remember to update the status of each activity in the **Status** column.*

Figure 3-7 (Continued)

New York State
Organizational Change Management Plan

PROCESS CHANGE MANAGEMENT

Organizational Change Activities	Individual/Group(s) Affected	Individual/Group(s) Responsible for Implementation	Required Completion Date	Status

*Describe any **Organizational Change Management Activities** specific to **PROCESS** that must be completed in order to ensure that the organization is ready to accept and use the product once it is implemented. Examples of **PROCESS** activities include: rewriting process and procedures; conducting training. Identify the **Individual/Group(s)** that will be affected by the activity and the **Individual/Group(s) Responsible for Implementation** of the activity. Include the **Required Completion Date**.*

*When managing this Organizational Change Management Plan during Project Execution and Control, remember to update the status of each activity in the **Status** column.*

Figure 3-7 (Continued)

New York State
Organizational Change Management Plan

CULTURE CHANGE MANAGEMENT

Organizational Change Activities	Individual/Group(s) Affected	Individual/Group(s) Responsible for Implementation	Required Completion Date	Status

*Describe any **Organizational Change Management Activities** specific to **CULTURE** that must be completed in order to ensure that the organization is ready to accept and use the product once it is implemented. Examples of **CULTURE** activities/tasks may include: identifying individuals impacted by the project; prepare and educate individuals regarding the impact. Once you have documented the activities, identify the **Individual/Group(s)** that will be affected by the activity and the **Individual/Group(s) Responsible for Implementation** of the activity. Include the **Required Completion Date**.*

*When managing this Organizational Change Management Plan during Project Execution and Control, remember to update the status of each activity in the **Status** column.*

3.4.6 Establish Time and Cost Baseline

A time and cost baseline is a project "snapshot in time," taken at the conclusion of Project Planning, against which performance on the project is measured. It is one way the Project Manager can determine if the project is on track. Using the electronic Project Schedule revised during Refine CSSQ, a baseline is captured. Once the baseline version is approved, the Project Manager should revise it only if a change control is approved that results in a change to the schedule. The time and cost baseline becomes part of the Project Plan. As the project progresses, subsequent schedules may be compared to the baseline version to track project performance.

If you revise the baseline as a result of change control, be sure to save the original baseline for historical purposes.

3.4.7 Develop Project Team

To effectively perform the activities required to produce project deliverables, Project Team members must have appropriate levels of skill and knowledge. It is the job of the Project Manager to evaluate the skills of team members and determine whether or not they meet the current and future needs of the project. It is important to remember that there are many kinds of skills. Some are technical and others are "soft skills," such as management, presentation, and negotiation skills. If it is determined that the team needs training, the Project Manager must include training in the Project Schedule and Project Budget. Some skills can be learned on the job, some can be learned through informal mentoring, some can be learned using computer-based courses, and others may require formal classroom training.

When the training needs and the method of training for each team member have been determined and documented, the Project Manager or Team Leader documents the Training Plan, including a training schedule. (See Figure 3-8, New York State Project Team Training Plan.) Subsequently the Project Schedule

must be updated to reflect all added training tasks: when and where training will take place and who will do it. The target date for completion of each team member's training program should be determined. As training takes place, the Project Manager should update the Training Plan with the names of the trainees and actual training completion dates. Not only will this help the Project Manager measure the success of the Training Plan, but it will also help him/her evaluate team members and prepare staff performance appraisals.

Figure 3-8 New York State Project Team Training Plan

New York State
Project Team Training Plan

PROJECT IDENTIFICATION

Project Name: _____ Date: _____

Project Sponsor: _____ Project Manager: _____

*Enter the **Project Name**.*
*Enter the current **Date**.*
*Enter the name of the **Project Sponsor**.*
*Enter the name of the assigned **Project Manager**.*

TRAINEE INFORMATION

Name	Project Role	Agency	Phone	Email	Skills Required

*Enter the **Name**, **Project Role**, **Agency**, **Phone Number**, **Email Address**, and **Skills Required** for each member of the Project Team.*

Figure 3-8 (Continued)

New York State
Project Team Training Plan

TRAINING PLAN

Name	Type of Training	Description	Planned Start	Planned Completion	Actual Start	Actual Completion	Certification

Document how each team member will gain the required skills entered above.
*Enter the **Name** of the team member requiring training.*
*Enter the **Type of Training**. Some examples of types of training are "On the Job", "Computer Based", and "Classroom".*
*Enter the training **Description** (i.e., name of the class), **Planned Start** date and **Planned Completion** date information for each training event.*

*As training occurs, maintain this training plan by entering **Actual Start** and **Actual Completion** dates for each training event. If completion of a training event results in the team member gaining some sort of certification (e.g., "Project Management Professional", "Microsoft Certified Systems Engineer", enter it under **Certification**. This information will be useful to the manager doing team member performance evaluations.*

Be sure to record the time required to complete all training tasks in the Project Schedule.

3.4.8 Develop Project Implementation and Transition Plan

The Project Manager must formulate and document a plan for implementing or deploying the product of the project and for transitioning the responsibility for the outcome of the project from the Project Team to the Performing Organization. The Transition Plan must include all the necessary activities to perform and procedures to follow to ensure a smooth and satisfactory hand-off. (See Figure 3-9, New York State Project Implementation and Transition Plan.)

When planning the implementation and transition, the Project Team must consider the impact the resulting product will have on the Performing Organization and Consumers. The Consumers must be prepared to use the product and the Performing Organization must be prepared to support it.

The Project Manager needs to define and document a plan to implement the product, and should consider:

- What needs to be done to ensure the organization will be ready to receive the product. These steps may include acquiring the necessary physical space, installing appropriate software, obtaining the appropriate building permits, etc.
- How and when the Customer will test and accept the product and confirm and authorize its implementation.
- The steps to be taken to ensure Consumers will be ready to use the product once it is transitioned. These steps must be coordinated with the Organizational Change Management Plan, and will include training and orientation on the use of the product. They also may include plans for training Customers or Consumers as trainers for the future. The plan must define which of the Customer(s) require training, the level of training necessary, who will provide the training, and when it will occur.
- The appropriate strategy for implementing the product into the Performing Organization, given the specific Consumers and Customers. For example – phased by location, phased by specific product functionality, “big bang,” etc.

The Project Manager should define and document a plan to transition the ongoing support of the product to the Performing Organization and should consider:

- The people from both the Project Team and the Performing Organization who need to be involved in the transition, and their associated roles and responsibilities. Examples include Customers, Consumers, and members of other specific support units within the Performing Organization.
- The steps that should be taken to ensure that the appropriate individuals are ready to support the product once it has been implemented and is in use. This may include negotiating with various internal organizations to determine the appropriate timing of the transition of responsibility, assigning specific organizations and individuals to support the specific products, and providing necessary training.
- The relationship between the implementation plan and the transition plan. The Project Team and the Performing Organization must agree on the point in implementation at which the Performing Organization takes responsibility for production problems, "help" or trouble calls, and for resolving the problems.
- The Performing Organization's expectations regarding any documentation that is required as part of transition.

Many otherwise successful projects fail due to a lack of transition planning. Don't let this happen to you!

Deliverable

- **Project Plan** – the revised Project Plan (see Figure 2-12, New York State Project Plan) is the main deliverable of the Project Planning Phase, incorporating the revised outputs of all other Project Planning components. The document should now be thorough and accurate enough to be used as the main guide to follow during Project Execution and Control. It is important to remember that the plan will continue to be revised throughout the course of the project.

At the end of Project Planning, the Project Plan should contain the following:

1. Project Charter
2. CSSQ (Cost, Scope, Schedule, Quality)
3. Risk Management Worksheet
4. Description of Stakeholder Involvement
5. Communications Plan
6. Change Control Process
7. Acceptance Management Process
8. Issue Escalation and Management Process
9. Organizational Change Management Plan
10. Time and Cost Baseline
11. Project Team Training Plan
12. Project Implementation and Transition Plan

Figure 3-9 New York State Project Implementation and Transition Plan

New York State
Project Implementation and Transition Plan

PROJECT IDENTIFICATION

Project Name: _____ Date: _____

Project Sponsor: _____ Project Manager: _____

*Enter the **Project Name**.*
*Enter the current **Date**.*
*Enter the name of the **Project Sponsor**.*
*Enter the name of the assigned **Project Manager**.*

Figure 3-9 (Continued)

New York State
Project Implementation and Transition Plan

PROJECT IMPLEMENTATION PLAN

Implementation Activity	Owner	Who is Affected?	Who is Involved?	Timing/ Dependency

Implementation Activity *is a step or event that will take place to move the product from the Project Team to the Performing Organization. (An example of an implementation activity is producing a mailing for those affected by the new product, describing when and how the new product will be introduced to them.)*
Owner *is the individual responsible for executing or verifying that the implementation activity takes place.*
Who is Affected? *identifies individuals, groups or organizations that are affected by the implementation activity (e.g., for a mailing, this may be the target audience.)*
Who is Involved? *identifies individuals, groups or organizations that need to be involved as part of executing the implementation activity (e.g., for a mailing, the print design or writing team.)*
Timing/Dependency *describes when the activity must be done, and any other activities that are dependent upon it (e.g. "the mailing must go out before the December 1 power outage.")*

Figure 3-9 (Continued)

New York State
Project Implementation and Transition Plan

PROJECT TRANSITION PLAN

Transition Activity	Owner	Who is Affected?	Who is Involved?	Timing/ Dependency

Transition Activity *is a step or event that will take place to transition ongoing support of the product from the Project Team to the Performing Organization.*
Owner *is the individual responsible for executing the transition activity or verifying that it takes place.*
Who is Affected? *identifies individuals, groups or organizations that are affected by the transition activity.*
Who is Involved? *identifies individuals, groups or organizations that need to be involved as part of executing the transition activity.*
Timing/Dependency *describes when the activity must be done, and any other activities that are dependent upon it.*

3.5 CONFIRM APPROVAL TO PROCEED TO NEXT PHASE

Purpose

The purpose of **Confirm Approval to Proceed to Next Phase** is to formally acknowledge that planning activities have been completed and that all deliverables produced during Project Planning have been completed, reviewed, accepted, and approved by the Project Sponsor. Formal acceptance and approval also signify that the project can continue into the next phase, Project Execution and Control.

Roles

- Project Manager
- Project Sponsor
- Project Team Members
- Customer Decision-Maker

The acceptance and approval process is ongoing. As changes are made during Project Planning, the Project Manager should be in constant communication with the Project Sponsor. Keeping the lines of communication open will avoid a situation where a Project Sponsor is surprised by a deliverable or receives something he/she does not anticipate.

In addition, the Project Manager should review the interim deliverables or work products for each process with the appropriate Customer Decision-Maker upon their completion and gain approval before moving on to the next process. These interim acceptances should streamline the final acceptance process.

Tasks

3.5.1 Review/Refine Business Case

At the end of Project Planning, the Project Manager and Project Sponsor should review the Business Case that was developed during Project Origination and revised during Project Initiation. Because more information is now known about the project, the Business Case may need to be refined. Any refinements should be made before proceeding to Project Execution and Control.

The tasks to Confirm Approval to Proceed to Next Phase are:

- 3.5.1 Review/Refine Business Case
- 3.5.2 Prepare Formal Acceptance Package
- 3.5.3 Gain Approval Signature from Project Sponsor

3.5.2 Prepare Formal Acceptance Package

At this time, the Project Manager should schedule a meeting to discuss and gain agreement to secure Project Execution and Control resources. Meeting attendees should always include the Project Sponsor and the members of Performing Organization Management whose resources will be affected. Attendees may also include members of other agencies who are able to provide resources that will add value during Project Execution and Control. During the meeting, resources are formally secured by gaining the signatures of the appropriate Performing Organization managers on the Project Deliverable Approval Form. (See Figure 2-13 for an example of a Project Deliverable Approval Form.)

In addition to reviewing the Business Case, all deliverables produced during Project Planning should first be reviewed by the Project Manager to verify that Customer Decision-Maker approval has been obtained; these are the Refined CSSQ, Risk Management Worksheet, and Refined Project Plan. If approval is not clear and explicit, the Project Manager must pursue it again. When the review has been completed, the Project Manager should organize the deliverables into a cohesive deliverable package and prepare a formal approval form.

3.5.3 Gain Approval Signature from Project Sponsor

Before gaining an approval signature, the Project Manager must review the revised Business Case with the Project Sponsor. Based upon changes to the Business Case and policies within the Performing Organization, the Project Sponsor must decide if a project re-approval cycle is warranted. If project re-approval is necessary, the Project Manager should ensure the appropriate Project Origination processes are followed.

At this point in time, the Project Sponsor may decide to terminate the project. This decision may be based upon factors outside the control of the Project Manager (i.e., the organization may have new priorities that are in direct conflict with the project or increased risk may have been introduced to the project.) Or it is possible that, having done more detailed planning, the costs of doing the work are greater than initially estimated and outweigh any project benefits. Realistically, termination of a project could happen at any point during the project. The

Project Manager must be comfortable and confident enough to approach the Project Sponsor at any time during the course of the project if he/she feels the project has reached a point where termination is the best possible solution.

At the end of this task, the Project Manager must present the acceptance package to the Project Sponsor and obtain his/her signature, indicating approval to proceed to Project Execution and Control. If the Project Sponsor does not approve the package, he/she should indicate the reason for rejection. The Project Manager is then responsible for resolving issues with the deliverables and presenting the updated package to the Project Sponsor.

Sometimes a Project Manager needs to gain approval of a large number of deliverables at the same time. The Project Plan is a good example, as it comprises several very important (and sometimes very complex) documents. Should the Project Sponsor become overwhelmed by the number or volume of documents requiring his/her attention, the Project Manager should take steps to work with the sponsor to streamline the Acceptance Management Process (See Section 3.4.2).

Deliverables

- **Project Plan** – a compilation of refined CSSQ, Risk Management Worksheet, and the Refine Project Plan deliverables packaged into a comprehensive plan for the remainder of the project.
- **Signed Project Deliverable Approval Form** – a formal document indicating that the deliverable has been reviewed and accepted.

Project Planning
End-of-Phase Checklist

How To Use

Use this checklist throughout Project Planning to help ensure that all requirements of the phase are met. As each item is completed, indicate its completion date. Use the Comments column to add information that may be helpful to you as you proceed through the project. If you elect NOT to complete an item on the checklist, indicate the reason and describe how the objectives of that item are otherwise being met.

Figure 3-10

Item Description	Page	Completion Date		Comments	Reason for NOT Completing
Conduct Planning Phase Kick-off:	**132**				
Ensure team members have whatever is required to perform their tasks	132				
Meet with each team member to convey roles and responsibilities	132				
Mentor or assign Team Leader to mentor new team members	132				
Distribute copies of all project materials and deliverables to all team members	133				
Hold orientation sessions	133				
Review previous deliverables and components of Initial Project Plan	133				
Schedule time and location of kick-off meeting	134				
Prepare materials for distribution at meeting	134				
Invite appropriate attendees	134				
Prepare meeting presentation and agenda	134				
Designate meeting scribe	134				
Conduct kick-off meeting	134				
Distribute meeting notes to all attendees	134				

Item Description	Page	Completion Date	Comments	Reason for NOT Completing
Update the project repository with all project correspondence	134			
Refine CSSQ	**137**			
Refine the Project Scope statement, breaking deliverables into smaller pieces of work	138			
Clearly define each deliverable	138			
Write description of scope change management	139			
Estimate effort and cost for each task and enter into schedule	140			
Define dependencies among tasks	141			
Review quality standards and revise as necessary	143			
Initiate/address procurement	144			
Recalculate budget	145			
Perform Risk Assessment	**149**			
Review identified risks with Project Team and Project Sponsor	149			
Create Risk Management Worksheet	149			
Assess each risk (low/med/high)	153			
Estimate timing of impact on project	153			
Determine mitigation actions	154			
Incorporate actions in Project Schedule and Project Plan	155			
Refine Project Plan	**156**			
Compile detailed descriptions of all work products and deliverables	156			
Define and document change control process	156			
Define and document acceptance management process	161			
Define and document issue management and escalation process	163			

Item Description	Page	Completion Date	Comments	Reason for NOT Completing
Refine Communications Plan	164			
Define and document Organizational Change Management Plan	166			
Capture baseline Project Schedule (effort and cost)	172			
Evaluate team member skills and identify training needs	172			
Establish Training Plan	172			
Define and document Implementation and Transition Plan	176			
Add above items to Project Plan	177			
Confirm Approval to Proceed to Next Phase	**182**			
Review Business Case and refine, if necessary	182			
Review all deliverables from Project Planning	183			
Organize deliverables into package	183			
Prepare formal approval form	183			
Present acceptance package to Project Sponsor for signature	183			
Resolve any issues	183			
Update package as needed to resubmit to Project Sponsor for signature	183			
Gain Approval to Proceed	**183**			

Measurements of Success

The ultimate measurement of success for Project Planning is the successful Project Execution that follows, or a decision to stop the project as, once again, the organization may be best served by deciding that the project should not continue.

Nevertheless, the Project Manager can still assess how successfully the project is proceeding by utilizing the measurement criteria outlined below as it proceeds through Planning. More than one "No" answer indicates a serious risk to the continued success of your project.

Figure 3-11

Process	Measurements of Success	Yes	No
Conduct Project Planning Kick-off	Do your team members have complementary skill sets, with no apparent gaps as per project approach?		
	If not, have you obtained authorization to provide them with necessary and timely training?		
Refine CSSQ	Is your Project Schedule defined according to the the 80-hour Rule?		
	Have the supervisors of all resources assigned to tasks on your project agreed to release those resources on the dates your project is expecting them?		
Perform Risk Assessment	Does your Project Sponsor agree with your risk prioritization?		
	Do the other decision-makers agree with your risk mitigation actions?		
Refine Project Plan	Do your Customers and Stakeholders agree with your definition of what constitutes a change?		
	Have you verified that the folks responsible for signing off on change control items and deliverable approval forms actually have authority, and are willing, to approve the items of expected magnitude and type?		
	Do your Customers understand the pre-determined acceptance criteria for all deliverables?		
	Have the persons you identified as "arbiters" for issue escalation agreed to serve in that capacity? Have the expenditures associated with your team Training Plan been approved?		
	Is your Project Sponsor sure that your organization will be ready to implement the product or service that your project will develop?		
Confirm Approval to Proceed to Next Phase	Do you have an approval form signed by your Project Sponsor authorizing you to proceed to Project Execution and Control, or halting the project?		

Phase Risks / Ways to Avoid Pitfalls

Project Planning may afford the Project Manager the last opportunity to plan for the successes – and prepare for the disasters – that may follow. Once the Project Plan has been accepted (read: set in stone and put aside) the events will unfold in their own due course: following the plan (more or less), or arising spontaneously, haphazardly and perniciously to jeopardize it. Your mission for this phase, should you choose to accept it, is to position the project so as to enable the former and impede the latter, or your plan will self-destruct in no time flat.

What are some of the key elements of Project Planning that require the most attention? The following table identifies processes and tasks that are highlighted in this section.

Figure 3-12

Process	Task	Why is it important?
Conduct Project Planning Kick-off	Orient New Team Members	Choose your Impossible Mission Force wisely – they must be fully prepared and totally committed
Refine CSSQ	Refine Project Schedule	The more impossible the mission, the greater the need for precise planning
Perform Risk Assessment	Develop Risk Management Plan	It matters not what you know about the ambush, but what you will do to avoid, or overcome it
Refine Project Plan	Define Change Control Process	Who has the authority to change mission parameters? When and how?
	Define Issue Escalation and Management Process	What is your "exit strategy?"

PITFALL #1 – YOU HAVE THE WRONG TEAM

Note: certain aspects of this topic are also covered in Section II:2, Leadership.

Before you get to play the leader, you first need to form your team. As a Project Manager appointed to a project, you probably think that you have very little latitude in selecting your team. Most likely, you are right – but it never hurts to try! And considering that these are the people who will define your success (flashback: what is the definition of "management?" –

answer, getting work done through others) you should certainly make every effort to surround yourself with folks who not only have the right alphabet soup on their resumes, but also have the "right stuff" to form a high-performing team.

It is a hard, and maybe even a counter-intuitive lesson to learn, that the right combination of character and intelligence – or, in other terms, of attitude and ability to learn – is far more important than a particular type or even length of experience. Here are some pointers for selecting – and weeding out – team member candidates.

1. When selecting new team members, the first attribute to determine is aptitude. Whatever the technology or tools they will have to use, do they have a "knack," a natural inclination for it? Do they take to it, do they do it on their own time, do they innately like it? Have they chosen – and succeeded at it – in the past? No degree, no level of erudition or IQ, guarantees that a person has an aptitude for a given job. And if they don't – beware. No matter how hard they work, or how much they study – they will still not produce the same results as someone with an aptitude who seems to knock off tasks left and right with nary an effort.
2. The second desirable attribute is work ethic. Whatever your expectations are of the level of effort required on the project, you must be able to answer an emphatic "Yes!" to these two questions about each new team member: (1) in the normal course of events, will the person put in an honest day's work? and (2) when the circumstances require it, will the person do whatever it takes to get the job done? Both questions are equally important, and both demand an affirmative answer.
3. The third requisite attribute is versatility. Despite what you forecast on your schedule, and what you outline in roles and responsibilities, your team members will have to either substitute for one another, or perform some tasks you cannot currently anticipate. The team will need to be able to adapt to different circumstances and to learn new skills. Consequently, people who have a track record of performing well in disparate environments are certainly preferable over fragile personalities who are thrown off their pace for a week when a time sheet format changes, or who cannot function unless they have the right view out their window. Likewise, folks who have a track record of

learning new skills and techniques, especially on their own, are vastly preferable over the types who must attend weeklong vendor seminars (preferably in tropical locales) before they can be persuaded to learn anything new.

4. The fourth, and final, attribute to look for – and look out for! – is temperament. Or disposition, or attitude, or character – whatever you want to call it. It makes a difference between enjoying camaraderie and synergism of a close-knit team and dreading coming to work in the morning.

Another way to "stack your deck" is to make sure you have the right combination of "types" for your team. Every team can benefit from one or more of the following:

- An "Eager Beaver." This is a person who typically has little experience with whatever technology your project is employing, but more than makes up for it in sheer persistence. You need these folks to carry the load.
- A "Guru." This is someone who knows everything there is to know about the subject, and is willing to teach anyone everything he or she knows; hopefully, the subject is what your team will actually need the most of. You need these folks to provide expertise and to solve real problems.
- A "Mother Hen." Male or female, this is a person who will remember everyone's birthday, take up collections for baby showers, and organize extracurricular team activities. Hopefully, they will have time left to do some actual work. You need these folks to maintain morale, provide team cohesion and balance the professional with the personal.
- A "Gadfly." Only in the sense of "acting as a constructively provocative stimulus" (The American Heritage Dictionary of the English Language, Houghton Mifflin), this person is indispensable in providing creative new ideas and challenging the status quo – when improvement is warranted. You need these folks to help the team come up with creative solutions, and to continuously improve the process.
- A "Leader." Finally, in addition to yourself, you need senior people on your team to inspire the other team members to accomplish their goals, as well as to hold them accountable when they don't.

PITFALL #2 – YOU PLAN FOR SUCCESS. ONLY.

Let's say you are going on vacation, driving through an unfamiliar area. As you are tuning the radio to a local station, you hear that there's a huge tie-up by Exit 11 of the route you're traveling on. You look up and see that you just passed Exit 10. What good is knowing about the obstacle at that point?

Would hearing the news at Exit 9 or earlier make a difference? Only if you had a local map and could plot your way around the obstruction.

But what if you knew, when you were first planning your trip, that Exit 11 on this highway was under construction? Would you not lay your course differently to avoid the delay?

So it is with risk mitigation. Identifying the risk is good; but planning a wise course of action around it is infinitely better. Planning mitigation actions ahead of time also removes the pressure of the moment, and allows you to clearly see the forest without bumping into the trees.

However, planning ahead for an eventuality that may or may not happen does not quite sharpen the mind with the same clarity that an immediate crisis does. It is not easy to be honest and tough, to avoid pat answers and rosy scenarios.

That's why it is useful to prioritize the risks first (using the Risk Management Worksheet) and start working on the ones that have the greatest chance of sinking the project. The anticipation of a disaster ought to concentrate your mind on a realistic solution, and allow you to plot the best course of action around major obstacles.

PITFALL #3 – YOU ARE OVERCOME BY CHANGE

Some projects resemble the Blob from the eponymous 50's movie (and its unnecessary 80's remake): they absorb any obstacle in their paths, growing larger and less well defined all the time until someone finally puts them out of their misery (usually, by freezing the funds). Unfortunately, a lot of people get hurt in the debacle.

One way to avoid this fate is to know what the project is – and is not – and keep it that way. A good Project Plan is certainly a good start. But either according to the risk mitigation planning you did, or in totally new and unpredictable ways, one thing you can definitely count on during the course of the project: CHANGE WILL HAPPEN. And whether you are prepared for it or not, you will have to take actions that deviate from your Project Plan. However, by the very nature of the dutiful sign-offs you so diligently pursued, you have no authority to undertake actions that deviate from your Project Plan!

That's where the Change Control Process comes in handy. You will need to know:

1. What constitutes a change
2. How to respond when a change occurs
3. Who can approve the new plan of action

What constitutes a change? Simply put – Anything that in any way deviates from the totality of your Project Plan as the Project Sponsor accepted it. If your project approach is not working – for whatever reason – and you need to modify it – it's a change. If your Project Scope changes (beware the scope creep!) – it's a change. If your Project Schedule needs to be modified – either up or down! – it's a change. If the quality standards in the agency change – it's a change. If the budget gets cut – it's a change. If you adapt a different communications mechanism because it works better – it's a change. If your Project Team composition changes – it's a change.

Of course, not all changes require the same level of response. It would be ludicrous to initiate a formal change control process and demand a sign-off when all you are asked to do is to change the date format on your status report. However, if you get fifty contradictory requests for formatting changes that effectively prevent you from getting your status report out on time – you may well need to wake the change control Cerberus.

All changes need to be documented, but it is useful to separate changes into two categories: those that affect the project's CSSQ (Cost, Scope, Schedule and Quality) and those that don't. Just remember that an accumulation of tiny, seemingly insignificant changes can affect CSSQ just as much as one big obstacle: if you remain still long enough, piranhas can get you just as surely as sharks.

So your change control process needs to explicitly state that you will consider any variation to the Project Plan as a change, and will respond to it in one of two ways:

- Changes that do not affect CSSQ will be documented in your status report.
- Changes that affect CSSQ will trigger a change control process.

Finally, the change control process needs to explicitly define who has authority to approve a change. Usually, different people have the prerogative to approve changes of a different magnitude or kind. Having it clearly spelled out up front will save you many headaches later.

PITFALL #4 – WHY CAN'T WE ALL JUST GET ALONG?

Your schedule is as tight as a drum; you've defined deliverables until no ambiguities remain; everyone knows what to expect and when. You think you are done? Only for as long as it takes one of the decision-makers to disagree with you. And disagree they will! The Customers will disagree that what you are delivering is what they had in mind "all along." The Stakeholders will disagree that they are not being adversely affected by the new product or service. Your own Project Sponsor – your purported guardian and protector – will disagree that the budget commitments were actually made for next year's budget.

When something like that happens, you need to be able to appeal to a "higher authority." Unfortunately, if you have not obtained the higher authority's OK, and others' concurrence, to appeal to them well ahead of time, you don't stand a chance.

You have to define, right up front, who will arbitrate when you and your Customer, you and your Stakeholder, and you and your Project Sponsor, have a difference of opinion and cannot negotiate a compromise. And the time to plan for it is early on, when you are still their best friend and you have no active issues at stake.

PITFALL #5 – WE DON'T REALLY NEED TO FOLLOW ALL THESE STEPS, DO WE?

In most PM-immature organizations, as soon as the project enters a phase when some real work needs to get done and real resources applied, the questions start:

- "Do we really need all this methodology junk?"
- "We should just concentrate on what REALLY needs to get done."
- "It's crazy to expect us to create all these deliverables!"
- "We don't have the luxury of making the plans look pretty."
- "Why do we need to do … (fill in any deliverable/process)."
- "We need to produce results – not waste time on 'methodology'."
- "If we produce all this make-work we will not have time to DO anything."

Etcetera, etcetera, ad nauseam.

Of course, what these comments betray is a fundamental lack of understanding of what Project Management is all about.

Project Management (as well as just basic Management) methodologies were developed, all over the world, in response to crises and disasters that resulted precisely from the kind of seat-of-the-pants approach that the doubters actually advocate. To cure the root cause of this attitude would take massive organizational re-education and PM "conscientiousness raising." Unfortunately, you (the "enlightened" Project Manager) don't have either time or authority for that.

What you can do, though, is to say "No" clearly, articulately and resolutely. No, you will not substitute a vague verbal statement of intent for a thoroughly written scope statement. No, you will not take a promise to "let you have our best people when you need them" instead of a signature on the Project Plan.

But let's be realistic – the pressure may get intense, and you may not have a choice. Your own manager, the Project Sponsor, or an influential Customer, may force your hand into short-changing your deliverables or skipping on your tasks. Your only recourse at that point is documentation. Document the specific risks to the project. Document the fact that a business decision was made to accept those risks.

Just don't become a willing accomplice in jeopardizing your own project. Don't "go along to get along." Resist organizational inertia and stick to your principles.

Frequently Asked Questions

When developing the Project Team, how do you handle different projects competing for the same resources that you have no administrative control over?

In the fight for resources, you have two main allies – your Project Plan and your Project Sponsor. Make sure your Project Plan is well reasoned and detailed enough to specify and justify the number and caliber of resources that your project requires. Then, make sure your Project Sponsor agrees with you (not the least, by signing the Project Plan). Finally, use both to secure the resources the Greater Good of the Project demands. And if you still don't get them – which you may not depending on the priority of competing projects – document that fact, so when the project performance suffers, you have ample justification for the requisite change control.

How much detail should be included in the definition of the deliverables? Should you keep it at a high level until more information is available?

Getting an informed agreement on deliverables ahead of time is one of the most important things you can do to ensure the success of your project. Some of the biggest disconnects that sank many projects before yours involved Customers expecting one thing while the Project Team was developing another.

You should describe the deliverables in excruciating detail. You should dig up examples from other projects and use them to illustrate exactly what will be delivered. If no examples are available, you should prototype the deliverables as closely as possible. And finally, the Customer's signatures must be all over the deliverable descriptions.

Also keep in mind that as the project progresses, the format and/or content of the deliverables may "evolve." Make sure that the Customers are constantly updated as to the latest understanding of what will be delivered! (See the "Project Black Box" Pitfall from the Execution and Control phase for more details.)

What do you do if the team training determined to be necessary cannot be completed within the required timeframe of the project?

Well, it depends on what "necessary" means and who "determined" it. If you have training as a task in your Project Schedule, and Project Team members really cannot function without it, then you should invoke change control until they either get the training, or learn on the job. On the other hand, if you have people that can teach the tool, on-the-job training may be a very viable option. The bottom line is, your resources must be able to produce the results you expect; if they cannot get to that point because of circumstances beyond your control, you have full right to invoke change control.

What do you do when management is making a poor project decision that you as Project Manager feel will doom the project to failure?

This impasse is most likely to occur when management initiates a change to Project Scope, pulls project resources, or alters Project Schedule. Your best course of action, after failing to persuade them of their folly, is to document your objections, including the analysis of the decision and its impact, alternatives you suggested, and all supporting research in a separate document and refer to it in an issues section of the Project Status Report. Subsequent status reports should track the impact of the decision, as well as projections for the potential of continued degradation if the project continues as is.

The best outcome is that as the project progresses, management realizes the impracticality of the situation, and makes changes to the scope, schedule or budget.

4 PROJECT EXECUTION AND CONTROL

Purpose

The purpose of Project Execution and Control is to develop the product or service that the project was commissioned to deliver. Typically, this is the longest phase of the project management lifecycle, where most resources are applied.

Project Execution and Control utilizes all the plans, schedules, procedures and templates that were prepared and anticipated during prior phases. Unanticipated events and situations will inevitably be encountered, and the Project Manager and Project Team will be taxed to capacity to deal with them while minimizing impact on the project's CSSQ.

The conclusion of the phase arrives when the product of the project is fully developed, tested, accepted, implemented and transitioned to the Performing Organization.

Accurate records need to be kept throughout this phase. They serve as input to the final phase, Project Closeout.

List of Processes

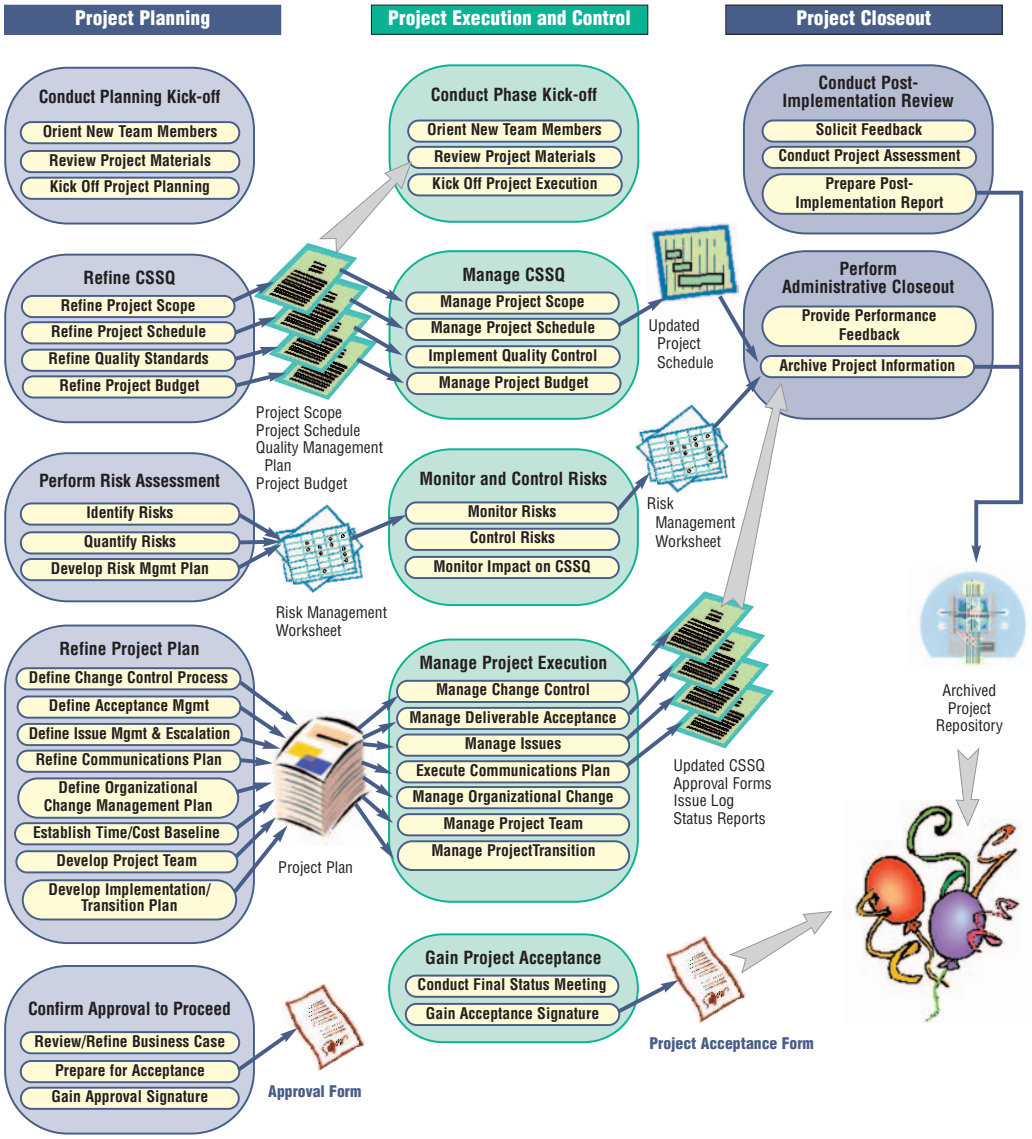
This phase consists of the following processes:

- **Conduct Project Execution and Control Kick-off,** where the Project Manager conducts a meeting to formally begin the Project Execution and Control phase, orient new Project Team members, and review the documentation and current status of the project.
- **Manage CSSQ,** where the Project Manager must manage changes to the Project Scope and Project Schedule, implement Quality Assurance and Quality Control processes according to the Quality Standards, and control and manage costs as established in the Project Budget.
- **Monitor and Control Risks,** where the Project Manager and Project Team utilize the Risk Management Plan prepared in previous phases, and develop and apply new response and resolution strategies to unexpected eventualities.

- **Manage Project Execution,** where the Project Manager must manage every aspect of the Project Plan to ensure that all the work of the project is being performed correctly and on time.
- **Gain Project Acceptance,** where the Project Manager, Customer Decision-Makers and Project Sponsor acknowledge that all deliverables produced during Project Execution and Control have been completed, tested, accepted and approved, and that the product or service of the project has been successfully transitioned to the Performing Organization.

The following chart illustrates all of the processes, tasks, and deliverables of this phase in the context of the project management lifecycle.

Figure 4-1


Project Planning
Project Execution and Control
Project Closeout
Conduct Planning Kick-off
Orient New Team Members
Review Project Materials
Kick Off Project Planning
Conduct Phase Kick-off
Orient New Team Members
Review Project Materials
Kick Off Project Execution
Conduct Post-Implementation Review
Solicit Feedback
Conduct Project Assessment
Prepare Post-Implementation Report
Refine CSSQ
Refine Project Scope
Refine Project Schedule
Refine Quality Standards
Refine Project Budget
Manage CSSQ
Manage Project Scope
Manage Project Schedule
Implement Quality Control
Manage Project Budget
Updated Project Schedule
Perform Administrative Closeout
Provide Performance Feedback
Archive Project Information
Project Scope
Project Schedule
Quality Management Plan
Project Budget
Perform Risk Assessment
Identify Risks
Quantify Risks
Develop Risk Mgmt Plan
Monitor and Control Risks
Monitor Risks
Control Risks
Monitor Impact on CSSQ
Risk Management Worksheet
Risk Management Worksheet
Refine Project Plan
Define Change Control Process
Define Acceptance Mgmt
Define Issue Mgmt & Escalation
Refine Communications Plan
Define Organizational Change Management Plan
Establish Time/Cost Baseline
Develop Project Team
Develop Implementation/ Transition Plan
Manage Project Execution
Manage Change Control
Manage Deliverable Acceptance
Manage Issues
Execute Communications Plan
Manage Organizational Change
Manage Project Team
Manage ProjectTransition
Updated CSSQ
Approval Forms
Issue Log
Status Reports
Archived Project Repository
Project Plan
Gain Project Acceptance
Conduct Final Status Meeting
Gain Acceptance Signature
Project Acceptance Form
Confirm Approval to Proceed
Review/Refine Business Case
Prepare for Acceptance
Gain Approval Signature
Approval Form

List of Roles

The following roles are involved in carrying out the processes of this phase. The detailed descriptions of these roles can be found in the Section I Introduction.

- Project Manager
- Project Sponsor
- Project Team Member
- Customer
- Customer Representative
- Consumer
- Stakeholders

List of Deliverables

Project Execution and Control differs from all other phases in that, between phase kick-off and project acceptance, all processes and tasks occur concurrently and repeatedly, and continue almost the entire duration of the phase.

Thus, the earlier concept of a "process deliverable" is not applicable to this phase, and even task deliverables are mostly activities, not products.

Of course, there is the ultimate phase deliverable – the product of the project, and it is formally recognized via the signed Project Approval Form.

The following table lists all Project Execution and Control processes, tasks and their deliverables.

Figure 4-2

Processes	Tasks	Task Deliverables *(Outcomes)*
Conduct Project Execution and Control Kick-off	Orient New Team Members	*Team Members Prepared to Work*
	Review Outputs of Project Planning	Project Planning Outputs Reviewed
	Kick Off Project Execution and Control	Kick-off Meeting Agenda Kick-off Meeting Notes
Manage CSSQ	Manage Project Scope	*Scope Under Control*
	Manage Project Schedule	Updated Project Schedule
	Implement Quality Control	*Quality Control Processes In Place*
	Manage Project Budget	Updated Budget
Monitor and Control Risks	Monitor Risks	Risk Management Worksheet
	Control Risks	Project Status Report
	Monitor Impact on CSSQ	*CSSQ Managed*
Manage Project Execution	Manage Change Control Process	Updated CSSQ
	Manage Acceptance of Deliverables	Project Deliverable Approval Forms
	Manage Issues	Project Status Report
	Execute Communications Plan	Project Status Report and Other Communication Tools
	Manage Organizational Change	*Organizational Change Processes Executed*
	Manage the Project Team	*High Performing Team*
	Manage Project Implementation and Transition Plan	Product of the Project
Gain Project Acceptance	Conduct Final Status Meeting	Final Project Status Report
	Gain Acceptance Signature from Project Sponsor	*Signed Project Acceptance Form*

4.1 CONDUCT PROJECT EXECUTION AND CONTROL KICK-OFF

Purpose

The purpose of **Conduct Project Execution and Control Kick-off** is to formally acknowledge the beginning of Project Execution and Control and facilitate the transition from Project Planning. Similar to Project Planning Kick-off, Project Execution and Control Kick-off ensures that the project is still on track and focused on the original business need. Many new team members will be introduced to the project at this point, and must be thoroughly oriented and prepared to begin work. Most importantly, current project status is reviewed and all prior deliverables are re-examined, giving all new team members a common reference point.

Roles

- Project Manager
- Project Sponsor
- Project Team Members
- Stakeholders

Tasks

4.1.1 Orient New Project Team Members

As in Project Planning, the goal of orienting new Project Team members is to enhance their abilities to contribute quickly and positively to the project's desired outcome. If the Project Manager created a Team Member Orientation Packet during Project Planning, the packet should already contain an orientation checklist, orientation meeting agenda, project materials, and logistical information that will again be useful.

The tasks executed in support of Conduct Project Execution and Control Kick-off are:

- 4.1.1 Orient New Project Team Members
- 4.1.2 Review Outputs of Project Planning and Current Project Status
- 4.1.3 Kick Off Project Execution and Control

The Project Manager should review the contents of the existing Team Member Orientation Packet to ensure that they are current and still applicable to the project. Any changes needed to the contents of the packet should be made at this time. Once updated, packet materials can be photocopied and distributed to new team members to facilitate their orientation process. The Project Manager or Team Leader should conduct one-on-one orientation sessions with new members to ensure that they read and understand the information presented to them.

If the orientation packet was not created during Project Planning and new team members are coming on board, the Project Manager must gather and present information that would be useful to new team members, including:

- All relevant project information from Project Origination, Project Initiation, and Project Planning
- Organization charts – Project Team, Customer, Performing Organization
- Information on Project Roles and Responsibilities
- General information on the Customer (what they do for a living!)
- Logistics (parking policy, work hours, building/office security requirements, user id and password, dress code, location of rest rooms, supplies, photocopier, printer, fax, refreshments, etc.)
- Project procedures (team member expectations, how and when to report project time and status, sick time and vacation policy)

4.1.2 Review Outputs of Project Planning and Current Project Status

Before formally beginning Project Execution and Control, the Project Team should review recent Project Status Reports and the Project Plan. At this point in the project, the Project Plan comprises all deliverables produced during Project Initiation and Project Planning:

1. Project Charter
2. CSSQ (Scope, Schedule, Quality Plan, Budget)
3. Risk Management Worksheet
4. Description of Stakeholder Involvement
5. Communications Plan
6. Time and Cost Baseline
7. Change Control Process
8. Acceptance Management Process
9. Issue Management and Escalation Process
10. Project Organizational Management Plan
11. Project Team Training Plan
12. Project Implementation and Transition Plan

See the sections on Project Initiation and Project Planning for detailed descriptions of these deliverables.

This will serve to remind the team of what has been produced so far, to clarify understanding of the work to be produced during Project Execution and Control, and to again communicate the management processes that will be followed during the remainder of the project.

4.1.3 Kick Off Project Execution and Control

As was the case for Project Initiation and Project Planning, a meeting is conducted to kick off Project Execution and Control. During the meeting, the Project Manager should present the main components of the Project Plan for review. (See Figure 4-3, Project Execution and Control Kick-off Meeting Agenda.) Other items to cover during the meeting include:

- Introduction of new team members
- Roles and responsibilities of each team member
- Restating the objective(s) of the project and goals for Execution and Control
- Latest Project Schedule and timeline
- Communications Plan
- Project risks and mitigation plans
- Current project status, including open issues and action items

The goal of the kick-off meeting is to verify that all parties involved have consistent levels of understanding and acceptance of the work done so far, to validate expectations pertaining to the deliverables to be produced during Project Execution and Control, and to clarify and gain understanding of the expectations of each team member in producing the deliverables. Attendees at the Project Execution and Control Kick-off Meeting include the Project Manager, Project Team, Project Sponsor, and any other Stakeholders with a vested interest in the status of the project. This is an opportunity for the Project Sponsor to reinforce the importance of the project and how it supports the business need.

As at every formal project meeting, the Project Manager should be sure that one of the Project Team members in attendance is designated as the scribe for the session, to capture notes and action items. Following the session, the notes and action items should be compiled into meeting minutes to be distributed to all attendees for review and approval, and should be added to the project repository.

Figure 4-3 Project Execution and Control Kick-off Meeting Agenda

Project Execution and Control Kick-off Meeting Agenda

Project: _____

Date: _____

Time: From: _____ To: _____

Location: _____

Invitees: List the names of individuals invited to the meeting

Invitees *should include the Project Manager, Project Team, Project Sponsor, and any Customers with a vested interest in the status of the project.*

Attendees: During the meeting, note who actually attended. If attendees arrived late or left early, indicating they missed some of the topics discussed, note their arrival or departure time.

AGENDA

Use the following suggested times as guidelines–the time you need to cover agenda topics will vary depending upon the needs of the project.

	Presenter Name	Time (minutes)
Introductions	Project Manager	5 min.

Project Manager welcomes everyone and briefly states the objective of the meeting.
Allow individuals to introduce themselves, and provide a description of their role within the Performing Organization and their area of expertise and how they may be able to contribute to the project efforts.
The material to be presented by the following agenda topics should come right from the Project Charter.

Sponsor's Statement	Project Sponsor	5 min.

After brief introductions, the Project Sponsor should describe the vision for the project, demonstrate support, and advocate for its success, setting it as a priority for all parties involved.

Project Request & Background	Project Manager	5 min.
Project Goals & Objectives	Project Manager	10 min.
Project Scope	Project Manager	10 min.
Roles & Responsibilities	Project Manager	10 min.

When reviewing roles and responsibilities be explicit about expectations relative to stakeholder availability and Project Sponsor commitment and support for the project.

Next Steps	Project Manager	5 min.
Questions	Project Manager	10 min.

ADDITIONAL INFORMATION:

Handouts:	

Provide a list of the material to be distributed to the attendees.

Figure 4-3 (Continued)

Project Execution and Control Kick-off Meeting

Project: _____

Date:_____

Time: From: _____ To: _____

Location: _____

Be sure that one of the Project Team members in attendance is scribing for the session, capturing important project-specific information that requires further review or discussion as well as potential issues that could impact the project. At the end of the meeting, the Project Manager and Project Team should review these points as well as any other notes captured by other team members to identify any additional actions required. The notes will be compiled into meeting minutes to be distributed to all the attendees and retained in the project repository.

DECISIONS

Decision Made	Impact	Action Required?

Document each project decision reached and its impact. Also indicate if the decision requires follow-up actions. If so, these should be captured below.

ISSUES

Issue Description	Impact	Action Required?

Document any project issues identified and its impact. Also indicate if the issue requires follow up actions. If so, these should be captured below.

ACTION ITEMS FOR FOLLOW UP

Action	Responsible	Target Date

Capture any follow up activities and the individual responsible for them as well as set a date as to when the action needs/should be completed.

At the end of the meeting, the scribe should recap the action items. These should also be included in the meeting minutes to be distributed.

4.2 MANAGE CSSQ

Purpose

CSSQ is the acronym for a project's inextricably linked quadruple constraints: Cost, Scope, Schedule, and Quality. During Project Planning, each section of the CSSQ was refined. As project-specific tasks are performed during Project Execution and Control, CSSQ will need to be managed according to the processes established during Project Planning.

Roles

- Project Manager
- Project Sponsor
- Project Team Member
- Customer Representative

The CSSQ is not static – although Project Planning is complete and has been approved, some components of CSSQ will continue to evolve as a result of the execution of project tasks. Throughout Execution and Control, as more information about the project becomes known and the product of the project is developed, CSSQ is likely to be affected and will need to be closely managed.

The purpose of **Manage CSSQ** is to:

- Manage Changes to Project Scope
- Control the Project Schedule and Manage Schedule Changes
- Implement Quality Assurance and Quality Control Processes according to the Quality Standards Revised During Project Planning
- Control and Manage Costs Established in the Project Budget

Tasks

4.2.1 Manage Project Scope

During Project Planning, the Project Manager, through regular communication with the Customer Representatives and Project Sponsor, refined the Project Scope to clearly define the content of the deliverables to be produced during Project Execution and Control. This definition includes a clear description of what will and will not be included in each deliverable.

The tasks for Manage CSSQ are:

- 4.2.1 Manage Project Scope
- 4.2.2 Manage Project Schedule
- 4.2.3 Implement Quality Control
- 4.2.4 Manage Project Budget

The process to be used to document changes to the Project Scope was included in the Project Plan. This process includes a description of the way scope will be managed and how changes to scope will be handled. It is important that the Project Manager enforce this process throughout the entire project, starting very early in Project Execution and Control. Even if a scope change is perceived to be very small, exercising the change process ensures that all parties agree to the change and understand its potential impact. Following the process each and every time scope change occurs will minimize confusion as to what actually constitutes a change. Additionally, instituting the process early will test its effectiveness, get the Customer and Project Sponsor accustomed to the way change will be managed throughout the remainder of the project, and help them understand their roles as they relate to change.

As part of managing scope change, one of the Project Manager's functions is to ensure that the project produces all the work but ONLY the work required and documented in the Project Scope. Any deviation to what appears in the scope document is considered change and must be handled using the change control process. Sometimes, despite the best effort of the Project Manager to carefully document what is in and outside of scope, there is disagreement between the Project Manager and Customer Representative or Project Sponsor regarding whether something is a change. When conflicts occur, the Project Manager and appropriate Customer must be willing to discuss their differences of opinion and reach a compromise. If a compromise cannot be reached, it may be necessary to escalate the issue to a higher level of management.

Once the Project Manager, the Project Sponsor, and the appropriate Customer Representative agree that scope change is occurring, they all must take the time to thoroughly evaluate the change. In order to effectively evaluate change, the Project Manager must forecast the impact of the change on the remaining three "quadruple constraints": Cost, Schedule and Quality. Equipped with this information, the Project Manager and Project Sponsor will be able to determine if implementing the proposed change would be beneficial. If it is determined, for

example, that the cost of implementing a change outweighs the benefit, the change should most likely be rejected or put aside for future consideration.

When a scope change is determined to be beneficial to the outcome of the project, approval and funding for the change is secured. At this point, the Project Manager must follow the procedures defined in the Project Plan to implement the change. (Managing the change control process is described in detail in 4.4.1.)

The Project Manager must incorporate any agreed-upon changes or addenda into the deliverables produced during Project Initiation and Project Planning. This ensures that all project deliverables are in line with the revised Project Scope. Any lessons learned from scope change control should be documented and included in the project repository for later use by the current project and any other projects to be performed by the organization.

Throughout Project Execution and Control, continuous communication between the Project Manager, Project Sponsor, and Customer Representative is crucial in managing scope.

4.2.2 Manage Project Schedule

During Project Planning, an agreed-upon baseline was established for the Project Schedule. This baseline will be used as a starting point against which performance on the project will be measured. It is one of many tools the Project Manager can use during Project Execution and Control to determine if the project is on track.

Project Team members must use the communications mechanisms documented in the Communications Plan to provide feedback to the Project Manager on their progress. It is recommended that each team member prepare a Progress Report. This report documents effort spent on tasks and provides estimates of the effort required to complete them. (See Figure 4-4, the New York State Progress Report.) Progress Reports are used by the Project Manager to update the Project Schedule. For details on the contents of a Progress Report and instructions on how to prepare one, see 4.4.4, Execute Communications Plan.

The Project Manager must emphasize to the team the importance of accurate reporting, and must be vigilant in collecting information at a detailed level. Using the information contained in the Progress Reports, the Project Manager tracks work done against the tasks in the Project Schedule. If the time remaining to complete a task in the schedule differs from the estimated time, the schedule should be updated accordingly. It is recommended that the Project Manager update the Project Schedule on a regular basis. Frequent updates to the schedule not only save time in the long run, they also allow the Project Manager to quickly spot potential problem areas. Small slippages on individual tasks may combine to create significant issues with other, dependent tasks.

Figure 4-4 New York State Progress Report

New York State
Progress Report

To:	Report Period Ending:
From:	Project Name:

The tasks I completed this reporting period are:
■

The tasks I plan to complete next reporting period are:
■

I lost time due to: (Specify hours and cause):
■

Issues:

Description	Date Identified	Impact

Scheduled Vacation/Training:

Description	Start Date	End Date	# of Hours

Time Reporting by Task:

Task ID	Description	Original Estimate	Hours this Week	ETC	Hours to Date
	Reporting Period Total				

After updating the Project Schedule, the Project Manager must take the time to review the status of the project. Some questions that the Project Manager should be able to answer by examining the Project Schedule include:

- Is the project on track?
- Are there any issues that are becoming evident that need to be addressed now?
- Which tasks are taking more time than estimated? Less time?
- If a task is late, what is the effect on subsequent tasks?
- What is the next deliverable to be produced and when is it scheduled to be complete?
- What is the amount of effort expended so far and how much is remaining?
- Are any Project Team members over-allocated or under-allocated?
- How much of the time allocated has been expended to date and what is the time required to complete the project?

Most project scheduling tools provide the ability to produce reports to display a variety of useful information. It is recommended that the Project Manager experiment with all available reports to find those that are most useful for reporting information to the Project Team, Customer, and Project Sponsor.

When updating the Project Schedule, it is very important that the Project Manager maintain the integrity of the current schedule. Each version of the schedule should be archived. By creating a new copy of the schedule whenever it is updated, the Project Manager will never lose the running history of the project and will also have a copy of every schedule for audit purposes.

The Project Manager should begin tracking actual work in the Project Schedule as soon as the work commences, which is usually as soon as the project is initiated and Project Planning begins. Work done in parallel with planning, before the Project Schedule is completed and approved, must be recorded. Remember that updates to the Project Schedule are not limited to tracking hours worked – ANY change resulting from the execution of the change control process will usually require future tasks to be re-planned and the schedule to be updated! (See Manage Change Control Process, task 4.4.1.) If the Project Schedule is updated to reflect approved change control, a new

baseline schedule must also be created. Updates must then be made against the new baseline. The previous baseline should be saved for historical purposes.

4.2.3 Implement Quality Control

Quality control involves monitoring the project and its progress to determine if the quality assurance activities defined during Project Planning are being implemented and whether the results meet the quality standards defined during Project Initiation. The entire organization has responsibilities relating to quality, but the primary responsibility for ensuring that the project follows its defined quality procedures ultimately belongs to the Project Manager. The following figure highlights the potential results of executing a project with poor quality compared to a project executed with high quality:

Figure 4-5

Poor Quality	High Quality
Increased costs	Lower costs
Low morale	Happy, productive Project Team
Low Customer satisfaction	Delivery of what the Customer wants
Increased risk	Lower risk

Quality control should be performed throughout the course of the project. Some of the activities and processes that can be used to monitor the quality of deliverables, determine if project results comply with quality standards, and identify ways to improve unsatisfactory performance, are described below. The Project Manager and Project Sponsor should decide which are best to implement in their specific project environment.

- **Conduct Peer Reviews** – the goal of a peer review is to identify and remove quality issues from a deliverable as early and as efficiently as possible. A peer review is a thorough review of a specific deliverable, conducted by members of the Project Team who are the day-to-day peers of the individuals who produced the work. The peer review process adds time to the overall Project Schedule, but in many project situations the benefits of conducting a review far outweigh the time considerations. The Project Manager must evaluate the needs of his/her project, determine and document which, if any, deliverables should follow this process, and build the required time and resources into the Project Schedule.

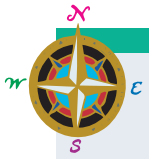
Prior to conducting a peer review, a Project Team member should be identified as the facilitator or person responsible for keeping the review on track. The facilitator should distribute all relevant information pertaining to the deliverable to all participants in advance of the meeting to prepare them to participate effectively.

During the meeting, the facilitator should record information including:

- Peer review date
- Names and roles of participants
- The name of the deliverable being reviewed
- Number of quality issues found
- Description of each quality issue found
- Actions to follow to correct the quality issues prior to presenting the deliverable to the approver
- Names of the individuals responsible for correcting the quality issues
- The date by which quality issues must be corrected

This information should be distributed to the Project Manager, all meeting participants, and those individuals not involved in the meeting who will be responsible for correcting any problems discovered or for producing similar deliverables. The facilitator should also solicit input from the meeting participants to determine if another peer review is necessary. Once the quality issues have been corrected and the Project Manager is confident the deliverable meets expectations, it may be presented to the approver.

- **Use Quality Checklists** – both the Project Manager and Project Team members can create and make use of various checklists to be sure items are not overlooked while a product is being developed. Checklists may be simple hard-copy lists of "things to do," or may be generated using more formal, electronic-based tools. In either case, a checklist should be comprehensive and detailed enough to ensure that the resulting product or deliverable has been built to the level required to meet quality standards. An example of a quality checklist is the End-of-Phase Checklist found at the end of each project management lifecycle phase in this ***Guidebook***.



Checklists can be refined and expanded over the course of several projects. This is a great way to reuse best practices and maintain historical information.

- **Maintain and Analyze the Project Schedule** – this activity should never be taken lightly, regardless of the size of the project. Updating the Project Schedule on a regular basis while keeping a close watch on the timeline and budget is the primary mechanism to measure quality of the schedule. If the project timeline or budget are not on track, the Project Manager can determine why and take immediate action to remedy the problem. (See Manage Project Schedule, task 4.4.2.)
- **Conduct Project Audits** – the goal of a project audit is to ensure that the Quality Assurance activities defined in Project Planning are being implemented and to determine whether quality standards are being met. It is a process to note what is being done well, to identify real or potential issues, and to suggest ways for improvement. Audits should be performed on a regular basis, depending upon the size and length of the project. At a minimum, it is recommended that an audit be performed at the end of each phase, at lease once during Project Execution and Control, and at the end of the project.

  The individual(s) performing the audit can be a member of a quality assurance department or team, if one exists, or any Stakeholder determined by the Project Sponsor to be unbiased toward the project. The individual should also be very familiar with the quality standards and procedures in place in the Performing Organization, but should have no involvement in day-to-day project activities.

  An auditor will most likely use a checklist questionnaire to interview the Project Manager, selected Project Team members, the Project Sponsor, and selected Customer Representatives to gain insight into how the project is progressing. One of the most important measurements the auditor will look for during these interviews is Project Team and Customer satisfaction. Poor satisfaction is an indicator of an underlying problem that should be uncovered as the auditor delves into the specifics of the project. In addition, the project repository will be examined to determine if it

contains sufficient documentation. An auditor will look for and review the components of the current Project Plan – including the Project Scope, Project Schedule, and Risk Management Worksheet. The questions listed below are examples of what an auditor may be asking when reviewing the Project Plan.

PROJECT DELIVERABLES

(Project deliverables will differ depending upon the project life-cycle being used. Customize the following questions and add others as necessary to properly and sufficiently evaluate the deliverables specific to your project.)

Do the deliverables meet the needs of the Performing Organization?

Do the deliverables meet the objectives and goals outlined in the Business Case?

Do the deliverables achieve the quality standards defined in the Quality Management Plan?

PROJECT MANAGEMENT DELIVERABLES

Does the Project Proposal define the business need the project will address, and how the project's product will support the organization's strategic plan?

Does the Business Case provide an analysis of the costs and benefits of the project and provide a compelling case for the project?

Has a Project Repository been established to store all project documents, and has it been made available to the Project Team?

Does the Project Charter define the project purpose, goals and objectives?

Does the Project Scope provide a description of the project, including its output, approach, and content?

In the Project Scope, is it clear as to what is "in" and "out" of scope?

Is the Project Schedule defined sufficiently to enable the Project Manager to manage task execution?

Was a Project Schedule baseline established?

Is the Project Schedule maintained on a regular basis?

Does the Quality Management Plan describe quality standards for the project and associated quality assurance and quality control activities?

Has a project budget been established and documented in sufficient detail?

Have project risks been identified and prioritized, and has a mitigation plan been developed and documented for each?

If any risk events have occurred to date, was the risk mitigation plan executed successfully?

Are all Stakeholders aware of their involvement in the project, and has this it been documented and stored in the project repository?

Does the Communications Plan describe the frequency and method of communications for all Stakeholders involved in the project?

Does the Change Control Process describe how to identify change, what individuals may request a change, and the process to follow to approve or reject a request for change?

Has changes to scope been successfully managed so far?

Does the Acceptance Management Process clearly define who is responsible for reviewing and approving project and project management deliverables? Does it describe the process to follow to accept or reject deliverables?

Has the Acceptance Management Process proven successful for the deliverables produced so far?

Does the Issue Management and Escalation Plan clearly define how issues will be captured, tracked, and prioritized? Does it define the procedure to follow should an unresolved issue need to be escalated?

Have issues been successfully managed up to this point?

Does the Organizational Change Management Plan document how changes to people, existing business processes, and culture will be handled?

Has a Project Team Training Plan been established, and is it being implemented?

Does the Implementation and Transition Plan describe how to ensure that all Consumers are prepared to use the project's product, and the Performing Organization is prepared to support the product?

Have all Project Management deliverables been approved by the Project Sponsor (or designated approver?)

Does the Project Plan contain all required components as listed in the Guidebook?

Are each of the Project Plan components being maintained on a regular basis?

PROJECT MANAGEMENT PROCESSES

Does each Project Team member produce regular progress reports, including actual effort expended on tasks and estimates to complete them?

Are regular Project Team meetings conducted? Are meeting minutes kept, disseminated after the meetings, and stored in the repository?

Does the Project Manager produce a status report on a regular basis that contains all recommended components from the Project Status Report template (Figure 2-10)?

Is the Project Status Report being reviewed with the Project Sponsor on a regular basis?

As new team members are introduced, are they being sufficiently oriented to the project and working environment?

PROJECT TEAM AND CUSTOMER SATISFACTION

(To be completed only if Project Team members and Customers have been interviewed as part of this review)

Are Project Team members satisfied with the way the project is being managed?

Do Project Team members feel challenged and excited about their work?

Do Project Team members feel comfortable in voicing concerns or issues to the Project Manager?

Do the Project Manager, Project Sponsor and Customer Decision-Maker(s) share a consistent view of project status and issues?

Is the Customer Decision-Maker(s) satisfied with deliverables provided by the project?

Is the Customer Decision-Maker(s) satisfied with the responsiveness and flexibility of the Project Team?

Is the Customer Decision-Maker(s) satisfied with the skills and capabilities of the Project Team?

Is the project currently free from serious Customer issues or concerns?

Upon completion of the audit and repository review, the auditor writes a summary report documenting his/her findings and recommendations. This report is reviewed with the Project Manager, who should immediately implement recommendations and corrective actions identified.

Every member of the Project Team must be committed to producing a quality product. Quality control cannot rely on "adding" quality at the end of a process; quality must be built into the work of each individual on the team. It is far more cost effective to have Project Team members add quality into their day-to-day jobs than to have an auditor find a problem after a process has been completed.

As a result of implementing quality control, the Project Manager should be able to determine and take the appropriate actions to increase the project's effectiveness and provide better service to the Customer.

Successful quality control processes always strive to see quality through the eyes of the Customer. The Customer is the ultimate judge of the quality of the product.

4.2.4 Manage Project Budget

The Project Manager must know the extent of his/her authority to make budget decisions. For example, is the Project Manager allowed to authorize work that requires additional hours of salaried personnel time, or must employee time extensions go through the same approval process as contract personnel or equipment purchases? Often, the Project Manager must work closely with fiscal and contract personnel in other divisions to track and control costs. These relationships must be established early in the project management lifecycle. For New York State projects, project staff must record hours expended and the Project Manager must use salary title and grade information to determine the dollar cost of the personal services.

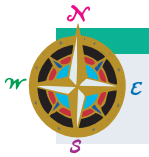
Part of the Project Manager's job is to ensure that the project is completed within the allocated and approved budget. Budget management is concerned with all costs associated with the project, including the cost of human resources, equipment, travel, materials and supplies. Increased costs of materials, supplies, and human resources, therefore, have a direct impact on the budget. Just as task duration estimates are tracked carefully against actuals, the actual costs must be tracked against estimates. The same analysis should be conducted and the same questions asked: What other aspects of the budget were constructed based upon these estimates? Changes to the scope of the project will most often have a direct impact on the budget. Just as scope changes need to be controlled and managed, so do changes to the Project Budget.

It is the responsibility of the Project Manager to closely monitor the financial performance of the project and take responsibility for addressing cost-related issues as they arise. In addition, the Project Manager should always be aware of the effect his/her decisions may have on the total cost of the project, both before and after the product or service is implemented.

Monitoring the financial performance of your project on a regular basis is the only way you can keep a handle on the Project Budget. Don't let the Project Budget get away from you – get into the habit of updating the schedule and analyzing the financial impact on a regular basis. Taking the time to do these administrative tasks will save you countless hours of reconciliation and balancing down the road, and warn you of impending cost issues!

There are several financial characteristics the Project Manager should monitor to determine if a project is performing satisfactorily against its budget. Most often, these values are entered into the scheduling tool by the Project Manager and calculated and displayed using its corresponding capabilities. Some budget-related characteristics the Project Manager should examine each time the schedule is updated include:

- **Original Contract Value:** the original estimated budget (cost) that was approved by the Project Sponsor.
- **Total Approved Changes:** the total cost of approved changes as a result of change control.
- **Total Current Budget:** the sum of the Original Contract Value and the Total Approved Changes. This is the most current approved Project Budget.
- **Cost to Date:** the actual dollars (cost) expended to date on all tasks and materials in the Project. The labor costs can be calculated by the scheduling tool based upon the time the Project Manager tracks against the tasks in the Project Schedule.
- **Estimate to Complete:** the dollars (cost) estimated to be expended to complete remaining project tasks. The Project Manager must verify and assess the impact of team members' revised effort estimates to complete tasks. The Project Manager must also validate that the remaining material costs are in line with the budget. These have a direct effect on the Project Budget.
- **Forecast Total:** the sum of the Cost to Date and the Estimate to Complete.
- **Project Variance:** the difference between all estimated and all actual dollars. It is calculated by subtracting the Forecast Total from the Total Current Budget. A positive variance means that the actual cost of the product is less than the budgeted cost. A negative variance means that the actual cost of the product is greater than the budgeted cost.



It is of utmost importance for the Project Manager to take the time to analyze, understand, and document the reason for variance every time the Project Schedule is updated.

Whether positive or negative, the Project Manager needs to understand what is causing variance and take proactive steps to keep it under control. The Project Manager must be able to explain the cause of variance to others and determine if corrective actions need to be taken to maintain the project's budget. For example, if a negative effort variance develops while a task is being executed, then more money may be needed than originally planned for, potentially impacting the success of the project. On the other hand, some tasks may finish ahead of schedule, freeing up money and offsetting the negative impact of those that finish late. The Project Manager must remain aware of such situations, working with the Project Team members and Customers to determine the causes of variance and to mitigate any associated risks.

It is the responsibility of the Project Manager to ensure the currency, accuracy, and viability of the Project Schedule as the primary mechanism for managing the budget. He/she must know and be able to communicate exact project status relative to budget, impact of changes, estimates to complete, and variance. This information must be known by task, process, phase, resource, and deliverable and be communicated to the Project Sponsor as part of the Status Meeting.

Deliverable

- **The CSSQ Deliverables** – the Project Budget, Project Scope, Project Schedule, and the Quality Management Plan are applied, monitored and updated during Project Execution and Control.

4.3 MONITOR AND CONTROL RISKS

Purpose

Risks are potential future events that can adversely affect a project's Cost, Schedule, Scope or Quality (CSSQ). In prior phases, the Project Manager defined these events as accurately as possible, determined when they would impact the project, and developed a Risk Management Plan. As the impact dates draw closer, it is important to continue re-evaluating probability, impact, and timing of risks, as well as to identify additional risk factors and events.

Roles

- Project Manager
- Project Sponsor
- Project Team Member
- Customer

When the risk event actually occurs, the risk (which is by definition a future, potential event) becomes an issue (which is by definition a current, definite condition) and issue monitoring and control takes over.

The purpose of **Monitor and Control Risks** is to deploy the Risk Management Plans prepared in prior phases to anticipate project challenges, and to develop and apply new response and resolution strategies to unexpected eventualities.

Tasks

4.3.1 MONITOR RISKS

During Project Initiation and Planning, risks were remote events with uncertain probabilities of coming true. In Execution and Control, however, impact dates draw closer, and risks become much more tangible.

The tasks for Monitor and Control Risks during Project Execution and Control are:

4.3.1 Monitor Risks
4.3.2 Control Risks
4.3.3 Monitor Impact on CSSQ

The Project Manager must continually look for new risks, reassess old ones, and re-evaluate risk mitigation plans. The Project Manager should involve the whole Project Team in this endeavor, as various team members have their particular expertise and can bring a unique perspective to risk identification. As the Risk Management Worksheet is integrated into the status reporting process, this review and re-evaluation should take place automatically, with the preparation of each new status report.

Because the Risk Management Worksheet places risks in order according to their priority level, it is important to update all quantifiable fields to portray an accurate risk landscape. The risk probabilities may have changed; the expected level of impact may be different, or the date of impact may be sooner or later than originally anticipated – all of these variables determine which risks the Project Team will concentrate on first.

Likewise, the Risk Management Plan needs to be constantly re-evaluated. Make sure the right people are still assigned to mitigation actions and that the actions still make sense in the context of the latest project developments.

Another consideration is whether a specific risk's probability level is high enough to warrant incorporating the Risk Management Plan in the Project Schedule via the change control process. If so, the risk should be removed from the worksheet.

Finally, the Project Manager must be constantly on the lookout for additional risks. Reviewing the risks as part of regular status reporting should involve the whole Project Team via bi-directional communications.

4.3.2 Control Risks

Sooner or later, one of the events on the Risk Management Worksheet – or an entirely new and unexpected risk – will actually occur. The Project Manager and Project Team members must evaluate the risk event and invoke the Risk Management Plan. There are generally three possible response scenarios:

1. If the risk occurred as expected, the existing Risk Management Plan may be adequate for dealing with it. Example: the project is being required to provide additional documentation to prove compliance with state regulations. However, that risk has been anticipated, and the Risk Management Plan details where and how to get the appropriate materials.
2. If the risk occurred in a different manner, or other circumstances have come to bear, the Risk Management Plan may have to be modified. Example: a consumer group brought pressure to examine the environmental impact of the product of the project more closely. As a result, the project is being required to obtain subject matter expert statements. Since the need was not

anticipated, the original contingency plan needs to be modified to comply with the new requirements.

3. If the risk event was unexpected and unanticipated, a whole new Risk Management Plan must be created to address it. Example: The Federal Government issued a mandate that challenges the project from a whole different perspective. The Project Manager needs to understand what the issue is, what response is required, and how to obtain the desired result.

Regardless of the scenario, however, as soon as the risk event occurs it ceases to be a risk (future, possible event) and becomes an issue (current, definite condition). As a result, it should transition from the Risk Management Worksheet and onto the list of current project issues, with the Risk Management Plan becoming the issue's Action Plan.

4.3.3 Monitor Impact on CSSQ

During the entire risk management process, the Project Manager should be especially vigilant regarding the effect on the project's Cost, Scope, Schedule and Quality (CSSQ). With the proper risk management processes in place, many risk events may come to pass without affecting (either positively or negatively) the project's defining parameters. However, when a risk event occurs that threatens the project's scope, quality standards, schedule or budget, the Project Manager must determine the proper course of action to protect the integrity of the project.

Until CSSQ impact is certain, the Project Manager must, at a minimum, introduce the event to the list of current project issues. The issue's Action Plan must reflect all the tasks required to accurately determine what impact (if any) the event will have on CSSQ. Once the impact is certain and quantifiable, the Project Manager should transition the issue to the Change Control process.

Deliverable

- **Risk Management Worksheet** – a record of risk variables, impact, probability, date of impact, level of priority and risk response actions which is continuously monitored and updated, and its Risk Management Plans applied as part of Project Execution and Control.

4.4 MANAGE PROJECT EXECUTION

Purpose

Project Execution is typically the part of the lifecycle of a project when the majority of the actual work to produce the product is performed and the majority of the Project Budget is expended. The purpose of **Manage Project Execution** is to manage every aspect of the Project Plan as work is being done to make certain the project is a success. This process is performed concurrently with the Manage CSSQ and Monitor and Control Risks processes. The tasks in this process are performed concurrently and repeatedly as various aspects of the product of the project are constructed, tested, and accepted.

Roles

- Project Manager
- Project Sponsor
- Project Team
- Customer

Tasks

4.4.1 Manage Change Control Process

During Project Planning, the Project Manager, Project Sponsor, and Customer agreed on a formal change control process that was documented and included in the Project Plan. The change control process describes:

- The definition of change and how to identify it
- How requests for change will be initiated
- How requests for change will be analyzed to determine if they are beneficial to the project
- The process to approve or reject change requests
- How funding will be secured to implement approved changes

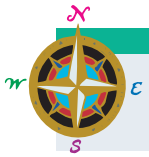
Although changes can be expected to occur throughout every project phase, any negative effect on the project outcome should be avoidable if the change control process is executed and managed effectively.

The need for change is usually discovered during Project Execution, as actual task work is being performed. It is during Execution that the Project Team may

The tasks to Manage Project Execution are:

discover their original effort estimates were not accurate and will result in more or less effort being required to complete their work. It is also during Execution that the Project Sponsor or Customer may realize that, despite their best efforts to thoroughly document the Project Scope, the product being produced is not exactly what they need. It is the responsibility of the Project Manager to keep a close watch on factors that could introduce potential "scope creep" and take proactive steps to prevent it from occurring, or to manage it as it occurs.

Sometimes change control is required if a Project Team member is not able to complete what was documented in the Project Scope, because of lack of skill, time constraints, or other factors outside his/her control. In most cases, these difficult to manage situations often result in lost time in the Project Schedule and can have a major impact on the project.



When someone does not do something he or she was supposed to do as documented in the Project Plan, the resulting change is called a "Non-Compliance" change.

Sometimes change is simply informational and will most likely not affect the Project Scope or Schedule (e.g., the name of a Project Team member or the physical location of the Project Team offices may change). Changes that do not affect the project's CSSQ do not need to follow the formal change control process, but should be documented in the Project Status Report or any other appropriate communication mechanism.

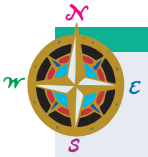
However, for all changes that affect the project's CSSQ, it is vitally important for the Project Manager to implement and manage the change control process in every situation. Not doing so will cause confusion on the part of the Customer as to what constitutes a change. The change control process also helps maintain balance between the requirements of the project and the timeline and cost.

During Project Planning, individuals authorized to be requestors, reviewers, and approvers of change requests were identified and information about them was documented in the change control process. Change control begins when a requestor completes a change request form and submits it to the appropriate reviewer(s). (See Figure 3-6, New York State Project Change Request.)

The role of the reviewer(s) in the change control process is to analyze the request in terms of the level of effort and skill required to implement it. The reviewer, typically an expert in the subject area, will also make a recommendation to accept or reject the change request based upon its feasibility from a technical or implementation standpoint. He/she will communicate this information to the Project Manager and document it on the Project Change Request.

One of the roles of the Project Manager in the change control process is to analyze the reviewer's recommendation, and determine the overall effect of the requested change on the Project Schedule in terms of effort, cost, and resource requirements and availability. This information will be documented on the Project Change Request and presented to the approver(s).

The approver(s) review the information and make a determination whether to approve the change request based upon the potential benefit of its implementation to the organization. If, for example, the implementation costs far outweigh the business benefit, the change request will most likely be rejected. A signature is required of all approvers, whether they are accepting or rejecting the request. If the request is being rejected, the approver must provide a reason. A signature of approval on the Project Change Request indicates that the approver accepts the consequences (impact) of the request on the project's Cost, Scope, Schedule or Quality.



NEVER execute a change request without first obtaining all required approval signatures!

Once a change request has been approved, the Project Manager must incorporate the effect of the change into the Project Schedule. All affected tasks, estimated durations, dependencies, and resources must be modified. A new baseline should then be created for the amended schedule and budget. These become the new tools against which hours will be booked and project performance measured going forward.

REMEMBER: Make a copy of the new baseline schedule and archive it in the project repository BEFORE you book new work to it! If you lose the baseline, you have nothing against which to compare later updates to see if your project is on track!

In addition, if new deliverables will be produced as a result of the change, their exact description must be included in the Project Plan, either as appendices to the Project Scope, or as separate attachments. In addition, any changes that affect the remaining components of CSSQ must be documented. All correspondence, supporting documentation and other information pertaining to the change should be saved in the appropriate location in the project repository.

4.4.2 Manage Acceptance of Deliverables

The goal of this task is to manage the acceptance of deliverables according to the acceptance management process developed during Project Planning. The acceptance management process is part of the Project Plan, and documents:

- The definition of "acceptance"
- The criteria that must be met for each deliverable to be considered "acceptable"
- The number and identity of Customers designated to be reviewers of each deliverable – typically reviewers are experts in the subject matter the deliverable covers
- The number and identity of Customers designated to be approvers – approvers have the authority to sign the approval form, indicating acceptance
- The number of business days in which deliverables must be either approved or rejected by the reviewers and approvers
- The number of times a deliverable can be resubmitted
- The escalation process that will be followed if a timely decision on approval or rejection of a deliverable is not met

The acceptance management process must be followed throughout the project. As with the change control process, the earlier in the life of the project the process begins, the sooner everyone will understand how it works and what to expect. The

key to facilitating acceptance is first to understand Customer expectations, and then to meet them.

The acceptance management process is not set in stone...if, while executing the process, you discover parts of it are not working as expected, adjust the process to more closely fit the needs of the project. Just be sure to document your changes and get Customer approval before implementing them.

Acceptance begins when the Project Manager presents a completed deliverable and Project Deliverable Approval Form to the approver. (See Figure 2-13, New York State Project Deliverable Approval Form.) When logistically possible, the Project Manager must take the time to formally review the deliverable, in person, with the approver. In some cases, the approver's geographic location or work shift prohibits face-to-face communication. Where in-person communication is feasible, it is recommended that the Project Manager not simply send the deliverable via email or leave it on the approver's desk. If the Project Manager has done a very thorough job in setting expectations, the approver may indicate acceptance at the end of this face-to-face presentation. More likely, however, the approver will prefer to have designated reviewers examine the document or product and recommend a course of action.

The reviewers independently analyze the deliverable and produce a recommendation as to whether to accept the deliverable, providing their comments and signature on the accompanying approval form. This must be done within the turnaround time documented in the acceptance management process. If a reviewer recommends the deliverable be rejected, he/she must provide the reason and forward the package back to the approver. This process should be followed for each person designated as a reviewer in the acceptance management process.

Keep in mind that the review and approval process will take more time if several reviewers or approvers need to get involved!

Using input and recommendations provided by the reviewer, the approver reviews the deliverable and decides if it meets the acceptance criteria documented in the acceptance management process. He/she will indicate acceptance or rejection of the deliverable on the Project Deliverable Approval Form. Once again, this must be done within the turnaround time documented in the acceptance management process. If the approver recommends the deliverable be rejected, he/she must provide the reason and forward the package to the Project Manager. It is then the responsibility of the Project Manager to have the deliverable adjusted as necessary and then resubmit it to the approver. This process should be followed for each person designated as an approver in the acceptance management process. The Project Manager must ensure that for rejected deliverables, specific corrective actions are defined, i.e., "I would accept this if..."

It is the responsibility of the Project Manager to be cognizant of the time elapsing during the review and approval process, in an attempt to complete the process within the maximum number of business days agreed upon and documented. Significant delays in the process should trigger the Project Manager to escalate the situation, following the documented escalation procedure. Similarly, the Project Manager should be aware of the number of times the acceptance process is being repeated. How many times is the Project Team making changes to a deliverable based upon its rejection? The number of times a deliverable can be resubmitted to the approver was also documented in the acceptance management process. If a deliverable is rejected more than once, the Project Manager should take immediate action to analyze the situation, resolve the conflict, or exercise the appropriate escalation procedure to get it resolved. A serious delay in the acceptance of a deliverable will almost always result in project delays.

If the number of iterations becomes unreasonable, the Project Manager should recognize that a bigger problem may exist, and should take the appropriate action to find out what it is and fix it!

The Project Manager should maintain a log of the activity that transpires while a deliverable is going through the acceptance management process. The deliverable acceptance log can be

included as part of the Status Report that is reviewed with the Project Sponsor. (See Figure 2-10, the Project Status Report.)

Once a deliverable is considered acceptable, the Project Manager should gain the appropriate signatures on the Project Deliverable Approval Form. Signatures on the form indicate formal acceptance of the deliverable.

4.4.3 Manage Issues

Managing issues involves documenting, reporting, escalating, tracking, and resolving problems that occur as a project progresses. During Project Planning, the Project Manager and Project Sponsor agreed upon and documented the process for managing issues and included the process in the Project Plan.

The issue escalation and management process addresses the following:

- How issues will be captured and tracked
- How issues will be prioritized
- How and when issues will be escalated for resolution

Issues are usually questions, suggestions, or problems raised by Project Team members, including the Project Manager and Customer. They are different from changes in that they do not usually have an immediate impact on the Project Scope or Schedule. If issues remain unresolved, however, they are likely to affect the Project Schedule or Budget, resulting in the need for change control. It is, therefore, very important to have an issue escalation and management process in place, and to execute the process before change control procedures become necessary.

Anyone involved in a project in any way can and should inform the Project Manager of issues. It is the responsibility of the Project Manager and Project Sponsor to foster an environment where communicating issues is not only acceptable but strongly encouraged. Individuals should feel a responsibility to the organization to voice their concerns. If individuals are fearful of communicating issues, the resulting effect on the project can be devastating.

The Project Manager should be cautious about reacting to an issue that is communicated by "shooting the messenger." This sends the wrong message to the Project Team. No matter how devastating the news or the issue, the Project Manager should thank the person who raised the issue and solicit ideas from that individual and other team members for its mitigation.

The Project Manager is responsible for capturing and tracking issues as soon as they arise, using the issues log section in the Project Status Report. Every issue, whether technical or business related, should be documented in the report. (See the Issues Log section in Figure 2-10, the Project Status Report.) Below are some examples of project issues:

- Computer system will be down for routine maintenance
- Project Sponsor is taking another job
- Project Team member start date may be sooner (or later) than expected
- There is a delay in approving or rejecting a change request or deliverable
- Severe weather is predicted in the area of the building site

Once the description of a new issue has been logged, the Project Manager should estimate the potential impact the issue could have on the project. Based upon potential impact, the Project Manager prioritizes the issue in relation to all other open issues. The goal of issue management is to resolve all concerns completely and promptly, but in reality the issues with the highest priority should be addressed first.

The issues log should also include the date the issue is recorded, its anticipated closure date, and the name of the individual responsible for resolving it or seeing that it is resolved. The due date for closure must be a specific date (i.e., the date cannot be "ASAP"). The responsible party must be a specific individual, not a functional group (i.e., an issue should not be assigned to the "IT Department" or the "DBA group").

While the issue remains open, its continuing impact and the status of its action plan should be discussed at every status meeting. If appropriate resources or materials are not available to complete the action items, or if there is disagreement about any

of the elements on the issues log, the Project Manager should invoke previously-defined escalation procedures. Unresolved issues are one of the leading causes of project failure, and the Project Manager must pursue issue resolution relentlessly.

As progress occurs on the resolution of an issue, the Project Manager should update the issues log to reflect what has occurred. As issues are closed, they should be moved to a different section of the issues log. Along with a description of how the issue was resolved, the Project Manager should document who resolved the issue and the closure date.

When managing issues, document *EVERYTHING* (yes, *EVERYTHING*) that happens as issues are resolved. Be sure to note what happened, when it happened and who was involved. Don't skimp on the details. Keep an issues "diary."

When issues are closed, don't delete them from your issues log – instead maintain the "diary" of closed issues in a separate file or folder or section of the log. This "diary" will ensure that you cover your bases, and the information included in it may become invaluable to you or another Project Manager as lessons learned when resolving similar issues down the road!

4.4.4 Execute Communications Plans

During Project Planning, the Communications Plan was refined to describe how project communications will occur, and expanded to describe the way communications will be managed. As a project progresses, events may occur to alter the way information is accessed or change communications requirements. During Project Execution, the Project Manager and Project Team must again review whether the Communications Plan is still current and applicable to the project. If it is determined that any portion of the plan is no longer applicable, the Project Manager should update the document.

During Project Execution the Communications Plan is carried out so that required information is made available to the appropriate individuals at the appropriate times, and new or unexpected requests receive a prompt response. Communications must continue to be bi-directional during Project Execution. The Project Manager must provide required information to the Project Team and appropriate Stakeholders on a timely basis, and the Project Team and Stakeholders must provide required information to the Project Manager.

In addition to having a solid Communications Plan in place, it is the responsibility of members of the Project Team to exercise good communication skills. When composing correspondence, progress reports, meeting minutes, etc., and when speaking with individuals face to face, the team members are responsible for clear, unambiguous, and complete communication of information. The receiver, in turn, must be sure information is not only received correctly and completely, but that it is understood.

During Project Execution, the Project Manager, Project Team, and Stakeholders will share information using a variety of communication mechanisms. These were defined during Project Planning and may include:

- Status Meetings
- Status Reports
- Memos
- Newsletters
- Executive Correspondence
- Meeting Notes
- Executive Meetings
- Steering Committee Meetings

This information is collected, stored and disseminated based upon procedures established and documented in the Communications Plan. While executing the plan, the Project Manager must be aware of how the organization will use the information, and whether the plan is effective. He/she must be flexible and ready to modify the plan if portions of it are not working as expected or communications needs change within the Performing Organization.

Of the many mechanisms available to the Project Manager, status reporting is particularly useful for communicating the performance of a project. Project Team members must complete *Progress Reports* providing regular feedback to the Project Manager. These reports can serve a dual purpose – as a reporting mechanism to the Project Manager and also to the team member's immediate supervisor. Progress Reports should document detailed descriptions of actual work accomplished and include Team members' estimates of the effort they feel will be required to complete tasks. Progress Reports should also con-

tain information regarding work to be done in upcoming weeks, and list any issues preventing completion of required tasks. When correctly completed by the Project Team, the reports are very useful to the Project Manager for updating the Project Schedule, and for anticipating issues and proactively planning ways for their resolution. (See Figure 4-4, the New York State Progress Report.)

Using the Progress Reports prepared by the Project Team, the Project Manager should complete a Status Report to be presented to the Project Sponsor. In this report, the Project Manager measures the "health and progress" of the project against the Project Plan. It is the primary communication vehicle between the Project Manager and the Project Sponsor, and should contain the following information:

- Summary of Progress to Project Schedule – a high-level glance at the major project deliverables, with their intended and actual start and end dates.
- Issues and action items – a running list of open and closed issues, including the name of the person responsible for taking action to resolve them. (See Manage Issues, 4.4.3.)
- Significant accomplishments – a list of the most important completed tasks, or a description of work done toward their completion.
- Significant planned accomplishments for the following weeks – a description of the most important tasks scheduled for completion during the following weeks.
- Deliverable acceptance log – a running diary of actions taken toward acceptance of deliverables. (See Manage Acceptance of Deliverables, 4.4.2.)
- Change control log – a running diary of actions taken toward acceptance of change control. (See Manage Change Control Process, 4.4.1.)
- Lost time – a description of any situation that occurred that resulted in the Project Team being unable to perform work.

Other project documents that should be attached to the Status Report include any Change Control Requests, Deliverable Acceptance Forms, Meetings Notes, and the Risk Management Worksheet.

The Status Report becomes the point of discussion for the Status Meeting, the regularly scheduled forum where the Project Manager presents the project status and discusses issues with the Project Sponsor.

Conduct a regularly-scheduled meeting with the Project Sponsor, using the Status Report to drive the agenda. If necessary, invite members of the Project Team who have expertise in a certain area you plan to discuss. Use the meeting time wisely – it is a great opportunity to have focused, dedicated time with your Project Sponsor and is the perfect forum for communicating the status of the project and planning ways to proactively resolve any issues or concerns.

Even though information is presented to the Project Sponsor at a summary level, it is very important to record and maintain ALL the detailed, supporting task-level information. Detailed information can be included as an appendix to your Status Report, or maintained in a separate document. Regardless of its location, detailed information should always be made available to the Project Team, and will be invaluable to you if your Project Sponsor requests clarification or more information.

The Project Manager should periodically assemble the Project Team to review the status of the project, discuss their accomplishments, and communicate any issues or concerns in an open, honest, constructive forum. These meetings are ideal opportunities for the Project Manager to gain insight into the day-to-day activities of Project Team members, especially if the team is large and individual interaction between the Project Manager and each team member is infrequent.

The Project Manager should determine the frequency of status meetings based upon the current state of the project and his/her good judgment. Weekly meetings may be sufficient during times of normal project activity, but during "crunch times" it may be necessary to gather more frequently. When a deadline is approaching and/or the Project Team appears to be under stress, consider holding a quick "sanity check" at the beginning of each day to ensure the team understands and remains focused on the important tasks for that day.

During the meeting the Project Manager should review the Project Schedule with the team and verify with each member the work that needs to be accomplished in upcoming weeks. Part of the meeting should focus on the team's Progress

Reports, to verify estimates to complete tasks and to discuss issues that may impact estimates. The Project Manager can then use information communicated during the Project Team meetings as input to the Status Report.

The regularly-scheduled Project Team meeting is also a good forum to recognize individual accomplishments, and to reward team members for outstanding work.

On large projects where gathering the entire team is prohibitive, Team Leaders can assemble the appropriate Project Team members for meetings. It will then be necessary for Team Leaders to meet regularly with the Project Manager to ensure all communication lines remain open.

As documents are gathered and generated during Project Execution, the Project Manager is responsible for filing them in the appropriate location in the project repository. The repository must be maintained on a continuous basis, as it represents a history of the project, from its inception through closure. It will be used as a reference manual throughout the project and should, therefore, be made available to every member of the Project Team. At a minimum, the Project Manager should make sure the following repository items are always current:

- Project Schedule, including any project financials
- Status Report, including:
  - Change control log
  - Issues log (open and closed)
  - Deliverable acceptance log
- Team member Progress Reports
- Team member timesheets, if used
- Risk Management Worksheet
- All correspondence, including any pivotal or decision-making memos, letters, email, etc.
- Meeting notes, results and/or actions

The project repository puts the history of the project at your fingertips, but only if it is kept up-to-date! It ensures project continuity even if the Project Manager gets promoted or reassigned.

4.4.5 Manage Organizational Change

During Project Planning, the Project Manager and Customer developed an Organizational Change Management Plan, taking into consideration the impact the product of the project will have on the Performing Organization.

During Project Execution, as the product is being produced, the Project Manager and Customer must evaluate the Organizational Change Management Plan documented during Project Planning to be sure it is still current. Because more information about the specific changes to the organization in terms of people, process and culture is known, it is quite likely that the plan will need to be adjusted and more details developed.

It is extremely important for the Project Manager and Project Sponsor to be actively involved in the change effort, and to proactively manage communications with the Performing Organization and Consumers. As specific changes are implemented in advance of and in preparation for the final product of the project, all involved parties must be made aware of the anticipated timing of events to give them ample time to prepare and participate as required.

Managing Organizational Change should include:

- **People:** Planned workforce changes must be executed in careful coordination with, and usually at the direction of, the Human Resource department of the Performing Organization, and in conjunction with appropriate labor/management practices. Specific changes in job duties, staff reductions or increases, and any changes in the organizational structure itself should be performed in accordance with the plan, and should include appropriate coordination and communication with union representatives and the external agencies involved. These agencies may include the Department of Civil Service and the Governor's Office of Employee Relations. The Project Manager must work with all of these organizations to

execute the changes as planned and scheduled, being sensitive to minimize any impact to them.

- **Process:** The redesign of existing business processes affected by the implementation of the product of the project, and the development of corresponding procedures, must be managed in coordination with product development. The redesigned processes and procedures must align with the product and associated changes. The implementation of the new processes, and any associated training or announcements regarding their introduction into the Performing Organization, must be integrated with the product implementation (to coincide with or precede the product, as appropriate). The Project Manager must manage these particular aspects of the schedule with diplomacy and tact. The active involvement of the Project Sponsor may be required as changes are implemented.
- **Culture:** Specific plans were developed based on the extent of the "culture shock" the product of the project was expected to introduce into the Performing Organization and its business strategy, established norms for performance, leadership approach, management style, approach to Customers, use of power, approach to decision making, and employee roles. Using the results of the assessment of the Performing Organization's "readiness for change," the Project Manager can develop more specific action plans to increase the organization's readiness and ability to adapt to the changes of the project. Most likely, these will include education and training events that can be targeted to specific audiences affected by the changes. The plans should provide information about the changes well in advance of implementation, so that affected Stakeholders have ample opportunity to express their concerns. To the greatest extent possible, the Stakeholders should be given a "preview" of how the product will actually work. They should also be given adequate training on how to adjust to change, how to work in the new environment, or similar "soft skills."

The Project Manager, with the active participation and support of the Customer and Project Sponsor, must be able to manage the specific activities that will adequately prepare the Performing Organization for the anticipated changes. (See Leading the Change Management Effort, Section II:2.2 for additional information on organizational change management.)

4.4.6 Manage the Project Team

In order to successfully meet the needs of a project, it is important to have a high-performing Project Team made up of individuals who are both technically skilled and motivated to contribute to the project's outcome. One of the many responsibilities of a Project Manager is to enhance the ability of each Project Team member to contribute to the project, while also fostering individual growth and accomplishment. At the same time, each individual must be encouraged to share ideas and work with others toward a common goal. The Project Manager, then, must be a leader, communicator, negotiator, influencer, and problem solver! The level of skills and competencies to successfully fill these roles helps distinguish good Project Managers from great ones. (See Section II:2, Leadership, for more information on Project Manager competencies.)

To maximize the successful performance of the Project Team, the Project Manager must do the following:

Execute the Training Plan

During Project Planning, the Project Manager evaluated the skills of each team member to determine whether he/she met the current and future needs of the project. For each team member requiring training, the Project Manager established a Training Plan. The Training Plan includes the method by which each team member will be trained, and the corresponding training schedule. During Project Execution, the Project Manager must review the contents of the Training Plan to be sure they are still applicable to the project. If additional training is necessary, it should be added to the plan. If it is determined that planned training is no longer necessary, it must be removed from the plan. If new team members have joined the project since the Training Plan was established, the Project Manager must evaluate the skill level of the new members to determine if additional training is needed. In all cases, training tasks must be added to or removed from both the Training Plan and the Project Schedule, since they will affect the end date of the project.

As training takes place during Project Execution, the Project Manager should update the Training Plan with the names of the trainees and actual training completion dates. This information will be used to measure the success of the Training Plan, and enable the Project Manager to provide input for evaluating team members and preparing staff performance appraisals. In addition, the Project Manager should mark the corresponding Project Schedule tasks as complete.

Allocate Work Properly and Ensure Accountability

A basic responsibility of the Project Manager is to assign work to the Project Team and ensure that the work is completed according to the Project Schedule. The Project Manager (or Team Leaders if the project is large) is responsible for allocating tasks to appropriate team members at the appropriate times. A good Project Manager establishes and maintains a Project Schedule that minimizes team member down time. Along with the Team Leaders, the Project Manager must continuously communicate to each member of the team what is required and by when, and then manage the performance of each team member in meeting the requirements.

Since the Project Manager is ultimately responsible for the success or failure of a project, he/she must direct Project Team endeavors and encourage team members to be accountable for their work. Accountability should be formally documented and measured through the use of team member Progress Reports. (See Figure 4-4, the New York State Progress Report.) But the Project Manager must also be willing to communicate face-to-face with the Project Team. Regular personal communication is one of the most effective ways to gather input on the status of project activities, discuss issues and concerns, recognize good work, encourage and provide support to team members who are struggling, and build relationships. It is also one of the primary ways to discover and take action to resolve team member performance issues.

Establish a Team Environment

Project Team members must learn to work together to achieve project goals. They must recognize that there is more to teamwork than simply having team members feel good about each other. High-performing Project Teams are disciplined. Team

members participate in all required meetings, are willing to suppress their egos for the good of the group, take their assigned tasks seriously, and continuously strive to improve their skills. High-performing Project Teams are either empowered to make decisions or are included in decision-making processes. This is the essence of project ownership.

Project Managers must develop sufficient management competencies to be able to create an environment that encourages team members to excel. The Project Manager may consider implementing some of the following:

- **Team-Building Activities** – these are actions taken specifically to improve the performance of the entire team. Activities can range from short items on a meeting agenda to extended, off-site professionally facilitated sessions. However implemented, team-building activities provide opportunities for team members to improve their interpersonal and working relationships.
- **Team Recognition and Rewards** – these are actions intended to promote, encourage, and reinforce desired behavior or exceptional performance. Frequently they are initiated by individuals at management level, but they are also very effective when initiated by an individual's peer. In all cases, recognition programs must be documented clearly enough so team members understand what level of performance warrants an award.

Don't underestimate the power of a box of donuts or a celebratory cake when the team reaches a major milestone!

The primary objective for establishing an appropriate team environment is to improve overall project performance. When team members are encouraged to do their best and are motivated about a project, they are more likely to do whatever is necessary to improve their individual skills so they are more efficient and effective in performing their assigned activities. And when team members understand the importance of interacting with each other, they are more willing to identify and proactively deal with conflict. Resolving issues early leaves team members more time for producing actual project work.

Manage Personnel Changes

All organizations change. Personnel may transfer to different assignments or leave their employers, new individuals may be added to a Project Team or Customer organization, or the nature of the project may change, forcing a change in project responsibilities or reporting structure. A successful Project Manager has a plan in place to minimize the effect these types of changes may have on the outcome of the project or the morale of the Project Team. At a minimum, this plan should describe what to do when there are changes to the Project Team, but it should also discuss the actions to take if the Customers change. The process may be formal or very informal, depending on the size and needs of the project. In all cases, changes to the Project Team or Customer will most likely require updates to the Project Schedule.

4.4.7 Manage Project Implementation and Transition

During Project Planning, the Project Manager formulated and documented a plan for implementing or deploying the product of the project, and for transitioning the responsibility for the outcome of the project from the Project Team to the Performing Organization. During Project Execution and Control, this Implementation and Transition Plan will be more fully developed as the product of the project is developed, and as specific activities in the plan are executed.

During Project Execution and Control, the Project Team will gain a better understanding of the impact the resulting product will have on the Performing Organization and Consumers. Activities begin that are required to prepare the Consumers to use the product, along with the tasks to prepare the Performing Organization to support it.

Managing Implementation and Transition includes:

- Monitoring and ensuring timely completion of all facilities issues, such as acquiring the necessary physical space, installing appropriate software, obtaining the appropriate building permits, etc.
- Coordinating Customer Acceptance Testing, including logistics of when and how Customers will test the product to confirm that it meets requirements before it is formally implemented and transitioned. Customer testing is one of the last opportunities for necessary changes to be

identified and made to the product before rollout. Time for sufficient Customer testing and any resulting rework that will affect the Project Team must be incorporated in the Project Schedule.

- Managing the steps that need to be taken to ensure Consumers will be ready to use the product once it is implemented. These steps must be coordinated with the Organizational Change Management Plan, and will include training and orientation on the use of the product. Any training for Customers or Consumers must be provided according to the plan and coordinated with other aspects of the implementation of the product.
- Managing the detailed implementation. The Project Manager must monitor implementation activities and make any necessary adjustments. The implementation will vary depending upon the needs of the Performing Organization and the product of the project. Some implementations are "done" at the flip of the final switch, such as opening a new highway, or publishing a book. Others are phased into implementation, like installing an inventory management system module-by-module, moving to a new building floor-by-floor, or implementing a new business process location-by-location.
- Managing the steps that need to be taken to ensure the appropriate individuals are ready to support the product once it has been implemented and is in use. This may include negotiating with various internal organizations to determine the appropriate timing of the transition of responsibility, assigning specific organizations and individuals to support the specific products, and providing necessary training. The Project Manager must carefully manage the point in implementation that the Performing Organization takes responsibility for production problems, "help" or trouble calls, and for resolving the problems, and ensure that all pre-requisites for transition have been met – for example, performance standards, quality standards, etc.
- Managing production of all necessary documentation. The Project Manager must ensure that all documents or records that will be provided with the product are produced. Examples of documentation include:
  - User manuals
  - On-line help
  - Assembly or usage instructions

Overall, the Project Manager must be sure each required activity is carried out according to the Implementation and Transition Plan and schedule, and to immediately communicate any discrepancies to the Project Sponsor.

Deliverable

- **Product of the Project** – at the end of Project Execution, all required deliverables as documented in the Project Plan have been produced by the Project Team and approved by the Project Sponsor. The product of the project, successfully transitioned from the Project Team to the Performing Organization, is the end result of Project Execution and Control.

4.5 GAIN PROJECT ACCEPTANCE

Purpose

The purpose of **Gain Project Acceptance** is to formally acknowledge that all deliverables produced during Project Execution and Control have been completed, tested, accepted, and approved by the project's Customers and the Project Sponsor, and that the product or service the project developed was successfully transitioned from the Project Team to the Performing Organization. Formal acceptance and approval also signify that the project is essentially over, and is ready for Project Closeout.

Roles

- Project Manager
- Project Sponsor
- Project Team Members
- Customer Representatives
- Customer Decision-Maker

Tasks

4.5.1 Conduct Final Status Meeting

Once the product of the project has been successfully transitioned to the Performing Organization, the Project Manager should prepare the final status report and conduct the final status meeting. The Project Schedule must be up to date for all completed project and project management lifecycle phases. This is the final opportunity for all participants to confirm that the product of the project has been successfully developed and transitioned. Any outstanding issues or action items must be transitioned from the Project Team to the Performing Organization.

The tasks to Gain Project Acceptance are:

4.5.2 Gain Acceptance Signature from Project Sponsor

As the deliverables of the project are produced and accepted, approval signatures are gained from the Project Sponsor and Customer Decision-Makers. Following the final status meeting, the Project Manager must obtain the Project Sponsor's signature one final time, indicating acceptance of the project to date, and indicating approval to proceed to Project Closeout. (See Figure 4-7, New York State Project Acceptance Form.) If the Project Sponsor does not accept the project, he/she must indicate the specific reason(s) for rejection. The Project Manager is then responsible for resolving the issues and seeking the Project Sponsor's acceptance again.

Deliverable

- **Signed Project Acceptance Form** – a formal document indicating Project Sponsor acceptance of all project deliverables and approval to proceed to Project Closeout.

Figure 4-6 New York State Project Acceptance Form

New York State
Project Acceptance Form

PROJECT IDENTIFICATION

Project Name: _____ Date: _____

Project Sponsor: _____ Project Manager: _____

*Enter the **Project Name**.*
*Enter the current **Date**.*
*Enter the name of the **Project Sponsor**.*
*Enter the name of the assigned **Project Manager**.*

PROJECT SPONSOR INFORMATION

Project Sponsor Name: _____

Action: Approve: ☐ Reject: ☐

Project Sponsor Comments:

Project Sponsor Signature: _____

Date: _____

*Provide the above information to the **Project Sponsor**. The Project Sponsor should either accept or reject the project and include any comments. If the Project Sponsor is rejecting the project, the reason for rejection must be provided. If the project is being approved, the Project Sponsor must sign the form and enter the **Date** approved.*

PROJECT MANAGER INFORMATION

_____
Name (Print)

_____ _____
Signature Date

*Once the project has been approved, the **Project Manager** should indicate agreement by providing a **Signature** and **Date**.*

Project Execution and Control End-of-Phase Checklist

How to Use

Use this checklist throughout Project Execution and Control to help ensure all requirements of the phase are met. As each item is completed, indicate its completion date. Use the Comments column to add information that may be helpful to you as you proceed through the project. If you elect NOT to complete an item on the checklist, indicate the reason and describe how the objectives of that item are otherwise being met.

Figure 4-7

Item Description	Page	Completion Date	Comments	Reason for NOT Completing
Conduct Execution and Control Kick-off	**204**			
Ensure team members have whatever is required to perform their tasks	204			
Meet with each team member to convey roles and responsibilities	204			
Distribute copies of all project materials and deliverables to all team members	205			
Hold orientation sessions for new members	205			
Review previous deliverables and components of Project Plan	205			
Schedule time and location of kick-off meeting	206			
Prepare materials for distribution at meeting	206			
Invite appropriate attendees	206			
Prepare meeting presentation and agenda	206			
Designate meeting scribe	206			
Conduct kick-off meeting	206			

Item Description	Page	Completion Date	Comments	Reason for NOT Completing
Distribute meeting notes to all attendees	206			
Update the project repository	206			
Manage CSSQ	**209**			
Update and analyze the Project Schedule as needed	211			
Conduct peer review of deliverables, if appropriate	215			
Implement quality checklists	216			
Conduct project audits	217			
Manage the budget by monitoring financial performance regularly	222			
Update project repository	222			
Monitor and Control Risks	**225**			
Review identified risks with Project Team and Project Sponsor	225			
Re-evaluate each risk	226			
Update Risk Management Worksheet regularly	226			
Execute contingency plans or modify them, if necessary	226			
Create new contingency plans to accommodate new risks	227			
Update project repository	227			
Manage Project Execution	**228**			
Execute change control process when necessary	228			
Gain acceptance and approval of all deliverables	231			
Identify and resolve issues, escalating them if necessary	234			
Provide timely communications according to Communications Plan	236			
Prepare Project Status Report regularly	237			

Item Description	Page	Completion Date	Comments	Reason for NOT Completing
Conduct status meeting with Project Sponsor regularly	238			
Ensure status meetings are being held with Project Team regularly	239			
Conduct training for support personnel	242			
Conduct training for Consumers	242			
Communicate rollout information	242			
Conduct training for Project Team members and update Training Plan	243			
Allocate and assign work to Project Team members	244			
Conduct team building activities	245			
Reward team members	245			
Manage Project Team member changes	246			
Manage changes to Customer's organization	246			
Acquire necessary physical space and equipment to support the product	246			
Transition product to Performing Organization	246			
Update the project repository	246			
Gain Project Acceptance	**248**			
Prepare final Status Report	249			
Prepare formal Project Acceptance Form	249			
Conduct final Status Meeting with Project Sponsor and present Project Acceptance Form	249			
Resolve any issues	249			
Gain final project acceptance signature from Project Sponsor	249			

Measurements of Success

The ultimate measurements of success for Project Execution and Control are the product acceptance by the Customer, and project acceptance by the Project Sponsor.

Meanwhile, the Project Manager can still assess how successfully the project is proceeding through Project Execution and Control by utilizing the measurement criteria outlined below. Because the processes in this phase (between Kick-off and Acceptance) are iterative, continuous and concurrent, the measurements for these processes need to be taken at regular intervals – probably coincidental with project status meetings. More than one "No" answer indicates a serious risk to the eventual success of your project.

Figure 4-8

Process	Measurements of Success	Yes	No
Conduct Project Execution and Control Kick-off	Did you receive confirmation from ALL Project Team members that they agree with their role descriptions, and that they understand and agree with the project objectives, risks and timetables as recorded in the kick-off meeting notes?		
Manage CSSQ	Do your team members agree that the estimates to complete for all open tasks are accurate?		
	Has your team implemented any "lessons learned" from either the peer review or the project audit process?		
	Is the Project Sponsor aware of the latest total current budget for the project?		
	Is your schedule current?		
Monitor and Control Risks	Have you adjusted the risk priority level for any risks on the Risk Management Worksheet?		
Manage Project Execution	Were all changes to the scope, schedule, cost or quality parameters of the project made with a signed Change Control Request?		
	Have all deliverables been presented to decision makers with prior preview of the deliverable in progress?		
	Is the deliverable approval cycle less than or equal to the period of time identified in the Acceptance Management Plan?		
	Are all project issues recorded in the Issue Log in the Project Status Report?		
	Is the Status Meeting being held as often as indicated in the Communications Plan?		
	If any Customer Decision-Makers are consistently absent from the status meetings, have they designated a replacement?		
	Are you confident that the organizational preparedness for the project is proceeding according to the plan you agreed to?		
	Are your team members showing no lost time in their Progress Reports?		
Gain Project Acceptance	Do you have a Project Acceptance Form signed by your Project Sponsor accepting the project?		

Phase Risks/Ways to Avoid Pitfalls

Project Execution and Control is where the rubber meets the road. In the immortal words of Yoda, it's "Do! Or do not! There is no try."

What are some of the key elements of Project Execution and Control that require the most attention? Not surprisingly, this phase has the most pitfalls and the most areas for consideration. The following table identifies processes and tasks which have pitfalls highlighted in this section.

Figure 4-9

Process	Task	Why is it important?
Manage CSSQ	Manage Project Schedule	Schedule slippage is the most visible sign of a project in trouble.
Manage Project Execution	Manage Issues	"That malfunctioning little #@?*!, this is all his fault." Maybe, maybe not. But it's still your responsibility to make sure the actual problem is fixed.
	Manage Acceptance of Deliverables	"Don't be too proud of this technological terror you've constructed." Your product is only as good as your Customer thinks it is.
	Execute Communications Plan	"Don't get technical with me!" Communicate with your Customers as you would have them communicate with you.
	Manage Organizational Change/Manage Product Implementation and Transition	You may have created the most awesome product in the known universe, but what good is it if the organization is not ready to utilize it?
	Manage the Project Team	"Who's the more foolish... the fool or the fool who follows him?" With some teams, it's hard to tell who's leading whom. Don't let that happen to you!

PITFALL #1 – YOUR SLIP IS SHOWING (OR YOU WISH YOU WERE A DAY LATE AND A DOLLAR SHORT!)

OK, the unthinkable has happened. Your project is actually behind schedule. Every week, something seems to happen, something quite outside everyone's control. You analyze, advise, reason, plead – and yet here you are, adjusting your deliverable dates once again. And the worst part of it is, deep down you really don't know why or, more importantly, what you can do about it.

Well, there is no need to panic. After all, you can always turn to the wise old Project Manager in the office across the hall who is ready and willing to help you, right? No? Oh well, then, you can always panic.

But before you do, let's figure out what's wrong. There may be myriad reasons why the schedule slips, but some of them are much more likely to occur than others. Broadly speaking, the fault may lie not in our stars, but in:

- Our customers. They love to change their minds – all the time!
- Our teammates. They may not be prepared, or may not have "the right stuff."
- Our environment. We may be camouflaged for desert warfare, but find ourselves fighting through the swamp.
- Our selves. In the final analysis, the buck always stops with the Project Manager. So whatever is going wrong – it's probably your fault (at least for not managing it properly!).

Now let's tackle each problem in turn, starting with the most likely one.

Problem: Management shortcomings.
Solution: C3PO said, "It's against my programming to impersonate a Deity!" But many Project Managers try, or feel they ought to. The tough part is that Project Manager's failures tend to disguise themselves as something else. When the Project Manager does not apply the right methodology to requirements gathering, and does not apply the right discipline to documenting its outcome, the result may appear to implicate Customers. When the Project Manager does not set up the right Project Team structure, and does not apply the right discipline to delivering assignments to all team members, the result may appear

to imply an incompetent Project Team. When the Project Manager does not select the right technology, or does not secure enough support from the Performing Organization, the result may appear to indicate an unfavorable environment.

But the odds are, when something is going wrong, you should "start with the man in the mirror and ask him to change his ways."

Problem: The requirements are not clear, or they are constantly changing.
Solution: Well, it takes no genius to realize that you can't hit a target you can't see or catch. But what can you DO about it? For starters, you need to figure out whether (a) the requirements were not defined clearly from the beginning or (b) the Customers keep changing their minds.

In the first case, you need to hit the brakes hard, and then redirect all resources at your command to re-define the requirements. Go back to the Customers, and re-confirm or figure out what it is they REALLY want. Since the original requirements-gathering process obviously did not work, first you need to analyze the way you went about gathering, defining and documenting the requirements, and try to improve it this time around.

In the second case, you need to have a chat with your Project Sponsor. Explain that by not sticking to their agreement (you do have their signature accepting the requirements, right?) the Customers are jeopardizing the project in all its parameters (Cost, Scope, Schedule and Quality), and, as a result, the Project Sponsor has essentially three options: (1) stop the requirements dithering, (2) expand the Project Budget to accommodate the process (warning: you will still need option 1 eventually!) or (3) cancel the project now (with small overruns) or later (with major overruns).

In either case, change control is key. As soon as you detect an increase in scope, even if you still don't know the full extent of it, you need to start the change control process. Remember that change control is not a bad thing; it's just a process to manage enhancements as well as risks and mistakes. Changes are often unavoidable, as in the case of legislative initiatives or technological advances, and change control serves as a mechanism to assure everyone is aware of and agrees to all deviations from the plan.

Problem: Project Team members don't produce.
Solution: First, check to make sure that the fault is not with the environment and/or management. It most probably is. But it just may be possible that your folks do not have the right skills, knowledge or tools to get the job done. Of course, that should be no surprise to you, and you should have had your team training plan going full swing, right? Well, nobody's perfect. The important thing to do is to separate what you can fix from what you can't. For example, if the folks do not have the right tools to do the job – that can be fixed, even if you have to go to the ends of the Earth to get them. Likewise, if the team members do not have the right knowledge – well, that can be fixed too, although by now it may be too late. But if you find that you are stuck with a turkey who just can't do the job, you have a bigger problem. The first thing to do is to try a variety of managerial approaches with the person. Everyone is different, and some people react to certain management styles better than others. But if after deploying your whole managerial repertoire the person still comes up short, the best thing to do is to consult with your manager, or another "seasoned" Project Manager, and understand how such situations have been handled in your organization in the past.

Problem: The project environment is not what you expected.
Solution: This problem can take one of two flavors. One, the Performing Organization may not be ready for your project, and is not providing you with the support infrastructure you require. Two, the technology you are trying to utilize is wrong, immature, or not properly implemented.

For the first eventuality, sound the alarms! This is when you need that Organizational Change Management Plan, and your Implementation and Transition Plan. You will need to have another one of those chats with your Project Sponsor. Explain how the team is doing all it can to deliver the product, but the support structure is failing you all around. Make specific suggestions as to what you need, and how it could be accomplished.

For the second eventuality, you must make a quick decision whether the technology can be fixed, or needs to be replaced. Some technological advances sound great in concept, but are just not ready for prime time. Try to avoid "bleeding edge" technologies altogether, but if you do get entangled in one, be ruthless – going back and retracing your steps using an older, less sexy but more stable technology may pay off in productivity gains for the rest of the project, compared with slugging through the immature mire of somebody's half-baked product.

PITFALL #2 – YOU DROP THE ISSUE BALL

In the course of the project, many issues come up. By definition, issues have a potentially adverse impact on the project's CSSQ. Most of them are solved internally, within the Project Team, but some require actions or decisions on the part of other players with whom you may have little influence.

The important fact to remember is that project issues are the Project Manager's responsibility. No matter how clear you are in communicating the issue, no matter how little say you have in its resolution – it remains your responsibility. Identifying another person as a party who can resolve the issue does not abdicate your responsibility to follow it through. Even obtaining consensus that another agency unit should, or a promise that they would, resolve it does not remove your obligation to track the issue to a successful conclusion.

One of the most natural pitfalls is to assume that once you have successfully convinced everyone that someone else has to solve the issue, you are done. On the contrary! Because it is now out of your control, you must be all the more dogged in the pursuit of its resolution. Tell the responsible parties that you're not going away. Keep asking them what you can do to help get the issue resolved, but keep tracking their progress – or lack thereof – on your status reports. Use all the tools in the project Communications Plan to continuously shine light on the issue.

PITFALL #3 – YOU FALL INTO THE PROJECT BLACK BOX

Scene 1 – You employ the latest facilitation techniques to extract all possible requirements from your Customers, even requirements they did not know they had.

Scene 2 – Your team performs wonders to design the perfect product, exactly as the Customers requested, and works like the dickens to develop it exactly as envisioned.

Scene 3 – You beam with pride as you deliver your masterpiece to an eager Customer.

Scene 4 – You slink away in shame as the Customer continues to rant and rave about all the features that the product does not have even though they told you about them all along.

What happened? You "black-boxed" your project. The Customers saw you when you were gathering the requirements. Then you and your team went away into the project black box, and only came out in time to show the Customer the finished product. The problem is, things changed in the interim! The Customer cast of characters may have changed. The business conditions may have changed. The expectations may have changed. And you did not keep in synch. Worse, you did not keep your Customers in synch with your project. You just assumed that because you are giving your Customers exactly what they originally asked for, they would like it. But you know what happens when you assume.

The simple remedy for the black box phenomenon is keeping the Customers involved every step of the way. You should constantly show select Customers project deliverables as they are being developed. Not so they can change their minds but so they know what to expect on delivery. You certainly want to minimize the number of decision-makers who will accept and sign off on your deliverables (chasing signatures of more than a couple of people is a pain) but you want to maximize the number of people who review, or even preview your stuff.

PITFALL #4 – YOU REMAIN INCOMMUNICADO

Once the project really gets going in Project Execution, it is very easy to focus internally – on Project Team dynamics, on technical challenges, on deliverables and schedules – to the exclusion of everything else; yet it is also important to pay attention to the externals. **After all, as Project Manager, you are the main link between the project cocoon and the big world outside.**

Executing all aspects of your Communications Plan is your responsibility, and nothing is more important than accurate and frequent status reporting. A Project Status Report is the most effective way for all Stakeholders to remain closely connected to and aware of the project's progress – and potential problems.

The two most important questions the Project Status Report must answer are:

1. What is the latest, best available estimate for the remaining work, and how does it compare with the schedule?

2. What issues have come up that may affect the project Cost, Scope, Schedule, or Quality, and what is being done about them?

These questions are far more important to the eventual success of the project, and to minimizing surprises along the way, than the usual dissertations on project status and enumerations of immediate tasks at various levels – not that the status report should not include them. But after collecting, analyzing and evaluating the status information, the Project Manager's job is to make decisions or suggestions regarding changes to be made – if necessary – to keep the project on track.

Of course, the best status report in the world will make no impact if there is no one there to hear it. A regularly scheduled status meeting, attended by as many members of the Project Team as practical, dedicated to a thorough review of the status report, is irreplaceable.

PITFALL #5 – YOU CONFUSE DESIRE WITH ABILITY

Your customers sincerely want what your project is developing. They demonstrated their desire for it by committing funds to the project; by allocating resources to the Project Team; and by devoting time to meetings, reviews, and other project-related activities. And yet they may be totally unprepared to actually make use of it, or even to implement it at all.

But whose fault do you think it will be when they realize their inability to utilize it? That's right, yours. So it is up to you to make sure that someone determines organizational readiness for the product or service, and that someone prepares for a smooth transition of the product from the Project Team to the Performing Organization. Notice that it does not say you have to do it – just that you have to make sure it gets done. And that requires including in the Project Plan that organizational readiness assessment and transition planning need to be done.

PITFALL #6 – THEY BLINDED YOU WITH SCIENCE (OR TECHNOLOGY)

There is no law that says that a Project Manager must be a master of whatever technology the project employs. Nevertheless, you will be called upon to manage numerous technical decisions on the project.

A frequent pitfall in those circumstances is over-delegating those decisions to the more technical members of the team, or accepting the recommendations of your technical experts on blind faith, both of which result in unacceptable loss of control. Instead, make the team explain the issue and alternative solutions to you. As a reasonably intelligent person, you should be able to understand the concepts by listening and asking questions. If, however, the technical folks can't explain to your satisfaction why they are advocating a certain position – watch out! It is indicative of a position dictated more by desire than by reason, or of poor understanding on the part of the supposed experts. Get a second opinion, and trust your own instincts.

PITFALL #7 – THE ENDLESS APPROVAL CYCLE LEADS YOU BY THE NOSE

You thought you were smart. You thought you were ready. You knew how finicky your Customer was, so you built into your schedule not one, not two, but three approval cycles – one for an informal pre-screen, one for a formal review, and the last one for formal approval. You built in time for re-work based on the review. You even indicated in your acceptance parameters that you were only willing to wait so many days for the approval. Yet here you are, a month and a half past the first scheduled deliverable – which your team presented right on time – and you still don't have the proper signatures on the approval form. What happened?

Any of a number of things. You may be stuck in a never-ending fine-tuning cycle (that's like hanging a picture for your mother-in-law: "A little more to the left. No, that's too far! Back a bit to the right. Hmm… How about a little higher? No, that's too high!" etc., etc.) Or you may be chasing signatures in a circle, with every person telling you that he can't sign until the other person does (that's like trying to solve a problem with your PC: "Install an updated driver before we swap the modem" – "No, flash the chip set before we upgrade the driver" – "No, update the operating system first!" – "Looks like you need to replace the motherboard.") Or the exalted Grand Poobah of the

Customer tribe may just be too busy to pay any attention to your puny little project.

But the common thread among all the possibilities is that you are just being too darned nice. You may have said that you would only allow five business days for deliverable approval, but what do you do after the five days expire? You may have asked for particular signatures on the approval form, but what do you do if the signatures do not appear?

You fight the approval war on two levels: tactical, and operational. Tactically, you should use two weapons: status report and change control. Highlight the acceptance cycle in your Status Report, and start the change control process when your criteria are not met. Be tough, and insist on the rules being followed. And finally, from the operational perspective, you should just make such a nuisance of yourself that the approvers would sign anything rather than be pestered by you again.

Frequently Asked Questions

How can a Project Manager manage the Project Schedule if team members don't accurately report when they are behind?

The key to accurate forecasting and precise reporting is the "Estimate to Complete" column on the Progress Report. The team members don't have to report that they are behind; you (and most likely, your team leaders) need to make sure that they come up with an accurate estimate to complete, and the math will tell you the rest. How do you know if their estimate is accurate? Unless you (or your team leader) are involved in the details of the task, and understand the technology used to perform it, you won't – the first time.

By next time, you will know the team member's bias – unbridled optimism (forecasting too little), gloomy pessimism (forecasting way too much) or random don't-have-a-clueism (forecasting erratically), so you can "guide" them to a better estimate and then hold them accountable for it.

The thing to remember is, you can't just take what you're given. You have to question the estimate to complete, you have to compare it with other tasks, and you have to get it to the point where all of you are comfortable with it.

5 PROJECT CLOSEOUT

Purpose

The purpose of Project Closeout is to assess the project and derive any lessons learned and best practices to be applied to future projects.

Project Closeout begins with a Post-Implementation Review. The review may start with a survey designed to solicit feedback on the project from the Project Team, Customers, Consumers and other stakeholders. Once feedback has been collected and evaluated, an assessment meeting is conducted to derive best practices and formulate lessons learned to inform future efforts. Ideally, the best practices and lessons learned should be stored in a centralized organizational repository, facilitating access and retrieval by managers of future projects.

Project Closeout ends with administrative closeout – providing feedback on Project Team members, updating the skills inventory, capturing key project metrics, and filing all pertinent project materials into the project repository.

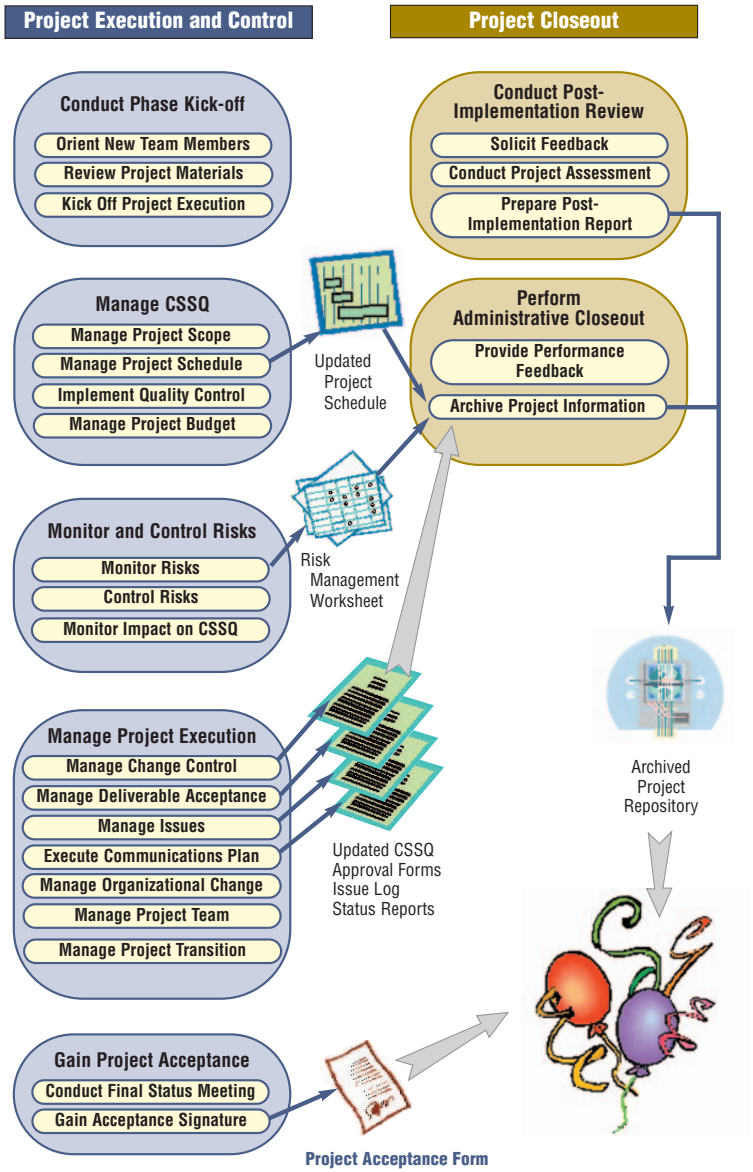
List of Processes

This phase consists of the following processes:

- **Conduct Post-Implementation Review,** where the Project Manager assesses the results of the project by soliciting feedback from team members, customers and other stakeholders through the use of a survey to gather lessons learned, best practices and performance patterns or trends, and communicate those results in the form of a Post-Implementation Report.
- **Perform Administrative Closeout,** where the Project Manager formally closes the project by providing performance feedback to team members, and archiving all project information.

The following chart illustrates all of the processes and deliverables of this phase in the context of the project management lifecycle.

Figure 5-1


Project Execution and Control
Project Closeout
Conduct Phase Kick-off
Orient New Team Members
Review Project Materials
Kick Off Project Execution
Conduct Post-Implementation Review
Solicit Feedback
Conduct Project Assessment
Prepare Post-Implementation Report
Manage CSSQ
Manage Project Scope
Manage Project Schedule
Implement Quality Control
Manage Project Budget
Updated Project Schedule
Perform Administrative Closeout
Provide Performance Feedback
Archive Project Information
Monitor and Control Risks
Monitor Risks
Control Risks
Monitor Impact on CSSQ
Risk Management Worksheet
Archived Project Repository
Manage Project Execution
Manage Change Control
Manage Deliverable Acceptance
Manage Issues
Execute Communications Plan
Manage Organizational Change
Manage Project Team
Manage Project Transition
Updated CSSQ
Approval Forms
Issue Log
Status Reports
Gain Project Acceptance
Conduct Final Status Meeting
Gain Acceptance Signature
Project Acceptance Form

List of Roles

The following roles are involved in carrying out the processes of this phase. The detailed descriptions of these roles can be found in the Section I Introduction.

- Project Manager
- Project Sponsor
- Project Team Member
- Customer
- Consumer
- Internal Stakeholders
- External Stakeholders
- Performing Organization Management

List of Deliverables

The major outcome of this phase is the Post-Implementation Report, which formalizes the feedback received from all involved parties, and identifies best practices and lessons learned. The output from the tasks performed as part of conducting a Post-Implementation Review serves as the building blocks for the report.

Of even more importance is the transfer of lessons learned and best practices from the Post-Implementation Report to an organizational repository of project management data.

The final deliverable of this phase is the Archived Project Repository.

The following table lists all Project Closeout processes, tasks and their deliverables.

Figure 5-2

Processes	Tasks	Task Deliverables *(Outcomes)*
Conduct Post-Implementation Review	Solicit Feedback	*Post-Implementation Survey*
	Conduct Project Assessment	*Project Assessment Meeting*
	Prepare Post-Implementation Report	*Post-Implementation Report*
Perform Administrative Closeout	Update Skills Inventory and Provide Performance Feedback	*Updated Skills Inventory* *Performance Feedback*
	Archive Project Information	Archived Project Repository

5.1 CONDUCT POST-IMPLEMENTATION REVIEW

Purpose

A project is considered complete when it has been successfully implemented and transitioned to the Performing Organization and approved by the Project Sponsor. At this point in the project management lifecycle, the responsibilities of the Project Manager are to assess how closely the project met Customer needs, highlight what worked well, learn from mistakes made during the project, identify patterns and trends, derive ways to improve upon processes executed throughout the project, and, most importantly, communicate results. The purpose of **Conduct Post-Implementation Review** is to gather the information required to meet those responsibilities, and to present the information in a Post-Implementation Report.

Roles

- Project Manager
- Project Team Members
- Project Sponsor
- Customers
- Consumers

Tasks

5.1.1 Solicit Feedback

The most important measures of the success of a project are whether the product was developed and delivered successfully and how well the needs of the Customers have been met. The most effective way to determine these measures is to Solicit Feedback.

The tasks executed in support of Conduct Post-Implementation Review are:

- 5.1.1 Solicit Feedback
- 5.1.2 Conduct Project Assessment
- 5.1.3 Prepare Post-Implementation Report

The Project Manager should gather feedback using a survey appropriate to the project. Depending on the size and type of the project and the structure of the Performing Organization, different surveys may be required for different stakeholder groups, and surveys will need to be distributed to the appropriate individuals. At a minimum, feedback should be solicited from the Project Sponsor and Project Team members who performed the tasks in the Project Schedule. The Project Manager should determine if surveys should also be given to Customer Representatives,

Consumers, or other stakeholders in order to collect sufficient information for assessing the success of the project in meeting its goals and their needs. The survey must also assess the outcome of the project and the performance of the Project Team and Performing Organization. The Project Manager must stress to all survey participants the importance of their honest feedback as one of the primary mechanisms for assessing the project's performance.

It is very important to solicit feedback from the Project Team. Because they have a different point of view from that of Customers and Consumers, Project Team members provide an "inside look" at the way the project was executed. They are also an important resource for communicating lessons learned and best practices.

The written survey should be distributed, in either electronic or hard copy form, with a specific due date for its completion. The Project Manager should follow up if the survey is not returned on time. If distribution is extensive, it may be helpful to keep a list of to whom and when the survey was sent and returned.

The Project Manager also has the option of conducting a survey in person or over the telephone. An interview survey can often be more effective than a written one. While those responding to a written survey are limited to answering the questions as they are written, an intuitive Project Manager will be able to expand upon the verbal responses of the survey participant, gathering information that might otherwise not be uncovered. In some cases, however, participants may be reluctant to disclose information as honestly in person. The Project Manager may not be the appropriate person to administer the survey interview to some Stakeholder groups.

It is also important to obtain feedback on the performance of the Project Manager! The Project Manager's immediate supervisor, or an individual in a similar capacity, needs to take responsibility for obtaining honest feedback from the Project Sponsor, Customer, and Project Team.

Figure 5-3, New York State Project Post-Implementation Survey, provides an example of a feedback survey. Each project is unique and questions should be tailored to address the specific project and the intended audience.

Figure 5-3 New York State Project Post-Implementation Survey

New York State
Project Post-Implementation Survey

Since every group involved in the project experiences it from a different perspective, survey questions should be tailored to the particular expectations of key groups identified in Project Roles and Responsibilities. These evaluations should apply not only to the execution of the project, but also to satisfaction with the project's product (or service), and with the support the Performing Organization provided to the Project Team.

The following survey is intended as a guideline, and provides sample questions that may be asked as part of soliciting feedback. The Project Manager should review the questions to determine which to include for the selected target audience. The respondents should be encouraged to provide not only a numerical rating (with 1=Not at All, or Poor, 2=Adequate, or Satisfactory, 3=To a great extent, or Excellent), but also their comments as to what worked well, what could have been done better, and recommendations for conducting future projects.

GENERAL INFORMATION

Project Name: _____ Date: _____

Your Name: _____ Your Performing Organization: _____

Your Role on the Project: _____ Dates of Your Involvement: _____

Questions	Rating (1-3)	Comments (What worked well? What could have been done better? What recommendations do you have for future projects?)
PRODUCT EFFECTIVENESS		
How well does the product or service of the project meet the stated needs of the Performing Organization?		
How well does the product or service of the project meet your needs?		
When initially implemented, how well did the product or service of the project meet the stated needs of the Performing Organization?		
To what extent were the objectives and goals outlined in the Business Case met?		
What is your overall assessment of the outcome of this project?		

Figure 5-3 (Continued)

New York State
Project Post-Implementation Survey

Questions	Rating (1-3)	Comments (What worked well? What could have been done better? What recommendations do you have for future projects?)
CSSQ MANAGEMENT		
How well did the scope of the project match what was defined in the Project Proposal?		
How satisfied are you with your involvement in the development and/or review of the Project Scope during Project Initiation and Planning?		
Was the Change Control process properly invoked to manage changes to Cost, Scope, Schedule, or Quality?		
Were changes to Cost, Scope, Schedule, or Quality, effectively managed?		
Was the established change budget adequate?		
As project performance validated or challenged estimates, were the estimates effectively revised and the current and future tasks re-scheduled?		
How closely does the initial Project Schedule compare with the actual schedule?		
How did the estimated Project Budget compare with the total actual expenditure?		
How effectively was the Quality Management Plan applied during Project Execution?		
How effective was the quality assurance process?		
How effective were project audits?		
How effective was the utilization of Best Practices from prior projects in the Performing Organization?		
RISK MANAGEMENT		
How well were team members involved in the risk identification and mitigation planning process?		

Figure 5-3 (Continued)

New York State
Project Post-Implementation Survey

Questions	Rating (1-3)	Comments (What worked well? What could have been done better? What recommendations do you have for future projects?)
RISK MANAGEMENT (Continued)		
To what extent was the evolution of risks communicated?		
How accurate were the risk probabilities on the Risk Management Worksheet?		
How effectively was the Risk Management Worksheet updated or reviewed?		
How comprehensive was the Risk Management Worksheet? (i.e. did many events occur that were never identified?)		
COMMUNICATIONS MANAGEMENT		
How effective were the informational materials available to orient team members?		
How satisfied were you with the kick-off meetings you participated in?		
How effectively were the project team meetings conducted?		
How effectively and timely were Progress Reports provided by Team Members to the Project Manager?		
How effectively were stakeholders involved in the project?		
Was communication with stakeholders adequate?		
How well were your expectations met regarding the frequency and content of information conveyed to you by the Project Manager?		
How well was project status communicated throughout your involvement in the project?		
How well were project issues communicated throughout your involvement in the project?		
How well did the Project Manager respond to your questions or comments related to the project?		

Figure 5-3 (Continued)

New York State
Project Post-Implementation Survey

Questions	Rating (1-3)	Comments (What worked well? What could have been done better? What recommendations do you have for future projects?)
COMMUNICATIONS MANAGEMENT (Continued)		
How useful was the format and content of the Project Status Report to you?		
How useful and complete was the project repository?		
ACCEPTANCE MANAGEMENT		
How effective was the acceptance management process?		
How well prepared were you to receive project deliverables?		
How well defined was the acceptance criteria for project deliverables?		
Was sufficient time allocated to review project deliverables?		
How closely did deliverables match what was defined within Project Scope?		
How complete/effective were the materials you were provided in order to make a decision to proceed from one project lifecycle phase to the next? If materials were lacking, please elaborate.		
ORGANIZATIONAL CHANGE MANAGEMENT		
How effectively and timely was the organizational change impact identified and planned for?		
How pro-active was the Organizational Change Management Plan?		
Was sufficient advance training conducted/ information provided to enable those affected by the changes to adjust to and accommodate them?		

Figure 5-3 (Continued)

New York State
Project Post-Implementation Survey

Questions	Rating (1-3)	Comments (What worked well? What could have been done better? What recommendations do you have for future projects?)
ORGANIZATIONAL CHANGE MANAGEMENT (Continued)		
Overall, how effective were the efforts to prepare you and your organization for the impact of the product/service of the project?		
How effective were the techniques used to prepare you and your organization for the impact of the changes brought about by the product or service of the project?		
ISSUES MANAGEMENT		
How effectively were issues managed on the project?		
How effectively were issues resolved before escalation was necessary?		
If issue escalation was required, how effectively were issues resolved?		
How effectively were issues able to be resolved without impacting the Project Schedule or Budget?		
PROJECT IMPLEMENTATION & SUPPORT		
How effective was the documentation that you received with the project product/service?		
How effective was the training you received in preparation for the use of the product/service?		
How useful was the content of the training you received in preparation for the use of the product/service?		
How timely was the training you received in preparation for the use of the product/service?		

Figure 5-3 (Continued)

New York State
Project Post-Implementation Survey

Questions	Rating (1-3)	Comments (What worked well? What could have been done better? What recommendations do you have for future projects?)
PROJECT IMPLEMENTATION & SUPPORT (Continued)		
How effective was the support you received during implementation of the product/service?		
PERFORMANCE OF THE PERFORMING ORGANIZATION		
How effectively and consistently was sponsorship for the project conveyed?		
How smooth was the transition of support from the Project Team to the Performing Organization?		
Was there a qualitative difference in the level of support provided by the Project Team during implementation and by the Performing Organization after transition?		
Did the Project Team adequately plan for and prepare the Performing Organization for its ongoing responsibilities for the product or service of the project?		
PERFORMANCE OF THE PROJECT TEAM		
Overall, how effective was the performance of the Project Manager?		
How well did the Project Team understand the expectations of their specific roles and responsibilities?		
How well were your expectations met regarding the extent of your involvement in the project (effort time commitments etc.)?		
How effective was each Project Team member in fulfilling his/her role?		
How effective was team member training?		

Figure 5-3 (Continued)

New York State
Project Post-Implementation Survey

GENERAL QUESTIONS

Question	Response
What were the most significant issues on this project?	
What were the lessons learned on this project?	
What on the project worked well and was effective in the delivery of the product?	
What other questions should we have asked? What other information would you like to provide to us about this project?	

Once survey feedback has been collected, the Project Manager must review, analyze, and summarize the results for presentation at the Project Assessment Meeting.

The following is a suggested list of categories to use when compiling survey information:

- Product Effectiveness
- CSSQ Management
- Risk Management
- Communications Management
- Acceptance Management
- Organizational Change Management
- Issues Management
- Project Implementation and Transition
- Performance of Performing Organization
- Performance of Project Team

Summarized feedback will be used during the Project Assessment Meeting as a starting point for identifying lessons learned and best practices to use in future projects. It will also be included in the Post-Implementation Report created at the end of Project Closeout.

A project may come in on time, under budget, and meeting all defined quality standards. Every deliverable may have been 100% error free and perfectly consistent with the Project Scope. BUT, if the Customer is not satisfied with the outcome, the project cannot be considered a success!

5.1.2 Conduct Project Assessment

The goal of this task is for the Project Manager to meet with select members of the Project Team and stakeholder community to present the summarized results of the feedback surveys, discuss all other aspects of the completed project, gain consensus on what was successful and what was not, and derive best practices and lessons learned.

In addition to the Project Team, the Project Manager should consider inviting Project Managers from the Performing Organization with experience on similar projects. Based on experience and prior knowledge, other Project Managers can provide information and insight on the assessment process. It is a good idea for the Project Manager to distribute the summarized survey results to each participant in advance of the Project Assessment Meeting, to allow them to come prepared to address the contents.

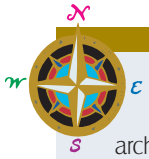
In order to provide the best possible products and services to Customers, Performing Organization Management must strive to continuously improve the way New York State projects are managed and products are delivered. During the course of the assessment meeting, participants will consider the summarized feedback results and the experience of the Project Managers in attendance to discuss and assess the performance of the project. Based upon these discussions, the group will identify and agree upon lessons learned. These lessons will not only benefit the current Project Team, they will also help managers and team members of similar projects. The lessons may be positive or negative. Lessons learned must not simply be identified during the meeting. It is also important to document each one and develop an action plan describing when and how they might be implemented within the Performing Organization.

During the course of the project, the Project Manager, Customer, and Project Team members most likely recognized certain procedures that, when exercised, improved the production of a deliverable, streamlined a process, or suggested ways to improve standardized templates. Best practices are documented as part of the Project Assessment Meeting and later shared with other Project Managers so they can be repeated. In some cases, the outstanding “successes” might be translated into new procedures to be followed by future projects.

5.1.3 Prepare Post-Implementation Report

After the Project Assessment Meeting, the Project Manager prepares a Post-Implementation Report. In the report, the Project Manager distills information gleaned from the discussion and organizes it according to the feedback categories described above, adding information on key project metrics. The report documents the effectiveness of the product in meeting the needs of the Customer, the effectiveness of project management and the Project Team, how well the Performing Organization supported the project, lessons learned, best practices to be used in future projects, and the key project metrics that will enable the Performing Organization to compare success measures across projects. It also contains recommendations for improvement to be used by other projects of similar size and scope. (see Figure 5-4, the New York State Project Post-Implementation Report) During Perform Administrative Closeout, the report is archived in the project repository.

The Project Manager must present or distribute the Post-Implementation Report to members of the Performing Organization. In Performing Organizations that undertake many projects, it is most effective to assign an individual or agency unit to take ownership of collecting and organizing the information, teaching the lessons learned, and implementing the best practices throughout the organization.



A central repository, owned and maintained by someone within your Performing Organization, provides a place where lessons learned and best practices can be archived for use by all Project Managers in the organization. Over time, as more and more information is added, it will become part of an invaluable knowledge base that, when leveraged, will translate into tremendous improvements on all New York State projects!

The New York State Office for Technology would appreciate receiving a copy of the Post-Implementation Report for any project guided by this methodology. Lessons learned and best practices from a variety of New York State projects will contribute to the continuous improvement of this *Guidebook*.

Figure 5-4 New York State Project Post-Implementation Report

New York State
Project Post-Implementation Report

PROJECT IDENTIFICATION

Project Name: _____ Date: _____

Project Sponsor: _____ Project Manager: _____

Report Prepared By: _____

*Enter the **Project Name**.*
*Enter the current **Date**.*
*Enter the name of the assigned **Project Sponsor** and **Project Manager**.*
Enter the name of the individual who prepared the report.

CATEGORIES: Categories of the report correspond to the categories in the Project Post-Implementation Survey.

For each category, the Overall Rating is the average of the ratings provided on completed survey forms for that category (1=Not at All, or Poor, 2=Adequately, or Satisfactory, 3=To a great extent, or Excellent)

A. PROJECT EFFECTIVENESS

Summarize how effectively the product or service met the needs of the Customer, Consumer, and the Performing Organization.

Highlight specific product performance metrics.

Identify and discuss "outliers" – specific Stakeholder groups dissatisfied with the project outcome, or those wildly enthusiastic about it.

Identify and discuss specific issues.

_____

Overall Survey Rating:

Figure 5-4 (Continued)

New York State
Project Post-Implementation Report

B. CSSQ MANAGEMENT

*Summarize effectiveness of **CSSQ Management** throughout the project.*

Highlight significance of approved changes to the original project scope, and how they were managed.

*Compare the baseline versions of the **Project Schedule** and **Budget** to the final versions. Describe discrepancies.*

Summarize deliverables compliance with defined quality standards.

Identify and discuss "outliers" – specific Stakeholder groups dissatisfied with the CSSQ management process, or those wildly enthusiastic about it.

Identify and discuss specific issues.

_____

Overall Survey Rating:

C. RISK MANAGEMENT

*Summarize effectiveness of **Risk Management** throughout the project.*

Highlight significant identified risks that actually occurred, and the effectiveness of the mitigation plan.

Identify and discuss "outliers" – specific Stakeholder groups dissatisfied with the Risk Management process, or those wildly enthusiastic about it.

Identify and discuss specific issues.

_____

Overall Survey Rating:

D. COMMUNICATIONS

*Summarize the effectiveness of the **Communications Plan** developed for the project.*

Highlight significant communication activities that were particularly effective.

Identify and discuss "outliers" – specific Stakeholder groups dissatisfied with the Project Communications process, or those wildly enthusiastic about it.

Identify and discuss specific issues.

_____

Overall Survey Rating:

Figure 5-4 (Continued)

New York State
Project Post-Implementation Report

E. ACCEPTANCE MANAGEMENT

*Summarize effectiveness of **Acceptance Management** throughout the project.*

Highlight significant deliverables and the effectiveness of the Acceptance Plan for those deliverables.

Identify and discuss "outliers" – specific Stakeholder groups dissatisfied with the Acceptance Management process, or those wildly enthusiastic about it.

Identify and discuss specific issues.

_____

Overall Survey Rating:

F. ORGANIZATIONAL CHANGE MANAGEMENT

*Summarize effectiveness of **Organizational Change Management** throughout the project.*

Highlight significant Change Management impacts and the effectiveness of the Organizational Change Management activities planned and executed for those impacts

Identify and discuss "outliers" – specific Stakeholder groups dissatisfied with the Organizational Change Management process, or those wildly enthusiastic about it.

Identify and discuss specific issues.

_____

Overall Survey Rating:

G. ISSUES MANAGEMENT

*Summarize effectiveness of **Issues Management** throughout the project.*

Highlight significant issues and the effectiveness of the Issues Management process for those issues

Identify and discuss "outliers" – specific Stakeholder groups dissatisfied with the Issues Management process, or those wildly enthusiastic about it.

Were issues resolved before change control was needed?

_____

Overall Survey Rating:

Figure 5-4 (Continued)

New York State
Project Post-Implementation Report

H. PROJECT IMPLEMENTATION AND TRANSITION

*Summarize effectiveness of the **Project Implementation and Transition**.*

Highlight significant milestones of the implementation and transition, and the effectiveness of the activities planned and executed for those milestones.

Identify and discuss "outliers" – specific Stakeholder groups dissatisfied with the Implementation and Transition process, or those wildly enthusiastic about it.

Identify and discuss specific issues.

Overall Survey Rating:

I. PERFORMANCE OF PERFORMING ORGANIZATION

*Summarize effectiveness of the **Performing Organization** within the context of this project.*

Highlight significant responsibilities of the Performing Organization, and the effectiveness of the Performing Organization in accomplishing them.

Identify and discuss "outliers" – specific Stakeholder groups dissatisfied with the performance of the Performing Organization, or those wildly enthusiastic about it.

Identify and discuss specific issues.

Overall Survey Rating:

J. PERFORMANCE OF PROJECT TEAM

*Summarize effectiveness of the **Project Team** within the context of this project.*

Highlight significant responsibilities of the Project Team, and the effectiveness of the Team in accomplishing them.

Identify and discuss "outliers" – specific Stakeholder groups dissatisfied with the performance of the Project Team, or those wildly enthusiastic about it.

Identify and discuss specific issues.

Overall Survey Rating:

Figure 5-4 (Continued)

New York State
Project Post-Implementation Report

K. KEY PROJECT METRICS

COST

Percent difference between the final cost, final approved baseline cost estimate, and the original cost estimate.

Number of approved changes made to the original budget.

Number of "re-baselined" budget estimates performed .

SCHEDULE

Number of milestones in baseline schedule.

Number of baseline milestones delivered on time (according to last baselined schedule).

Difference in elapsed time of original schedule and final actual schedule.

Difference in elapsed time of final baseline and final actual schedule.

SCOPE

Number of baseline deliverables.

Number of deliverables delivered at project completion.

Number of scope changes in the post-planning phases.

QUALITY

Number of defects/quality issues identified after delivery.

Number of success measures identified in the Business Case that were satisfied or achieved at project completion.

5.2 PERFORM ADMINISTRATIVE CLOSEOUT

Purpose

The purpose of **Perform Administrative Closeout** is to perform all administrative tasks required to bring the project to an official close.

Roles

- Project Manager
- Team Leader

Tasks

5.2.1 Update Skills Inventory and Provide Performance Feedback

The tasks executed in support of Perform Administrative Closeout are:

- 5.2.1 Update Skills Inventory and Provide Performance Feedback
- 5.2.2 Archive Project Information

During the course of the project, Project Team members most likely enhanced their current skills or obtained new ones. The investment made in improving an individual's skills should not be lost. In order to leverage skills on future projects, and to facilitate and encourage individual growth, the Project Manager should maintain a record of the skills developed and used on the project. If a skills inventory exists within the Performing Organization, the Project Manager or Team Leader must be sure each Project Team member takes the time to update it with any skills newly developed and any new project roles that were assumed. An up-to-date inventory will become invaluable to future Project Managers when attempting to appropriately staff their projects. It can also be used as input for an individual's immediate supervisor when providing performance feedback.

If no skills inventory exists within a Performing Organization, the Project Manager should encourage the Performing Organization to implement one. The inventory can be as simple as a hardcopy list, or as sophisticated as an electronic skills database, depending upon the needs and desires of the organization.

The Project Manager and/or Team Leader must also take the time to document their feedback on the accomplishments and performance of each Project Team member. As the person most aware of the day-to-day activities performed by the Project Team, the Team Leader or Project Manager is the most appropriate person to provide honest and accurate feedback. Feedback documentation should be prepared and reviewed with the individual team members first. Following this performance discussion, the documentation is submitted promptly to each Project Team member's immediate supervisor to be used as input to performance appraisals. The performance feedback mechanisms (appraisal forms, project exit interviews, etc.) specific to the Performing Organization should be used.

5.2.2 Archive Project Information

Throughout the course of the project, the Project Manager maintained a project repository. As the project progressed, the purpose of the repository was to create a central point of reference for all project materials to be used by anyone involved in the project. Once the project comes to an official close, the repository provides an audit trail documenting the history and evolution of the project.

During Project Closeout, the Project Manager should examine the repository to ensure that all relevant project-related material, documents produced, decisions made, issues raised and correspondence exchanged have been captured. In addition, the Post-Implementation Report should be included.

When the project is officially closed, the project repository should include the following materials:

- Project supporting documentation, including the Business Case and Project Proposal
- Project description/definition documents such as the Project Charter and Project Plan
- Any working documents or informal documents defining Cost, Scope, Schedule and Quality of the project
- Project Schedules – retain all copies electronically, but only include the baseline and final schedule in the hard-copy repository
- Project financials

- Project Scope changes and requests log
- Project Status Reports
- Team member progress reports and timesheets
- Issues log and details (open and resolved)
- Project acceptance log by deliverable
- Project Deliverable Approval Forms, with original signatures
- Risk Management Worksheets
- Audit results, if encountered
- Correspondence, including any pivotal or decision-making memos, letters, email, etc.
- Meeting notes
- Final Project Acceptance Form, with original signatures
- Post-Implementation Report

A hard copy repository should be archived in a designated documentation area. It may be made available electronically at the discretion of the Project Sponsor in accordance with organizational records management policies. See Figure 5-5 Project Repository Table of Contents.

Deliverable

- **Archived Project Repository** – A collection of all project-related materials, documents produced, decisions made, issues raised and correspondence exchanged, providing the history and evolution of the project.

Figure 5-5 New York State Project Repository Table of Contents

New York State
Project Repository Table of Contents

PROJECT IDENTIFICATION

Project Name: _____ Date: _____
Project Sponsor: _____ Project Manager: _____

*Enter the **Project Name**.*
*Enter the current **Date**.*
*Enter the name of the assigned **Project Sponsor** and **Project Manager**.*

TABLE OF CONTENTS

*The following is a suggested **Table of Contents** for your project repository. The organization and content of your actual repository may differ, depending on the scope and type of project and your personal preference.*

- Project Proposal
- Business Case
- Project Charter
- Project Scope Statement
- Project Schedule
- Quality Management Plan
- Budget Estimate
- List of Risks/Risk Management Worksheet
- Description of Stakeholder Involvement
- Communications Plan
- Post-Implementation Survey(s)
- Post-Implementation Report
- Change Control Forms
- Signed Approval Forms
- Meeting Notes/Minutes/Correspondence
- Project Status Reports
- Progress Reports
- Project Work Products/Deliverables
- End of Phase Checklists

Project Closeout
End-of-Phase Checklist

How To Use

Use this checklist throughout Project Closeout to help ensure that all requirements of the phase are met. As each item is completed, indicate its completion date. Use the Comments column to add information that may be helpful to you as you proceed through the project. If you elect NOT to complete an item on the checklist, indicate the reason and describe how the objectives of that item are otherwise being met.

Figure 5-6

Item Description	Page	Completion Date	Comments	Reason for NOT Completing
Solicit Feedback:	**268**			
Prepare surveys	268			
Distribute or review surveys with appropriate participants	269			
Gather survey results	277			
Review and analyze survey results	277			
Summarize feedback for presentation at Project Assessment Meeting	277			
Conduct Project Assessment:	**278**			
Schedule Project Assessment Meeting	278			
Select and invite appropriate meeting participants	278			
Review and distribute survey summary results	278			
Gather notes and meeting results for inclusion in Post-Implementation Report	278			
Use survey feedback and meeting results to identify lessons learned and best practices	278			

Item Description	Page	Completion Date	Comments	Reason for NOT Completing
Document each lesson learned	278			
Document best practices	278			
Develop action plans to implement lessons learned and best practices	278			
Prepare Post-Implementation Report:	**279**			
Gather summarized survey feedback, notes from Project Assessment Meeting, lessons learned and best practices	279			
Present or distribute report to Performing Organization Management	279			
Send copy of report to OFT	279			
Update Skills Inventory and Provide Performance Feedback:	**285**			
Establish skills inventory system, if one does not exist	285			
Update skills or add skills to inventory system for each Project Team member	285			
Write performance feedback on each Project Team member	286			
Discuss performance feedback with each Team member	286			
Forward feedback to team member's immediate supervisor	286			
Archive Project Information:	**286**			
Gather all project information	286			
Archive information in project repository	286			
Locate hardcopy repository in designated documentation area	287			
CELEBRATE! Your project is complete!				

Measurements of Success

The ultimate measurement of success for Project Closeout will probably never be known. That's because it is impossible to assess now how much future projects will benefit from best practices and lessons learned derived from this project; the only thing certain is that no one will benefit at all if the best practices and lessons learned are not documented and communicated.

Meanwhile, the Project Manager can still assess how successfully the project is proceeding through Closeout by utilizing the measurement criteria outlined below. More than one "No" answer indicates a lesser probability that your experiences will help with the eventual success of other projects.

Figure 5-7

Process	Measurements of Success	Yes	No
Conduct Post-Implementation Review	Was the survey presented in a way to encourage active participation?		
	Were feedback results meaningful?		
	Were best practices and lessons learned appropriately identified and documented in such a way as to facilitate their application to all types of projects?		
	Did people read and provide feedback on the Post-Implementation Report?		
Perform Administrative Closeout	Was all project information readily available and easy to consolidate in the project repository?		
	Were you able to easily provide performance feedback on team members?		
	Did you take the initiative to establish/recommend a skills inventory, if one did not exist within your organization?		

Phase Risks/Ways to Avoid Pitfalls

Project Closeout may be perceived as the least important of all of the project phases, but its value to future projects cannot be underestimated. The knowledge gathered, the expertise developed, the lessons learned, the practices perfected – will remain locked temporarily in a few people's heads unless the Post-Implementation Review is conducted promptly, documented thoroughly, and (most importantly) its results are disseminated appropriately throughout the Performing Organization.

What are some of the key elements of Project Closeout that require the most attention? The Post-Implementation Review definitely stands out, and receives the most attention in the following table that identifies processes and tasks which have pitfalls highlighted in this section.

Figure 5-8

Process	Task	Why is it important?
Conduct Post-Implementation Review	Solicit Feedback	Do you have to ask? Yes, if you want answers. Your opinion, no matter how lofty, is not enough.
	Conduct Project Assessment	"Honesty is such a lonely word." But that is what your project – and all future projects – need from you!
	Derive Lessons Learned	"Truthfulness...always seems so hard to give." But you owe it to yourself, and all other Project Managers that will follow in your footsteps. Learn from the bad things and leverage the good.
	Identify Best Practices	Here's your chance to highlight for posterity all the things you and your team did right!

PITFALL #1 – YOU WAITED TOO LONG TO GET FEEDBACK

Your project is a success! Everyone is walking on air! In your joy and celebration, you neglect to solicit immediate feedback from the Project Team and other stakeholders….

Every project has its challenges, and everyone can learn from them. But people tend to forget the challenges they faced during the course of a project when the final outcome is a success. It is very important to solicit feedback as soon as Project Closeout begins so you get immediate, honest, and complete information regarding not only the project successes, but the failures. Then, the celebration can begin!

PITFALL #2 – YOU AREN'T SURE YOU ARE READY TO HEAR WHAT THEY REALLY THINK OF THE PROJECT

Scenario 1. Your project was a miserable failure. Your team mutinied; your Customers hate you; and you are in big trouble with your boss because the project came in months late and way over budget. You want to put this wretched experience behind you. The last thing you want to do is dredge up all the misery again. Why give everyone yet another opportunity to kick you?

Scenario 2. Your project went OK. You had a pretty good team (with just a few nuts and bolts); you are still on speaking terms with your Customers; and the project was just a bit over, mostly because of someone who insisted on "just one more thing." You can probably even use this project as a resume-builder for future opportunities. So why jeopardize it by giving everybody a chance to bring up all the things that could have been done better? Let sleeping dogs lie!

Scenario 3. You are on top of the world. Your project was a success. The Customers love the product. Your boss nominated you for an award because you delivered the project on time and under budget. So why are you still afraid to find out what everybody thinks about the experience?

As you can see, whatever the outcome, the bias is always to "close the chapter" and move on. And yet, for your personal growth, for the benefit of your organization, and for all the

other Project Managers to come, you need to spend the time to review the project. You need to understand what you did right – and what you did wrong. You need to know how your behavior, your approach, and your techniques, really worked – not from your own skewed perspective, but from the objective standpoint of your team, your Customers, and your management; if you think about it, from the only perspective that really matters, at least vis-à-vis your career.

PITFALL #3 – YOU DECIDE TO PLAY FACILITATOR (OR SCRIBE)

Since you are the one inviting the folks to your Project Assessment Meeting, and it is your project they are reviewing, the temptation is to try to facilitate the meeting yourself.

Bad idea for two reasons. First of all, you probably don't know how to do it right. A few Project Managers do happen to be talented facilitators; a lot more think they are, but in reality don't have a clue as to what's involved in getting meaningful output from a large group of disparate personalities. Remember, if you want a professional job, secure a professional. Many agencies have trained facilitators that are available for such meetings. Alternatively, you may consider hiring an outside consultant if it can be done expediently.

Secondly, even if you are a great facilitator, what do you want to concentrate on during this meeting: analyzing what people say, or worrying about Loud Luther dominating the rest of the group with his diatribes? Remember what they say in the legal profession, "a lawyer representing himself has a fool for a client."

Likewise, it's a bad idea to play scribe, for the same reasons: you probably can't type as fast as people talk, and you should be worrying about the meaning of what people are saying, and not keeping up with Rapid Rita as she's rattling off sixteen reasons why you are such a rotten rascal.

PITFALL #4 – YOU GET LOST IN THE FEEDBACK AND LEARN THE WRONG LESSONS

If you overcome your fears and invite a good cross-section of the Project Team to the Project Assessment Meeting, and get a good facilitator to lead the session, you are going to get a lot of feedback – especially if, in preparation for the meeting, your facilitator asks the participants to list all the things that could have been handled better.

Making sense of all the feedback will be tough. Here are some guidelines:

First, concentrate on what's important. During the meeting, your facilitator should ask the group to prioritize their feedback, both positive and negative. What were the things that impeded the project the most? If there was a problem (corrected or not) with Cost, Scope, Schedule, or Quality – what contributed the most to it? The group should come to consensus on the top three or four or five things that affected the project the most. (How? That's why you get a professional facilitator!)

Second, select items that may be of use to other projects. If your locality had a flood for the first time in fifty years during the crucial phase of your project, and as a result your schedule got thrown off kilter, well, too bad for you – but nobody else really cares.

Third, "genericize" your experience so it can be applicable to multiple projects. If one of your key team members developed a rare tropical disease and as a result you had to scramble to identify and secure another resource who could do the work while the expert recuperated, the lesson learned is not how to treat the rare tropical disease, but how to anticipate and prepare for the risk of a key member of the team being unavailable – for whatever reason.

PITFALL #5 – YOU ARE TOO MODEST

No matter how rotten everyone thinks you are at managing projects, you are guaranteed to have done at least something right (like reading this ***Guidebook***, for example). So along with getting all the negative feedback at the Project Assessment Meeting, you also need to accentuate the positive. That is not difficult if your facilitator, in preparation for the meeting, asks the participants to list all the things that went right with the project.

Again, making sense of the feedback is possible if you follow the same guidelines: prioritize the comments, select those that are applicable to other projects, and make them generic and useful.

Don't be bashful about throwing things in that only you thought of. After all, who knows this project better than you? And be specific. If you came up with a better format for a progress report that suits your organization or your project circumstances to a "T" – include it, both as a template, and as a filled-in example. If you followed an unorthodox issue escalation procedure, but it worked better than the tried-and-true chain-of-command one, by all means, let the other folks have the benefit of your ingenuity and good fortune.

PITFALL #6 – YOU LET IT ALL GO TO WASTE

You complete a magnificent project, one that will be a feather in your cap for years to come. You survey half the world for their feedback. You hold a great Project Assessment Meeting, and come up with a host of brilliant strategies for other Project Managers to emulate, and a multitude of obstacles for them to avoid. You triumphantly record them all into your project repository, and file it away.

Never to be seen again.

That's because your organization does not have a way to disseminate this hard-won knowledge throughout the workplace. There is no central repository of historical project data. There is no agency unit charged with taking ownership to collect, organize and make available information about other projects. There is nobody assigned to actively teach lessons learned, or faithfully implement best practices.

There is no way to share organizational knowledge, other than by personal contact.

But it doesn't have to be that way. You can change that, and you can benefit greatly by doing it. First, start accumulating the knowledge from your own projects and from others you are aware of. Second, publicize what you are doing, and create a track record of successful utilization. Third, present the organizational knowledge repository idea to your management, and encourage them to take action. Someone at a management level needs to assign ownership to the appropriate individuals for implementing best practices and lessons learned throughout the Performing Organization. By then, the organization will have been exposed to the idea, will think it is fabulous, and will think you're fabulous for coming up with it.

And don't forget to share your knowledge with the OFT Project Management Office. Let others learn from your experiences while you benefit by learning from theirs. THEY WANT TO KNOW!!

PITFALL #7 – COMPLETION IS ANTI-CLIMACTIC

Your project ends successfully. People go their separate ways. You feel like the whole experience is now nothing more than a vague memory. Why? Maybe you didn't take the time to appropriately celebrate your success.

Don't be afraid to approach your Project Sponsor to inquire about funds that may exist for hosting a celebration function. The function may be as simple as a cake and coffee meeting, or may be an agency-sponsored party or event. In any case, you want your Project Team to have good memories of their experiences on projects you manage, so they will be excited about having the opportunity to work with you again.

Good luck, and have fun!

Frequently Asked Questions

Why should I write a Post-Implementation Report? Who's going to read it, anyway?

Three reasons: because it's good for you, because it's good for your agency, and because it's good for project management everywhere!

Let's say the project did not go well. Do you want to repeat this sorry experience again, or would you rather avoid the same mistakes the next time? The only chance you have is by learning from experience, and allowing your organization to do the same.

Now let's say the project went OK. Don't you want to do better the next time? Enhance your career, earn the respect of your peers, etc., etc.? Repeating what you did right this time will give you more opportunity the next time to concentrate on things you could do better.

Finally, let's say the project was a great success. Aren't you proud of your accomplishment? Don't you want everybody to know about it, and benefit from it?

For more information, see 5.1.2 Conduct Project Assessment.

SECTION TWO

II

Project Management Topics

SECTION II: PROJECT MANAGEMENT TOPICS
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Section II Introduction

This section provides in-depth advice and direction on selected topics of importance to New York State Project Managers. It is anticipated that this section of the ***Guidebook*** will grow as the state's Project Managers identify and contribute advice on additional topics of common interest. The intent of this section is to provide a repository to share the lessons learned from the experience and expertise of the state's Project Managers.

Chapter 1 covers **Project Triage**, designed to assist Project Managers who have a project that is "going south." It outlines a specific process that can be employed to quickly identify project problems and define corrective action plans.

Chapter 2 discusses **Leadership**, one of the most important qualities for a Project Manager to have and to continuously develop and improve. The challenges and the many facets of leadership are explored and specific suggestions are offered.

Chapter 3 contains specific information regarding **New York State Procurement and Contractor Management**. Projects undertaken in New York State are increasingly complex, frequently involving multiple agencies and contractors supplying myriad products and services. This chapter provides references to available New York State Procurement Guidelines and existing state contracts, as well as guidance on when to use specific contracts and whom to contact for procurement advice and direction, and advice on managing contractor performance.

Chapter 4 identifies **Performance Measures** terms and concepts to orient Project Managers to this important aspect of organizational performance.

Chapter 5 describes **IT Project Capability** and provides an objective way to establish and predict performance of an agency's IT effort. It is designed to assist organizations improve the effectiveness of their software and business processes.

Chapter 6 provides a brief description of how **IT Project Tools** support the system development lifecycle. The discussion is focused on the value of tools and how a Project Manager may utilize them during a SDLC project.

1 PROJECT TRIAGE

Purpose

Project Triage is a process used to perform a quick evaluation of a project and to prioritize actions or corrective recommendations based on current project status. Triage is performed when a Project Manager is given a project in progress or when a project is determined to be "in trouble." Recognition that a project is in trouble may come from a number of different sources, including the Project Manager, the Project Sponsor, a Project Team member, an auditor, a fiscal analyst or others within the Performing Organization. The Project Manager must play a role in the triage, with support for the triage effort from the Project Sponsor.

While the emphasis of the triage effort is on a quick evaluation, speed is relative to the project size/scope. A three-year project may require a triage review lasting several weeks, while a project of several months duration may only require a triage review of several hours. It is important to spend adequate time to gather the information needed to analyze the problems and define the actions necessary to get the project back on track. The triage effort may be completed by an individual, or by a team, depending upon the size of the project and the time available.

An experienced Project Manager should perform a Project Triage. In some cases it may be more effective to secure a Project Manager from outside the Performing Organization, who is less likely to be influenced by organizational politics, history, or other factors. Inside knowledge can sometimes limit the effectiveness of a triage by prejudicially eliminating ideas without proper consideration. While having the triage performed by another Project Manager within the organization who has not previously been involved in the project may be more objective, it still may be difficult for anyone from within the organization to evaluate the work of a peer. In general, the less background related to the project and the Performing Organization the Project Manager has before taking on the project triage, the more likely it is that the effort will produce objective and effective results. However, the reality is that a Project Manager often triages his or her own project.

List of Processes

Project Triage consists of the following processes:

- Gather the Data
- Review and Analyze the Data
- Prepare Findings and Develop Corrective Action Plan
- Present Report
- Revise Project Plan

List of Roles

The following roles are involved in carrying out the processes of this phase. The detailed descriptions of these roles can be found in the Section I Introduction.

- Project Manager
- Project Sponsor
- Project Team Member
- Customer Decision Makers

List of Deliverables

Figure 6-1 lists all Project Triage processes and their deliverables.

Figure 1-1

Processes	Process Deliverables
Gather the Data	Collection of existing information (project repository)
Review and Analyze the Data	Assessment of current project status (Preliminary Problem Identification List)
Prepare Findings and Develop Corrective Action Plan	Findings and Corrective Action Plan
Present Report	Management presentation
Revise the Project Plan	Revised Project Plan, including remediation activities as required

1.1 GATHER THE DATA

The first step in Project Triage is for the Project Manager to gather all available information from the project repository. For example, start with the Project Plan or any existing pieces of the plan, and gather:

- a Project Schedule
- the work breakdown structure
- a task list
- a list of team members and role descriptions
- Project Status Reports
- a product description

If any of these items is not available, its creation should become a task in the corrective action plan. The End-of-Phase Checklists can be used for a more comprehensive list of project requirements for the phase the project is in and all preceding phases.

In addition to the documentation specific to this project, all existing standards, including templates and forms the organization has in place, must be collected. All written documentation should be reviewed – diagrams, electronic documents, blueprints, and other media.

For a troubled project, information will also need to be gathered through interviews with team members and stakeholders. The Project Manager must try to get a feel for the attitude and atmosphere surrounding the project by talking to a few key players.

The best place to start is with the Project Sponsor.

There isn't a Project Sponsor? Why is this project being done? To whom in the Performing Organization is it important? There may be more than one Project Sponsor, but if there are more than two, this is also a caution point. Too many sponsors may lead to conflicting directions.

Next, it is important for the Project Manager to talk to the technical or subject matter experts on the Project Team. If the project is a software development effort, this will probably be an experienced computer programmer or similarly skilled individ-

ual. If the project is a new building, this may be an architect or a construction engineer.

The Project Manager should next meet with some or all of the Project Team members. These interviews can be conducted in a group setting, or individually, if that might be more productive. The Project Manager should try to sense the mood of the Project Team to determine the proper interview settings. A team meeting, if practical, may allow more information to be gathered faster. Individual interviews can be conducted subsequently if participants were reluctant to contribute in a group setting. ("Starter" questions are provided in a sample interview agenda, see Figure 6-2. Any that are relevant to the project being assessed can be used, although additional questions may be needed to elicit the information required.)

If the Project Team interviews or the team meeting did not involve Customers or Consumers of the project's product, follow-up with those individuals is also required.

Don't forget that Customers or Consumers should be actively represented on the Project Team.

Sample Triage Interview Agenda

Figure 1-2

Interviewee: _____ Project Team: _____

Role: _____ Date & Time: _____

1. What do you view as the problems with this project?
   Response:

2. What would you do differently?
   Response:

3. What was/is your role is on this project?
   Response:

4. What is your current task? When did it begin? When will it be completed? Do you expect to meet that due date?
   Response:

5. Do you have a copy of the Project Scope statement?
   Response:

6. Do you have a copy of the Project Schedule? Do you know specifically which tasks you are assigned? Do you understand how they fit into the total project?
   Response:

7. Do you provide a Progress Report to your Team Leader or the Project Manager? Do you participate in a status meeting? Do you receive a Project Status Report?
   Response:

8. Do you have the resources required to complete your tasks? Are you assigned to this project exclusively? Do you have other assignments that are inhibiting your ability to complete the assigned tasks on this project? Has the relative priority of your assignments been clarified to you by your supervisor?
   Response:

1.2 REVIEW AND ANALYZE THE DATA

The Project Manager should quickly determine where the project is within the phase (Project Planning, Project Execution and Control, etc.) and process level. Major problems must be identified (e.g., behind schedule by 60%, over budget by 30%, lost resources, unstable bleeding edge technology). The End-of-Phase Checklists in this ***Guidebook*** can be used for each project phase (Initiation, Planning, Execution and Control, and Closeout) to evaluate whether each project phase is complete and to identify missing elements. The lists of Pitfalls and Measurements of Success for each phase will also assist in evaluating the current state of the project.

Analysis of issues begins during information gathering, when new questions may be raised. It is not necessary to wait until all information has been gathered to begin the analysis. Any assumptions developed as part of the triage effort must be documented in a Preliminary Problem Identification List and verified. Answers to the following questions will assist in determining the project's overall health:

- Is the available documentation an accurate reflection of what has happened?
- Does documentation exist or are the Cost, Scope, Schedule, and Quality moving or unidentified targets?
- Which deliverables have been completed? Reviewed? Approved?
- Which deliverables have been completed on time?
- Which milestones have been met?
- Where are the actuals in relation to the baseline? Is there a baseline?
- What percentage of the total project resources has been expended?
- What percentage of the total estimated work has been completed?
- What are the outstanding issues? Is there an issues log?
- What are the communications vehicles? (status reports, memos, etc.) What evidence exists of their use?

The Project Manager must identify causes of problems, not just symptoms. Reacting to symptoms without addressing problems often gets a project into trouble. For example, if there are excessive requests for scope changes and there is a lack of

understanding of the Project Scope by the Project Team, the cause may be that the Project Scope was not well defined or that no change control process exists.

It is important to recognize and acknowledge that some of the issues that could cause a project to run into trouble are external to the control of the organization. Examples of such situations include natural disasters, newly enacted legislation, acts of terrorism or war, etc. Risk plans cannot cover every possible contingency.

Also, major successes should be identified (user requirements are clear, planning was complete, status reporting has been accurate, team members are all getting along, etc.). This will help to eliminate causes of problems as well as provide a foundation for the remediation portion of the mission.

If at any point the Project Manager identifies an action that should be taken immediately in order to prevent further problems or to correct a problem, it should be documented and presented to the Project Sponsor for immediate implementation.

1.3 PREPARE FINDINGS AND DEVELOP CORRECTIVE ACTION PLAN

The output of a triage is a description of the findings of the triage effort, including the problems identified (symptoms/indicators), the root causes of the problems, and the specific prioritized recommended corrective actions. A prioritized list of action items must be created to get the project back on track as quickly and efficiently as possible. Some actions may need to stop to allow other processes to be completed. Most importantly, the Project Manager must not allow tasks to move ahead which are pulling the project further in the wrong direction.

Examples of Problem Indicators, Causes, and Actions Recommended follow.

Figure 1-3

Indicator	Potential Causes	Actions Recommended
1. Behind schedule	**a.** Scope creep.	**i.** Ensure/create baseline scope statement. **ii.** Implement a change control system.
	b. Staff assigned does not have the same level of expertise anticipated when estimates were made.	**i.** Assign appropriately experienced staff (contract or in-house). **ii.** Adjust schedule to allow for training. **iii.** Additional staff assigned.
	c. Using not-ready-for-primetime software.	**i.** Replace with a proven product. **ii.** Adjust schedule to accommodate software maturity.
	d. Estimates made during Project Initiation have not been revised throughout Project Planning.	**i.** Revise initial high-level estimates in light of additional information gained through the planning process.
2. Over budget	**a.** Poor initial estimates.	**i.** Re-estimate, re-baseline, and gain approval for new plan.
	b. Technology cost increases.	**i.** Consider alternative implementations. **ii.** Justify budget increase and re-baseline.
	c. Project Budget charged with unrelated expenses.	**i.** Document and report to management. Update and maintain budget documentation.

Indicator	Potential Causes	Actions Recommended
3. Poor staff performance	**a.** Poorly defined Project Schedule.	**i.** Re-plan task breakdown, resource estimates, and assignments with team involvement.
	b. Poor communications.	**i.** Evaluate and revise Communications Plan. **ii.** Implement regularly-scheduled team meetings.
	c. Poor project management.	**i.** Assess project management competencies and identify weaknesses. Provide training and mentoring to strengthen Project Manager. **ii.** Assign new Project Manager. **iii.** Hire an experienced Project Manager.
	d. Lack of user involvement.	**i.** Cultivate mutually beneficial relationship
	e. Roles and responsibilities not defined or communicated.	**i.** Define and document roles and responsibilities. Review with team.
	f. Conflicting priorities.	**i.** Reschedule project consistent with actual priority.
	g. Lack of executive support.	**i.** Seek support through Project Sponsor. **ii.** Seek support through Performing Organization management, if appropriate.
	h. Changed priorities – project no longer needed.	**i.** Cancel project.
4. Poor project progress	**a.** Lots of activities, no definable deliverables and/or project milestones.	**i.** Organize activities into tasks with defined responsibilities and dependencies. Define relationship of activities to deliverables, and to key project milestones.
	b. Unrealistic expectations.	**i.** Manage user expectations.
5. Unexpected obstacles	**a.** Unforeseen issues possibly including external factors that are out of the organization's control.	**i.** Re-evaluate cost/benefit and determine if project should proceed.
	b. No risk plan.	**i.** Define a risk plan.

When prioritizing the recommendations, include any additional resources that will be needed, including who should be responsible for each item, by role if not by name. Provide alternatives along with the pros and cons of each, if possible. For example, hiring additional staff will add to the cost of the project but preserve the schedule as opposed to maintaining the budget by delaying the completion.

Examples of Prioritized Recommendations and Resource Needs follow.

Figure 1-4

Priority	Action	Resources	Owner
1.	Stop development until scope is defined.	None	Project Sponsor
2.	Document scope.	Customer Representative, Project Sponsor, Subject Matter Expert	Subject Matter Expert
3.	Define change control process.	Subject Matter Experts to develop a small system	Project Manager
4.	Clarify priorities.	Performing Organization managers	Project Sponsor
5.	Formalize schedule.	Need to purchase scheduling software	Project Manager
6.	...	...	...

A narrative report should be developed to explain the process undertaken to identify the problems and causes, identify the reasons for the prioritization, and to define the actions recommended. This will facilitate execution of the corrective action plan.

1.4 PRESENT REPORT

The report should provide an honest, accurate assessment of the current state of the project, what went wrong, and how to fix it. Whenever possible, the Project Manager should prepare a presentation of the report, which includes the corrective action recommendations. There may be multiple presentations – one at the management level and one for the Project Team members. The tone of the presentation should be positive, focusing on how the Project Plan can be revised. The Project Manager must ensure that management understands the exact current project status. The need for additional resources and changes to the Project Schedule should be made clear. The Project Manager must also maintain a constructive and positive tone with team members, since they are the ones who determine the success or failure of the remediation effort. Participants should be given an opportunity to respond and ask questions so that everyone understands the situation and the corrective action plan. Leadership skills play a vital role at this time.

Occasionally, the corrective action recommendation will be to scrap the work that has been done and start over. This may include complete re-planning and securing a new project approval. This should be a rare occurrence, but when it happens, starting over must be justified by a savings of time or money, improvement in quality, or preservation of scope.

1.5 REVISE PROJECT PLAN

The final part of the triage and remediation effort is to revise the Project Plan to include the activities resulting from the recommendations in the report. Optimally, the Project Team will implement the corrective action plan, with additional resources as required. The corrective action plan must be integrated into the Project Plan and managed as part of the ongoing project. The corrective action plan is designed specifically to get the project back on track quickly, not to address long-term organizational needs such as training, cultural changes, or methodology development.

Sometimes, project problems may be corrected with no-cost activities such as team building and re-alignment of priorities. More often, the remediation effort will require additional resources, either in time or money, or a decreased product, either in scope or quality. If the decision is made to create a new baseline Project Schedule, the original schedule must be kept for historical purposes.

Completing the triage and remediation effort requires ongoing diligence, continuing communications, tracking, reporting and commitment from all Project Team members. It remains the Project Manager's responsibility to coordinate all of these efforts. Often, reporting requirements are increased following triage because some managers want to be informed of more detail than would otherwise be required.

Measurements of Success

Figure 1-5

Process	Measurements of Success	Yes	No
Gather the Data	Did team members share information freely? Do you have enough information to do an assessment?		
Review and Analyze the Data	Does the data support the obvious problems with the project? If not, you may need to look further.		
Prepare Findings and Develop Corrective Action Plan	Do stakeholders agree with, or at least understand your findings? Are the action items reasonable and do-able?		
Present Report	Does management understand both the problems and the solutions?		
Revise the Project Plan	Have the resources required been allocated? Does the Project Team support the effort?		

1. Triage Questionnaire – Gather the Facts

Figure 1-6

Question			Response
Does the project have:	Consumer involvement?	Are the Consumers involved the correct ones and have you established and maintained a good working relationship?	
		Are you facilitating their involvement and are they actively contributing?	
		Who should be promoting the project and its priority?	
		Do you know who will use the product you are creating and what its impact will be?	
	Executive Management support?	Is there a Project Sponsor?	
		Is the Project Sponsor involved and supportive?	
		Does the Project Sponsor have a stake in the outcome of this project?	
		Does the Project Sponsor have the authority needed to address conflicts between projects and commit resources?	
		Does the project support the Performing Organization's strategic plan?	
	a clear statement of requirements?	Is there a vision?	
		Has the Business Case been defined?	
		Are the expectations realistic?	
		Are functional requirements defined? Has a risk assessment been done?	
		Are there measurements by which to determine the success or completion of the project?	
		Have the requirements been: - Documented? - Agreed to with signatures from all appropriate parties? - Communicated to the Project Team and all other stakeholders?	

Figure 1-6 (Continued)

Question		Response
Is the Project Manager assigned to this project?	Does the Project Manager have a clear understanding of the priority of this project? Is this consistent with the Project Sponsor's understanding and the priority stated by management?	
	Does the Project Manager have the experience and training necessary to be successful on his or her assigned tasks?	
Are team members assigned to this project full time?	Do team members have a clear understanding of the priority of this project?	
	Does this agree with the Project Manager's understanding and the priority stated by management?	
	Do team members have the experience and training necessary to be successful on their assigned tasks?	
Is project communication adequate?	Is everyone aware that the project exists?	
	Is project status clearly, frequently, and widely communicated to all concerned?	
	Do all team members clearly understand what is expected of them?	
Has planning thus far been adequate?	Review the lists of what should be included in the Project Plan at each phase. For example, Develop Initial Project Plan, Section I:2.4, includes a list of what pieces of information should be in the Project Plan by the end of Project Initiation: a. Project Charter b. CSSQ c. List of risks d. Description of stakeholder involvement e. Communications Plan	

Figure 1-6 (Continued)

Question		Response
Where do you need to be and what is driving the Project Plan?	Time: Do we need to complete the project by a certain time? If so, are additional resources (time, money, technology) available to the project?	
	Cost: Do we need to complete the project under a specified cost? If so, can the dates be moved to allow the project to be completed by less-expensive resources (provide time for a learning curve, use in-house staff rather than consultants, etc.)?	
	Scope: Do we need to deliver every feature defined even if means more time or more cost?	
	Quality: Can a "beta" version of the product be released and then anomalies fixed and features added later on? (sometimes possible for internal users, where there are no health or safety issues, or loss of assets, etc. involved)	

2 LEADERSHIP

Purpose

Over the last 20 years the role of the Project Manager has changed dramatically. The successful Project Manager of the 21st century is expected to have leadership skills as well as the traditional managerial skills.

As a manager, the Project Manager's role is focused on producing the outcomes or products of the project. As a leader, especially on larger projects, the Project Manager establishes the vision for and direction of the project. Defining project priorities, guiding and motivating team members and Stakeholders, the Project Manager inspires the necessary collaboration and participation of all involved in the project. Effective communication with the various individuals and groups affected by or working on the project and active management of change and conflict are crucial to the Project Manager's increased leadership role. Guiding and leading Stakeholders throughout the life of the project is essential not only to the success of the project, but also to the success of the Project Manager.

The Project Manager performs multiple leadership and managerial roles, serving alternately as:

- **Catalyst:** Making things happen; identifying problems, fears, and resistance and initiating corrective action; instilling urgency and personal ownership; motivating others to step up and succeed.
- **Process Helper:** Acting as a "Super User," providing real time support for the Project Team and Stakeholders; answering process/technical questions, coaching, monitoring, and reviewing their progress, and looking for improvement opportunities.
- **Problem Solver:** Listening actively to all, contributing to problem resolution; promoting and sharing best practices within and across the Project Team and the Performing Organization; mediating and resolving conflicts; facilitating Project Team and Stakeholder communication; educating and coaching Project Team members and Stakeholders through the change.

- **Resource Linker:** Coordinating "right people, right place, right time;" identifying and utilizing resources; anticipating and responding to Stakeholder needs; networking and sharing information and resources across Performing Organizational boundaries.

This section of the ***Guidebook*** addresses key aspects of the leadership challenge facing the Project Manager.

2.1 COMMUNICATION

The effectiveness of the Project Manager's leadership is dependent upon his/her communication skills. Some project management theorists estimate that a Project Manager spends 90% of his/her time in communication activities. Communication is a critical component of every project management process, so the Project Manager must develop skills that ensure that messages are appropriately transmitted and correctly received.

While developing the project's Communications Plan, the Project Manager formally identifies and plans for the varying informational needs and appropriate methods and frequency of communication for each Stakeholder group. (See 2.4.2, 3.4.4, and 4.4.4 on the Communications Plan.) This is the blueprint for establishing effective communications, on which the Project Manager builds by cultivating and then nurturing relationships with all identified key project Stakeholders. These include the Project Sponsor, Project Team members, Customer Representatives and Customer Decision-Makers, and Stakeholders from other groups or organizations that may influence the project's progress and success, all of whom will have different interests and expectations for the project. Their ability to interact will determine how smoothly the project progresses. Positive relationships with these individuals will help the Project Manager achieve consensus among the project's Stakeholders when needed, and understand and resolve sources of conflict during the project.

It is up to the Project Manager to provide appropriate communication opportunities for each Stakeholder. The Project Manager should ensure that there are mechanisms, formal and informal, for obtaining Stakeholder feedback. Communication with Stakeholders should be bi-directional: listening to them, understanding their concerns and issues, and actively addressing their concerns through the appropriate project management processes (change control, status reporting, etc.) is as important as providing them with information. The Project Manager should also be pro-active in seeking input and feedback. Information should be received openly and with enthusiasm and gratitude for the opportunity to improve and ensure the project's success. The Project Manager should avoid being judgmental or defensive.

Effective use of active listening and questioning techniques can enhance the Project Manager's ability to be an effective communicator:

- Active listening techniques include seeking understanding through asking for clarification of the message, paraphrasing to make sure you have understood the message, encouraging dialogue through empathic remarks, and refraining from interrupting and making judgmental remarks.
- Examples of questioning techniques are using open-ended questions that call for more than a "yes" or "no" answer, using follow-up questions to obtain additional information, and avoiding leading questions that put the respondent under pressure to respond in a certain way.

The Project Manager should also be cognizant of the role played by informal communications. A conversation in the hallway, a chance meeting outside the office with a Stakeholder, even overheard conversations, may have a potential impact on the project. Since the Project Manager is responsible for setting and managing the "mood" of the project, he/she must pay attention to communication undercurrents, and be prepared to bring relevant issues to more formal communication venues when appropriate.

In the case of virtual Project Teams, in which team members work across time, distance and/or Performing Organizational boundaries, the Project Manager faces special communication challenges. The Project Manager should select appropriate electronic communication and collaborative technologies, e.g., phone conferencing, email, e-meeting, web conferencing, and intranet/internet. He/she should be adept at using them to build the team, motivate and inspire team members, give and receive feedback on performance, handle conflict and ensure that project goals are achieved. The Project Manager should make a special effort to supplement virtual interaction with face-to-face contact as often as possible.

2.2 LEADING THE CHANGE MANAGEMENT EFFORT

Increasingly, organizations are becoming aware that projects they carry out involve significant changes. The Project Manager then assumes the role of change leader, steering the Performing Organization and its Stakeholders through the change process. This is a role that is sometimes neglected or assumed to be within the purview of the Performing Organization. But lessons learned from successful projects demonstrate that the Project Manager can most effectively lead Stakeholders through changes to the Performing Organization's structure, systems, culture, and people. (See Section I:3 for additional information on the Organizational Change Management Plan.)

The Project Manager should promote widespread participation in the change process. In this leadership role, the Project Manager needs to be prepared to be the motivator and the cheerleader, to generate enthusiasm for the project and continually obtain buy-in, support, commitment, and participation from the various Stakeholders. To assist with these efforts, the Project Manager should identify and actively recruit change champions from the Performing Organization and the key Stakeholder groups. These individuals, along with the management team of the Performing Organization, will play a critical role in the change process and have great influence over whether the change will be interpreted as positive or negative by the organization and its Stakeholders.

The Project Manager should forge a partnership with the change champions and the management team to lead the change effort. The management team will collectively own the change initiative and set a strategic and organization-wide direction that encompasses the change. The Project Manager and the change champions will lead the management team in these efforts, coordinating effective communication throughout the Performing Organization regarding the need for change.

The Project Manager, along with the change champions and the management team, should do the following to support the change process:

- Serve as credible role models.
- Create a shared sense of urgency about the need for change.

- Effectively communicate the vision and strategy for change by creating and using a common vocabulary.
- Empower people to take action and to get rid of obstacles to change.
- Generate and implement immediate "wins" (visible improvements in performance to get people on board).
- Anticipate and handle disruptions during change.

The change champions within the Performing Organization should be given an opportunity to acquire the new skills and information necessary to sustain the change effort "locally." The Project Manager should coordinate all efforts to distribute responsibility for managing the change effort outward to the Performing Organizational units most affected by the change.

Because change is challenging for a Performing Organization, the Project Manager should assess the Performing Organization's capacity for change, or its "readiness for change." Change in technology, in particular, is a transforming event for a Performing Organization. It can trigger reactions that go well beyond the project to impact all parts of an organization's structure and systems, as well as its culture. If the transforming nature of the change event is not taken into account, even the best-designed technology can cause long and painful disruption to the activities of the Performing Organization, or can fail altogether.

At the individual or group level, resistance to change is to be expected, and indicates that the Stakeholders are actively involved in the project, but it must be managed and mitigated. The Project Manager can take the following actions:

- Identify changes in the Performing Organization's structure, systems, culture and people.
- Identify impacted users.
- Clarify the impact of the change on the users.
- Gauge reactions to the change; acknowledge and understand the sources of resistance to change.
- Manage negative reactions to change through selling and articulating the vision, creating a liaison with the local site transition team, involving the user, as appropriate, in the project lifecycle phases.

- Develop skills and knowledge, through training, discussions, roundtables.
- Support the transition of responsibility for the outcome of the project from the Project Team to the Performing Organization.

The Project Manager should also make plans for sustaining the project changes after the project's conclusion. People in the Performing Organization should share ownership of the changes affected by the project if the changes are to become permanent. Under pressure, it is common to revert to old ways of doing things. Changes also may not be perceived as complete because results are not yet visible or tangible. The Project Manager should ensure that proper education and training are offered to those affected by the project's outcomes before related new responsibilities are imposed, and arrange for assistance and support in implementing new work processes. Formal acknowledgement of people's resentments and losses arising from the change process can facilitate acceptance of the change and its adoption by the Performing Organization.

2.3 MANAGING POLITICS AND CONFLICT

While the Project Manager typically has a lot of responsibility for the project, he/she frequently has limited authority or control over human, material and financial resources for the project. This is especially true in a matrix organization where members of the Project Team are assigned part-time to the project and report to a line manager rather than to the Project Manager.

In order to achieve project goals, the Project Manager will often have to rely on his/her political skills to effectively influence others on the Project Team and in the Performing Organization. In attempting to do so, he/she will inevitably encounter people with different interests and approaches. This may lead to conflicts that should be resolved. Since a project is by definition temporary, the Project Manager cannot usually afford the luxury of waiting until a conflict "blows over," but must work to create a setting where the conflict can be resolved quickly and with as little damage as possible.

The following four steps can help the Project Manager develop political skills and anticipate and resolve conflicts:

Identify project Stakeholders: Stakeholders should be identified specifically by name and role so that there is a clear understanding of who is involved in the project. Potential project Stakeholders include: the Project Sponsor, Project Team, management of the Performing Organization, Customers, Customer Representatives and Decision-makers, the public, the media, regulators, vendors, and unions. In New York State government, the Division of Budget, the Department of Civil Service, the Office for Technology, and other agencies, commissions, and boards are often project Stakeholders.

Analyze Stakeholder interests: After the project Stakeholders have been identified, the Project Manager should assess the range of their interests and expectations for the project. The convergence or divergence of the Stakeholders' varied interests, goals, and values will help identify the sources of conflict that may occur during the project. Anticipating these potential conflicts, understanding their origins, and creating action plans to mitigate and diffuse conflict are an essential role for the Project Manager.

Analyze power relations: Power is usually attributed either to an individual's personal attributes, or to structural and positional sources including formal authority, control over resources and information, and interpersonal relationships. Where Stakeholders have equal power and compatible interests, decisions are obtained most easily when the Project Manager uses facts and data to support the development of a logical argument. Where there are unequal power relationships, the Project Manager must be prepared to deal with situations where interests conflict, relying on his/her instincts to know when it is time to capitulate or to continue to try to influence the Stakeholders to achieve the desired outcome. Concise and to the point discussions with the Project Sponsor regarding advice and direction are crucial at this time.

Some techniques the Project Manager can use to influence Stakeholders and mitigate conflict include:

- Reasoning – Using facts and data to support the development of a logical argument
- Consulting – Seeking input and ideas to generate a viable plan in order to meet common concerns
- Appealing – Connecting with the emotions, predispositions, or values of those involved, conveying that a request is not at the cost of their interests
- Networking – Actively including other Stakeholders who hold relevant information or authority to gain the support from the reluctant Stakeholder
- Exchanging – Offering an exchange of favors to convince the Stakeholder that a proposal can satisfy the needs of both sides
- Bargaining – Negotiating with the Stakeholder to reach an agreement that meets his/her needs
- Pressuring – Making direct and forceful demands to the Stakeholder, even through resistance on the part of the Stakeholder
- Counteracting – Blocking efforts of the Stakeholder or acting in the opposite direction

The way in which a Project Manager deals with conflict depends on his/her personal style as well as on the compatibility of interests among the divergent parties, their power relationships, and the length of time available for decision-making.

Develop negotiating style: Collaboration is often useful for finding a "win-win" solution that satisfies all parties involved in a conflict. In the collaborative negotiating style, all parties work together to find a solution that satisfies all concerns. (A compromise solution is less desirable because each party has to give up something, resulting in a "win-lose" situation for both.) While facilitating a collaborative approach, the Project Manager must actively confront issues of negativity and try to address them by articulating a common vision of the project and its benefits. When all parties participate in initiating ideas, investigating options, sharing information, and negotiating solutions, there is a better chance of reaching a collaborative decision on contentious issues.

In an emergency or when there is too little time available to reach a collaborative solution or even a compromise, the Project Manager may have to make a unilateral decision. This decision should be well documented in the project repository. When the Project Manager makes such a decision, Stakeholder interests must still be fully considered to ensure future buy-in for the project.

Managing politics and conflict is a dynamic process that occurs throughout the life of a project. Stakeholder interests and power may change; the individuals themselves may leave, causing new people to fill the ranks. Strategies and tactics used to build and maintain working relationships will have to be constantly re-examined and modified.

2.4 LEADING THE PROJECT TEAM

A key to project success is developing a high-performing Project Team, which should ideally have:

- specific, challenging goals, which have been agreed upon collaboratively.
- well-defined deliverables.
- proper mix of skills and personality types. (see Pitfall #1 – 'You have the wrong team' in Section I:3, Project Planning)
- adequate resources.
- sense of discipline and cohesion.
- ability to achieve the desired results.
- ability to work with Customers.
- ability to integrate diversity, e.g., contractors and staff.

Research has shown that most teams do not immediately become high-performing. In actuality they go through stages, beginning with the forming stage, in which the group decides on its purpose, composition and leadership patterns; a storming stage, characterized by initial conflict; a norming stage, in which trust and confidence are established, and finally the high-performing stage, in which project execution is smooth. The Project Manager's role is to use a leadership style appropriate to guiding the team through these various stages:

- A directive approach to organize and guide work in the forming stage
- A coaching approach to set high standards and work collaboratively at the storming stage
- A supportive approach to allow the team to structure work and find ways to work together and solve problems during the norming stage
- Delegating, to allow the team to carry out the work, in the performing stage.

In Project Closeout, sometimes referred to as the "adjourning" stage, the Project Manager should take a coaching approach to bring formal closure to the project and assist the Project Team members in transitioning from the project to their next opportunity.

Another important factor in developing the high-performing team is motivating individual team members and the team as a whole. The Project Manager's role is to:

- Try to determine what motivates individual Project Team members – the desire for challenging work, professional development, recognition, possibility for promotion, visibility within the Performing Organization, or collaboration with other team members.
- Identify the characteristics of the individual project that have an impact on individual motivation, e.g., the degree of innovation involved in the project, the level of support from senior management, the duration of the project, and the nature and frequency of interaction of Project Team members.
- Use appropriate techniques and style to enhance individual and team motivation, taking into account the above factors. For example, scheduling regular and ad hoc feedback sessions for individual team members, including recognition for good performance in the individual's formal performance appraisal, giving public recognition for team contributions, and creating team spirit.

2.5 BUILDING TRUST

In the final analysis, project Stakeholders must trust the Project Manager in order for the Project Manager to be an effective leader. Trust is developed over time, and is most easily inspired when the Project Manager exhibits a willingness and ability to:

- share information.
- discuss personal feelings.
- listen to and understand others' perspectives.
- admit mistakes.
- encourage others.
- confront others.
- keep promises.
- be credible and sincere.
- be responsible and accountable for actions.

Development of leadership skills requires a conscious effort. The Project Manager must continually examine his/her own effectiveness, be aware of shortcomings, and be willing to devote time and energy to improvement.

3 PROCUREMENT AND CONTRACTOR MANAGEMENT

Purpose

The purpose of Procurement and Contractor Management is to provide basic information and direction regarding procuring commodities or services within New York State and to recommend strategies for managing the resulting contract. Once the need for services and/or products has been identified, procurement activities should be initiated as soon as possible, since the process may take a significant amount of time to accomplish.

Roles

- Project Manager
- Project Sponsor
- Project Team Member
- Customer

The Project Manager may be responsible for the actual procurement of the services or products needed to develop and implement the project, or may be directing these activities through a contracting or procurement Team Leader. These activities may have a significant impact on the Project Budget and Schedule, so they must be integrated into the overall Project Plan and Project Schedule.

3.1 PROCUREMENT STRATEGIES

Once a determination has been made that outside resources or products are needed, a procurement strategy must be developed. In developing this strategy several options are available.

A ***turnkey*** procurement involves securing a complete vendor-supplied solution that is provided to the Customer "ready to operate" (just turn the key). The contracted vendor acquires all the necessary parts, products and services, and all required labor to construct and install the turnkey solution. This type of procurement requires the contractor to perform the day-to-day management of the Project Team and project processes, while the Project Manager focuses on contractor performance and management of the product transition to the Performing Organization. In a turnkey procurement, the purchaser generally takes ownership of all products purchased, either at time of purchase or at time of transition, depending on the contract terms.

While turnkey procurements are a possible option, it is more likely that the Project Manager will choose to procure several products and services, and to manage the resulting contracts. Examples of typical procurements associated with a project include:

Product Acquisitions: These may range from typical products such as furniture and personal computers, to highly specialized products for the project such as digital scanners, servers, and the software needed to operate them. Frequently, projects involve the purchase of a "Commercial Off The Shelf" (COTS) software system that may meet most of the functional requirements of the project. Such a system usually requires customization to provide all required functionality, or to meet specific technical requirements of the Performing Organization. Customization may be done by in-house staff, or by the contractor's staff as part of the contract to purchase the system.

Staff Augmentation: Frequently, while in-house resources are available to perform a significant amount of the project work, additional resources are needed to complete the project on time or to provide some needed skill. One strategy is to obtain outside resources, usually consultants, to augment the project staff. If consultants are hired to provide a missing skill, having them work along side in-house staff

facilitates acquisition of that skill by in-house staff during the development phase of the project. This, in turn, facilitates the takeover of system maintenance activities after the system is deployed and the consultants leave.

Selective Outsourcing: Outsourcing also involves contracting additional staff services, but in this case the contractor assumes responsibility for performing all aspects of a selected service, usually to specific standards and for a fixed cost. In this type of scenario, the Customer usually does not own the products associated with the production or delivery of the service, but purchases the specific service. Examples might include demolition services, disaster recovery services, and data conversion services.

3.2 GENERAL CONTRACTUAL INFORMATION

Every contract with a New York State agency must include Appendix A (Standard Clauses for all New York State Contracts), MacBride Principles, and Article 15A Provisions. Agencies may also have their own standard contract provisions. Agency staff should discuss with their Office of General Counsel the standard forms and language to be used.

Among the statutory and regulatory requirements applicable to the procurement of goods and services by New York State agencies are Section 112(2)(a) of the State Finance Law, which provides that a contract in excess of $15,000 must be approved by the State Comptroller before it becomes effective, and Section 163(6) of the State Finance Law, providing that a contract in excess of $15,000 must be awarded pursuant to a formal competitive process. The Office of the Attorney General must also approve such contracts. The NYS Procurement Council Procurement Guidelines and other general information concerning the statutes and regulations governing state contracts can be found at the websites maintained by the New York State Office of General Services (http://www.ogs.state.ny.us/purchase/) and the Office of the State Comptroller (http:// www.osc.state.ny.us/agencies/).

3.3 CONTRACT TERMS

The procurement strategy will frequently define the method by which the selected contractor's performance will be managed.

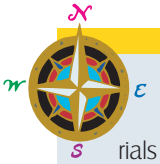
3.3.1 Fixed Price

Outsourcing and turnkey procurements are generally done on a fixed price or fixed fee for deliverables basis. This type of contract is best used when the specific service or product to be delivered can be fully defined and specified before the start of work. The contractor is required to successfully perform the specified work and deliver agreed-upon products or services. The specifications are described in detail, ensuring complete understanding of the requirements by both parties. The responsibility and risk for the delivery of the specific product/service is on the contractor. If the contractor exceeds the contract cost, he must still deliver the product for the agreed-upon amount. However, responsibility for the detailed specification and the management of scope change belongs to the Project Manager. If the scope of the project is changed, a change request must be processed and the cost of the changes, which may not exceed established limits, must be agreed upon. As long as scope can be adequately defined, this type of contract is good for controlling cost, but changes in scope must be managed.

3.3.2 Time and Materials

Staff augmentation procurements are generally done using a time and materials contract. These contracts pay for services rendered at a fixed rate and for materials at cost plus a handling fee. This type of contract is usually employed if the scope of the work to be completed is not well defined and does not permit a fixed level of effort or a fixed price to be estimated. A contract is developed to secure services for a range of technical skills, with negotiated hourly rates. The contract is usually assigned a maximum amount payable. This contract type is particularly well suited to situations where the principal "deliverable" is labor hours. The Project Manager must provide for the management of each individual contract staff person's performance, and specific performance standards for each type of resource must be established. This may be particularly difficult if different performance standards are being used for contract staff and for in-house staff performing the same functions. In

this type of contract, the burden is on the Project Manager to control Project Scope and cost by defining individual and ensuring performance standards and monitoring contractor performance.



If the scope of the project is not fully defined, some of the attributes of a fixed price contract could be used to try to minimize disadvantages of using the time and materials contract. The contract can be established with defined rates for specific technical skills, as in the standard time and materials model, up to a maximum amount payable ("cost not to exceed"). As specific deliverables are defined, specifications can be developed and a fixed price can be agreed upon for the delivery of these items. Once all parties agree to the scope and cost, this item would be treated as a fixed price deliverable.

3.3.3 Cost Reimbursement

In some cases, usually when there are such uncertainties of performance that a price cannot be estimated with sufficient accuracy to ensure that it is fair and reasonable, cost reimbursement contracts may be preferred. A cost reimbursement contract allows for payment to the contractor of all costs incurred, within a predetermined ceiling and allowable cost standards, after the work of the contract is performed. Cost reimbursement contracts place the least cost and performance risk on the contractor. They basically only require the contractor to use "best efforts" to complete the contract. These contracts are not often in the best interest of the state, but may be useful in certain circumstances. There are a number of different types of reimbursement contracts, including:

- Cost – This type involves the payment of all incurred costs within a predetermined total estimated cost.
- Cost Sharing – The agency and the contractor agree to split the costs of performance in a predetermined manner. No fee is given. This type of contract can sometimes create additional liability issues of which the Project Manager should be aware.
- Cost-plus-fixed-fee – This type allows for payment of all incurred costs within a predetermined amount, plus an agreed upon fee which will not change.
- Cost-plus-incentive-fee – This provides for an adjustment of the fee (up or down) using a pre-determined formula based on the total allowable cost in relation to total targeted costs.

- Cost-plus-award-fee – Provides for a negotiated base fee with an award fee that can be given based upon an evaluation of contractor performance and cost control.

The advantages of the cost reimbursement contract are better control of project cost while still providing some flexibility when scope has not been fully defined.

3.3.4 Indefinite Delivery Contracts

Indefinite delivery contracts are also known as "on call," "term" or "back drop" contracts. In general, they provide for delivery of goods and services upon the issuance of a delivery or task order when specific needs arise. Many agencies use these predefined contracts to simplify the procurement process. Utilizing an indefinite delivery contract minimizes the requirement to establish agency terms and conditions since it is only necessary to go through the process of defining the agency's requirements once. In many cases an agency will enter into a contract before the project starts. These contracts usually state the type of service to be provided, a length of time that the service can be requested (usually 3 to 5 years) and a maximum contract amount. The contracts can significantly reduce the amount of time it will take to secure services, but are normally only used on smaller, less complex projects.

Payment incentives and disincentives can be included in many types of contracts. They can be based on predetermined performance standards that are agreed to by all parties to the contract. For example, an incentive fee could be included in a contract and awarded to a contractor if the product is delivered ahead of schedule, and a disincentive fee could be assessed if the product is delivered late. To ensure that these items have a positive effect on the contract and to create a win-win situation, it is recommended that incentives only be used when the contract also includes disincentive clauses.

3.4 UTILIZING EXISTING CONTRACTS

There are existing statewide and agency contracts that may be utilized when procuring products and services. This is often the most efficient and cost effective method to secure the required goods and/or services, since it can reduce the procurement cycle time.

Within the Office for Technology, the Strategic Technology Acquisition and Assessment Team (STAAT) has established a consistent approach to technology procurements and manages a number of statewide technology contracts that provide significant savings due to anticipated quantity purchases/licenses. They can also assist agencies with predictive cost modeling tools and relevant market data on current and emerging technology trends to improve overall strategic planning.

Similarly, the Office of General Services maintains a number of statewide contracts for commodities and selected goods and services that agencies can take advantage of without conducting a full procurement. Procurement Guidelines have been issued by the New York State Procurement Council and endorsed by the Office of the State Comptroller (OSC), the Division of the Budget (DOB), and the Office of General Services (OGS). Full text of the Guidelines can be found on the OGS website at http://www.ogs.state.ny.us. As set forth in Section 5.B of the Procurement Guidelines, the statewide contracts that agencies may use include:

Statewide or Regional Single Vendor Contract: The agency may purchase directly from the contractor.

Statewide or Regional Multiple Vendor Contracts with Agency Selection Among Contractors: The agency may select from commodities, technology or services offered and then purchase directly from a selected contractor.

Backdrop Contracts with Agency Selection Based Upon a Mini-Bid: State agencies and the OGS Procurement Services Group may establish backdrop contracts with multiple vendors that require a subsequent bid process and award among the contracted vendors. Backdrop contracts are based on continuous recruitment and require all bidders to provide not-to-exceed pricing which establishes the ceil-

ing pricing for the term of the contract. The agency must conduct a mini-bid among the pre-qualified backdrop contracts. There are special options available to streamline this process even further, e.g., the "Fast Track" option, provided certain criteria are met. Complete information on these options is available on the OGS website noted above.

Centralized Contracts with One or More Contractors Allowing Subcontracts with Agency Specific Modifications: These centralized contracts contain general terms and conditions for services and/or technology with discounted pricing. An agency may obtain services directly from the vendor using the centralized contract or may execute and obtain approval of a subcontract with specific modifications to the terms and conditions.

Discretionary Purchases: In situations where a commodity, service or technology is not under a centralized contract, an agency may purchase goods or services directly from a responsive and responsible bidder, up to the discretionary limits established. The current discretionary limit for most agencies is $15,000, or $50,000 if the purchase is made from a New York State Small Business Enterprise (SBE), certified Minority-owned Business Enterprise (WBE) or Woman-owned Business Enterprise (WBE).

Depending on the contract used, and subject to State Finance Law, Article XI, the agency may have flexibility in defining the contract terms, and payment methodology, for the particular engagement (i.e., fixed fee, time and materials, etc.).

3.5 ESTABLISHING NEW CONTRACTS

If the required products and services cannot be obtained within existing state or agency contracts, the Project Manager will have to incorporate the establishment of the new required contracts into the overall Project Plan. New York State Finance Law, Article XI, "State Purchasing" and the Procurement Guidelines referenced in 3.2 above provide guidance to state agencies when establishing new contracts to procure commodities, services and technology. Pursuant to Section 4 of the Procurement Guidelines, the following choices are available when establishing a new contract to purchase commodities, products, technology, or services.

3.5.1 Preferred Source

In an effort to advance certain social and economic goals, some providers of commodities have Preferred Source status under the law. Any acquisitions from these providers are not subject to competitive procurement requirements. The Preferred Source status for commodities has been given to the NYS Department of Corrections (DOCS) Industries Program (Corcraft). The Preferred Source status for services and commodities is also given to qualified charitable non-profit agencies for the blind, qualified charitable non-profit agencies for other severely disabled persons, qualified special employment programs for mentally ill persons and certain veterans' workshops. State agencies must purchase from a Preferred Source if the commodity or service required appears on the List of Preferred Source Offerings published by OGS.

In addition to Preferred Sources, other statutes establish a policy to promote small businesses, women-owned businesses and minority-owned businesses in New York State. (See Section 4.A of the Procurement Guidelines; see also Appendix C of the Procurement Council Guidelines for additional information.)

3.5.2 Sole Source/Single Source Procurement

In Sole Source procurement only one vendor can supply the commodity, technology and/or perform the service required by the agency. This method of procurement requires a Procurement Record explaining a) the unique nature of the requirement; b) the basis upon which it was determined that

there is only one known vendor able to meet the need; and c) the basis upon which the agency has determined the cost to be reasonable. All of the above documentation is required by OSC to review the proposed contract.

A Single Source procurement is one in which two or more vendors can supply the commodity, technology and/or service required, but the agency selects one vendor over the others for reasons such as expertise or previous experience with similar contracts. This type of procurement requires a Procurement Record explaining a) the circumstances leading to the selection of the vendor, including the alternatives considered; b) its rationale for selecting the specific vendor; and c) the basis upon which it determined the cost was reasonable. All of the above documentation is required by OSC to review the proposed contract. (See Section 4.F of the Procurement Guidelines.)

3.5.3 Emergency Situations

An emergency is an urgent and unexpected requirement by an agency where health, public safety or the conservation of public resources is at risk. An agency's failure to plan in advance does not constitute an emergency. When an emergency arises, an agency may let procurement contracts without complying with formal competitive requirements. Under these circumstances, the agency head must approve a waiver of the competitive bidding requirements.

The agency must document in the Procurement Record each transaction entered into as a result of the emergency, explaining the nature of the emergency situation, the potential effect on the health, safety or conservation of public resources, and a detailed description of the commodities, services or technology to be provided. (See Section 4.G of the Procurement Guidelines.)

3.5.4 Competitive Procurements

Competitive procurements utilize either an Invitation for Bid (IFB) or a Request for Proposal (RFP) process. Generally, commodities are awarded on the basis of lowest price, as a result of an IFB. While services or technology may be awarded on lowest price as well, they are more often awarded on the basis of best value as a result of an RFP process. (See Section 4.E of the Procurement Guidelines.)

All solicitations of $5,000 or above must be published in the Contract Reporter in conformance with applicable statutes and regulations. (See Section 7 of the Procurement Guidelines.)

The Project Manager should consult with STAAT and OGS prior to initiating a competitive procurement. These agencies may be able to save significant time and effort for the Project Team by providing references to other agencies that have already developed similar RFP's or IFBs, with evaluation and selection methods and processes, good contractual language, and performance standards. By utilizing established procurement best practices the Project Manager can more effectively and efficiently complete the procurement. The RFP process summarized here is described in greater detail in Section 7 of the Procurement Guidelines.

RFP Development:

The RFP should contain a comprehensive and concise statement of work (SOW) that clearly defines the products desired, their functional requirements, operating and performance characteristics and required interfaces with other agency systems and processes. The RFP process enables the agency to obtain and evaluate recommended solutions from a number of different vendors.

The RFP should also contain the invariable and mandatory terms and conditions of the contract. The agency counsel must participate in the development of this element of the RFP. This section will include such items as the method of payment, required Project Schedule, location of work, method of product delivery, warranties, and damages for non-performance, source code escrow, etc.

The RFP must describe the required qualifications for the responding vendors. It must also include a description of the evaluation and selection process and general criteria that will be used in the evaluation. Finally, the administrative aspects of the procurement, such as contacts, key dates, policy and bidding requirements, format of proposals, etc., must be detailed.

Independent Estimate:

An independent estimate of the time and cost to complete the project should be developed. This should be a realistic and not overly optimistic estimate that takes into consideration the technologies and skills involved in the project, especially if "bleeding-edge" technologies are involved. Sometimes this is done through an RFI (Request for Information) process prior to the decision to develop the RFP, to assess the available competitive field and state of the marketplace for the particular industry, as well as to establish a baseline for costs.

This independent estimate will provide a baseline for comparing proposals during the selection process. If there are significant variations between cost and schedule estimates in submitted proposals, the lowest bid may not always be the best value. If the low bid is significantly lower then the independent estimate, it should be looked at very carefully. If the contract is not profitable it can generate many problems for the contractor and the agency.

Selection, Negotiation and Award:

Generally, there are three independent panels or committees involved in the evaluation and selection process:

- A technical evaluation committee reviews and evaluates the technical and functional aspects of the proposals.
- A cost or financial committee reviews and evaluates the cost proposals.
- A selection committee receives the reports of both evaluation committees and recommends the final selection to the Agency Head, Commissioner, or other officer who must authorize the final decision.

Specific criteria, the evaluation instruments, the weighting of individual elements, the cost component, and the technical component must all be defined and sealed before initial receipt of offers (proposals). It is paramount that this process provides equal and fair opportunity to each proposal.

Ideally, the contract language included in the RFP will be of sufficient detail that limited negotiation is required after a proposal has been selected.

3.6 CONTRACTOR MANAGEMENT

After a contractor has been selected to provide commodities, technology or services, the Project Manager is responsible for managing contractor performance, either directly or through a Team Leader. The Project Manager must ensure that responsibility is established for contractor oversight, and that the contractor receives clear direction regarding all contractual matters. Wherever possible, the project management processes defined in this ***Guidebook*** should be required of all contractors.

The keys to successful contractor management are an unambiguous and mutual understanding of the contract and a good business relationship. The performance standards for the contractor must be articulated in the contract, and the contractor should demonstrate a complete understanding of the standards and show that a process has been established for meeting each of these standards. There are benefits to both the contractor and the state agency if a positive relationship can be established and maintained in which risks and benefits are shared.

The Project Manager should hold regularly scheduled meetings with the contractor to obtain information about how effectively the contractor is achieving the contractual objectives. Periodic reviews with the contractor should be established to ensure contractor adherence to standards and compliance with project processes and schedules.

4 PERFORMANCE MEASURES

Objective

Strategic, performance measurement-based management systems allow an organization to align its business activitities to its strategy, and to monitor performance toward strategic goals over time.

Definitions

Performance Measures should identify the population to be measured, the method of the measurement, and the data source and time period for the measurement. Each measure should also be:

- objective
- easy to understand
- controllable by minimizing outside influences
- timely
- accurate
- cost-effective
- useful
- motivating
- trackable

Performance Measures are quantitative or qualitative ways to characterize and define performance. They provide a tool for organizations to manage progress towards achieving predetermined goals, defining key indicators of organizational performance and Customer satisfaction.

Performance Measurement is the process of assessing the progress made (actual) towards achieving the predetermined performance goals (baseline). Measurement is managed using output measures and outcome measures.

Output measures are calculations of recorded activity or effort expressed quantitatively or qualitatively.

Outcome measures are an assessment of the results of a program compared to its intended purpose.

How does an enterprise (agency, business) know how well it's doing? As the vagaries of the stock market have shown us, there is more to a company's performance than just its financials. High-performing enterprises actively identify "key performance indicators," and measure their progress against established target values for those indicators, as a way of measuring their effectiveness. This is performance management, and the key indicators are the Performance Measures (or metrics) of the enterprise.

Performance management is used to track an organization's progress against its strategic plan and specific performance goals. While Performance Measures may be applied to individual projects to ensure that deadlines are met and costs are controlled, etc., it is essential for the Project Manager to understand how the project itself supports the organization's strategy, and how the project will impact or influence the organization's key Performance Measures. This chapter identifies key performance measurement terms and concepts to orient the Project Manager to this important aspect of organizational performance.

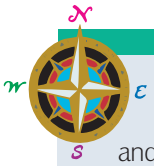
Purpose

The concept of Performance Measures may be new to many Performing Organizations. If Performance Measures do not exist in an organization, a Project Manager may want to develop a system to prove the effectiveness of his own project. In so doing, the Project Manager might also contribute to process improvements within the organization.

Project Managers should consider the following to ensure that projects align with the Performing Organization's mission and strategy:

- Does the agency have a mission and strategic plan?
- Is it clearly articulated?
- Does the organization understand how its activities contribute to mission success?
- Does understanding of the mission extend vertically throughout the organization?
- Are the measures of success focused (at least in part) on outcomes?
- Are the measures related to the mission and goals as reflected in the strategic plan?
- Are the performance data reliable?
- Are appropriate measures reported to individuals at different levels of the organization, and to external stakeholders?
- Are Performance Measures used to influence and/or inform resource allocation decisions?
- Is there any relationship between organizational performance and individual or group incentives to contribute to organizational performance?

In some organizations, projects are selected because they will enhance operational performance. For example, a project may be intended to reduce cycle time, improve time to market, or increase Customer satisfaction. The Project Manager must understand how and to what extent the performance of his/her project is expected to improve organizational performance, and how the project's effect will be measured.



Remember, performance measurements provide a mechanism for the organization to manage its financial and non-financial performance. Accountability is increased and enhanced, ensuring that projects support the organizational strategy, and that better services and greater satisfaction are provided to the Customer. Performance that is measured and reported will improve.

4.1 THE BALANCED SCORECARD

There are many different measurement frameworks, including the balanced scorecard, activity based costing, competitive benchmarking, and shareholder value added. Each of these provides a unique and different lens through which to view an organization's performance.

Most frameworks tend to be one-dimensional in perspective. For example, benchmarking tends to involve taking a largely external perspective, often comparing performance with that of competitors or other best of breed practitioners or business processes. This kind of activity is frequently pursued as an exercise to generate ideas for or obtain commitment to short-term improvement initiatives rather than to design a formalized performance measurement system. However, the balanced scorecard is a measurement framework which integrates multiple perspectives.

The balanced scorecard integrates four sets of measurements, complementing traditional financial measures with those driving future performance. An organization using this framework is encouraged to develop metrics that facilitate collection and analysis of information from the following perspectives:

- Financial
- Customer
- Learning and Growth
- Internal Business Processes

Implementation of a balanced scorecard presents an opportunity for a Performing Organization to look at its existing programs, services, and processes. Are the right services being provided to the Customers? (Are we doing the right things?) Are the processes implemented now the most efficient and cost

effective that they can be? (Are we doing things right?). Specific measures (metrics) are developed which can then be analyzed to provide answers to these questions.

Once appropriate metrics have been identified, data collection and tracking processes are put in place, the organization can begin to adjust its practices and evaluate its performance over time. A continuous feedback loop is formed, in which the organization can use measurement information to re-align initiatives as needed.

Scorecards are effective in aligning an organization's business areas and activities with its overall strategy, identifying critical financial and non-financial measures, identifying cause-and-effect relationships among measures that may aid in problem diagnosis and encourage accountability across the organization.

4.2 PERFORMANCE MEASURES IN THE PUBLIC SECTOR – A SUCCESS STORY

While executing a large initiative to improve organizational business processes, the New York State Workers' Compensation Board recognized the need to measure performance within its organization. The project was expected to dramatically improve operational effectiveness, but how could that be proved? The volume of work performed was the only measurement being calculated, and this did not reflect other aspects of organizational performance. By identifying and implementing Performance Measures the Board would also be able to measure the effectiveness of its organizational business process improvements.

Because the business process improvements being implemented were going to affect the entire organization, the Board was challenged with identifying and developing Performance Measures that would be widely applicable. Appropriate metrics were needed for Executive Management, Performing Organization Management, Project Management, and individual Project Team members. It became apparent that implementing Performance Measures to the level of detail required would become a project in and of itself! The Board assembled a Project Team that was charged with:

- Defining Performance Measures - Team members quickly realized that while many ideas and methods for performance measurement already exist, it would require some effort to find the ones that would work best for them.

- Formulating the Project Scope - The team needed to identify business areas that would be involved in or affected by the project and obtain buy-in from the appropriate members of Executive Management.
- Identifying the Project Approach - Two teams were formed. The Measures Team was responsible for developing measurements, analyzing measurement results, recommending processes for improvement, and producing deliverables. The Strategy Team was the liaison between the Measures Team and Executive Management and ensured regular communication and contact among all involved parties.
- Developing a Plan - The team assembled a plan that documented a phased approach to implementing Performance Measures within the organization. Earlier phases concentrated on measurements at a conceptual level. Detailed measures, measurement targets, data, and required reports were defined during subsequent phases. The outcome of the project was to be a set of detailed reports containing the information that would drive process improvements that would be consistent with the strategic vision of the organization. To enable the integration of performance measures into management programs within the organization, these reports would need to be readily produced and easily available to managers and staff.
- Identifying Risks - Early in the project, the team identified and documented potential risk events that might be barriers to the success of the project, and formulated plans to mitigate the risks should they occur. Some of the risk factors included:
  - Organizational inertia
  - Fear
  - Availability of funding
  - Availability of data
  - Lack of skills necessary to implement process improvements
- Evaluating Best Practices - The team contacted state agencies and other public sector entities to gather and evaluate existing best practices for Performance Measures. During the beginning stages of the Worker's Compensation Board project, however, very few successful implementations existed in the public sector.

Without a system of Performance Measures available "out of the box," the team formulated a methodology that drew heavily upon the concepts of the balanced scorecard. The team discovered that there are a number of factors affecting measuring performance in a public sector enterprise that require a customized approach to implementing the balanced scorecard. Most public sector organizations are in the business of policy, not profit, whereas for-profit organizations would supplement extensive and standard measures of financial performance with the other perspectives of the scorecard. In addition, it was difficult to reconcile the business process improvement notion to "measure the process, not the people" within a system of measuring performance that encourages the linkage between strategy, process and individual performance. Also, the limited number of measures recommended by the methodology may not necessarily allow a public sector organization to meet the public's demand for information on how the organization was performing.

Once the upfront planning was complete, the team categorized the business and functional areas that would be measured and developed a mission statement for each. Team members then agreed upon the criteria against which all proposed Performance Measures would be assessed. Depending upon the factors determining success of the business or functional areas being measured, potential measurement criteria were narrowed down to a key set. The team refined the key set of measures by defining and expressing them in terms of target goals, based on the long-term vision of Executive Management. These were refined throughout the course of the project.

The list of measures numbered only 50, but when the data was leveled, trended, sliced, and diced, it translated into 300 reports! It was then necessary for the team to define a way to deliver the information contained in the reports in a way that would be meaningful and could translate into process improvements. Data were grouped into reports appropriate to the selected audience: Executive Management, Performing Organization Management, Project Management, and individual Project Team members. Standards were defined to report data in a valid, user-friendly way, displaying information as it related to defined target goals.

With the support of Executive Management, business process improvements based upon the data collected and reflected in

the reports were introduced in the organization. Measurements translated into results! For example:

- As a result of re-engineering, the average time required to index a case at the Board dropped from 31.4 days to 16.5. After implementing Performance Measures for this process, the average days dropped again to 6.7, with the best practices district achieving an average of only 3.4 days.
- The number of cases resolved through informal processes increased from 2100 per month to 3750 per month. Shortly after implementing Performance Measures, with fewer claims examiners, the number increased to 5000.
- Despite a 300% increase in the volume of Administrative Determinations produced by Worker's Compensation Claims Examiners, the approval rate for Administrative Determinations remains above 95%.
- Every area of the Board's operations related to handling claims for benefits saw improvement almost immediately after implementing Performance Measures.
- Although the Board's Electronic Case Folder (the technological cornerstone of the OPTICS project) is nearly 4 years old, through continuous improvement activities and Performance Measures the Board continues to see improvement in its business processes.
- Areas not yet measured continue to provide opportunities for improvement.

The following were noted by the Worker's Compensation Board as important lessons learned as a result of successfully implementing a Performance Measures system:

- Strong executive sponsorship is critical in order to resolve policy and strategy issues that arise when an organization attempts to implement a successful Performance Measures system. In fact, some propose that "Leadership" should be added as a fifth perspective to the balanced scorecard for public sector organizations.
- Measures should come in sets. Measures drive behavior and, therefore, balance must exist not only between the components of the framework but within each component.
- It is easy to develop measures – the challenge is defining the right set of measures that tie directly to the strategic vision for the organization.

- Measures must be few in number, have quantifiable goals, and be derived from what drives operational success in the organization.
- Set targets! If you cannot establish a target for a proposed measure you must ask the question "Why do we measure this?"
- If meeting the performance goals of the strategic vision is not possible at the outset, establish pragmatic targets for today. Review these targets periodically and increase them over time until they meet the vision. If you do this, you will establish a culture of continuous improvement!
- Measures must be produced more frequently than an annual report.
- Reporting standards reduce the learning curve and ease the process of implementing Performance Measures in the field.
- Measures should, wherever possible, involve the individual performer; but supervisors and managers must not confuse a scorecard with a report card. Performance Measures supplement the traditional performance evaluation process.
- When implemented correctly, an organization should see improvements in every area measured.

The success of the efforts of the Worker's Compensation Board did not go unnoticed. The MIRROR Project (**M**anagement **I**nformation, **R**esearch, **R**eferences and **O**perational **R**eports), which has been described as one-stop shopping for performance data and information about the performance measures project, has won the following prestigious awards:

Winner - Workforce Champions 2001

New York State Governor's Office of Employee Relations
http://www.goer.state.ny.us/Train/wfc/2002

The annual Work Force Champions Award recognizes teams of New York State employees for their exceptional efforts in making their respective agencies better at achieving their objectives. The Work Force Champions Award was established at the direction of Governor Pataki to recognize Executive Branch employees for their noteworthy accomplishments within State

government," said Acting Director Currier. "This award program publicly acknowledges employees for their outstanding contributions, and showcases their achievements so other agencies can learn about the creative initiatives and solutions that exist throughout State government."

Winner - Prize for Public Service Innovation 2002

Citizens Budget Commission
http://www.cbcny.org

Through the Prize for Public Service Innovation the Citizens Budget Commission (CBC) seeks to identify and highlight a New York State government agency that demonstrates an innovative approach to providing government services. The CBC awards this prize both to celebrate creative thinking and to share government achievements with the public and other agencies.

The CBC Prize for Public Service Innovation was established in 1997 to recognize and promote successful innovations in the delivery of public services. The Trustees of the CBC instituted a prize schedule that alternates annually between New York City and New York State agencies.

Winner - 2001-2002 Best Practices Award

New York State Forum for Information Resource Management
http://www.nysfirm.org/index.html

The Forum recognizes outstanding work done during the past year in the area of Information Resource Management by New York state and local government organizations.

Winner - Computerworld Honors Program Laureate 2003

Computerworld Honor Program – A Search for New Heroes
http://www.cwheroes.org

The Computerworld Honors Program brings together the Chairmen or Chief Executive Officers of the foremost information technology companies in the world and the world's leading universities, libraries and research institutions to document a revolution in progress: the global information technology revolution. Established in 1988, the Program is dedicated to identifying the men and women, organizations and institutions, that are leading this revolution and to recording the impact of their achievements on society.

The MIRROR is also under consideration for a Computerworld Honors Program Worldwide Finalist and Computerworld Honors Program 21st Century Achievement Award to be selected in June, 2003.

Semi-Finalist - 2002 Innovations in American Government Competition

Harvard University John F. Kennedy School of Government
http://www.innovations.harvard.edu

Launched in 1985, the Innovations in American Government is an awards program of the Institute for Government Innovation in partnership with the Council for Excellence in Government funded by the Ford Foundation. It has become a significant force in identifying and promoting excellence and creativity in the public sector. Through this annual awards competition, the program has recognized 295 innovative programs, which have received $17.9 million in Ford Foundation grants. By highlighting exemplary models of government's innovative performance, the Program serves as a catalyst for continued progress in addressing the country's most pressing public concerns.

The MIRROR continues to be under consideration for winning this award to be determined in April 2003.

In addition to these awards, the MIRROR's technical achievement, based on an early prototype, was recognized by Sybase, Inc. and presented at the company's annual international technical conference Tech Wave 2000 - Los Angeles, California.

5 IT PROJECT CAPABILITY (CMM)

Purpose

One way to measure an organization's capability to perform IT projects is through a tool such as the SEI Capability Maturity Model. The Capability Maturity Model (CMM) provides a framework for improving the performance of an IT organization.

Description

In the 1980's, the United States Air Force funded research at the Carnegie-Mellon Software Engineering Institute (SEI) to create a model for the military to evaluate software subcontractors objectively. The result was the Capability Maturity Model, published as *Managing the Software Process* in 1989. The CMM has since been revised and updated. More information is available at the SEI website:

http://www.sei.cmu.edu/cmm/cmms/transition.html

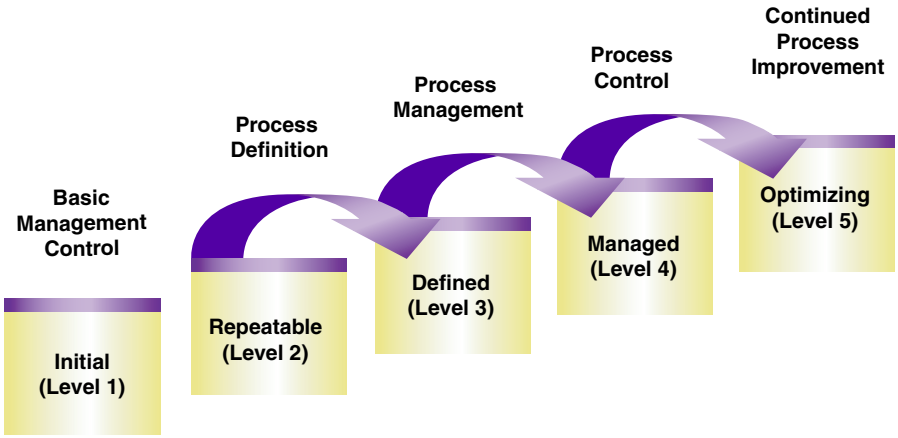
The underlying principle of the CMM is that software development is a management discipline undertaken as part of an organization's mission and strategic plan to achieve its business goals. To ensure success in using the CMM, management must first understand the needs of the organization, and accurately predict its ability to meet those needs.

The most widely accepted model for measuring the effectiveness of the software development process, the CMM has been used successfully by many organizations to identify the key areas on which to focus improvement initiatives. Although it is geared to large organizations, many of the processes involved are appropriate for organizations of any size.

The CMM is organized into five levels of organizational maturity, with each level representing a higher evolutionary stage of process capability and a progressively greater likelihood of producing quality software.

The five-stage CMM roadmap, through which an organization can mature its processes and practices, is illustrated below.

Figure 5-1 Capability Maturity Model



These levels are described in terms of Key Process Areas. A Key Process Area is a group of related activities considered important for an organization functioning at the appropriate process maturity level.

Many organizations may find themselves operating at Level 1, with movement towards Levels 2 and 3 posing a major challenge. Each level is described in more detail below.

LEVEL 1 - INITIAL

This level has no Key Process Areas. There may be minimal formal processes and project management disciplines, but they are typically very lax with limited controls in place. Results are unpredictable and successes are due to the efforts of individuals rather than the performing organization. Many organizations begin at this level.

LEVEL 2 - REPEATABLE

The Key Process Areas in Level 2 require the definition of and enforcement of project management practices. These practices are utilized to assist organizations control project cost, time and deliverable commitments. Successfully repeating previously mastered tasks, to avoid repetitive failures brings an organization to Level 2.

LEVEL 3 - DEFINED

The Key Process Area to Level 3 is defined process management. This level focuses on processes that relate to management and software engineering activities across the Performing Organization, that are formally defined, documented and integrated into a standard process that is understood and followed. Once the Performing Organization has reached this level, and the management and software engineering processes are established successfully, continuous process improvement will have been achieved.

LEVEL 4 - MANAGED

The Key Process Area to Level 4 focuses on the process controls in place to measure quality. Detailed measures of the management and software processes are collected and used to identify and correct issues with process performance. As new tools or processes are added or introduced to an existing environment, the measured data enables the Performing Organization to assess the success of the adjustments made. A managed process for these continuous improvements helps to establish and maintain a high performing organization.

LEVEL 5 - OPTIMIZING

This level has only been achieved by a handful of organizations. The Key Process Area for Level 5 is to maintain continuous improvement and optimize existing processes. The Performing Organization at this level will be equiped to proactively address the strengths and weaknesses of the business processes and software engineering practices. Instead of correcting defects as they occur, quality efforts will focus on prevention and will also anticipate possible root cause scenarios. Level 5 is the premier level of optimization.

The Benefits of the CMM

The benefits to moving up the CMM scale are major performance improvements, including:

- Improved Stakeholder and Customer satisfaction
- Improved quality and robustness of deliverables and products
- Shortened and more predictable delivery times
- Cost reductions in development and support
- A shift in organizational culture from reactive to proactive
- Implementation of performance measurements organizationally, as well as by project

The CMM helps organizations meet mission and strategy goals, better align projects to Customer needs, and better align people and processes to technology. As organizations move through the levels of the maturity model they become more efficient. At the same time, their understanding of tools and techniques and when to use them to solve a business challenge increases. Higher levels of maturity result in organizations that are better equipped to predict the impact of introducing new technology, new techniques, and new tools, enabling them to bring products to market faster, with higher quality and with more Customer satisfaction.

6 IT PROJECT TOOLS

Purpose

Over the last ten years, there has been a proliferation of software to assist in the management of IT projects and IT operational processes. New software has been introduced to support all phases of the System Development Lifecycle (SDLC). Although these tools can and do provide much needed support for the application development process, it is important to remember that the tools are there to support the SDLC process, not to provide the process. As the Gartner Group emphasizes, "Methodology before Technology – technology changes frequently, solid methodologies are flexible, adaptable and age well."

Implementing automation into the SDLC process is a serious commitment. Without a clear understanding of what it will take to be successful, from the fiscal commitment to the resource commitment, the software becomes shelfware.

There are a number of concerns regarding automation in the SDLC, including selecting the right tool for the job and lack of management support for the automated tool that is chosen. Because the use of automated tools in the SDLC process is a relatively new and expanding area, it often does not gain the attention it deserves until something goes wrong. Many agencies lack effective automation architecture and the specialized competencies required to implement and use the automated tools. Adding new tools requires new skills, training, and expenditures for the software and equipment, all of which drain existing resources.

It is important, therefore, to address several key factors in the automation of the SDLC, including:

- Senior management support
- Adequate resources with appropriate skills
- Clear and effective ownership and integration of technology with SDLC processes
- Proper training
- Performance Measures

6.1 TOOL SELECTION

Selecting the correct software to assist in the SDLC process is the key to its effectiveness. Purchasing and implementing the correct tool for the job is as important in application development as it is in building a house. Defining the requirements and functionality that the tool is expected to provide is similar to working with the architect in the design of a new building. After the building has been designed and agreed upon, you have a better understanding of what tools to use. Using 10 laborers with shovels is one way to dig a foundation. Bringing in a worker with a backhoe would be considered an automated way to dig the foundation. For a house, a bulldozer would be appropriate, for a doghouse, it would be considered overkill. With so many tools on the market and so many companies buying each other out and coming up with new ideas, it is important to accurately define what is to be accomplished with the software.

When implementing automated solutions, keep it simple. If the tool gets in the way, people won't use it. The tool should be integrated into existing work processes for Customer support and documentation. Then purchasing software ensures that a definite business need has been defined.

There are many different types of automated software that sound good, but will using them make the development faster or the quality of the software better? The best idea is to start small and build on successes.

When purchasing a tool, continue to refine and prioritize requirements based on the initial round of investigation. Quiz the vendors and read the literature, and narrow the list to no more than three options. To evaluate the finalists, develop a list of real tasks that the tool would be required to perform and have someone who will be an actual user of the tool perform the hands-on analysis. Other evaluation steps would be to find the local user group and attend a meeting, determine the extent of the on-line community for the tool and consider the stability of the vendor (how long have they been in business?). Once the selection has been made, a plan should be developed for introducing the tool. Make sure that training is available for the users and that the effects of the change are considered. (from *Making the Right Choice–A "How To" Guide to Choosing Tools* by Elisabeth Hendrikson, www.qualitytree.com. Automated Testing Conference, Boston, MA. August 2001.)

Six key ingredients to help avoid the chance that the tool will become shelfware:

- evaluate,
- implement and deploy well,
- use wisely,
- overcome problems, and
- reap the benefits!

Implementing an Automated Regression Test Suite by Lloyd Roden, Grove Consultants Automated Testing Conference, Boston, MA. August 2001.

There are many tools, suites and packages to choose from. Some tools are specific to the type of job you require, some tools address all aspects of a particular phase in an SDLC, and then there are tools that are comprehensive for an SDLC and are packaged as a suite. If the need has been thoroughly identified, it is easier to determine the level of tool to analyze. It will be helpful to visualize the phases of the lifecycle and the deliverables in order to determine which tool is required.

Some tools available are packaged to provide functionality for both business and data modeling. For example, within System Requirements Analysis it is possible that both a business modeling tool, and a data modeling tool may be required. Tools that can help capture information, perform modeling, and generate test scripts can be especially helpful in keeping data in one repository, and for tracking how it is processed.

To summarize, the Project Manager should determine if there are any tools that will assist the Project Team in their SDLC efforts. It is important to note, however, that many tools, and especially tool suites, may require a change in the way work is performed, which may or may not be beneficial. The final measure of a tool is how well it assists the Project Team in accomplishing the goals of the project. Knowing which tools provide which service will allow you to select the right tool for the job!

SECTION THREE

III

System Development Lifecycle

SECTION III: SYSTEM DEVELOPMENT LIFECYCLE
TABLE OF CONTENTS

Section III Introduction

There are currently many different methodologies employed for system development projects within New York State agencies. Many methodologies are driven by the application development tools, by the software architecture within which the application will operate, or by the "build versus buy" decision. There are standard phases and processes, however, that all system development projects should follow, regardless of environment and tools. This section describes the standard phases and major processes of the New York State System Development Lifecycle (SDLC), using a common language and in sufficient detail to enable a Project Manager to plan and manage a system development project.

System Development Lifecycle Overview

The material in this section is organized according to a generic system development lifecycle. While no two development efforts are exactly alike, all projects should progress through the same six phases:

1. **System Initiation** – in which the Business Case and Proposed Solution developed during Project Origination are re-examined to ensure that they are still appropriately defined and address an existing organizational need. This validation effort provides the Project Team with the basis for a detailed schedule defining the steps needed to obtain a thorough understanding of the business requirements and an initial view of staffing needs. In addition, a high level schedule is developed for subsequent system development lifecycle phases.

2. **System Requirements Analysis** – in which the needs of the business are captured in as much detail as possible. The Project Manager leads the Project Team in working with the Customers to define what it is that the new system must do. By obtaining a detailed and comprehensive understanding of the business requirements, the Project Team can develop the Functional Specification that will drive the system design.

3. **System Design** – which builds upon the work performed during System Requirements Analysis, and results in a translation of the functional requirements into a complete technical solution. This solution dictates the technical architecture, standards, specifications and strategies to be followed throughout the building, testing, and implementation of the system. The completion of System Design also marks the point in the project at which the Project Manager should be able to plan, in detail, all future project phases.

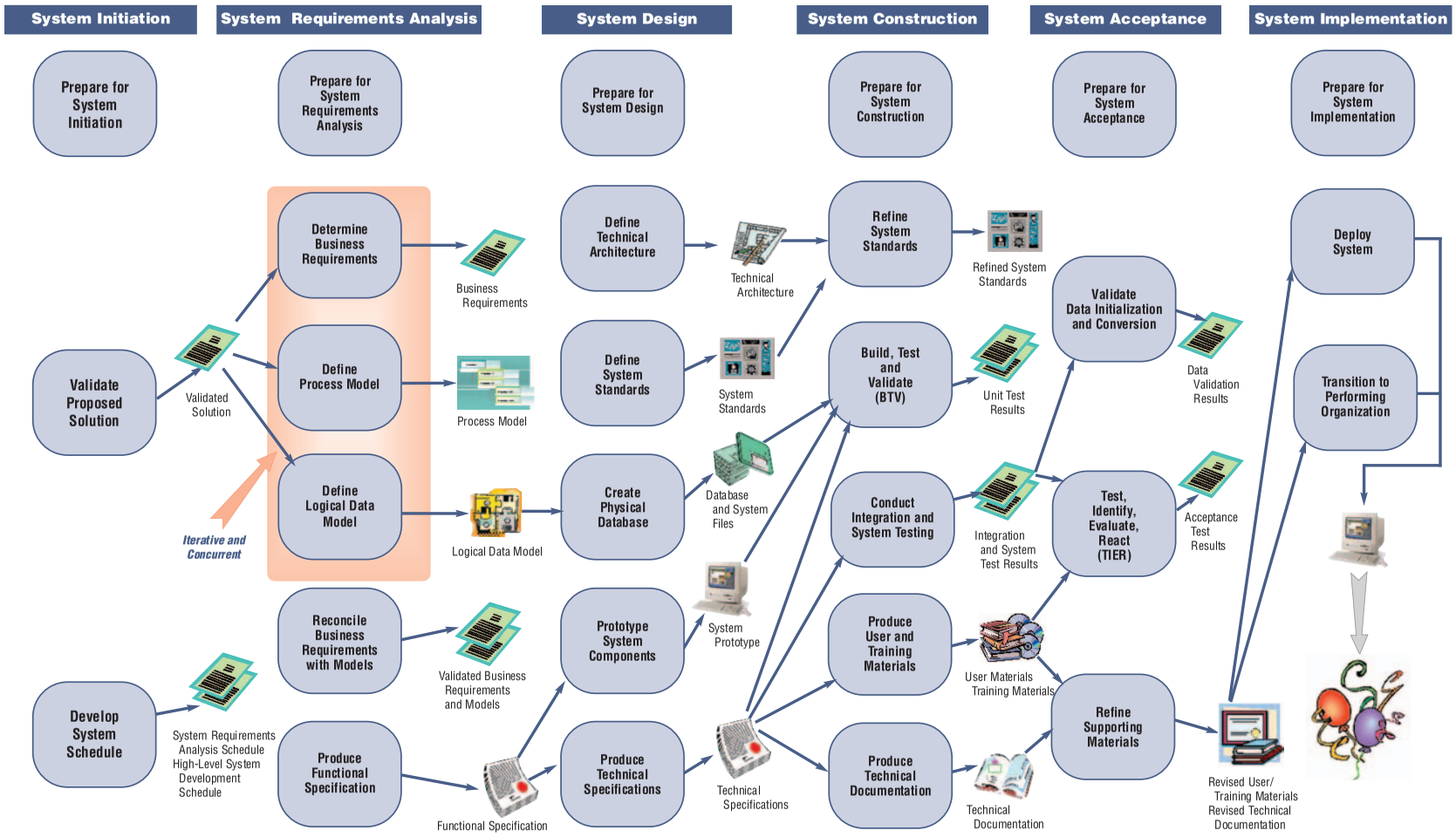
4. **System Construction** – throughout which the Project Team builds and tests the various modules of the application, including any utilities that will be needed during System Acceptance and System Implementation. As system components are built, they will be tested both individually and in logically related and integrated groupings until such time as a full system test has been performed to validate functionality. Documentation and training materials are also developed during this phase.

5. **System Acceptance** – during which the focus of system validation efforts shifts from those team members responsible for developing the application to those who will ultimately use the system in the execution of their daily responsibilities. In addition to confirming that the system meets functional expectations, activities are aimed at validating all aspects of data conversion and system deployment.

6. **System Implementation** – the final phase of the lifecycle, which comprises all activities associated with the deployment of the application. These efforts include training, installation of the system in a production setting, and transition of ownership of the application from the Project Team to the Performing Organization.

The following diagram illustrates every phase, process and deliverable in the system development lifecycle.

Figure 0-1 *NYS Project Management Guidebook* The System Development Lifecycle

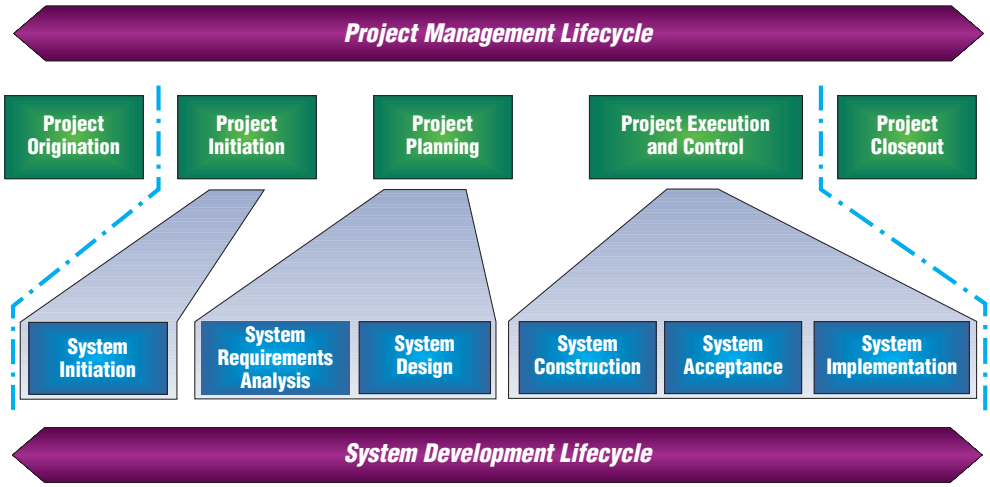


NYS Office for Technology
Project Management Office

Mapping the Project Management and System Development Lifecycles

The phases of the system development lifecycle generally align with the phases of the project management lifecycle; however, SDLC phases do not correspond one-to-one with the project management phases. One of the challenges for system development projects is aligning the SDLC with the project management lifecycle. The following diagram demonstrates how the phases of the two lifecycles may be integrated.

Figure 0-2



In reality, each phase of the SDLC can be thought of as a mini-project in itself, requiring planning, execution, and analysis. As the Project Team proceeds through the project, they will need to create a clear and detailed plan for the phase immediately in front of them, along with a higher-level view of all remaining phases. As the team executes each phase, they will collect additional information that will enable the detailed planning of subsequent phases. Some of this information will be a natural by-product of having performed the processes associated with the current phase (e.g., as the detailed technical design evolves throughout the System Design phase, the team will have a much better understanding of the modules that will need to be built during construction, and will therefore be able to refine any prior estimates and plans for System Construction). Additional information can be obtained through a focused

analysis effort, performed at the completion of each phase. This assessment is analogous in many respects to conducting the Post-Implementation Review as described in Section I, Project Closeout, although it is typically conducted in a less formal fashion. The responsibilities of the Project Manager include assessing how closely the phase met Customer needs, highlighting those aspects of the phase that worked well, identifying lessons learned and best practices in an attempt to derive ways to improve upon processes executed throughout the project, and, most importantly, communicating results.

The SDLC defined in this section may appear to have characteristics of a classic "waterfall" approach, which assumes that each phase and process is completed and agreed upon before the next phase begins. The reality is, however, that phases generally overlap, with each successive phase introducing changes to the work of the prior phase, resulting in an iterative process.

This SDLC is also consistent with newer techniques for system development, such as Rapid Application Development (RAD). RAD allows users to participate in an iterative design and development process. Conceptually, the project "loops" through the Design, Construction, and Acceptance phases, followed by re-Design, revised Construction, Acceptance, and so on. Project management deliverables such as the Project Scope Statement, Project Schedule, and budget estimates are refined to reflect increasing clarity of scope and requirements with each iteration.

While there is the potential to compress Requirements Analysis, Design, and Construction in RAD approaches, compression introduces increased risks. It is important, therefore, to include risk analysis in each iteration of the design, build, and evaluate loop. When a prototype is presented, Project Managers must actively and diligently address the management of Customer expectations and the maintenance of current documentation.

The RAD approach has advantages, since it usually achieves results quickly, the design is less abstract, and users have assurance that up-to-date requirements are considered. Its disadvantages include difficulty in controlling the process and ensuring the creation of an acceptable product.

Many factors may impact your choice of approach to follow when developing a system. The better you know your Customers and Stakeholders, and the better you understand the factors that may influence their assessment of the project, the more likely it will be that your approach will suit their personalities, preferences, vision, and needs.

The key is to pick the approach that you believe will provide the best complete solution, balancing the preferences of your Customers, the abilities of your Project Team, and the overall business drivers (legislated timeframes, overall time to market, etc.).

In any approach, the basic SDLC processes must be performed – what differs is the timing of their execution. As with the project management methodology, if processes or deliverables are skipped, the Project Manager must record the reasons why, and must describe how the objectives of that process/deliverable will otherwise be met.

Understanding the Breadth of System Development Projects

When assessing the scope of a system development project, it is important that the needs, goals, and challenges of the project are understood from many perspectives. The ***business requirements***, which define the high-level Customer objectives and vision for the system, are used to determine the scope of the system. When capturing the business requirements, it is essential that the Project Team look at all aspects of the system, including:

- **Functional Requirements** – describing processes and tasks that the Consumer must be able to accomplish through the use of the system. These can typically be categorized as processes that require action on the part of Consumers (data entry, selection of a system command, etc.), and those that are not directly related to human interaction with the system (for example, off-hours processing or the automated exchange of information between systems).
- **Technical Requirements** – identifying technical aspects and constraints that must be considered when defining the new system. Considerations may include accessibility needs of Consumers, whether or not the storage and

handling of data must follow specified encryption regulations, or whether the system will operate on internal agency hardware or will be hosted at either an internal or external data center.

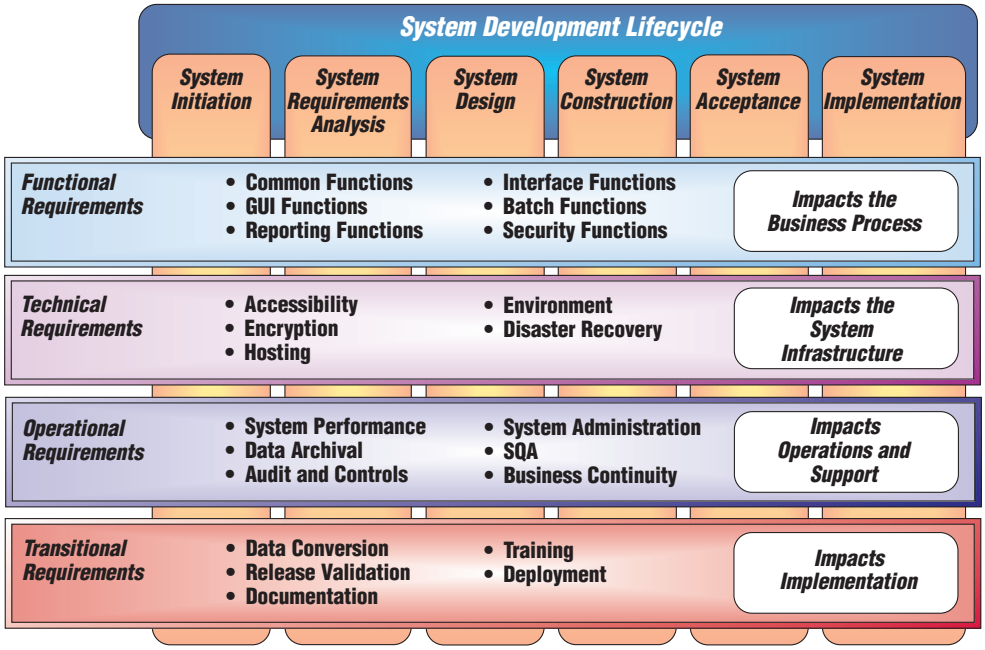
- **Operational Requirements** – specifying any administrative constraints or expectations that must be supported by the system. These requirements may include system performance expectations, technical infrastructure constraints, security mechanisms that must be followed, the need to regularly archive data, and any mandated audit and control processes.
- **Transitional Requirements** – defining the realm of conditions that must be satisfied prior to physically implementing the system in a production environment, or to relegating support responsibilities to the Performing Organization. Data conversion requirements and development and delivery of Consumer training programs and materials fall into this category.

Formally organizing thoughts along these four dimensions will drive the identification of tasks to be performed beginning in System Initiation and continuing throughout the lifecycle. The Project Manager is responsible for creating this broad view of requirements and communicating it to the Project Team, establishing a pattern that should be carried throughout all project phases.

The following diagram illustrates some representative categories of requirements that the team should consider when defining tasks and activities throughout the system development project.

Figure 0-3

Representative SDLC Considerations



It should be noted that not all considerations may be applicable to every project, and additional categories may be discovered that are not represented in the diagram. The fundamental point is that for those considerations that do apply to the project, there will be corresponding activities required throughout each and every phase of the SDLC, all contributing to the eventual implementation of the system. Regardless of whether the Project Team is performing System Initiation, Requirements Analysis, Design, Construction, Acceptance, or Implementation activities, they will need to understand and address the full realm of functional, technical, operational, and transitional requirements to ensure a successful project. In an attempt to reinforce this point, this diagram will be revisited in each of the individual SDLC phases that follow, drawing specific references to the processes relevant to each phase of the lifecycle.

Software Quality Assurance

In the way that project management provides the umbrella under which all project activities are directed, software quality assurance provides the foundation on which all system development activities should occur so that the highest quality system possible will be delivered. According to the IEEE Standard Glossary of Software Engineering Terminology, quality is defined as the degree to which a system, component, or process meets specified requirements and Customer needs and expectations.

As will be stressed throughout the following chapters, it should be noted that simply meeting requirements is not enough to guarantee a successful system development effort. Ultimately, Customer needs and expectations can be met only if the requirements are fully and correctly captured in the first place.

Analogous to the Quality Assurance Plan associated with the project management lifecycle, software quality assurance programs should be comprised of three components – quality standards, quality assurance processes, and quality controls.

Software Quality Standards define the programming standards, and development/testing standards to be followed throughout the project.

Software Quality Assurance Processes define practices and procedures to be used by the Project Team to meet the quality standards, and to provide management with evidence that these procedures are being followed.

Software Quality Controls comprise a series of reviews and audits that evaluate deliverables with respect to defined standards and acceptance criteria. These controls include software testing techniques and peer reviews.

The key to these SQA efforts is that they must be performed throughout all phases of the project. In addition, all SQA efforts should ideally be performed by a third party, independent from the team members responsible for delivering the system. Availability of staff and budget are two factors that must be considered in determining the feasibility of applying an independent SQA Analyst or team to the project. In developing the

overall system development plan, the Project Manager needs to allocate sufficient time and resources to perform the appropriate level of SQA activities, and must obtain management commitment to providing these resources as called for in the Project Schedule.

Project Roles and Responsibilities

As presented in the Section I Introduction, Project Roles and Responsibilities, there are many groups of people involved in both the project and project management lifecycles. When staffing system development projects, there are a number of roles that should be considered. It should be noted that the SDLC only provides details to the phase and process level, whereas the PM lifecycle further decomposes activities down to individual tasks. As a result, while the roles identified within the SDLC are representative of those that are typically required in a system development effort, the function of the role as it relates to a given SDLC process may not be specifically described within that process narrative.

The **Project Team** consists of a Project Manager and a variable number of Project Team members who are responsible for planning and executing the project. Team members specific to the System Development Lifecycle are described below.

The **Facilitator** leads sessions to identify business requirements and issues, keeps sessions focused and productive, draws out issues and ideas from all participants, and maintains clear and open communications within the session.

The **Business Analyst** effectively leads discussions with the Customers to determine the business requirements, participates in preparing the data and process models, prepares module specifications, test data, and user documentation materials, assists in prototyping activities, and develops strategies for testing and implementation.

The **Database Administrator** is responsible for providing and maintaining database administration policies and procedures, approving and executing database scripts, performing database tuning activities, and transforming a pictorial representation of the system data (the Logical Data Model) into physical database tables that support the final system.

The **Data/Process Modeler** develops and maintains data and process models to represent the business information needs in the area under study, develops and defines the data dictionary, validates models with the Customers, and participates in prototyping.

The **Technical Lead/Architect** drives the logical process and data models into an application architecture, establishes architecture guidelines, and develops strategies for the creation and distribution of applications.

Application Developers include all those responsible for developing prototypes, technical specifications, and application code, and for executing test scripts.

The **Software Quality Assurance (SQA) Analyst** is responsible for establishing and executing the Quality Assurance Plan, for assisting in the preparation of test scripts and test data, and for participating in integration and acceptance testing efforts.

Technical Services (HW/SW, LAN/WAN, TelCom) include all those responsible for the ordering, installation and maintainence of hardware and software components, LAN/WAN components and telecommunications components.

The **Information Security Officer (ISO)** is responsible for identifying and enforcing security standards and processes.

Technical Support (Help Desk, Project Administration, Documentation, Trainers) includes all those responsible for supporting the development of the new system. Support includes the documentation of user, training, operation materials, and help files, training for Customers, responding to technical and business questions forwarded to the Help Desk, and supporting the project and associated administrative processes.

Figure 0-4 New York State System Development Life Cycle Templates

Phase	Template	Description	Page in Text	Page in Appendix
System Requirements Analysis	Business Requirements Document	A document containing detailed functional, technical, operational and transitional requirements for the system being developed	45	99
System Requirements Analysis	Functional Specification	A document describing the logical grouping of related processes and the mapping of those processes to business requirements and data items.	59	103
System Design	Technical Architecture	A document describing the system architecture in terms of hardware, software, tools and peripherals, and the distribution of system components and processes across this architecture.	81	109
System Design	System Standards	A document detailing the standards to be applied and adhered to throughout the project.	87	115
System Design	Technical Specifications	A compilation of system diagrams, module specifications, and test plans that serve as a detailed, comprehensive blueprint for the system.	109	121
System Construction	Defect Log	A document used to log defects encountered when performing integration, system, data validation or acceptance testing, and track their resolution.	145	131

1 SYSTEM INITIATION

Purpose

The purpose of **System Initiation** is to validate the Proposed Solution developed during the Project Origination phase of the Project Management Lifecycle, and to estimate the system development effort in greater detail. In this phase, the broad parameters of the new system are defined, and applicable system development activities are identified.

Once the overall approach has been confirmed, it is necessary to estimate the effort and resources required for the next phase in elemental detail, and to provide high-level estimates for subsequent phases, to the extent necessary to support the project management lifecycle deliverables and activities of Project Initiation.

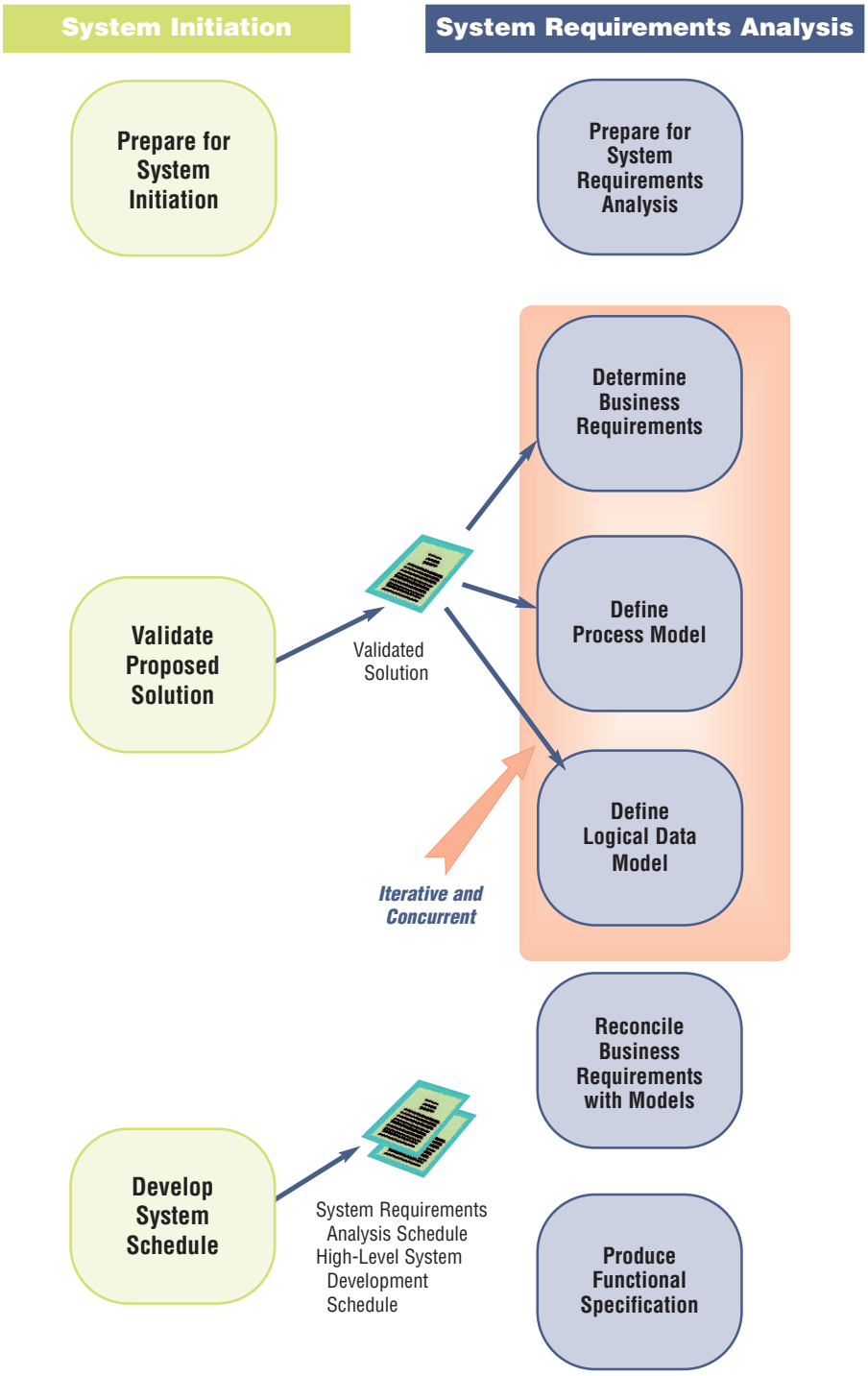
List of Processes

This phase consists of the following processes:

- **Prepare for System Initiation**, where the initial members of the Project Team familiarize themselves with the project's defining documents and plan the activities for the rest of the phase;
- **Validate Proposed Solution**, where the original technology direction and system development approach are validated;
- **Develop System Schedule**, where a detailed System Requirements Analysis schedule is developed, and a high-level system development schedule is produced.

The following chart illustrates all of the processes and deliverables of this phase in the context of the system development lifecycle.

Figure 1-1


System Initiation
System Requirements Analysis
Prepare for System Initiation
Prepare for System Requirements Analysis
Determine Business Requirements
Define Process Model
Define Logical Data Model
Validate Proposed Solution
Validated Solution
Iterative and Concurrent
Reconcile Business Requirements with Models
Develop System Schedule
System Requirements Analysis Schedule
High-Level System Development Schedule
Produce Functional Specification

List of Roles

The following roles are involved in carrying out the processes of this phase. Detailed descriptions of these roles can be found in the Introductions to Sections I and III.

- Project Manager
- Project Sponsor
- Business Analyst
- Technical Lead

List of Deliverables

The following table lists all System Initiation processes, some techniques available for use in executing these processes, and process outcomes and deliverables.

Figure 1-2

Processes	Techniques	Process Deliverables *(Outcomes)*
Prepare for System Initiation	Interviews Document Gathering and Reviews	*Established Team and Environment for System Initiation*
Validate Proposed Solution	Brainstorming Research	Validated Solution
Develop System Schedule	Brainstorming Research Estimating	System Requirements Analysis Schedule High-Level System Development Schedule

1.1 PREPARE FOR SYSTEM INITIATION

Purpose

The purpose of **Prepare for System Initiation** is to ensure that the Project Team, and the environment in which it will operate, are ready for successful completion of this phase.

Roles

- Project Manager
- Project Sponsor
- Business Analyst
- Technical Lead

Description

In addition to the Project Manager, Business Analyst and Technical Lead roles are required to complete the team for this phase.

Identification, assignment and orientation of new team members required for this phase are activities in Project Initiation in the project management lifecycle.

Environment preparation includes gathering all relevant project and historical documentation, and placing it in the document repository. At a minimum, the Project Team should have available the Project Proposal (consisting of the Business Case and Proposed Solution), and any relevant evaluation and decision documentation. Any historical data, such as best practices or performance statistics from similar earlier efforts, can also serve to guide the Project Team towards – or away from – certain solutions.

A record of prior efforts to develop a similar system (including current system documentation, if it is a replacement) can also be very helpful, although you should take care not to pre-judge the approach either because of, or in spite of, prior experiences.

1.2 VALIDATE PROPOSED SOLUTION

Purpose

The purpose of **Validate Proposed Solution** is to make sure that the original technology decision and system development approach still represent the optimal solution for the identified business need.

Description

Considerable time may have elapsed since the Project Proposal (and its constituent Proposed Solution) was developed, due to the vagaries of the budget process or to other procedural delays. In the interim, the Performing Organization may have changed its course and the state-of-the-art technology may also have changed significantly. With rapid advances in technology, it is certain that the longer the period of time between the original proposal and the commencement of System Initiation, the more likely it is that the chosen technology is no longer supported, has become obsolete, or commands a vanishing talent pool.

Roles

- Project Manager
- Project Sponsor
- Business Analyst
- Technical Lead

If System Initiation closely follows the development of the Project Proposal, it may not be necessary for the Project Team to perform all parts of this validation process.

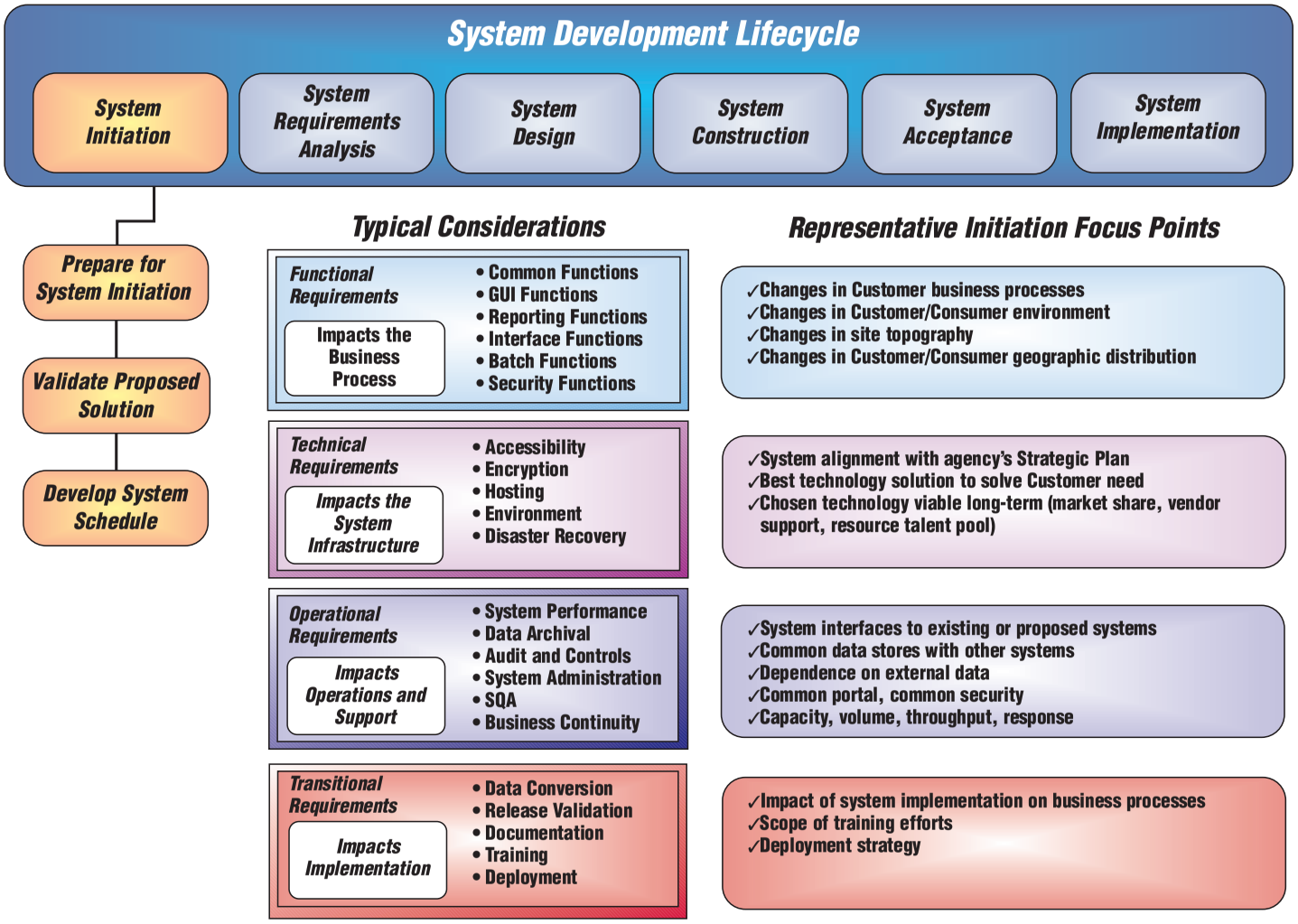
To validate the Proposed Solution, the Project Team must:

- understand the agency's current Strategic Plan, and how the new system fits into it;
- assess the proposed technology solution in view of Customer needs, the Performing Organization's long term technology direction and constraints, and state-of-the-art technology; and
- confirm feasibility of the proposed system development approach.

In assessing the Proposed Solution, the team must consider how it fits into the Performing Organization's application portfolio of existing or proposed systems. A System Context Diagram can be used to illustrate how the new system will make use of, or add to, existing major data stores, and how it will interface with other systems identified in the Strategic Plan (extract, update, data entry, etc.).

The next step is to confirm that the Proposed Solution is still the best option for the current set of business needs and conditions (as they are reflected in the Project Charter project management deliverable). For example, reorganization may have dispersed Consumers over a large geographical area, necessitating a re-evaluation of the originally proposed technology that was best suited to many Consumers in close physical proximity to one another.

Figure 1-3 System Initiation Considerations



In deciding whether the proposed technology direction represents an industry trend or a dead end, there are numerous professional journals available by subscription or free on the Web. There are forward-looking reports by organizations such as Gartner, Inc. or the Meta Group, Inc., and many consulting companies can offer valuable advice. The NYS Office for Technology can also serve as an authoritative point of reference.

Once it has been determined that the proposed technical solution fits into the Performing Organization's Strategic Plan, any lingering questions may be resolved through formal reviews, or directed to the Project Sponsor.

If it becomes apparent that the original Proposed Solution is no longer the optimal one, the team should propose an alternative solution. The Project Sponsor will then direct the team to proceed with the original solution, to take the alternative proposal, or to take action such as terminating the project or repeating the project management lifecycle starting at an earlier process or phase.

Finally, the system development approach needs to be validated against the latest understanding of both the business needs and the technology solution. Certain decisions must be considered even if they cannot yet be made. Among them are:

- Should the system be developed in-house or acquired as a Custom Off-The-Shelf (COTS) solution?
- Are there available resources to develop/customize the system, or is it necessary to contract for additional resources?
- Is the choice of technology platform predicated on the existing environment, or does the system offer an opportunity to upgrade the infrastructure?

If the Proposed Solution involves using infrastructure and/or services provided by the NYS Office for Technology, early notification to OFT is necessary to ensure smooth integration with planned service upgrades and other service demands. The Office for Technology may also be able to provide valuable contacts in other agencies where systems similar in function or technical components have been developed.

Deliverable

- **Validated Solution** – The team should update the original Project Proposal, or recreate the Proposed Solution using the template from Section I, Project Management Lifecycle.

1.3 DEVELOP SYSTEM SCHEDULE

Purpose

The purpose of **Develop System Schedule** is to create a detailed schedule for System Requirements Analysis and a high-level schedule for the remaining phases.

Description

After the technical solution has been validated, it is possible to decide how the rest of the System Development Lifecycle will be applied to this particular system development effort.

Roles

- Project Manager
- Project Sponsor
- Business Analyst
- Technical Lead

Using a project scheduling tool of choice and referring to the chart of the System Development Lifecycle, the Project Manager should populate the project with the phases and processes and the suggested roles. Then the Project Team, including the Business Analyst and the Technical Lead, should walk through and brainstorm each process, attempting to answer as well as possible the following questions:

- What are the system development deliverables in this process?
- What are the tasks necessary to produce this deliverable?
- Is there a logical way to organize the tasks associated with this process for this system? That is, are the modules already defined? Will they be worked on in parallel or serially?
- How complex is each task likely to be?
- What skills are required to perform each task?
- How many resources with each identified role/skill set will be needed to produce the deliverables?

In addition to thinking through the deliverables necessary for implementing the desired functionality, the team should consider the technical, operational and transitional requirements of the system (refer to Figure 1-3). These additional requirements will influence the definition of necessary tasks and the tasks' order or complexity.

This scheduling process needs to be performed to an elementary level of detail for the next phase, but only at a high level for the subsequent phases. The goal of the high-level estimating process is not premature precision, but rather a coherent, purposeful system development strategy that will form the basis for subsequent efforts (understanding that it will nevertheless be changed, augmented and enhanced throughout the lifecycle.)

At the end of System Initiation, all system-related materials gathered and produced by the Project Team should be consolidated and prepared for use as input for the next phase.

Deliverables

- **System Requirements Analysis Schedule** – Task-level schedule for the System Requirements Analysis phase of the System Development Lifecycle.
- **High-Level System Development Schedule** – Process-level schedule for the remaining System Development Lifecycle phases.

Both the detailed and high-level schedules produced in this process are part of, and are integrated into, the High-Level Project Schedule deliverable of the Project Initiation phase of the Project Management Lifecycle.

Measurements of Success

The success of this phase is measured by how readily the team can perform the next phase. The schedule for System Requirements Analysis should be immediately executable by the team.

The Project Manager can assess how successfully the project is proceeding by utilizing the measurement criteria outlined below. More than one "No" answer indicates a serious risk to the next phase and the eventual success of the system.

Figure 1-4

Process	Measurements of Success	Yes	No
Prepare for System Initiation	Have you obtained the materials that describe (1) the business needs and benefits, by functional unit; (2) the proposed solution; (3) the reasons that this project and this solution were selected for initiation?		
Validate Proposed Solution	Does the head of the information technology organization (or designate) agree that the system solution fits into the Strategic Plan?		
Develop System Schedule	Have the standard development procedures been customized for the specific system components defined for this system, including functional, technical, operational and transitional requirements?		
	Do you have management commitments for team member availability for the next phase?		
	In the High-Level System Development Schedule, do you know if the effort allocated to system development phases correlate to industry-accepted norms?		

Phase Risks / Ways to Avoid Pitfalls

PITFALL #1 – PLAYING WITH TOYS

You read the original Proposed Solution, and it seems very astute and on the ball: it promotes the latest technology trend, and is full of impressive-sounding concepts.

You consult with your technology folks, and they enthusiastically endorse the approach: it's the latest rage, and they just can't wait to get their hands on those great new packages. In fact, they will use your system as the showcase of the new technology, and allocate all kinds of resources to make it succeed. All of them will just be delighted to work on your system.

Their enthusiasm is contagious, and you consider yourself one lucky Project Manager. Until, that is, you realize that none of them actually knows how the new technology works; not that it stops them from trying to use it, all in their different ways, until they make a total mess of your "sandbox".

People like gadgets and gismos, buzzwords and catch phrases, and the technology folks like them most of all. They are like a bunch of little kids, going all googly-eyed at a new shiny toy.

So before you agree to play with a new solution, make sure that somebody convinces you that the tried-and-true really won't work here, and that you need to take on all the risks of the new technology. Do your own research, consult with outside experts, talk to the managers who've implemented technology projects successfully in the past, do the risk vs. reward analysis, and dull that "bleeding edge".

PITFALL #2– UNDERESTIMATING REQUIREMENTS ANALYSIS

If you have worked in your organization for a long time, you may have dealt with your Customers long enough to know what they want better than they know it themselves. In your mind, it all seems so clear – they need access to this data, here's how they will want to see it broken down, and this is the type of interface they are most comfortable with. In fact, you are probably already constructing the screens and reports in your mind, visualizing their reaction to this great new technological advance. The real challenge seems to be in the development, while the requirements analysis effort is often seen as a

straightforward exercise – get together with some key individuals, tell them what the new system will do for them, and you are done.

The reality, of course, could – and should – be very different. The estimated effort includes not only identifying the requirements of ALL interested parties, but also documenting and reconciling them, to a point where the Functional Specification could be passed to another team altogether and still result in an accepted product.

Frequently Asked Questions

How do I map the Project Team roles identified in the Section I, the Project Management Lifecycle, to the people working on the project? Do I need that many people on the project?

First of all, you need to understand that a role does not necessarily translate to an FTE. Depending on the size and complexity of the system you are trying to develop, the size and geographical distribution of your Customer and Consumer base, and finally on the versatility of your Project Team, you may need many people to fill one role, or you may have one person fill many roles. The following steps should help you map available people to required roles:

1. Determine Project Team requirements. Using the High-Level Project Schedule, estimate which roles are going to be required throughout the duration of the project, and to what extent.
2. Understand Stakeholder landscape. Using the Description of Stakeholder Involvement (contained in the Project Plan), refine your list of required roles, adjusting for approach (individual vs. group requirements meetings, individual vs. classroom training), geography (all Customers in one building vs. multiple facilities throughout the state) and size (a handful of Customers who are also Consumers vs. scores of representatives from competing Customer and Consumer groups.)
3. Research your team capabilities. Understand people's skills, interests and proclivities. Document their work hours and availability to the project.

4. Map roles to people using all information available. Document and address any apparent gaps.

I have a few skeptical Customers who, because they've been around for a while, have the SME (Subject Matter Expert) status on my project. However, they've never participated in a formal system development effort before. How do I get them to contribute in a productive fashion?

The good old carrot and stick approach should work: on the one hand, appeal to their self-interest and flatter them immoderately; on the other, make sure their manager is on board with the project and is aware of their expected contributions.

You should be able to convincingly demonstrate to any Customer (and most Consumers) why and how the new system will benefit them; in addition, you should genuinely appreciate (and praise!) their knowledge of the business process.

Having an experienced Facilitator and/or Business Analyst is extremely helpful as well, to engage all participants in a constructive dialog and set realistic expectations for future contributions.

What are the go/no go points in the SDLC? How do they integrate with decision points in the project management lifecycle?

The decisions to proceed with, or to halt, the system development effort properly belong in the project management lifecycle. To that end, the final process in each of its first three phases (Project Origination, Project Initiation and Project Planning) contains an explicit go/no go decision point. However, even before the project comes to those points, it is entirely possible that the system development lifecycle will necessitate project go/no go decisions.

The first such event may occur in System Initiation. If it is determined that the original Proposed Solution is no longer adequate or desirable, it may be prudent to halt the system development process (and the project) altogether, or re-initialize the project back at the Project Origination phase.

The next event may occur during System Requirements Analysis. If the business requirements gathered during this phase push the scope of the project way beyond the initial estimate, it may be necessary to halt Project Planning activities until the amended scope, schedule and budget are approved, or the decision is made to terminate the project.

The same is true for System Design. Insurmountable technical difficulties or irreconcilable differences over the prototype may jeopardize the success of the project, disrupting the flow of Project Planning and forcing a go/no go decision.

Finally, the controls put in place for Project Execution and Control may be triggered by difficulties with System Construction, Acceptance and even Implementation activities, and an abrupt end (or reiteration) of the Project Management Lifecycle may occur as a result.

How do I estimate the System Requirements Analysis phase?

The first thing to remember is not to do it in a vacuum. Use your entire team to flesh out the answer.

Start by decomposing the SDLC and creating the Work Breakdown Structure for the System Requirements Analysis phase. Consider the Stakeholder landscape and your team's capabilities and availability (see the first question above) and map out to whom you will be talking, when, how many times, and for how long. Then, based upon your (and your team's) knowledge of the business environment, estimate how much effort – and time – you will need to come up with all the System Requirements Analysis deliverables. Be as precise as possible, decomposing each process into elementary tasks, and each deliverable into its constituent (or pre-requisite) work products.

Is this SDLC appropriate for outsourced/contracted out engagements? How do I know what system development methodology my vendors will use?

The whole point of creating common project management and system development methodologies for New York State is to have a consistent approach to system development on ALL engagements. Not only does it streamline planning and execution and enable state Project Managers (and Project Team

members) to move within and among state agencies with a minimal learning curve, it also provides a standard for agency staff to use when contracting with private vendors. The state can now provide the methodology for its contractors, and direct them to adhere to it, instead of requiring New York State staff to adjust to the different development methodologies of each firm with whom they contract.

This SDLC is designed to be generic enough for virtually all system development efforts, and allows utilization of nearly all platforms, tools and techniques.

2 SYSTEM REQUIREMENTS ANALYSIS

Purpose

The purpose of **System Requirements Analysis** is to obtain a thorough and detailed understanding of the business need as defined in Project Origination and captured in the Business Case, and to break it down into discrete requirements, which are then clearly defined, reviewed and agreed upon with the Customer Decision-Makers. During System Requirements Analysis, the framework for the application is developed, providing the foundation for all future design and development efforts.

System Requirements Analysis can be a challenging phase, because all of the major Customers and their interests are brought into the process of determining requirements. The quality of the final product is highly dependent on the effectiveness of the requirements identification process. Since the requirements form the basis for all future work on the project, from design and development to testing and documentation, it is of the utmost importance that the Project Team create a complete and accurate representation of all requirements that the system must accommodate. Accurately identified requirements result from effective communication and collaboration among all members of the Project Team, and provide the best chance of creating a system that fully satisfies the needs of the Customers.

The primary goal of this phase is to create a detailed Functional Specification defining the full set of system capabilities to be implemented, along with accompanying data and process models illustrating the information to be managed and the processes to be supported by the new system. The Functional Specification will evolve throughout this phase of the SDLC as detailed business requirements are captured, and as supporting process and data models are created, ensuring that the eventual solution provides the Customers with the functionality they need to meet their stated business objectives.

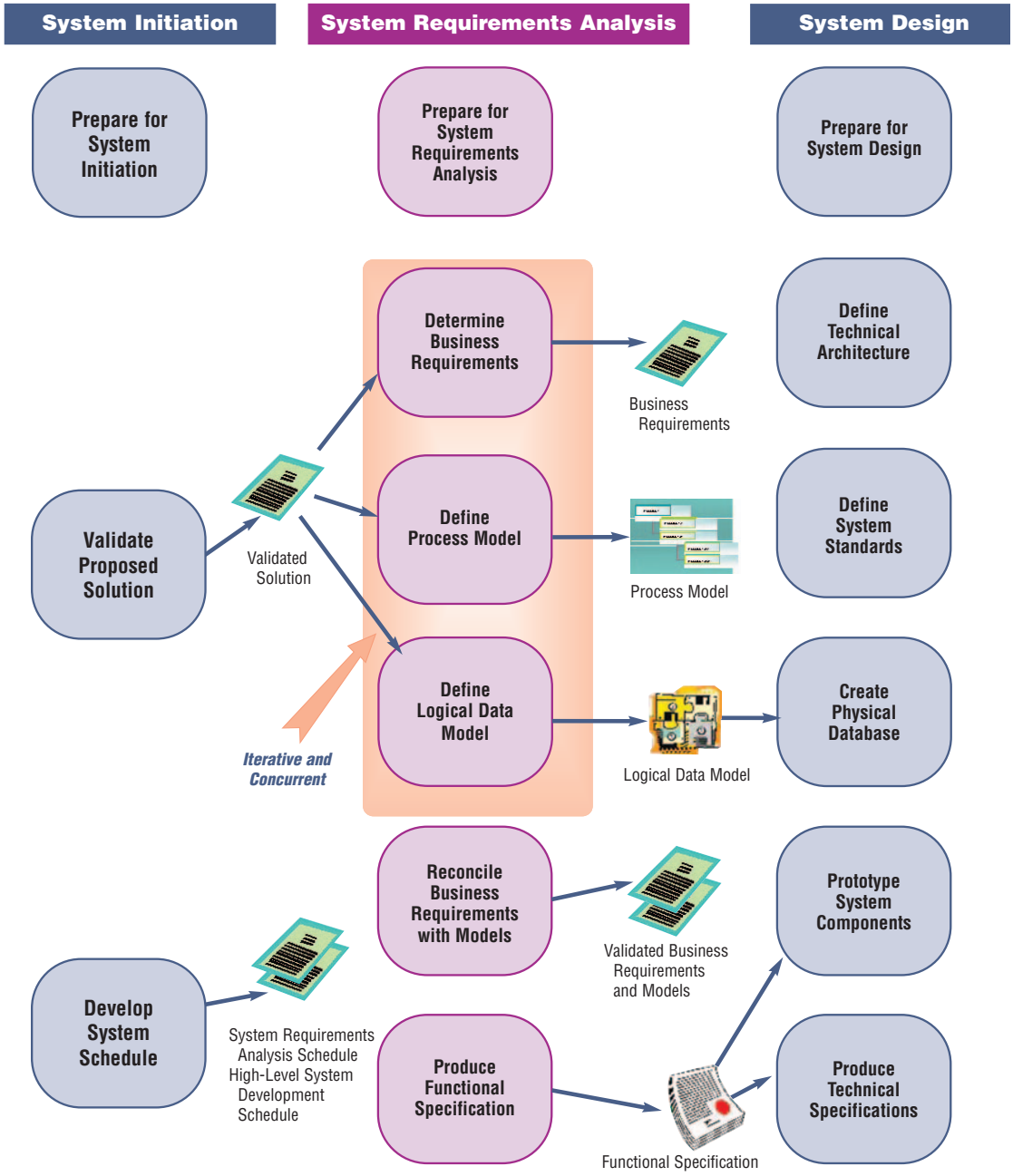
List of Processes

This phase consists of the following processes:

- **Prepare for System Requirements Analysis**, where steps are taken to ensure that the project environment and Project Team members are adequately prepared to both capture and analyze the system requirements;
- **Determine Business Requirements,** where in-scope and out-of-scope business requirements are identified, business rules are defined and documented, and interfaces to and from the new application are discussed;
- **Define Process Model,** where a pictorial top-down representation of the major business processes that interact with the system is diagrammed and decomposed into manageable functions and sub-functions until no further breakdown is feasible;
- **Define Logical Data Model,** where data that supports the processes and business rules is logically modeled, identifying entities and their relationships to other entities, and defining attributes with their business definitions;
- **Reconcile Business Requirements With Models,** where the Project Team ensures that the Process and Logical Data Models accommodate all requirements and business rules;
- **Produce Functional Specification,** where interfaces, processes and data are merged to describe systematically how the Consumer will use the application, and how data will be retrieved, processed and stored.

The following chart illustrates all of the processes and deliverables of this phase in the context of the system development lifecycle.

Figure 2-1


System Initiation
System Requirements Analysis
System Design
Prepare for System Initiation
Prepare for System Requirements Analysis
Prepare for System Design
Determine Business Requirements
Define Technical Architecture
Business Requirements
Validate Proposed Solution
Validated Solution
Define Process Model
Process Model
Define System Standards
Define Logical Data Model
Create Physical Database
Logical Data Model
Iterative and Concurrent
Reconcile Business Requirements with Models
Prototype System Components
Validated Business Requirements and Models
Develop System Schedule
System Requirements Analysis Schedule
High-Level System Development Schedule
Produce Functional Specification
Produce Technical Specifications
Functional Specification

List of Roles

The following roles are involved in carrying out the processes of this phase. Detailed descriptions of these roles can be found in the Introductions to Sections I and III.

- Project Manager
- Project Sponsor
- Facilitator
- Business Analyst
- Database Administrator
- Data/Process Modeler
- Technical Lead/Architect
- Software Quality Assurance (SQA) Analyst
- Technical Services (HW/SW, LAN/WAN, TelCom)
- Information Security Officer (ISO)
- Technical Support (Help Desk, Documentation, Trainers)
- Customer Decision-Maker
- Customer Representative
- Consumer
- Performing Organization
- Stakeholders

List of Deliverables

The following table lists all System Requirements Analysis processes, some techniques available for use in executing these processes, and process outcomes and deliverables.

Figure 2-2

Processes	Techniques	Process Deliverables *(Outcomes)*
Prepare for System Requirements Analysis	Team Skills Assessment Site Walk-throughs Technology Needs Assessment Tool Needs Assessment	*Established Team and Environment for Requirements Analysis*
Determine Business Requirements	Interviews JAD Sessions Brainstorming Storyboarding Critical Success Factor Interviewing Context Diagramming Use Case Diagramming Prototyping Walk-throughs Potential Problem Analysis Expressing Logic: Pseudo Code, Structured English, Object Oriented Logic	Business Requirements
Define Process Model	Work Flow Diagramming Flow Chart Diagramming Process Modeling Customer Event Diagramming Use Case Diagramming Decision Trees Prototyping	Process Model
Define Logical Data Model	Entity Relationship Diagramming Data Normalization/ De-Normalization	Logical Data Model
Reconcile Business Requirements With Models	CRUD Matrices Gap Analysis	*Analysis Assessment* Validated Business Requirements and Models
Produce Functional Specification	Process Association and Grouping Logical Organization Work Flow Clustering Expressing Logic: Pseudo Code, Structured English, Object Oriented Logic	Functional Specification

2.1 PREPARE FOR SYSTEM REQUIREMENTS ANALYSIS

Purpose

The purpose of **Prepare for System Requirements Analysis** is to position the Project Team and their working environment to ensure successful completion of System Requirements Analysis. This is the point at which the Project Team prepares to capture the detailed functional, technical, operational, and transitional requirements of the system.

Description

In preparing for this phase, the Project Manager must focus on the Project Team and the environment in which the team will work.

With each new project phase comes the need for new skills, experience, and, potentially, new Project Team members. The team needed during this phase must possess analytical skills that allow them to continually "peel the onion", driving to continuously deeper levels of requirements definition. Experience in effective interviewing, facilitation, various modeling techniques, requirements gathering, and gap analysis will be extremely beneficial.

Roles

- Project Manager
- Project Sponsor
- Business Analyst
- Facilitator
- Data/Process Modeler
- Technical Lead/Architect
- Customer Decision-Maker
- Customer Representative

In reviewing the Validated Solution all team members must share a clear and common understanding of the scope of this phase of the project, the Project Schedule, the deliverables to be produced, and their individual responsibilities relating to the creation of these deliverables.

Regardless of the size of the development effort being undertaken, System Requirements Analysis may place the greatest demand upon Customers in terms of resources and the extent of their required participation. During the preparation for this phase, the Project Manager should continue to manage the Customer's expectations surrounding this participation. Less involvement typically leads to a less acceptable finished product. In addition, many

individuals earmarked to participate in the requirements gathering sessions may not have been privy to earlier project scope-setting sessions. This can lead to the possible perception of these upcoming sessions as opportunities to identify or request functionality and features that are beyond the original intent of the project. Since management of scope creep is an essential role of the Project Manager, this may be an appropriate time to review the established change management processes with the Customer.

At the start of the System Requirements Analysis phase, it is the Project Manager's responsibility to ensure that the environment in which the Project Team will work is properly established. Beyond the obvious need to ensure that team members have adequate equipment to perform their duties, there are additional elements of the environment that should not be overlooked. The project repository, a secure area for maintaining work products and deliverables that was established during Project Initiation, continues to evolve over subsequent phases of the project. Although the establishment of the repository itself is important, it is equally necessary to define the mechanisms and processes to be followed for creating and maintaining all System Requirements Analysis related materials.

2.2 DETERMINE BUSINESS REQUIREMENTS

Purpose

In **Determine Business Requirements**, information is gathered from a variety of project participants relating to the vision and scope of the system. From this, specific detailed requirements are identified and documented so that they address the stated business need. These requirements are then decomposed into a set of business rules.

Description

While this process specifically addresses the capturing of Business Requirements for the new system, the reality is that it may be necessary, and is often beneficial, for the Project Team to determine these requirements while simultaneously defining the supporting process and data models. By conducting these three processes (Determine Business Requirements, Define Process Model, and Define Logical Data Model) concurrently, as opposed to sequentially, the team can develop the process and data models as information and requirements are defined, and can update these models as a result of gathering new or changed information.

Roles

- Project Manager
- Project Sponsor
- Business Analyst
- Facilitator
- Data/Process Modeler
- Technical Lead/Architect
- Technical Services
- Information Security Officer
- Technical Support
- Customer Decision-Maker
- Customer Representative
- Stakeholders

Because the three processes are performed not only concurrently, but also often iteratively, it is important for the Project Team to tightly manage the documentation for each process so that requirements are not lost, misunderstood or overlooked. The Project Manager may need to utilize techniques and/or tools to help document requirements and ensure that they are not missed. The Glossary contains a brief description of some of the techniques available to the Project Manager; examples include storyboarding, interviews, joint application design sessions (JAD), Unified Modeling Language (UML), prototyping, data flow diagramming, process modeling, and entity-relationship diagramming.

Don't hesitate to use one of the commercially available tools to assist the Project Team in their documentation efforts. Through use of these tools, changes made to a process are automatically carried through to all other associated processes or business rules.

Determining Business Requirements requires eliciting, analyzing, specifying, prioritizing, verifying and negotiating business functions that the system must deliver and support. The results are captured in a Business Requirements deliverable (use Figure 2-5, Business Requirements template, as a guide). During this process it is important to have all of the Stakeholders involved. Since this is the process in which all business and processing requirements are determined and agreed to, it is critical that all parties understand the ramifications of including or excluding requirements from scope. This is an opportunity to work out business process issues as a group, in order to reach optimal performance and efficiency within an organization or even across organizations or functional areas. Decisions made will impact remaining phases, so all parties involved in the project lifecycle should be heard, and all areas of concern or question should be thoroughly addressed. Reaching consensus and agreement on the final deliverable from this phase will help to ensure that everyone gets the product to which they agreed.

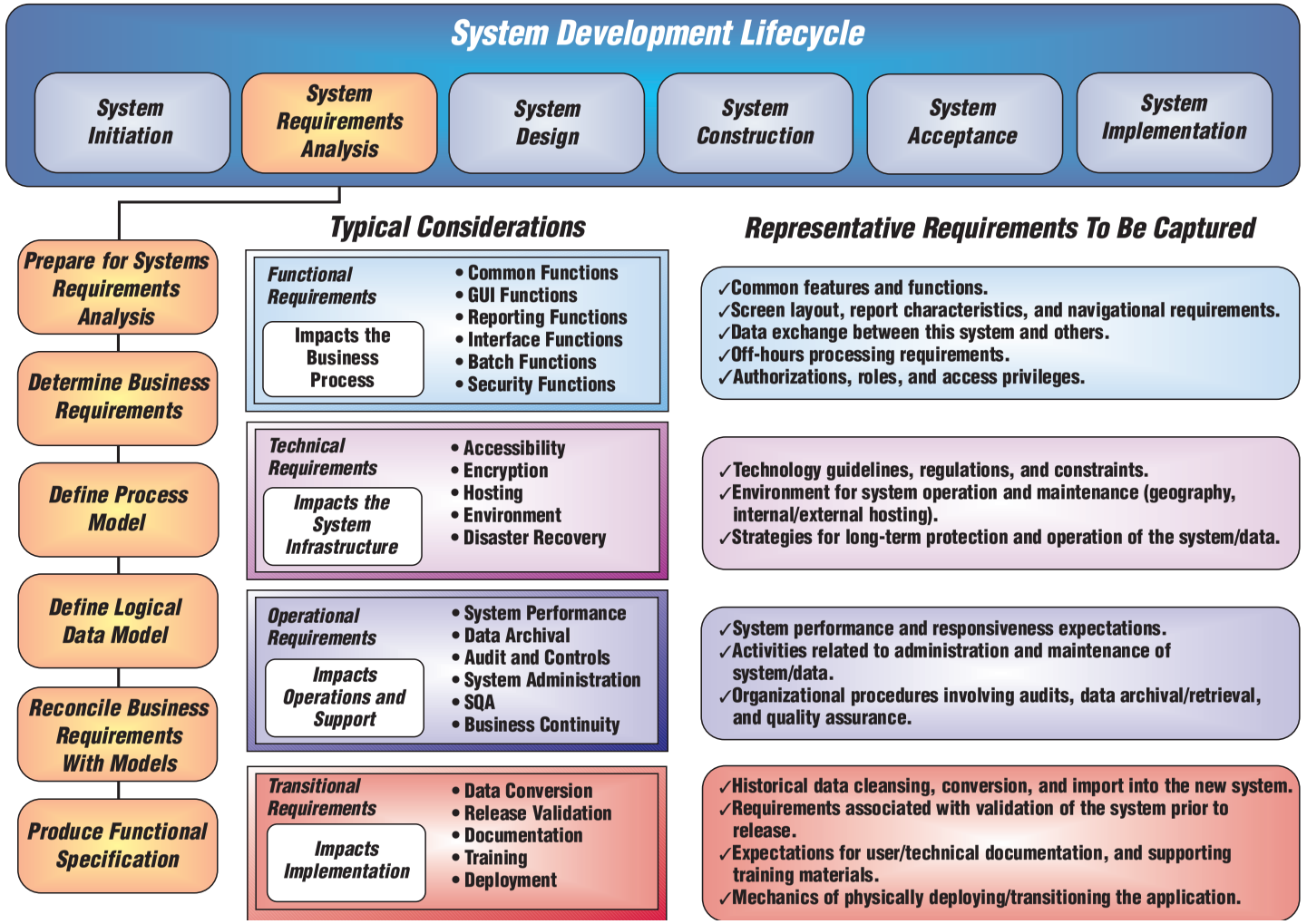
As stated in the SDLC Overview, requirements fall into multiple categories that, while related, are themselves separate and distinct. These categories are:

Figure 2-3

Category	Description
Functional Requirements	Requirements that define those features of the system that will specifically satisfy a Consumer need, or with which the Consumer will directly interact.
Technical Requirements	Requirements that identify the technical constraints or define conditions under which the system must perform.
Operational Requirements	Requirements that define those "behind the scenes" functions that are needed to keep the system operational over time.
Transitional Requirements	Requirements that define those aspects of the system that must be addressed in order for the system to be successfully implemented in the production environment, and to relegate support responsibilities to the Performing Organization.

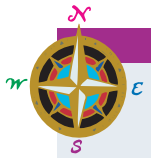
When capturing Business Requirements, the Project Manager must ensure that the Project Team addresses all of the categories above. Figure 2-4 illustrates the types of considerations and requirements that the Project Team must capture specific to System Requirements Analysis.

Figure 2-4 System Requirements Analysis Considerations



One approach to eliciting requirements from the Customer is to hold one or more JAD sessions. For these sessions, assembling individuals from both the program areas and IT into cross-functional groups can help clarify how proposed changes to a business process may impact operations. The benefit of having a session with multiple representatives from the program areas is that the pros and cons of business process changes are heard and discussed by all involved.

Requirements gathering, when properly facilitated, establishes a forum for everyone to be heard, for issues to be worked through, and for resolutions to be defined that meet the needs of all parties. Through this forum, multiple opinions may enhance the team's understanding of how certain processes are currently being performed, better defining how they should be structured within the context of the new application. This approach may also result in negotiations of functionality. There may need to be some trade-offs, and as a result processes may be reexamined and redefined. As the sessions progress, the Project Team must constantly assess and analyze the requirements.



A common mistake when coordinating the logistics of interviews or group requirements definition sessions is to hold these meetings where the majority of the participants represent only the Customer and Consumer populations. Doing so may set the stage for the Project Team to form a type of tunnel vision in which business requirements that focus primarily, or even exclusively, on the functional aspects of the system are captured. Just by the nature of their day-to-day responsibilities, Customers will often approach these requirements definition sessions from the perspective of, "What do I need this system to do in order for me to perform my duties?" Many operational, technical, and transitional requirements do not fall within the answers to that question. It is up to the Project Team member running these sessions (typically a Business Analyst or Facilitator) to make certain that these aspects of the system are also discussed, and that the individuals best positioned to provide this information are represented at the requirements definition meetings.

It is not unrealistic to assume that there may come a point at which negotiation or consensus building activities will break down, and that resolution of an issue may require insight or information not available to the Project Team. Ultimately, there must be a single decision making body responsible for resolving such issues. A key role of the Project Sponsor or Customer Decision-Maker is to make the final determination regarding these issues, and to communicate the decision to the Project Team. The Project Sponsor may or may not choose to share the

rationale for such decisions with the entire team, nor is it guaranteed that the team will agree with determinations that are made. The Project Manager should encourage the team to support the decisions and move forward.

The following steps should assist the team in building a useful and comprehensive Business Requirements document:

Absorb the requirements. Before the requirements can be analyzed, they must first be collected. Team members need to be sponges and take everything in, no matter how unimportant or inconsequential it may seem. There are many approaches to gathering these requirements, but all start with effective listening. Regardless of the technique used, the Project Team must remember that the goal of this process is to understand what the Customers need – not what the team members think they need.

Interpret the requirements. Now that the requirements have been captured, the Project Team must think about them. What have they heard? What was missed? Look for unanswered questions or contradictions. The requirements must be stated as clearly and concisely as possible, avoiding combining requirements and eliminating subjective wording. If the system must do A and B and C and D, there should be four distinct and verifiable requirements that can each be approved or rejected on its own merits. Avoid ambiguities and opinions. If the requirement is that some process should be "easy", the team should go back and find out exactly what that means. What would make something about that process difficult or more complex than it should be?

Bind the requirements. While defining what the business requirements are, it is also necessary to determine what they are not! This is done to establish consensus on the Project Scope and to clarify any scope issues. At least some requirements that were captured will be labeled "out of scope."

Categorize the requirements. Even for a relatively small system, you are likely to end up with scores of requirements. To understand how they relate to each other, and to effectively deal with them later on in the process, it is necessary to separate them into categories, logically grouping the requirements according to related business functions or organizational boundaries.

Prioritize the requirements. Regardless of how accurately the business requirements reflect the business need, it may not be feasible to implement them all at once (or even at all). In finalizing the requirements to be implemented, it will be necessary to prioritize them according to their criticality to the business. This classification into core, essential, and desirable will very likely involve both the Project Sponsor and Customer Decision-Makers.

The following guidelines may be used: "Core" requirements are the ones without which the system may as well not be developed at all; it will be of no use to most Customers without these. "Essential" requirements are those for which a short-term work-around could be developed (or for which an old process can hobble along for a little while longer) but over the long run, they have to be there. "Desirable" requirements are the "bells and whistles" that may be precious to certain constituencies, but without which the system will function just fine.

To put it another way, the system must go into production with all Core and a good portion of Essential requirements represented, and with a plan to implement the remaining Essential requirements in the subsequent phase.

Deliverable

- **Business Requirements** – A document containing detailed requirements for the system being developed. These requirements define the functional, technical, operational, and transitional capabilities, restrictions, and features that must be provided by the new system.

Figure 2-5 Business Requirements Document

< Name of Agency >

Business Requirements Document

< System Name >

Agency	
Project Name	
Project Sponsor	
Project Manager	
Document Date	
Prepared By	

*Enter the name of the **Agency** for which the system is being developed.*
*Enter the **Project Name**, and the names of the **Project Manager** and the **Project Sponsor**.*
*Enter the **Date** as of which this document is current.*
*Enter the names of the Project Team members by whom the document was **Prepared**.*

Figure 2-5 (Continued)

Business Requirements Document

TABLE OF CONTENTS

*The **Table of Contents** should be at least two levels deep.*

1.0 DOCUMENT SCOPE

***Document Scope** describes the goal of this document in a narrative.*
Example:
To define a consistent set of business requirements for the <XYZ> system and to identify what is in and out of scope.

The narrative should also provide an overview of the efforts conducted to gather business requirements.
Example:
This document summarizes the requirements gathered in a series of <X> Joint Application Design (JAD) sessions that were conducted by <members of the Project Team> with <DEF> and <GHI> business units between <date> and <date>.

2.0 GENERAL REQUIREMENTS

*The **General Requirements** section lists high-level business requirements that apply to the whole system.*
Example:
This system will provide a central repository for all <XYZ> data.

It should also include those requirements that are common to all Customer groups.
Example:
This system will provide ad hoc reporting capabilities to each Consumer business unit.

***NOTE:** By default, all requirements listed in this section are deemed to be Core to the system. Those general requirements that do not meet these criteria should be listed below under "4.0, Business Requirements Not Being Implemented".*

Figure 2-5 (Continued)

Business Requirements Document

3.0 SPECIFIC REQUIREMENTS

*The **Specific Requirements** section lists business requirements specific to each Customer group. A concise and specific listing of **Business Requirements** by **Business Function** should be provided. Requirements should be categorized, bulleted, detailed, and prioritized. These requirements should encompass the multi-dimensional aspects of the system (i.e., the functional, technical, operational, and transitional requirements).*

3.1 Business Unit

Description

*The **Description** identifies the purpose and main functions of the **Business Unit**.*

3.1.1 Business Function 1

Description

*In addition to **Business Function Description**, the narrative focuses on the desired business processes that will be in place when the new system is implemented as opposed to the current state of the business function, which can be documented, if necessary, in the Appendix.*

- Business Requirement 1 (Priority)
- Business Requirement 2 (Priority)
- Etc.

3.1.2 Business Function 2

Description

- Business Requirement 1 (Priority)
- Business Requirement 2 (Priority)
- Etc.

This format is repeated for all Customer and Consumer groups and their respective functions that require interaction with the system.

Example:

<XYZ> Unit

Description:
This unit is responsible for developing the <ABC> deliverable, maintaining the <DEF> function and executing the <GHI> process.

Business Function:
Developing the <ABC> Deliverable
Description:
The <XYZ> unit personnel will utilize the system reports to compile and produce the <ABC> deliverable (see attached).

Business Requirements *(Priority)*

1. *The System will provide a report detailing <JKL> expenditures that will be used for Page 2 of the <ABC> Deliverable.* *(Essential)*
2. *Etc.*

Figure 2-5 (Continued)

Business Requirements Document

4.0 BUSINESS REQUIREMENTS NOT BEING IMPLEMENTED

This section specifies requirements that will NOT be part of the new system.

Example:
Director of Contracts and Director of Claims have determined that the following functions are outside the scope of this system:
1. *<ABC> Process*
2. *<DEF> Deliverable*
3. *Etc.*

APPENDIX A – Requirements Definition Supporting Details

All published work products (meeting notes, session results, etc.) of individual interviews and group facilitated sessions held to determine business requirements should be included in this section.

A table detailing dates, times, topics and participants of all interviews and sessions should precede the compilation.

2.3 DEFINE PROCESS MODEL

Purpose

The purpose of the **Define Process Model** process is to create a pictorial representation of the functions and operations (i.e., the processes) that will eventually be performed by the system being developed.

Description

The second of the three concurrent processes within System Requirements Analysis, Define the Process Model may begin at any time after the Project Team has started collecting specific business requirements. The resulting Process Model of the system, also often referred to as the "To Be" model, illustrates the system processes as they are envisioned for the new system. Over time, this pictorial top-down representation of the major business processes will be decomposed into manageable functions and sub-functions until no further breakdown is possible. When combined with the detailed set of Business Requirements and the supporting Logical Data Model, this Process Model should completely address not only the full list of business needs to be satisfied by the new system, but also the vision for how the new system will provide and support this functionality.

Roles

- Project Manager
- Business Analyst
- Facilitator
- Data/Process Modeler
- Technical Lead/Architect
- Technical Services
- Information Security Officer
- Technical Support
- Customer Decision-Maker
- Customer Representative
- Stakeholders

During the Determine Business Requirements process, a picture of the *current* business processes and practices will begin to evolve. This can be a useful tool in confirming that all current processes have been identified, and can be used by the Project Team as a means of ensuring that their Process Model has not neglected any existing functionality. There is a risk, however, that too much focus on current business processes may cause Customers to take a myopic view of the their true business needs, ultimately defining a system that provides little value over the system that is already in place.

A key to successful process modeling is to find a way to get your Customers to look beyond "what they do and how they do it", and to instead describe "what they need and how it could best be accomplished" if they were not forced to perform their duties within the constraints or limitations of existing systems and processes. One of the most common mistakes made during this phase of the development lifecycle is to automate a bad process, simply because that's the way the business has always operated.

Remembering that much of System Requirements Analysis is iterative, the Project Manager must ensure that as requirements are updated as a result of continued efforts to Determine Business Requirements, the Project Team also refines the Process Model to accommodate those changes.

The Project Manager must ensure that the Stakeholders and Customers periodically validate the Process Model as it is being developed. It is important that they understand that the Process Model is a representation of the proposed business solution, an attempt to meet everyone's needs. As part of validating the final Process Model deliverable with the Customer, it may be beneficial to conduct walk-throughs to map the defined business requirements to the diagrammed Process Model. A walk-through helps to identify any requirements missed by both the Project Team and the Customer, and helps to further validate that the requirements and processes are accurately decomposed.

Before the Customer accepts the final deliverable for this process, ensure that he or she understands the ramifications of acceptance. For instance, if a process critical to the application was overlooked in a JAD session, and therefore not modeled, and the deliverable has been approved, change control may be necessary. Ensuring that the processes have been identified and decomposed will make it more likely that the data model built to support the process is adequate. If a process has been overlooked, there will most likely be an impact to the design of the data model, and therefore to the database itself. This could definitely warrant change control downstream. This applies to the Business Requirements and Logical Data Model deliverables as well as the Process Model. You may need to validate these three deliverables incrementally during this phase, and provide the Customer with a final walk-through at the conclusion of this process, before proceeding to the development of the Functional Specification.

Deliverable

- **Process Model** – A graphical representation of the decomposition of all business processes that interact with the system.

2.4 DEFINE LOGICAL DATA MODEL

Purpose

The purpose of **Define Logical Data Model** is to identify all uniquely distinguishable objects either used or produced by the system (the data entities), to capture all of the characteristics that help define those objects (the data attributes), and to describe the relationships between the entities.

Description

Like process modeling, definition of the data model can start as soon as the interviews or JAD sessions begin. A Data Modeler is most often responsible for designing the logical representation of the data to support the business need. Typically, this model will evolve throughout the iterations of capturing and documenting the business requirements.

Roles

- Project Manager
- Business Analyst
- Facilitator
- Database Administrator
- Data/Process Modeler
- Technical Lead/Architect
- Technical Services
- Information Security Officer
- Technical Support
- Customer Decision-Maker
- Customer Representative
- Stakeholders

The Data Modeler may begin to work on one of two paths: the first assumes that the application is brand new, and that the Data Modeler is working from a blank slate. In this case, informational requirements are captured as they are identified during the JAD sessions or interviews. As sessions are held, a view of potential entities and attributes is constructed and organized.

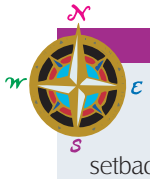
The second path assumes that the new application is going to replace an existing system. In this case, the Data Modeler may work with the current Data Base Administrator (DBA) to reverse engineer the existing database or file structures, often using a modeling tool. This enables the Project Team to use the existing structures as a starting point for the new Logical Data Model, and as a means

of validating that all informational needs of the system are being accommodated for in the Process Model.

It is important to define the entities and attributes in business English to facilitate Customer consensus and to ensure consistency with the organizational nomenclature forming the framework for the design of the application and the database. As additional requirements are flushed out during the interviews or sessions, the informational needs of the system are continually re-analyzed and re-applied to the data model. It is important to keep in mind, when identifying data sources, that consideration must be given to enterprise data and standard data that may be maintained in external systems (e.g., County Code Table, OSC code tables, etc.)

A key to successful data modeling is to ensure that the logical data model is not dependent on how the system processes the data. This ensures that data is grouped and organized based strictly on the informational needs of the system, and not based on an implied or assumed usage of the data by the system. The benefit is that the integrity of the data model will remain intact even if future business needs change the functionality of the system.

Defining the data model also helps to define the business rules by establishing the data entities (tables) and identifying attributes (fields). With the requirements and business rules known, and the Process Model outlined, the Project Team can begin to establish relationships between the data entities. This becomes the foundation of the data repository (or physical data model). As attributes are identified, the Data Modeler begins to build the Data Dictionary – again, in business English. Data normalization, a process in which complex relationships are simplified, is important once the Data Dictionary has been established. This eliminates redundancy, creates stable data structures, prevents anomalies, and simplifies data maintenance. The Logical Data Model is the basis for the DBA to create the physical database, so it is important that the Data Dictionary is clear in its definitions, and that all the data has been modeled appropriately.



The experience that a seasoned Data Modeler can bring to the Project Team can often make the difference between a successful project and one that encounters multiple setbacks or surprises. Understanding how to identify entities and attributes, establish relationships between the entities, normalize the attributes and define the Data Dictionary are important to developing a high performing application. These activities lay the groundwork for the technical team to build the physical database.

The Project Manager's goal for this process is to ensure that the Project Team accurately reflects the data requirements as they are defined, and as they relate to the Business Requirements and Process Model. The Project Manager should ensure that a process exists for the various Project Team members to share information and refine the requirements and models without risk of losing information, or jeopardizing the consistency and inter-dependencies of these deliverables.

The evolution of the Logical Data Model is analogous to the creation and confirmation of the Process Model in that it requires frequent interaction and validation by the Customer. While many of the deliverables in System Requirements Analysis present information in formats and terminology with which the Customer is familiar, this may not always be the case with data models. As a result, the Project Manager should anticipate the need for additional interaction during these reviews to ensure that the Customer can accurately interpret the output of this process. In addition, walk-throughs must be conducted in conjunction with, or in close proximity to, the reviews of the Process Model to be most effective.

Deliverable

- **Logical Data Model** – Diagrams and Data Dictionary information defining data elements, their attributes, and logical relationships as they align within a business area, with no consideration yet given to how data will be physically stored in actual databases.

2.5 RECONCILE BUSINESS REQUIREMENTS WITH MODELS

Purpose

The purpose of **Reconcile Business Requirements With Models** is to ensure that all business requirements and rules that have been captured have been accurately reflected and accommodated for in the Process Model and the Logical Data Model.

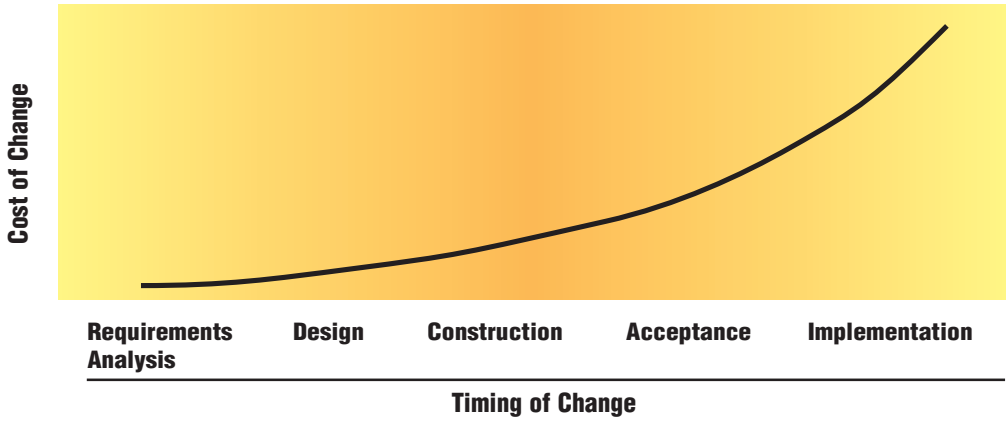
Description

Since the Process and Logical Data Models will ultimately form the basis of the system design, it is critical to invest the time here in System Requirements Analysis to ensure that these models are complete and accurate. If business requirements have been identified that are not reflected in these models, or if discrepancies exist between these models, then it is almost certain that this step will be revisited at some point later in the project. As Figure 2-6 indicates, the further out in the project that deficiencies in the business requirements are identified, the more costly the effort required to correct these deficiencies.

Roles

- Project Manager
- Business Analyst
- Facilitator
- Database Administrator
- Data/Process Modeler
- Technical Lead/Architect
- SQA Analyst
- Technical Services
- Information Security Officer
- Technical Support
- Customer Decision-Maker
- Customer Representative
- Stakeholders

Figure 2-6 Impact of Change on Project Costs



A typical technique at this point in the SDLC is to perform an analysis assessment, which validates and cross-references all requirements to the process and data models, and which continues until all gaps have been identified, resolved, or recognized as an out of scope item.

One technique to reconcile the Business Requirements, Process Model and Logical Data Model is for the Business Analyst to create a gap analysis checklist or matrix that may be used to display the interactions among the requirements, data entities and the processes. This will help to ensure that all the requirements have been captured and modeled appropriately.

It is helpful to walk Customers through this exercise so that they understand how all requirements have been captured and modeled. These reviews are often iterative, and any gaps identified are corrected through subsequent revisions to the Business Requirements, the Process Model, or the Logical Data Model. It may be necessary to hold several review sessions to go over the reconciliation with different sets of Customers, remembering that the more people who review the output, the less likely it will be that key elements have been missed.

The Project Manager must ensure that the Customer understands the ramifications of overlooking a process, or of failing to decompose and model data appropriately. By understanding the potential impacts on both schedule and cost, the Customer is more likely to dedicate the appropriate staff to participate in these reviews.

Deliverable

- **Validated Business Requirements and Models** – An updated set of Business Requirements, Process and Logical Data Models that have been modified to address any gaps or weaknesses identified as a result of a gap assessment performed on these documents as a single unit.

2.6 PRODUCE FUNCTIONAL SPECIFICATION

Purpose

Produce Functional Specification maps the Logical Data Model and Process Model to the organizations and locations of the business. This process also produces the final deliverable for the phase – the Functional Specification.

Description

The ultimate goal of this process is to derive a comprehensive representation of the application that logically organizes related business processes, functions, data, and workflows. This provides a detailed roadmap from which the Customer Representatives can fully envision the final solution, and from which the Project Team can progress into the Design and Construction phases of the project lifecycle. Whereas all System Requirements Analysis efforts up to this point have been focused on continually decomposing information into discrete requirements or processes that can each be reviewed and validated on their own merits, this final process now builds a broader view of the system that groups the individual pieces of the solution into logically related business functions. The final result, the Functional Specification, defines and illustrates how each requirement of the system will eventually be satisfied in terms of business processes (or transactions).

Roles

- Project Manager
- Project Sponsor
- Business Analyst
- Facilitator
- Data/Process Modeler
- Technical Lead/Architect
- SQA Analyst
- Technical Services
- Information Security Officer
- Technical Support
- Customer Decision-Maker
- Customer Representative
- Stakeholders

Deliverables resulting from this phase of the lifecycle must capture the full set of requirements for the new system in a way that is completely independent of any development approach, methodology, or organizational constraints. Much like System

Initiation defined **why** the new system was needed, the System Requirements Analysis deliverables must define **what** the system must do without making any assumptions regarding **how** the system will be built.

The Functional Specification will present many views of the system, from different perspectives and at different levels of detail. For example, the System Context Diagram shows how the new system fits into the larger picture of the performing organization's application portfolio. The Business Flow Diagram shows how Customer and Consumer business units will interact with the new system from the business process and data flow perspectives. And the System Interface Diagram will present a view of the system from a perspective of Consumer interface, depicting menu structures and navigation paths of online system components, and organization and distribution of reports and other batch interfaces.

Within the Functional Specification, each business process or transaction will correlate to the set of Business Requirements that it satisfies and a representation of the corresponding data elements. The reports associated with each process, business constraints (such as related security or controls), interfaces to other systems and business functions, and any related administrative operations required to support the system should also be identified.

When identifying the new vision of the system with its proposed sets of related processes and functions, organizational or operational changes may be introduced. Ultimately, the Customer must be comfortable with these changes, and be willing and able to institute them. The Project Team must take this into account when establishing this framework. Both the Project Manager and the Stakeholders must find the appropriate balance between the potential need for the change, and the likelihood that it will be embraced throughout the organization.

As discussed in Determine Business Requirements, requirements gathering sessions frequently result in features or functions above and beyond those initially envisioned during Project Origination being identified. One advantage of a well-defined

Functional Specification is that it provides the Project Team with a vehicle to assist the Customer with decisions on trade-offs in functionality and scope, should the situation arise that sufficient budget is not available to support the development of the full set of capabilities.

To ensure that the Customer agrees with the final deliverable, the Project Manager should schedule a walk-through to review the concepts and flow of the Functional Specification, and to achieve consensus that the proposed grouping of processes defines a solution that will satisfy the Customer's needs.

Deliverable

- **Functional Specification** – Document describing the logical grouping of related processes and functions within the new system, along with the mapping of these processes to both the business requirements that they satisfy and the data items with which they interact.

Figure 2-7 Functional Specification Template

< Name of Agency >

Functional Specification

< System Name >

Agency	
Project Name	
Project Sponsor	
Project Manager	
Document Date	
Prepared By	

*Enter the name of the **Agency** for which the system is being developed.*
*Enter the **Project Name**, and the names of the **Project Manager** and the **Project Sponsor**.*
*Enter the **Date** as of which this document is current.*
*Enter the names of the Project Team members by whom the document was **Prepared**.*

Figure 2-7 (Continued)

Functional Specification

TABLE OF CONTENTS

*The **Table of Contents** should be at least two levels deep.*

1.0 DOCUMENT SCOPE

***Document Scope** describes the goal of this document in a narrative.*
Example:

To define a comprehensive set of functional specifications for the <XYZ> system and to identify what is in and out of scope.

The narrative also provides an overview of the efforts conducted to gather business requirements, derive process and logical data models, and to reconcile business requirements with these models.

2.0 GENERAL FUNCTIONAL SPECIFICATIONS

*The **General Functional Specifications** section details those specifications that are common to all aspects of the system (e.g., the menu structure, security, accessibility, overall performance requirements, etc.).*

Three graphical representations of the overall system should be included:

- *a System Context Diagram, showing how this system will interact with other existing systems,*
- *a Business Flow Diagram, showing how Customer and Consumer business units will interact with the system; and*
- *a System Interface Diagram, showing the application structure (menu structure and navigation of online components), organization of reports and other batch interfaces, and utilities.*

3.0 DETAILED FUNCTIONAL SPECIFICATIONS

*The **Detailed Functional Specifications** section lists functional specifications for each aspect of the system. The structure of this section is dependent on system organization. For example, if the system is organized to follow the business unit structure, with each sub-system supporting a specific Customer or Consumer group, then each **Sub-system Description** should list main characteristics and functions of that group; on the other hand, if the system is organized by type of interface (data entry, reporting, etc.), then the Sub-system Description should outline common characteristics of those system components.*

It may also be useful to provide more detailed versions of the Business Flow and System Interface diagrams for each sub-system.

Figure 2-7 (Continued)

Functional Specification

3.1 Sub-system

*The **Sub-system Description** describes the sub-system in a narrative.*

3.1.1 Component Type

*Depending on system structure (and Functional Specification document), it may be useful to organize system components by **type** (such as screens vs. reports, or tracking vs. auditing). If that is the case, **Component Type Description** would provide a rationale for such structural breakdown, and describe common elements of all components within that type.*

Component Type Description

3.1.1.1 Component 1

- Component Description
- Component Mockup (where appropriate)
- Component Business Flow
  - Cross-reference to Business Requirement(s), Logical Data and Process Models
  - Flowchart
  - Detailed Business Rules for each Flowchart element

*The **Component Description** should identify the appropriate Customer or Consumer group, and provide a description of how their needs are being met by this component.*
Where appropriate, a mockup of the component should be included in the document.
***Component Business Flow** details how the system supports the business process.*
*A **Cross-Reference** is provided to all prior deliverables.*
*A **Flowchart** details the system component's interaction with the business process. Every shape and arrow on the Flowchart is annotated with detailed descriptions of **Business Rules** governing that particular interaction or transformation.*

3.1.1.2 Component 2

- Component Description
- Component Mockup (where appropriate)
- Component Business Flow
  - Cross-reference to Business Requirement(s), Logical Data and Process Models
  - Flowchart
  - Detailed Business Rules for each Flowchart element

Figure 2-7 (Continued)

Functional Specification

4.0 OTHER SPECIFICATIONS

Besides functional aspects of the Business Requirements, the specifications for the system should also enumerate technical, operational and transitional aspects of the system.

4.1 Technical Specifications

This section documents in detail the technical specifications, regulations and existing constraints that must be considered in relation to business requirements. These include considerations such as accessibility, encryption, security, disaster recovery, and other technical areas.

4.2 Operational Specifications

This section should document in detail the operational specifications that must be considered in relation to business requirements. These include considerations such as system performance, data archival, audit and controls, system administration, software quality assurance and business continuity. The narrative should specify how these operational requirements may affect the organization and its current business processes.

4.3 Transitional Specifications

This section documents in detail the transitional specifications that must be considered in relation to business requirements. These include considerations such as data conversion, system testing, documentation, training and deployment. The narrative should describe how historical data will be cleansed, converted and imported into the new system, how expectations must be set for the deployment of and support of user and technical documentation and training, and what approach may be employed to physically deploy and transition the system into the organization.

5.0 BUSINESS REQUIREMENTS NOT BEING IMPLEMENTED

This section specifies those requirements that will NOT be part of the new system. If this list is identical to the one published in the Business Requirements document, a simple reference to the prior document may be substituted.

APPENDICES – SUPPORTING DOCUMENTS

The Appendices should contain all relevant documents provided by Customers and Consumers during System Requirements Analysis, as well as documents supporting decisions made while compiling the Functional Specification.

Measurements of Success

The immediate measurement of success for System Requirements Analysis is the acceptance of all deliverables by the Customer, while the ultimate measurement is whether or not the Project Team has created solid groundwork for the upcoming design and development of the application. Each process in this phase builds towards the final deliverable: Functional Specification. It is necessary to validate that certain steps have been successfully executed to ensure that the Functional Specification has been derived appropriately.

The Project Manager can assess how successfully this phase is proceeding by utilizing the measurement criteria outlined below. More than one "No" answer indicates you may have serious risk to the Project.

Figure 2-8

Process	Measurements of Success	Yes	No
Prepare for System Requirements Analysis	Have all new team members participated in project orientation sessions?		
	Is the team comfortable with the process defined for managing the deliverable repository?		
	Do all team members have experience with (or training on) the tools that will be used in this phase?		
Determine Business Requirements	Do the business requirements state what is in scope as well as what is out of scope?		
	Have the business requirements been reviewed and approved by the Customer?		
	Are the requirements stated in such a way as to allow for easy validation of their existence in the final solution (i.e., a Yes/No determination of whether or not the requirement has been satisfied by the new system)?		
	Are requirements prioritized within the Business Requirements deliverable?		
	Do the requirements consider the technical, operational and transitional aspects of the system, including elements such as: · Security/access needs; · Existing technical standards (accessibility, encryption, etc.); · Application hosting;		

Figure 2-8 (Continued)

Process	Measurements of Success	Yes	No
Determine Business Requirements (Continued)	· Disaster recovery; · Archiving, audit and regulatory needs; · Performance requirements by all Customers and Consumers for all aspects of the system; · Business continuity; · Data conversion?		
Define Process Model	Have all known business requirements and associated business rules been mapped and accommodated for in the Process Model?		
	Has the Process Model deliverable been reviewed and approved by the Customer?		
Define Logical Data Model	Have all known business requirements and associated business rules been mapped and accommodated for in the Logical Data Model?		
	Has the data model been normalized?		
	Has the Logical Data Model deliverable been reviewed and approved by the Customer?		
Reconcile Business Requirements With Models	Does the Customer agree that all aspects of the requirements and rules have been accommodated for in the process and data models?		
Produce Functional Specification	Has the Functional Specification deliverable been reviewed and approved by the Customer?		
	Has a system validation and testing approach been formulated?		
	Have training needs been identified?		
	Has an approach for the implementation and transition of the application been developed?		

Phase Risks / Ways to Avoid Pitfalls

PITFALL #1 – IF YOU BUILD IT (TOO SOON), WILL THEY COME?

Your Project Team is top-notch and you can't believe your luck in securing their stellar capabilities. You have the guru of gurus as your development lead. After the first JAD session he tells you he already has envisioned the application – it's a financial module and similar to one he has previously developed. He convinces you that he needs to skip the rest of the JAD sessions so he can begin to prototype immediately. He is so enthusiastic and convincing in his argument to you, that you bless him to go off and start creating. You have already re-forecast your

Project Schedule mentally and foresee an early delivery date. How sweet it is!

Four weeks into the JAD sessions, you haven't yet seen any output from him. He tells you he's almost there, just a few more tweaks … you remind him it is just a prototype, not a full-fledged construction effort yet. He assures you it is just what the Customer wants. But you realize that the Customer hasn't been involved in the prototyping exercise. How can your lead developer be creating anything without the Customer vision?

You arrange a meeting with the developer and the Customer to review the prototype as it is so far, and to elicit feedback. Your developer is giddy with anticipation, convinced that what he has already built will make their dreams come true. Then, the moment of truth: the developer begins to walk the Customer through the first screen, and it is already apparent that there is a huge disconnect between the developer's and the Customer's visions of the application. Productive dialogue quickly turns into heated debate.

It all could have been avoided if the developer's vision really was the Customer's vision. If only he had gone to the interviews and JAD sessions and heard the requirements, instead of making assumptions as to what HE thought the Customer should have. If you build it, you'd better make sure they can see it, or they won't come…..

PITFALL #2 – LET'S CROSS THAT BRIDGE WHEN WE COME TO IT

During your JAD sessions the Project Team has collected and prioritized a set of issues that need to be resolved by Customer Decision-Makers or a Steering Committee. However, some of the issues appear to be so huge that no one thinks they'll be able to resolve them. Instead of using the defined escalation process outlined in your Communication Plan, group consensus based on speculation and gut feeling is that by the time the Project Team is ready to start development, the issue will have been resolved by the 'higher ups'. Thus, the old saying, "Let's cross that bridge when we come to it."

Unfortunately, everyone's crystal ball that day was cloudy and/or cracked, and assumptions were proven wrong. The issue did not go away and it has suddenly become a high priority need because legislation was passed to 'make it so'.

Because the team did not address or resolve the issue, a major piece of functionality for the application is missing, and has a negative downstream effect on other modules. Why oh why didn't you escalate the issue when it arose, so you wouldn't be in the boat you're in now?

Taking the time NOW, during those JAD sessions, to address all issues, assess their impact and develop resolutions to them, is critical to achieving success in the ultimate design and development of the application. You will also save yourself hours of regret and heartache later.

PITFALL #3 – DESIGNING ON THE FLY

By nature, most technicians – including system developers – are natural problem-solvers. They are the kind of folks that disdain reading the twenty pages of directions, but immediately start fitting the parts together by eye; the kind of people who never read the manual, but just start pushing the buttons to see what happens.

When you sit with them at a requirements gathering session, you may see their eyes glaze over and their faces assume this far-away look. This is by no means due to a lack of interest, but because they are already designing – and may be even programming – the new system in their heads, based on some initial snatches of conversation.

Tell them to "Snap out of it!"

If the system requirements are not sufficiently defined and understood, the Project Team may experience "expectation gaps" – for example, the developers may build a Taj Mahal, while the Customer wanted a simple privy. At best, this may result in frustration and friction between the Project Team and the Customers – at worst, it can mean significant cost and schedule overruns that can impact many aspects of the Customer's business operations.

The trick to successfully capturing business requirements is to make sure that the Project Team does not get ahead of itself. The Business Requirements deliverable is a detailed and concise list that, without passing judgment and without in any way

indicating a solution, identifies the full set of business requirements that must be met by the system. If the list has been done correctly, the Project Team should be able to walk through it at any future point in the lifecycle and determine whether the emerging solution satisfies each requirement.

PITFALL #4 – GOT PICTURES?

Contrary to what the SDLC preaches, the wording used in Business Requirements can end up high-level, leaving many of the actual requirements open to interpretation. As this chapter has discussed, the decomposition of these requirements involves translating the business need into discrete, well-defined components that collectively provide the desired functionality. Therefore, you need to be creative in the ways in which these requirements are captured. Whenever possible, do not limit your understanding and representation of the requirements strictly to the written word.

As we all know, the English language is open to misinterpretation. How many of us have walked in for a haircut, described exactly what we're looking for, and walked out 30 minutes later wondering how "Take a little off the sides" turned into "I'd like you to make me as physically repulsive as possible, so that young children cry at the sight of me, and junkyard dogs turn and flee for safety"? In this case, a picture would have been worth more than a thousand words (at least to the children and junkyard dogs of the world).

The same is true when capturing system requirements. Words like "automate", "process", and "calculate" may mean different things to different people, and it is essential that everyone involved in the project share the same view of these requirements. Moving forward with an incomplete or incorrect vision of the system can be more terrifying than the haircut, except that this time, the ones running away will be your Customers. Never underestimate the power of prototyping, diagrams, illustrations, and modeling when trying to fully represent and validate the requirements that your Customer is communicating to you. These techniques, and the pictures that result from them, can be worth 1000 words, and many times that in dollars.

Frequently Asked Questions

What do you do if you don't have a Project Team schooled in the art of early life cycle techniques?

The skills required for the requirements definition and analysis activities are very different from those utilized in other phases of the System Development Lifecycle. The best strategy is to get an experienced Facilitator, if only for a few initial sessions, to transfer the skills to the team. However, if no early life cycle expert is available, you need to identify candidates among your team who are best suited to an interactive mode of communications, get them into some training, and have them study all available materials (including this chapter of the Guidebook). Then, make sure the team follows the SDLC methodology, and you, the Project Manager, follow the PM methodology to the letter, and rely on Project Sponsor and Customer Decision-Maker feedback to make sure your team is doing the right things.

How does your Project Team know when done is done?

In the normal course of events, if you have identified ALL Customers, Consumers and Stakeholders, gathered ALL their requirements as they relate to this system, built your Process and Logical Data Models, and then validated, cross-checked and verified everything, obtaining Customer and Project Sponsor approvals all along the way – then you are done! However, you are probably talking about cases when Customers keep changing their minds and you are trapped in an endless cycle of revisions and clarifications. Or cases when you keep chasing Customers who just won't spare a moment to talk to you. In either instance, think Time Box. With the help of your Project Sponsor, declare a deadline, communicate it to all participants, and end the game there.

What if you don't know which tools to select to help you through this phase?

While many tools exist that can simplify the creation of documents, illustrations, and other materials that support requirements analysis efforts, it should be stated that a pretty chart does not a good system make. People used to draw flowcharts by hand – and their systems did not come out any worse. The important thing is to get all the requirements, understand how

they relate to each other and to current and proposed business processes, and to get agreement and consensus on what will be delivered and when. And if in the process you can use some nifty tool and generate some neat documents – great!

What is the risk of just compiling all the process deliverables into one big deliverable, and foregoing the final deliverable: Functional Specification?

The Functional Specification deliverable has many aspects to it that its constituent parts miss (look at the annotated templates earlier in this chapter to see what they are). It is not enough to slap a bunch of work products together, tie them with a rubber band, and declare victory. "The whole is greater than the sum of its parts." The Functional Specification is a document that supplies the background for the effort and organizes the work products in a logical sequence that makes it easy to understand the process and verify the result.

How do I deal with a Customer who is afraid to commit?

We've all dealt with folks who believe that putting their signature on that acceptance form will forever doom them to dealing with an inadequate and cumbersome system; and whether that attitude comes from having such forms flung back into their faces in the past in response to reasonable requests or from genuine personality disorders is beside the point: you need to get the Customer OK, and he won't have any part of it! What to do?

For starters, don't say, "Just trust me!" (or equivalent). Like love, trust takes a while to form, and you can't really force it. Try to figure out what the underlying concern is. Is it fear of being locked into a particular design? Mistrust of the process used to gather the requirements? Lack of confidence in the players? Misunderstanding of the nature or purpose of the deliverable? Lack of knowledge about what will come next?

Education is the key here. Try to have a reasonable, calm conversation with the Customer Decision-Makers. Go over the process used to gather the requirements and prepare the deliverable. Explain the methodology, and the intent behind it: to support the Customer's business process with the best darn system a bunch of chip-heads can come up with.

And if they are still holding up the process without a good reason, pull out your big gun – the Project Sponsor – and have him earn his keep.

Where in the lifecycle do I define that a phone number is ten digits with dashes and parentheses?

Yes, it's a lot easier to record vague functionality requests ("the system should produce the required reports accurately and on time") than to get to brass tacks and figure out exactly what is going to happen, when and how.

When you are gathering business requirements, you should document every data source the Customer mentions, and mock up every interface the Customer requests. The data elements thus captured are formalized in the Data Dictionary (part of the Logical Data Model deliverable), and then further refined during requirements reconciliation, development of the Functional Specification deliverable, and creation of the prototype. By the time technical specifications are created, your data definitions should be set in concrete.

3 SYSTEM DESIGN

Purpose

The purpose of **System Design** is to create a technical solution that satisfies the functional requirements for the system. At this point in the project lifecycle there should be a Functional Specification, written primarily in business terminology, containing a complete description of the operational needs of the various organizational entities that will use the new system. The challenge is to translate all of this information into Technical Specifications that accurately describe the design of the system, and that can be used as input to System Construction.

The Functional Specification produced during System Requirements Analysis is transformed into a physical architecture. System components are distributed across the physical architecture, usable interfaces are designed and prototyped, and Technical Specifications are created for the Application Developers, enabling them to build and test the system.

Many organizations look at System Design primarily as the preparation of the system component specifications; however, constructing the various system components is only one of a set of major steps in successfully building a system. The preparation of the environment needed to build the system, the testing of the system, and the migration and preparation of the data that will ultimately be used by the system are equally important. In addition to designing the technical solution, System Design is the time to initiate focused planning efforts for both the testing and data preparation activities.

List of Processes

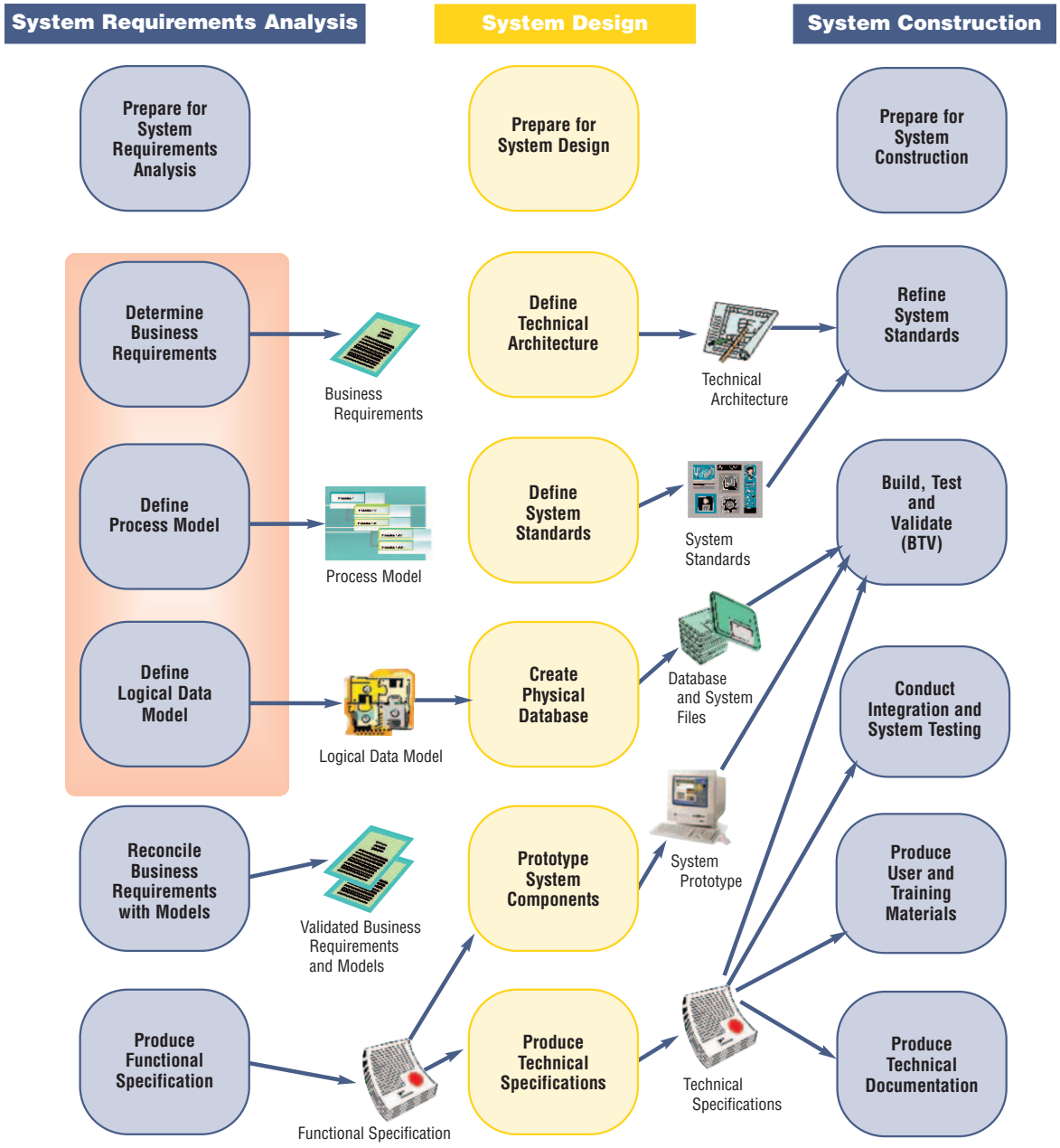
This phase consists of the following processes:

- **Prepare for System Design,** where the existing project repositories are expanded to accommodate the design work products, the technical environment and tools needed to support System Design are established, and training needs of the team members involved in System Design are addressed.

- **Define Technical Architecture,** where the foundation and structure of the system are identified in terms of system hardware, system software, and supporting tools, and the strategy is developed for distribution of the various system components across the architecture.
- **Define System Standards,** where common processes, techniques, tools, and conventions that will be used throughout the project are identified in an attempt to maximize efficiencies and introduce uniformity throughout the system.
- **Create Physical Database,** where the actual database to be used by the system is defined, validated, and optimized to ensure the completeness, accuracy, and reliability of the data.
- **Prototype System Components,** where various components of the solution may be developed or demonstrated in an attempt to validate preliminary functionality, to better illustrate and confirm the proposed solution, or to demonstrate "proof-of-concept."
- **Produce Technical Specifications,** where the operational requirements of the system are translated into a series of technical design specifications for all components of the system, setting the stage for System Construction.

The following chart illustrates all of the processes and deliverables of this phase in the context of the system development lifecycle.

Figure 3-1


System Requirements Analysis
System Design
System Construction
Prepare for System Requirements Analysis
Prepare for System Design
Prepare for System Construction
Determine Business Requirements
Define Process Model
Define Logical Data Model
Business Requirements
Process Model
Logical Data Model
Define Technical Architecture
Define System Standards
Create Physical Database
Technical Architecture
System Standards
Database and System Files
Refine System Standards
Build, Test and Validate (BTV)
Conduct Integration and System Testing
Produce User and Training Materials
Produce Technical Documentation
Reconcile Business Requirements with Models
Validated Business Requirements and Models
Prototype System Components
System Prototype
Produce Functional Specification
Functional Specification
Produce Technical Specifications
Technical Specifications

List of Roles

The following roles are involved in carrying out the processes of this phase. Detailed descriptions of these roles can be found in the Introductions to Sections I and III.

- Project Manager
- Project Sponsor
- Facilitator
- Business Analyst
- Data/Process Modeler
- Technical Lead/Architect
- Application Developers
- Software Quality Assurance (SQA) Analyst
- Technical Services (HW/SW, LAN/WAN, TelCom)
- Information Security Officer (ISO)
- Technical Support (Help Desk, Documentation, Trainers)
- Customer Decision-Maker
- Customer Representative
- Performing Organization Management
- Stakeholders

List of Deliverables

The following table lists all System Design processes, some techniques available for use in executing these processes, and process outcomes and deliverables.

Figure 3-2

Processes	Techniques	Process Deliverables *(Outcomes)*
Prepare for System Design	Interviews Site Walk-throughs	*Established Team and Environment for System Design*
Define Technical Architecture	Interviews Document Gathering and Reviews Role/Authorization Analysis	Technical Architecture
Define System Standards	Interviews Brainstorming Policy and Standards Reviews	System Standards
Create Physical Database	Formal Walk-throughs Standard Data Definition Languages Data Administration Techniques (Data Normalization, De-Normalization)	Databases and System Files
Prototype System Components	Iterative Prototypes/Reviews Presentations GUI/Report Development Tools	Prototype and Proof of Concept Results
Produce Technical Specifications	Function Decomposition Expressing Logic: Pseudo Code, Structured English, Object Oriented Logic Operational Requirements Assessment System Load Analysis Business Impact Analysis Potential Problem Analysis Training Needs Decomposition	Technical Specifications

3.1 PREPARE FOR SYSTEM DESIGN

Purpose

Prepare for System Design formally marks the beginning of System Design and facilitates the transition from System Requirements Analysis. The purpose of this process is consistent with every "prepare for phase" process identified within the system development lifecycle - to assess whether the Project Team members, and the environment in which they will work, are ready for successful completion of this phase.

Description

The skills needed by the Project Team to perform System Requirements Analysis processes are dramatically different from those required to translate the requirements into a technical design. While it is certainly possible for the current team to possess the range of skills required for both phases, this assessment needs to be performed and the team profile adjusted to match the needs of System Design.

Roles

- Project Manager
- Project Sponsor
- Business Analyst
- Facilitator
- Data/Process Modeler
- Technical Lead/Architect
- SQA Analyst
- Technical Services
- Information Security Officer
- Technical Support
- Customer Decision-Maker
- Customer Representative
- Performing Organization
- Stakeholders

Often, there is a distinct advantage to keeping as much of the original Project Team as possible while progressing from each phase to the next, thereby retaining business knowledge and functional expertise gained in prior phases. It is, however, also common for the team size to expand as the project advances into the Design phase.

The initiation of a new project phase is also the right time to assess the training needs of the existing team. Please refer to Section I, Project Planning, for a detailed approach to developing your Project Team.

It is the Project Manager's responsibility to ensure that team members have adequate equipment to perform their duties, that this equipment is configured with the proper design tools,

and that the team has access to the data repository that will be used throughout design efforts. A key activity will be the definition of the mechanisms and processes to be followed for creating and maintaining all System Design related materials, similar to the repository that was utilized for all System Requirements work products and deliverables.

This is also the time to begin to establish the environment that will likely be required when the Project Team initiates the prototyping activities.

During this phase, the Project Team's focus moves from business and functional areas to technical issues. As a result, there is often less involvement on the part of those project participants more closely aligned with the organization's functional and operational needs (the Stakeholders, Customer, Consumer, and Project Sponsor). These parties may begin to feel isolated or removed from the project due to their reduced involvement and they may not be immediately aware of much of the progress of the Project Team. While they are likely to play an active role in the discussions surrounding test planning and data conversion, they usually have limited involvement in the identification of the technical architecture and standards and the development of Technical Specifications. This situation poses a challenge for the Project Manager, since these individuals will ultimately be profoundly affected by all of these activities. The Project Manager must maintain effective communications with these individuals throughout this phase to ensure that they understand the implications of the technical decisions being made.

Business area experts, such as Customer Representatives, typically have much less involvement in System Design than in the System Requirements Analysis phase. Those areas of System Design in which they are most often involved include:

- Reviewing iterations of the prototype and user interface design.
- Defining detailed business-related algorithms that were not specified during System Requirements Analysis.
- Approving plans for converting from old system(s) to the new one.
- Validating user security schemes and authorizations.

Periodic design reviews conducted at key points during System Design often provide a way to batch user comments so that they are most useful to the software designers.

While System Design activities often reduce the demand for involvement of those participants aligned with the functional side of the organization, there is usually an opportunity for increased participation by the technical Project Team members. These team members, (often associated with Technical Services, Technical Support, ISO, and SQA), have a definite vested interest in many decisions being made and directions being set. As a result, they need to understand the extent to which the design aligns with their existing infrastructure, standards, and processes. In addition, it may be these team members who ultimately inherit, and therefore must provide long-term support for, the final system. The earlier the Project Manager can incorporate these sectors of the organization into the Project Team and make them a part of the solution, the better. The more active their involvement during System Design, the greater their buy-in to the system, and the greater their sense of ownership throughout the project.

3.2 DEFINE TECHNICAL ARCHITECTURE

Purpose

The purpose of **Define Technical Architecture** is to describe the overall technical solution in terms of the hardware platform, programming development languages, and supporting toolsets to be used in the creation and maintenance of the new system. The goal of this effort is to design a technical solution and architecture to accommodate both the initial and expected long-term requirements of the Performing Organization.

Description

The Project Team needs to understand the processing and data management capabilities, and the respective long-term strategic technical directions, of the organization that will ultimately support this application. This understanding will enable the team to determine the best approach to distributing or centralizing the data and processing capabilities of the system.

To define the technical architecture of the new system, the Project Team must perform a thorough assessment of the orga-

Roles

- Project Manager
- Project Sponsor
- Business Analyst
- Facilitator
- Data/Process Modeler
- Technical Lead/Architect
- SQA Analyst
- Technical Services
- Information Security Officer
- Technical Support
- Customer Decision-Maker
- Customer Representative
- Performing Organization
- Stakeholders

nization's existing infrastructure, standards, and information capabilities. Assuming that the technical platforms already in place can adequately support the new system, a design that leverages these existing platforms results in clear advantages in terms of increased productivity, decreased costs, and reduced learning curves. It is not uncommon, however, for new systems to impose technical solutions that require the extension or expansion of an organization's current architecture standards. Prime examples of this are organizations seeking to establish an Internet and Intranet presence with 24x7 accessibility, potentially introducing the necessity for new system support, security, disaster recovery, and maintenance strategies.

Issues that need to be addressed during this process include:

- Determination of the hardware and system platforms (mainframe, client/server, etc.) needed to accommodate the various Development, QA, and Acceptance environments.
- Definition of a strategy for distributing the system across the architecture (data storage and access, business logic, and user presentation layers).
- Identification of runtime and batch processing requirements, and definition of a supporting strategy.
- Assessment of reporting, archiving, and audit requirements, along with a supporting architecture.
- Determination of system interfaces and the accommodation of the supporting data.

It is during the System Design phase that the significance of the Technical Lead/Architect role increases, with responsibility to:

- establish and communicate the overall technical direction,
- ensure that design decisions made during this phase effectively support the functional requirements while leveraging existing infrastructure and standards,
- justify and defend design decisions that deviate from the existing environments,

- establish standards by which all Technical Specifications will be produced, and
- communicate with all technical support organizations (both internal as well as statewide entities).

Obviously, the Technical Lead/Architect is crucial throughout this process. Keys to the Technical Lead's success are familiarity and background with multiple technologies, and the ability to assess pros and cons of these technologies as they apply to the system at hand. As Project Manager, you need to ensure that the Technical Lead has access to additional expertise and resources, if needed.

Deliverable

- **Technical Architecture** – A document describing the overall system architecture in terms of hardware, software, tools, and peripherals, and the logical distribution of system components and processes across this architecture.

Figure 3-3 Technical Architecture Template

< Name of Agency >

Technical Architecture

< System Name >

Agency	
Project Name	
Project Sponsor	
Project Manager	
Document Date	
Prepared By	

*Enter the name of the **Agency** for which the system is being developed.*
*Enter the **Project Name**, and the names of the **Project Manager** and the **Project Sponsor**.*
*Enter the **Date** as of which this document is current.*
*Enter the names of the Project Team members by whom the document was **Prepared**.*

Figure 3-3 (Continued)

Technical Architecture

TABLE OF CONTENTS

*The **Table of Contents** should be at least two levels deep.*

1.0 DOCUMENT SCOPE

***Document Scope** describes the context and the goals of this document in a narrative.*

Example:

This document describes the Technical Architecture of the <XYZ> System that satisfies business requirements as documented in the Business Requirements Document, <Date>, and implements the functionality and satisfies technical, operational and transitional requirements described in the Functional Specification, <Date>.

The goal of this Technical Architecture is to define the technologies, products, and techniques necessary to develop and support the system, and to ensure that the system components are compatible and comply with the enterprise-wide standards and direction defined by the Agency.

This document will also:

- *Identify and explain the risks inherent in this Technical Architecture;*
- *Define baseline sizing, archiving and performance requirements;*
- *Identify the hardware and software specifications for the Development, Testing, QA and Production environments;*
- *Define procedures for both data and code migration among the environments.*

The Document Scope narrative also provides an overview of the efforts conducted to understand the existing technical environment and IT strategic direction and to determine how the system's proposed technical architecture fits into them.

Figure 3-3 (Continued)

Technical Architecture

2.0 OVERALL TECHNICAL ARCHITECTURE

2.1 System Architecture Context Diagram

*The **System Architecture Context Diagram** provides the "big picture" view of the system's architecture, and puts it in context with the rest of the Performing Organization's systems portfolio, illustrating how the system's hardware and software platforms fit into the existing environment.*

2.2 System Architecture Model

*The **System Architecture Model** represents the various architecture components that comprise the system, and shows their interrelationships.*

2.2.1 Overall Architectural Considerations

*The **Overall Architectural Considerations** section defines how additional technical requirements have been addressed by the architecture. Representative items in this section may include:*

- *Security Strategy*
- *Performance requirements*
- *Accessibility*
- *Database sizing*
- *Transaction volumes*
- *Data import and export*
- *Data encryption and decryption*
- *Disaster recovery*
- *Audit tracking*

2.3 System Architecture Component Definitions

2.3.1 System Architecture Component A

*The **Architecture Component Definitions** section provides narrative describing and explaining each architecture component in the System Architecture Model, and identifies specific elements that comprise that component in this system. The following are examples of architecture components and elements:*

Architecture Component	*Component Elements*
Database Server	*Server Hardware Configuration* *Server Operating System* *DBMS*
Client Application	*Development Tool* *Online Help Tool* *Client Characteristics*

2.3.2 System Architecture Component B

*The **System Architecture Design** section provides detailed descriptions of each product implementing architecture components, and explains the rationale for product selection.*

Figure 3-3 (Continued)

Technical Architecture

3.0 SYSTEM ARCHITECTURE DESIGN

3.1 System Architecture Component A

3.1.1 Component Functions
3.1.2 Technical Considerations
3.1.3 Selected Product(s)
3.1.4 Selection Rationale
3.1.5 Architecture Risks

*For each **System Architecture Component**, the narrative describes specific **Component Functions**, requirements and other **Technical Considerations** that were used in the decision-making process, as well as any specific **Products** selected to implement this component. The **Selection Rationale** identifies any other products that may have been considered, and provides rationale for the decision. **Architecture Risks** identifies any potential risks associated with the architecture element.*

3.2 System Architecture Component B

4.0 SYSTEM CONSTRUCTION ENVIRONMENT

*The **System Construction Environment** section details the various environments necessary to enable system construction and testing.*

4.1 Development Environment

4.1.1 Developer Workstation Configuration
4.1.2 Supporting Development Infrastructure Configuration

4.2 QA Environment

4.2.1 QA Workstation Configuration
4.2.2 Supporting QA Infrastructure Configuration

4.3 Acceptance Environment

4.3.1 Acceptance Workstation Configuration
4.3.2 Supporting Acceptance Infrastructure Configuration

*For each environment necessary for system construction (**Development**, **QA** and **Acceptance**), provide detailed specifications for the **Workstation** and **Supporting Infrastructure** that will be used (including hardware and operating system requirements, all necessary installed packages and tools, and needed directory structures that will be utilized to store all construction components).*

3.3 DEFINE SYSTEM STANDARDS

Purpose

The purpose of the **Define System Standards** process is to develop and identify programming techniques, naming conventions, and all other standards that will be used to introduce consistency and conformity throughout system development efforts.

Description

In an attempt to maximize efficiencies in the design, coding, testing and management of the system, it is important to define system standards early in the design process. System standards typically fall into three basic categories:

- Technical Development
- Configuration Management
- Release Management

Technical Development standards describe naming conventions, programming techniques, screen formatting conventions, documentation formats, and reusable components. These may be established for all projects in a large data processing/IT shop, or may be developed uniquely for a particular project. In addition, they may be unique to a development team, or industry-standard and universally accepted.

Roles

- Project Manager
- Project Sponsor
- Business Analyst
- Facilitator
- Data/Process Modeler
- Technical Lead/Architect
- SQA Analyst
- Technical Services
- Information Security Officer
- Technical Support
- Customer Decision-Maker
- Customer Representative
- Performing Organization
- Stakeholders

Configuration Management standards provide the basis for management of the development of individual software components of the system. These standards ensure that functions such as controlling and tracking changes to the software being developed, along with backup and recovery strategies, are inherent in the development process.

Establishing Release Management standards at this point in the lifecycle ensures that the right level of planning occurs surrounding both the initial and subsequent releases of the system to the Customers and Stakeholders. These standards are also necessary for successfully managing migrations of the application to the various testing environments.

It is essential that the technical architecture system standards be firmly established before starting further System Design and System Construction activities. Deferring these activities can have a significant impact later in the project, often causing rework or discarding of completed work products. The later in the project that these decisions are made, or that prior decisions are reversed, the larger the "snowball effect" in terms of the amount of work that needs to be reviewed and potentially revised.

Deliverable

- **System Standards** – A document detailing the various standards to be applied and adhered to throughout the execution of the project. Standards applicable to each phase of the lifecycle will be identified, along with examples, where applicable.

Figure 3-4 System Standards Template

< Name of Agency >

System Standards

< System Name >

Agency	
Project Name	
Project Sponsor	
Project Manager	
Document Date	
Prepared By	

*Enter the name of the **Agency** for which the system is being developed.*
*Enter the **Project Name**, and the names of the **Project Manager** and the **Project Sponsor**.*
*Enter the **Date** as of which this document is current.*
*Enter the names of the Project Team members by whom the document was **Prepared**.*

Figure 3-4 (Continued)

System Standards

TABLE OF CONTENTS

*The **Table of Contents** should be at least two levels deep.*

1.0 DOCUMENT SCOPE

***Document Scope** describes the context and the goals of this document in a narrative.*

Example:

This document defines standards that will be followed in the development of the <XYZ> system. The following sources were considered in development of these standards:

- *<Agency> Programming Standards, <v. 1.6>*
- *<Agency> Naming Conventions, <Date>*
- *<Agency> Configuration Management Procedures, <Date>.*

All deviations from the <Agency> standards are annotated and explained.
This document addresses standards for the following areas:

- *Graphical User Interface*
- *Reporting*
- *Application Navigation*
- *Error Prevention and Correction*
- *Programming*
- *Documentation*
- *Naming Conventions*
- *Database Access and Views*
- *Data Creation and Updating*
- *Stored Procedures*

The Document Scope narrative also provides an overview of the efforts conducted to understand the existing standards in the organization, and to research those areas for which no appropriate standards exist.

Figure 3-4 (Continued)

System Standards

2.0 MODULE DEVELOPMENT STANDARDS

2.1 Graphical User Interface

Graphical User Interface *standards address such areas as:*

- *Screen Design (Resolution, layout, menus, tabs, messages, and other screen components)*
- *Visual Design (Colors, fonts, icons, buttons, symbols, system pointer, tabs and other visual components)*
- *Operational Design (GUI component behavior, operational consistency, application response (instructions and messages), and other operational behaviors)*
- *Usability Design (simplicity, clarity, fault tolerance, system feedback, and other usability attributes)*

2.2 Reporting

Reporting *standards address such areas as:*

- *Report Design (Layout, Mandatory fields, Identifying fields, Fonts, Colors, Graphical elements)*
- *Numerical Data Representation (Formats, Totals, Rounding)*
- *Usability Design (Simplicity, clarity, messages, explanations, user-controlled variables)*

2.3 Application Navigation

Application Navigation *standards address such areas as:*

- *Menu Structure (Levels, access, behavior, verbosity)*
- *Selective Navigation (Beginner, Intermediate and Expert navigation paths)*
- *Navigation Aids (Navigation buttons, keyboard commands, navigational messages)*
- *Keyboard Shortcuts (Special key combinations for frequently-used operations*

2.4 Error Prevention and Correction

Error Prevention and Correction *standards address such areas as:*

- *Input Guidance (Variable field protection, value selection, informational messages, directional messages, input fields position/presentation/behavior)*
- *Input Validation (Validation order, edit checking, alternative presentation, choice verification)*
- *Error Handling (Routines, messages, responses)*

2.5 Programming

Programming *standards address such areas as:*

- *Coding standards (Organization, structure, style, consistency)*
- *Documentation standards (Placement, verbosity, style)*
- *Development environment elements (Objects, packages, methods, variables, parameters, etc.)*
- *Debugging (Techniques, routines, messages)*

Figure 3-4 (Continued)

System Standards

2.6 Documentation

Documentation *standards address such areas as:*

- *Technical Specifications (Organization, format, level of detail, style)*
- *Test plans (Organization, format)*
- *Test results (Format, responsibility, process)*
- *Defect logs (Format, responsibility, process)*
- *User materials (Organization, presentation, format, style)*
- *Technical Documentation (Organization, presentation, format, style)*

2.7 Naming Conventions

Naming Conventions *standards address such areas as:*

- *Overall naming schema (Concepts, hierarchy, precedents)*
- *Overall naming conventions (Terminology, use of abbreviations, case, length, format, consistency, precedence, extensions, prefixes and suffixes)*
- *Development environment naming conventions by element (Module, object, package, variable, parameter, stored procedures)*

2.8 Database, Data Access and Data Views

Database *and* ***Data*** *related standards address such areas as:*

- *Database standards (Scripts, tables, rows, columns)*
- *Data access (Record locking, online updating techniques, batch updating techniques, deadlocks, navigation techniques)*
- *Data views (Creating, updating, using)*
- *Stored procedures and triggers (Conventions, techniques)*

2.9 Miscellaneous Standards

Miscellaneous *standards address any other Technical Development areas that are not covered in sections above.*

3.0 CONFIGURATION MANAGEMENT STANDARDS

3.1 Development Environment

3.1.1 Software Management

3.1.2 Database Management

Figure 3-4 (Continued)

System Standards

3.2 QA Environment

3.2.1 Software Management
3.2.2 Database Management

3.3 Acceptance Environment

3.3.1 Software Management
3.3.2 Database Management

*For each environment necessary for system construction (**Development**, **QA** and **Acceptance**), identify **Software Management** procedures (source code version control, application version control, backup and recovery, etc.) and describe procedures and controls used for **Database Management** (data sources, migration and synchronization procedures, data backup and recovery, etc.)*

4.0 RELEASE MANAGEMENT STANDARDS

4.1 Migration from Development to QA Environments

4.1.1 Software Migration
4.1.2 Data Migration

4.2 Migration from QA to Acceptance Environments

4.2.1 Software Migration
4.2.2 Data Migration

***Release Management Standards** detail how source code, compiled applications, and data will be migrated among the various environments (Development, QA, and Acceptance).*

5.0 TESTING STANDARDS

5.1 Unit Testing

5.1.1 Unit Testing Standards
5.1.2 Unit Testing Tools

5.2 Integration and System Testing

5.2.1 Integration/System Testing Standards
5.2.2 Integration/System Testing Tools

5.3 Acceptance Testing

5.3.1 Acceptance Testing Standards
5.3.2 Acceptance Testing Tools

*For each kind of testing performed (**Unit, Integration/System and Acceptance**), define **Testing Standards** and suggested approaches to setting up test cases and conducting tests, and identify and describe **Testing Tools** that should be utilized in that testing cycle.*

3.4 CREATE PHYSICAL DATABASE

Purpose

The purpose of the **Create Physical Database** process is to accommodate all of the data that needs to be managed by the system within the system database tables and files. This information must be stored in a manner that ensures its reliability, accuracy, and completeness, while minimizing redundancy and meeting system performance expectations.

Description

The Create Physical Database process expands on the Logical Data Model created during System Requirements Analysis to identify physical database schemas, file formats, and data views required by the system. While the majority of new systems developed take advantage of relational database technologies, it is important to consider the feasibility of this approach for handling the full extent of the system's data needs. Often, data will be used in the exchange of information between the system being developed and other existing legacy systems. The system interfaces may require the creation and management of data that, for valid reasons, uses other non-relational storage mechanisms.

It is important to review existing database administration, data distribution, and data management policies and guidelines prior to proceeding with the definition of the physical database. These policies often dictate approaches to auditing, archiving, and recovering data that may need to be taken into consideration.

Roles

- Project Manager
- Project Sponsor
- Business Analyst
- Facilitator
- Data/Process Modeler
- Technical Lead/Architect
- SQA Analyst
- Technical Services
- Information Security Officer
- Technical Support
- Customer Decision-Maker
- Customer Representative
- Performing Organization
- Stakeholders

Data views are an effective way to manage the presentation of data to the user as well as to accommodate many of the security needs of the system. Sometimes, data views are overlooked until late in the project, often defined and created during the construction or testing phases in response to security or performance issues. This is a clear case of "you can pay me now or pay me more later", with the costs associated with implementing these views late in the project often exceeding what they would have been had data views been a focus in the early design efforts.

When designing the database, it is important to accurately estimate anticipated data usage and volumes. Answers to basic questions will help determine the most efficient database schemas, and will enable the team to optimize the database to achieve desired performance. Sample considerations include:

- Expectations surrounding the use of the data.
- The number of users expected to access the data simultaneously during normal usage.
- Anticipated peak user loads on the system.
- Data retention needs (e.g., is it necessary to save specific details of each record, or is it sufficient for historical purposes to simply maintain summarized data?).

Finally, it is critical to understand the data needs of all environments associated with the system being developed. Many organizations require multiple environments for development, testing, quality assurance, and production of the system, with each environment having its own unique characteristics. All of these requirements must be taken into consideration when designing and creating the physical database.

This process results in the production of database creation scripts and file utilities that, when executed, produce the physical database tables and system data files required by the system. The creation of these scripts, sometimes through the use of automated tools, equips the development team with a base upon which all future enhancements or refinements to the database can be made. Once the scripts have been modified and tested, a simple rerunning of the scripts will produce the enhanced database.

Deliverable

- **Database and System Files** – Physical data storage repositories created to support the data management needs of the application being developed, either in the form of a relational database, tables, and structures, or in the form of structured system files.

3.5 PROTOTYPE SYSTEM COMPONENTS

Purpose

The purpose of the **Prototype System Components** phase is two-fold – to provide early examples of system screens and reports that demonstrate to the Customer the proposed look and feel of the system; and to validate the applicability and feasibility of proposed technical components as they pertain to the overall technical solution.

Description

Prototyping system components is one of the most popular methods used to help the Project Team to make educated design decisions based on an actual hands-on assessment of various alternatives. Prototyping also helps to mitigate the risks associated with the introduction of new technologies or toolsets into an organization.

Roles

- Project Manager
- Project Sponsor
- Business Analyst
- Facilitator
- Data/Process Modeler
- Technical Lead/Architect
- Application Developers
- SQA Analyst
- Technical Services
- Information Security Officer
- Technical Support
- Customer Decision-Maker
- Customer Representative
- Performing Organization
- Stakeholders

Often, throughout the design of a system, the Project Team may be faced with having to choose from several alternative approaches. They may have to select from a variety of technical architectures, package components, or graphical user interface (GUI) designs. In order to select the best approach for the project, it is necessary to determine what best meets the Customer's needs and expectations, and is technically feasible.

Prototyping activities will often provide information on the performance and usability of the system, as well as insights into the design process.

Prototyping for Illustrative Purposes

The Functional Specification captured the operational and informational needs of the system. While there may have been some preliminary prototyping activities performed during System Requirements Analysis, these efforts are typically rudimentary, and do not contain the level of detail necessary for the design team to fully lay out the user interface aspects of the system. In order to successfully complete the design of both the user interface and the related system reports, it is often useful to conduct iterative prototypes of the system.

Aspects of the system addressed through prototyping should include screen layouts, navigation, controls (such as push buttons), and presentation styles. With respect to reports, prototyping can easily illustrate the proposed approach to queries, report selection, and filtering of data based on various reporting options.

Prototyping enables Customers to get a clearer picture of the system being developed and presents an opportunity for them to ensure that the Project Team understands their requirements. It provides all project participants with a common view of the system as it is being designed, and allows for open communications and input into how the screens and reports can be improved very early in the project. Whether these prototypes are done with paper and pen or with some elaborate design and development tool does not matter. The key is that proactively accommodating these refinements throughout the Design phase, instead of during either the development or testing of the system, eliminates many of the pitfalls that are typical of projects that exceed their allocated budget, timeframe, or both.

Another benefit to prototyping is that by actively involving the Customers in the design of the system, a sense of ownership and buy-in is created that might not otherwise be possible, or that certainly could be more difficult to achieve if the system were designed without their input.

In addition, there are advantages to engaging the Application Developers early in System Design. While these developers will make their primary contribution to the project during System Construction, involvement during System Design will enhance their overall understanding of the system, the business objectives, and the rationale behind many of the design decisions, all of which will contribute towards a stronger final product.

Prototyping as a Means of Performing Proof of Concept

In addition to being a means of illustrating and refining the design of the system, prototyping is also a valuable approach used prior to the development of the entire solution, to validate that individual components of the system will operate as expected. This can be used to confirm whether the functionality of purchased hardware or software meets expectations, for example, or to substantiate architectural decisions made earlier in System Design. Other areas of the design in which prototyping can be used include system-to-system interfaces, security, and off-the-shelf ad hoc reporting tools.

Regardless of the specific prototyping activities performed, they can serve to validate that the design solution being developed provides the best overall fit with a system that satisfies functional requirements and meets system performance goals.

A word of caution ... although the benefits of prototyping can be tremendous, and more information is learned with each iteration, prototyping without sufficient management controls can quickly take on a life of its own. It is important to set expectations from the start regarding the number of iterations that your Project Plan will accommodate. Otherwise, the Project Team can easily find itself in an endless procession of "nips and tucks" and "minor revisions" that all add up to extra effort and increased risk to the schedule and budget. Knowing that there are a finite number of prototype reviews planned can also encourage more active participation and involvement on the part of the Customers, since they should understand that they risk "missing the boat" if their feedback comes too late in the project.

In addition, many project participants often look at prototypes as an indication that the system is close to functional. This can lead to false impressions and overly optimistic time predictions if not properly managed.

Deliverable

- **Prototype** – A set of work products that 1) illustrate how the system being developed may look when finished, and serve as a model for subsequent development efforts, and 2) describe the applicability of one or more potential solutions, technologies, approaches, or components to satisfying the requirements associated with the system being developed.

3.6 PRODUCE TECHNICAL SPECIFICATIONS

Purpose

The purpose of **Produce Technical Specifications** (or 'Tech Specs') is to perform the critical process of translating all requirements captured during System Requirements Analysis into a set of documents forming the framework upon which all upcoming application development, testing, and implementation activities will be performed by the Project Team.

Description

Technical Specifications take many forms, including diagrams, structured English, decision trees, and pseudo-code. Regardless of the method used to capture and communicate the information, the main purpose is to encapsulate every possible detail needed to completely define the various technical modules that must be produced to create the new system. The accuracy and completeness of these details are essential, as these specifications drive many of the subsequent SDLC activities – most notably, the construction of each of the system modules, and the development of the test plans to be used in the eventual validation of the system.

Roles

- Project Manager
- Project Sponsor
- Business Analyst
- Facilitator
- Data/Process Modeler
- Technical Lead/Architect
- SQA Analyst
- Technical Services
- Information Security Officer
- Technical Support
- Customer Decision-Maker
- Customer Representative
- Performing Organization
- Stakeholders

During System Requirements Analysis, the role of the Business Analyst was critical to ensure that the full set of business requirements was captured accurately and completely. During System Design, the Business Analyst role expands to include the function of liaison between the business world and the technical members of the Project Team.

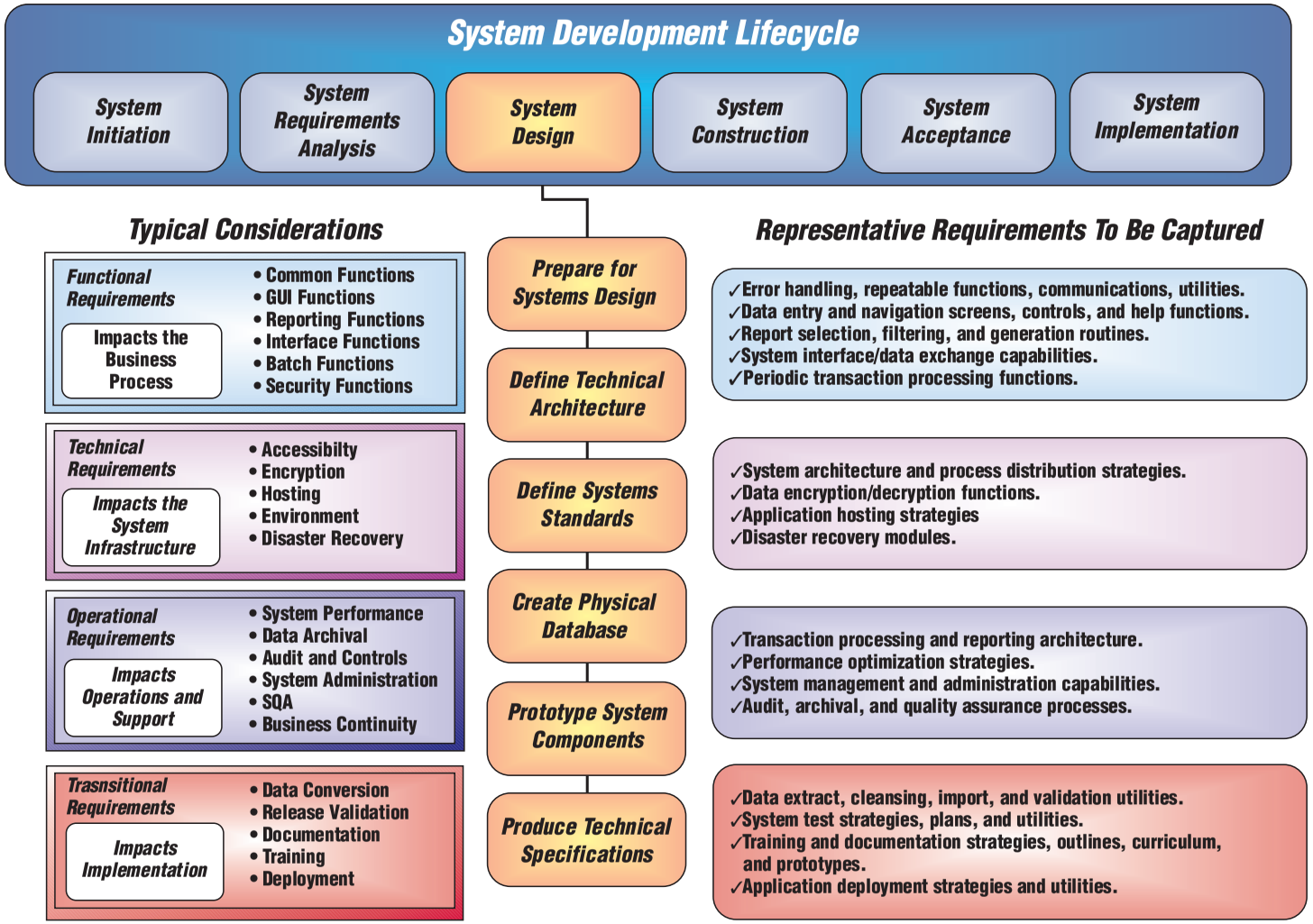
A common mistake made on many System Development projects is attempting to reduce or remove the Business Analyst function from the Project Team once the requirements have been captured. This can lead to many potential pitfalls, since it then places the burden of transforming these requirements into Technical Specifications on the shoulders of team members who may not have been actively involved in the JAD sessions or interviews from which the requirements were derived.

In fact, if project budget and staff availability permit, there can be significant benefits gained by maintaining a Business Analyst presence on the team throughout the entire project, ensuring continuity in understanding the objectives and operations of the various system components.

The Business Analyst should also have an active role in the development of both test plans and data conversion strategies. These efforts are most successful when input is solicited from the Customer Representatives, taking into consideration the full spectrum of available business expertise. Techniques used in the development of these strategies often include interviews and JAD sessions.

As with system requirements, it is important for the Project Team to address all dimensions of the solution – specifically, the functional, technical, operational, and transitional needs of the system – when producing these Technical Specifications. Figure 3-5 illustrates the types of considerations that the Project Team must keep in mind specific to System Design.

Figure 3-5 System Design Considerations



Managing the Project Team and the Customer relationship throughout the creation of the Technical Specifications can be one of the more challenging aspects of a system development project. Typically, there is pressure to produce components of the application prior to the conclusion of System Design. Reasons for this include:

- Customers begin to get anxious to "see" progress. They begin to look at the work to date as a series of documents, none of which directly results in the development of a screen or report. As a result, they begin to push for development to begin.
- The Project Team may want to begin to code those components of the system that are defined early in the design phase. Although there can be benefits to overlapping Design and Construction, the key is to do so in a controlled fashion.
- Project Team members may begin to view the production of exhaustive technical design specifications as overkill. This is particularly true if the individuals producing the specifications are those who will also develop the software. Since many of the technical details are already "in their heads", they just assume that they will recall necessary details during the development of the system.

Capturing complete, detailed Technical Specifications is essential for the development of a robust and successful system. Detailed specifications are also critical when system requirements change over time and the impact of the change on the system modules must be assessed.

As illustrated in Figure 3-5, designing a complete solution means considering each aspect of the requirements and designing a set of Technical Specifications that supports all dimensions of the project. Detailed Tech Specs not only define the specific application modules or functions to be developed, but also establish the framework for all remaining phases of the lifecycle. For example, these specifications will define:

- detailed **module specs** for all system components, whether they are common routines, GUI elements, report and batch functions, or interfaces;
- the approach for implementing the **security strategy** (defined in the Technical Architecture) throughout each module of the system;

- **system performance expectations** and a strategy for meeting them given anticipated system usage and peak processing loads;
- cumulative **testing strategies** enabling validation of all levels of the application from individual modules through a completely integrated system;
- a complete **data conversion** approach addressing the cleansing and loading of historical data as well as population of new data not currently available in any existing system;
- **documentation and training strategies** aligned with the overall application, enabling development of comprehensive training curricula, and supporting materials; and
- **deployment plans** addressing the distribution and transition of the system, that can be reviewed with and validated by the Consumers.

The Project Manager's role is to communicate the importance of producing complete and accurate Technical Specifications, demonstrate meaningful progress, and exude confidence to the Customers and Stakeholders. The best time to start delivering this message is when this process is first kicked off.

Creative and quantifiable evidence must be provided to prove that progress is being made through the development of specifications. Common indicators of progress are counts of the number of Tech Specs initiated, completed, reviewed and approved. Remember, a picture is worth a thousand words, so find ways to depict this graphically in your Project Status Reports. Everyone needs to understand the increased risks and potential cost impact of taking shortcuts, even though shortcuts could give the sense that more progress is being made because they could lead to System Construction earlier in the project.

And, don't forget to take every advantage of prototyping. This remains one of the most effective tools for generating buy-in and demonstrating progress.

Since System Construction logically follows System Design in the overall lifecycle, the team's focus will be on designing the application components needed to build the final solution. Other critical aspects of the project must also be addressed. While many of the activities surrounding these efforts may occur later in the project, the Project Manager must ensure that the planning and coordination of these efforts occur throughout System Design, coincident with the application design.

The following pages provide a detailed decomposition of three representative areas of the system – **data conversion**, **testing,** and **deployment**. The intent is to demonstrate the level of thought and consideration that must go into planning and designing every element outlined in the Technical Specification.

Data Conversion

Much of the data required by the system will be entered through normal day-to-day business operations, whether through manual input or through automated mechanisms. Additional data may be required, however, before the system can effectively begin operation, such as:

- **Historical data,** typically found on existing legacy systems, that may need to be migrated to the new system to provide a basis for future calculations, historical or trend reports, etc.
- **Reference data,** also known as lookup data, which can be used to populate common tables upon which other data is dependent (e.g., system codes that might be referenced across multiple tables). This information may or may not reside on existing systems, depending upon how the eventual design of the new system maps to the legacy environments.
- **New data,** essential to the initial operation of the system being built, that may not be available on any legacy systems.

Whether or not the data the new system requires exists on legacy systems (or in spreadsheets, or on scraps of paper, etc.), the Project Manager must ensure that the Project Schedule includes the steps needed to obtain all required data in a format compatible with the new environment. This often necessitates the development of conversion and migration software modules, to support and ensure successful completion of the data conversion. Research may also be needed to determine whether data is valid, and cooperation between multiple organizations may be required as attempts are made to identify and resolve conflicting data.

It is not uncommon for many Project Managers to delay planning of this effort until later in the project. As a result, there is often a last minute scramble to try to account for and address all of the potential issues that surround the collection and val-

idation of the data. By evaluating data needs and planning how best to address them during System Design, the Project Manager will better position the Project Team to take all necessary actions throughout the construction of the system.

While evaluating initial data needs (often referred to as "Day One" data, since it refers to the data needed on the first day of system operation), it is important to perform a gap analysis against all existing data. This identifies data that is needed but not immediately available. This process may also require the development of software modules, whose sole purpose is to pre-populate tables as part of the overall data conversion process, but which will likely not be used again once the system is operational.

Ultimately, the goal is to develop a data conversion plan. The plan outlines all of the necessary data population efforts required prior to the system going live, and assigns responsibilities for these efforts to the Project Team, Customers, and anyone else who may need to take an active role in this effort.

Because data is often only as good as the source from which it originated, you need to ensure that you involve your Customers in evaluating and validating the information that may eventually be loaded into your system. Often there are historical implications or nuances embedded in the information that may not immediately be evident to someone unfamiliar with the data. The data itself may also imply business rules that may not have been captured during System Requirements Analysis. Historical data often contains "dummy" or otherwise invalid data to flag the existence of an exception situation. Without planning for direct and active involvement of your Customers during the data conversion process, the risk of missing or mishandling critical system data is greatly increased.

One final consideration when planning data conversion is its potential impact on an organization's operations. The time it takes to physically convert, populate, and validate system data can be lengthy, depending upon the volume of data, and the variety of sources from which information will be pulled. It is not uncommon for data conversion plans to require that legacy data be "frozen" as of a certain date, after which any data entered into the legacy system will not automatically be converted. The data conversion plan must ultimately account for how any data entered beyond the freeze date will be entered

into the new system. If there is a need to run the new and legacy systems in parallel for some period of time to allow for validation of the new system, there may be additional data conversion implications that must be addressed. All identified impacts should be captured in the Project Implementation and Transition Plan and the Organizational Change Management Plan, both defined in the Project Planning phase of the Project Management Lifecycle.

Testing

Test plans created in the Produce Technical Specifications process define the overall strategy for validating the functionality of the system being developed, as well as the individual test cases that will be performed in the execution of this strategy. Additionally, the environments in which these tests will be executed must be defined in detail.

Four common types of testing are:

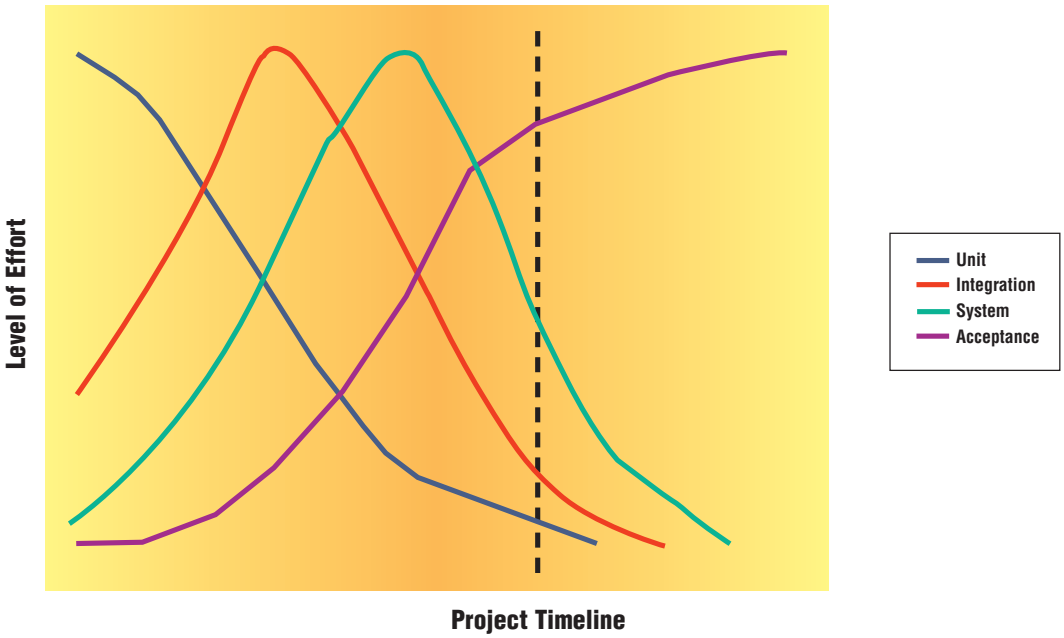
- **Unit Testing,** where individual system components are independently tested as they are developed to ensure that each logic path contained within each module performs as expected. Many tests performed during unit testing can be used for more than one module (error handling, spell checking of screens and reports, etc.).
- **Integration Testing,** where multiple, related elements of the system are tested together to validate components of the system, and to ensure that the appropriate edits and controls are functioning correctly. This testing concludes with the entire system being tested as a whole. "Bottom up" and/or "top down" testing approaches can be used. With bottom up testing, the lowest level modules are created and tested first, and successive layers of functionality are added as they are developed. Top down testing takes the opposite approach, where the highest-level modules are developed and tested, while lower level "stubs" are created and invoked until the actual modules are available. These stubs are temporary software modules that are created in order to enable the higher-level routines to be validated, but that do not yet perform the full set of functions needed by the system. Most testing strategies employ a mix of both approaches.

- **System Testing,** where the entire system is linked together and tested to validate that it meets the operational requirements defined during System Requirements Analysis. Factors that are commonly tested at this level include performance, load, boundary, and external interfaces.
- **Acceptance Testing,** where the Customer Representatives, and potentially Consumers and Stakeholders, perform validation tests to ensure that the developed system meets their expectations and needs. The results of this testing usually determine whether or not the system is ready to be released into production, so it is critical to define and understand the plan for completing this testing as early in the project as possible.

Thoroughly documented and detailed test cases provide two advantages. First, they enable the execution of these tests to be performed by any Project Team member, not just those team members that created the test cases. Secondly, they provide the basis for future regression testing efforts, where all aspects of system functionality are revalidated whenever changes are introduced to the system (most likely during the long-term maintenance and support of the system once it is in production). Involving the SQA Analyst in the development or review of these test cases can help to ensure that they can be leveraged by both the initial Project Team and the Performing Organization once they have assumed ownership of the system.

The following chart illustrates when each of these testing cycles is used within the overall testing lifecycle. There is a heavy emphasis on unit testing at the beginning of development efforts, with a gradual shift through Integration and System Testing, and finally into User Acceptance Testing efforts as all elements of the system become available.

Figure 3-6 Typical Testing Patterns



As Figure 3-6 illustrates, testing cycles overlap each other, primarily because multiple components of the system are in different stages of the lifecycle at any point in time. As illustrated by the dashed line, it is possible that on any given day, the system could be undergoing all stages of testing concurrently. Reasons for this include:

- Modules that may have been developed early in System Construction may already have gone through unit and system testing, while unit testing of recently developed modules may just be starting.
- Testing may uncover problems with the system, frequently resulting in coding changes being made to one or more modules, which then require retesting.

Since testing is often iterative and testing activities may occur concurrently, it is important to ensure that the testing strategy accommodates these scenarios. Performing test planning activities at this stage of the project is critical so that testing participants are fully aware of the time commitments required to prepare for and execute these tests. When developing a test

plan, it is important to assess and define many aspects of the testing strategy. Factors to consider include:

- Testing objectives
- Scope of testing (both what is in and what is out of scope)
- Responsibilities
- Testing approach
- Test data needed to execute the tests
- Criteria for suspending and resuming testing
- Testing sequence
- Defect reporting and criteria

Often one of the most difficult aspects of testing an application is defining and creating the appropriate set of test data needed to validate system functionality. This is especially true in environments that require special processing of data at the end of specific time periods (monthly, quarterly, annually, etc.), or need to manage data across multiple fiscal years. Preparation of this data can be very time consuming, and it is in System Design that the scope and responsibilities for data preparation must be clearly defined.

Also, while the creation of representative or "dummy" test data may be acceptable for tests performed internally by the Application Developers, real or meaningful data should employed in any testing that involves Customer Representatives.

Deployment Planning

By this point, the Project Manager and Project Team have determined what needs to be built, how to build it, and how the Performing Organization is going to use it. The one remaining piece of the puzzle is to identify how the system being created is going to be made available for use once testing has been completed.

Again, the tendency might be to delay this planning since the actual deployment of the system may be far in the future. Proper planning of deployment activities, however, is the key to their success. The method through which the system will be made available may dictate the need for certain System Construction activities, and the testing process created during System Design must be robust enough to validate this deploy-

ment process. The full Project Team, therefore, must understand the deployment plan and its effect on other design, development, and testing activities. This information must also be clearly communicated to, and validated with, the Customers to ensure compatibility with their existing operations, infrastructure and expectations. Factors such as whether the system will require new production hardware must be identified and confirmed early in the project, to allow for proper planning of fiscal and logistical impacts (see corresponding Project Budget and Project Implementation and Transition Plan templates in the Project Planning phase of the Project Management Lifecycle.)

When the time comes to move the application into production, there will be a set of activities for the team to perform. To the extent possible, this set of activities should be tested before actual deployment to ensure that the deployment will proceed smoothly.

A final element of the deployment strategy is the communication of the overall plan. This will allow for coordination with the data conversion plan (ensuring availability of data), and will enable the Consumers to coordinate the system rollout with their day-to-day business activities, generating enthusiasm and ownership toward the system as they prepare for its arrival. This topic is explored in more detail in the Project Planning phase of the Project Management Lifecycle.

Deliverable

- **Technical Specifications** – A compilation of system diagrams, module specifications, and test plans that serve as a detailed, comprehensive blueprint for the system.

Figure 3-7 Technical Specifications Template

< Name of Agency >

Technical Specifications

< System Name >

Agency	
Project Name	
Project Sponsor	
Project Manager	
Document Date	
Prepared By	

*Enter the name of the **Agency** for which the system is being developed.*
*Enter the **Project Name**, and the names of the **Project Manager** and the **Project Sponsor**.*
*Enter the **Date** as of which this document is current.*
*Enter the names of the Project Team members by whom the document was **Prepared**.*

Figure 3-7 (Continued)

Technical Specifications

TABLE OF CONTENTS

*The **Table of Contents** should be at least two levels deep.*

1.0 DOCUMENT SCOPE

***Document Scope** describes the context and the goals of this document in a narrative.*

Example:

This document describes the Technical Specifications or the <XYZ> System that will be developed to satisfy business requirements and implement functionality as documented in the Business Requirements Document, <Date>, and the Functional Specification, <Date> and confirmed via <XYZ> System Prototype, accepted on <Date>.

The goal of this Technical Specifications document is to define the system and its development and testing strategies in enough detail to enable the Application Developers to construct and test the system with minimal need for further explanation.

This document places the system in its context from Technical Architecture, Customer Interface, and System Development perspectives, provides detailed Module Specifications for all its components, details Unit, Integration and System Plans, and outlines Deployment and Transition plans.

Figure 3-7 (Continued)

Technical Specifications

2.0 SYSTEM ARCHITECTURE

System Architecture *section provides the "big picture" view of the system from technical, functional and development perspectives, and puts it in context with the rest of the organization's systems portfolio. This section repeats some of the information from Section 2 (Overall Technical Architecture) of the Technical Architecture document, and from Section 2 (General Functional Specifications) of the Functional Specification document, with their contents refined as a result of the prototyping and other System Design efforts.*

2.1 Refined System Context Diagram

The ***Refined System Context Diagram*** *shows how this system integrates into the Agency's application portfolio. All external dependencies and influences should be noted, as well as all data sources and outputs.*

2.2 Refined System Architecture Context Diagram

The ***Refined System Architecture Context Diagram*** *shows how the system's hardware/software platform fits into the existing environment.*

2.3 Refined System Architecture Model

The ***Refined System Architecture Model*** *represents the various architecture components that comprise the System, and shows their interrelationships. This model presents the view of the system from the technical architecture perspective, as opposed to the Consumer-driven perspective of the System Interface Diagram.*

2.4 Refined Business Flow Diagram

The ***Refined Business Flow Diagram*** *shows how the Customer and Consumer business units will interface with the system.*

2.5 Refined System Interface Diagram

The ***Refined System Interface Diagram*** *shows the application structure (menu structure and navigation of the online application) and batch/utility structure (organization and flow of reporting and other interfaces), which is a refinement of the System Interface Diagram from the Functional Specification document. The System Interface Diagram presents the view of the system from the Consumer perspective.*

Figure 3-7 (Continued)

Technical Specifications

2.6 System Development Diagram

*The **System Development Diagram** shows the system from the development perspective, according to how the components of the system will be coded, tested, and integrated. Beginning with the application structure established in the Functional Specification, a modified list of sub-systems will be identified based on development efficiencies and testing and deployment considerations. Each sub-system consists of a number of Modules, which will be assigned to individual Application Developers for coding and unit-testing; each sub-system constitutes a work packet that will be assigned to a group of Application Developers for construction and integration testing.*

3.0 MODULE SPECIFICATIONS

***Module Specifications** detail the design of each system module, organized by sub-system (following the System Development Diagram). A module may be a collection of code that will present a Consumer interface, or it could be a utility, a database stored procedure, or another common object.*

3.1 Sub-System A

Depending upon how the system has been decomposed into sub-systems, these Sub-System sections contain specifications for all Modules comprising the sub-systems. Sub-systems may be defined by functional area (e.g., security, reports, etc.), or by business focus (e.g., accounts receivable, payroll, etc.)

3.1.1 Module A-1

*A **Module** may be a collection of code that will present a Consumer interface, or it could be a utility, a database stored procedure, or another common object. Each module is described in sufficient detail as to enable the Application Developers to construct and test it with minimal further explanation:*

3.1.1.1 Module Overview

***Module Overview** explains how the module will satisfy the business requirements, and how it fits into the sub-system.*

3.1.1.2 Interface Prototype

***Interface Prototype** shows the module's interface (if applicable), as accepted by the Customers during the Prototype System Components process.*

3.1.1.3 Customer Decision-Maker(s)

***Customer Decision-Makers** lists the Customers who have the sign-off authority to accept the module.*

3.1.1.4 Customer Representative(s)

***Customer Representatives** lists the Customers who are the Functional Subject Matter Experts for this module (They will answer questions about the module and will conduct its acceptance testing.)*

Figure 3-7 (Continued)

Technical Specifications

3.1.1.5 Business Requirement(s)

Business Requirements *provides a tie-back to the Business Requirements Document.*

3.1.1.6 Inputs

Inputs *details all data sources, Consumer input, etc. that will provide data to the module.*

3.1.1.7 Interfaces

Interfaces *details how the Consumers will interact with the module's interface components, and how those components will behave in all circumstances.*

3.1.1.8 Security Considerations

Security Considerations *identify how the security strategy will be implemented in the module.*

3.1.1.9 Logic Flow

Logic Flow *details how the business rules will be implemented by module code.*

3.1.1.10 Outputs

Outputs *details all data stores, displays, etc. created or modified as a result of the module's execution.*

3.1.1.11 Database Access

Database Access *explains how the module will navigate the database(s) to obtain, update, create or delete the data, and which data sources, tables, records, etc. will be used in the process.*

3.1.1.12 Common Elements Used

Common Elements Used *lists all the common objects, stored procedures, etc. that will be used by the module.*

3.1.1.13 Module Review Process

Module Review Process *outlines what QA procedures will be used to review the module and its test results.*

3.1.1.14 Audit Tracking

Audit Tracking *details how updates to data and access to or utilization of system components will be recorded and tracked for auditing purposes.*

3.1.1.15 Special Considerations

Special Considerations *allows compilation of all other Requirement, Design and/or Construction considerations that the Application Developer should be cognizant of.*

3.1.1.16 Unit Test Plan

Unit Test Plan *details how the module will be tested, once developed.*

Figure 3-7 (Continued)

Technical Specifications

Unit Test Case
- Unit Test Case Number:
- Unit Test Case Name:
- Purpose of Test Case:
- Unit Test Data:
  - Data Source A — Value(s):
  - Data Source B — Value(s):
- Navigation:
  - Navigation Directions
- Expected Results:
  - Narrative
- Comments:
  - Additional Testing Consideration

Unit Test Results:
- Tester:
  - Name
  - Date — Time
- Results:
  - Passed: _____ — Failed: _____
  - Justification:

Unit Test Case Number *allows quick reference to test case; should be based on module identification.*
Unit Test Case Name *provides a brief description of the condition/scenario being tested.*
Purpose of Test Case *identifies those functions that the test is intended to validate.*
Unit Test Data *identifies data values (or conditions) that need to be set in order to conduct the test case.*
Navigation *provides a sequence of activities that need to be performed to set up and execute the test.*
Expected Results *provides a comprehensive description of how the module is expected to react to the test case, and/or what data values (or conditions) are expected as a result of the test.*
Comments *provides additional considerations for the test (expected Fail conditions, etc.)*
Unit Test Results *allows the tester to record the results of the unit test.*
Tester *enters his/her* ***Name****, and* ***Date*** *and* ***Time*** *of the test.*
Tester certifies the test as ***Passed*** *or* ***Failed****, and provides a* ***Justification*** *for that certification. In the event of a failure, and depending upon how defects are being captured and tracked, this justification may be a description of the problem encountered, or may simply contain a reference to the defect log, where a detailed description of the error would be maintained.*

3.1.2 Module A-2

3.2 Sub-System B

3.2.1 Module B-1

3.2.2 Module B-2

Figure 3-7 (Continued)

Technical Specifications

4.0 INTEGRATION TEST PLAN

Integration Test Plan *details the activities to be performed in integration testing.*

Sub-system modules are organized into ***Integration Packets*** *to facilitate integration testing. The same module (or a series of modules) can be included in different, smaller or larger, Integration Packets depending on the aspects of the system being integrated and tested.*

4.1 Integration Packet 1

Integration Test Case
Integration Test Case Number:
Integration Test Case Name:
Module List:
Purpose of Integration Test Case:
Integration Test Data:
Data Source A Value(s):
Data Source B Value(s):
Navigation:
Navigation Directions
Expected Results:
Narrative
Comments:
Additional Testing Consideration
Integration Test Results:
Tester:
Name:
Date: Time:
Results:
Passed: _____ Failed: _____
Justification:
Verifier:
Name:
Date: Time:

Figure 3-7 (Continued)

Technical Specifications

Integration Test Case Number *allows quick reference to test case; should be based on module identification.*
Integration Test Case Name/Purpose *provide a brief description of the scenario being tested.*
Module List *identifies system modules included in the Packet*
Integration Test Data *identifies data values (or conditions) that need to be set in order to conduct the test case.*
Navigation *provides a sequence of activities that need to be performed to set up and execute the test.*
Expected Results *provides a comprehensive description of how the Packet is expected to react to the test case, and/or what data values (or conditions) are expected as a result of the test.*
Comments *provides additional considerations for the test (expected Fail conditions, etc.)*
Integration Test Results *allows the tester to record the results of the test.*
Tester *enters his/her* ***Name****, and* ***Date*** *and* ***Time*** *of the test, certifies the test as* ***Passed*** *or* ***Failed****, and provides a Justification for that certification. As with Unit testing, this justification may contain descriptive text, or may refer to an entry in the project's defect log.*
Verifier *verifies that the Integration Test was conducted as described, and produced reported results.*

4.2 Integration Packet 2

5.0 SYSTEM TEST PLAN

System Test Plan *details the activities to be performed in integration and system testing.*

Sub-systems and system modules are organized into ***System Test Packets*** *to facilitate system testing. The same packet, or the system as whole, may be tested numerous times to verify different aspects of its operation.*

5.1 System Test Packet 1

System Test Case
- System Test Case Number:
- System Test Case Name:
- Module List:
- Purpose of System Test Case:
- System Test Data:
  - Data Source A — Value(s):
  - Data Source B — Value(s):
- Navigation:
  - Navigation Directions
- Expected Results:
  - Narrative
- Comments:
  - Additional Testing Consideration

Figure 3-7 (Continued)

Technical Specifications

System Test Results:
Tester:
Name:
Date: Time:
Results:
Passed: _____ Failed: _____
Justification:
Verifier:
Name:
Date: Time:

System Test Case Number *allows quick reference to test case; should be based on module identification.*
System Test Case Name/Purpose *provide a brief description of the scenario being tested.*
Module List *identifies system modules included in the Packet*
System Test Data *identifies data values (or conditions) that need to be set in order to conduct the test case.*
Navigation *provides a sequence of activities that need to be performed to set up and execute the test.*
Expected Results *provides a comprehensive description of how the Packet is expected to react to the test case, and/or what data values (or conditions) are expected as a result of the test.*
Comments *provides additional considerations for the test (expected Fail conditions, etc.)*
System Test Results *allows the tester to record the results of the test.*
Tester *enters his/her* ***Name****, and* ***Date*** *and* ***Time*** *of the test, certifies the test as* ***Passed*** *or* ***Failed****, and provides a Justification for that certification. In the event of a failure, and depending upon how defects are being captured and tracked, this justification may be a description of the problem encountered, or may simply contain a reference to the defect log, where a detailed description of the error would be maintained.*
Verifier *verifies that the System Test was conducted as described, and produced reported results.*

5.2 System Test Packet 2

6.0 ACCEPTANCE TEST PLAN

Acceptance Test Plan *details the activities to be performed in integration and system testing.*

Modules, groups of modules and sub-systems are organized into ***Acceptance Test Packets*** *to facilitate Customer Representative testing of the system.*

6.1 Acceptance Test Packet 1

Acceptance Test Case
Acceptance Test Case Number:
Acceptance Test Case Name:
Module List:
Purpose of Acceptance Test Case:

Figure 3-7 (Continued)

Technical Specifications

Acceptance Test Data Preparation:
Data Preparer:
Data Sources and Values:
Acceptance Case Description:
Business Rules, Requirements and Conditions being tested:
Navigation directions:
Expected Results:
Narrative
Comments:
Additional Testing Consideration
Acceptance Test Results:
Tester:
Name:
Date: Time:
Results:
Passed: _____ Failed: _____
Justification:
Defect Resolution:
Application Developer:
Resolved Date:
Re-Tester:
Name:
Date: Time:
Results:
Passed: _____ Failed: _____
Justification:
Approval:
Name:
Date: Time:

Acceptance Test Case Number *allows quick reference to test case; should be based on module identification.*
Acceptance Test Case Name/Purpose *provide a brief description of the condition/scenario being tested.*
Module List *identifies system modules included in the Packet*
Acceptance Test Data Preparation *describes how the Data Preparer will prime Data Sources with Values that will provide realistic and understandable test scenarios for Customer Representatives.*
Navigation Directions *provide a guide for the Customer Representative testing the Packet on a proper sequence of activities to set up and execute the test.*
Expected Results *provides a comprehensive description of how the Packet is expected to react to the test case, and/or what data values (or conditions) are expected as a result of the test.*

Figure 3-7 (Continued)

Technical Specifications

Comments *provides additional considerations for the test (expected Fail conditions, etc.)*
Acceptance Test Results *allows the tester(s) to record the results of the test.*
Tester
In case of a ***Defect****, the Packet is passed to an* ***Application Developer*** *for* ***Resolution****; the* ***Date*** *of resolution is recorded, and the Packet is passed back for further Acceptance Testing.* ***Re-Tested*** *enters his/her* ***Name****, and* ***Date*** *and* ***Time*** *of the test, certifies the test as* ***Passed*** *or* ***Failed****, and provides a* ***Justification*** *for that certification. In the event of a failure, and depending upon how defects are being captured and tracked, this justification may be a description of the problem encountered, or may simply contain a reference to the defect log, where a detailed description of the error would be maintained.*

A Customer Decision-Maker (or Representative) approves the test results by entering his/her ***Name****,* ***Date*** *and* ***Time*** *of the* ***Approval****.*

6.2 Acceptance Test Packet 2

7.0 DEPLOYMENT AND TRANSITION PLANS

The ***Deployment and Transition Plans*** *section outlines the activities to be performed during System Implementation. The details identified in this plan form a subset of the overall Project Implementation and Transition Plan, defined in the Project Planning phase of the Project Management Lifecycle.*

7.1 Consumer Training and Deployment
7.2 Data Preparation
7.3 Software Migration
7.4 Production Start-up
7.5 Production Verification
7.6 Performing Organization Training and Transition

Consumer Training and Deployment *deals with training and preparing Consumers for system deployment.*
Data Preparation *deals with plans for data conversion, data cleansing, and data migration in preparation for system deployment.*
Software Migration *outlines an approach for migrating developed software to Production, and making it available to Consumers.*
Production Start-up *considers all other (outside data preparation and software migration) activities necessary to prepare and start up the System in Production.*
Production Verification *deals with all the tasks that need to be performed to make sure the version of the System migrated to Production is functioning properly.*
Performing Organization Training and Transition *outlines plans for training and turning over system support responsibilities to the Performing Organization.*

8.0 OPERATIONAL CONSIDERATIONS

A high-level description of how the technical architecture supports and addresses the ***Operational*** *needs of the system is presented in this section. Items include load and update procedures, report production and distribution, data archival and retrieval, backup and recovery, periodic and on-demand procedures, incident reporting, Consumer support requirements, enhancement request processing, etc.*

Measurements of Success

The immediate measurement of success for System Design is the acceptance of all deliverables by the Customer, while the eventual measurement is whether or not the system can be developed according to plan.

Meanwhile, the Project Manager can still assess how successfully the project is proceeding by utilizing the measurement criteria outlined below. More than one "No" answer indicates a serious risk to the eventual success of the project.

Figure 3-8

Process	Measurements of Success	Yes	No
Prepare for System Design	Do all team members have experience with (or training on) the tools that will be used in this phase?		
	Is the team comfortable with the process defined for managing the deliverable repository?		
Define Technical Architecture	Has the proposed architecture been reviewed by an independent third-party subject matter expert?		
	Do your Customers understand the potential impact that the proposed architecture may have on their operations, and agree that the defined architecture supports both their immediate and long-term needs?		
Define System Standards	Have the technical and configuration management standards been reviewed and approved by an agency's SQA Administrator or equivalent?		
	Have standards been defined and accepted that address the strategy for managing future releases of the system?		
Create Physical Database	Were the Performing Organization's data administration policies and standards considered in creating the database?		
	Was the database created using scripts from an automated tool to ensure consistency, repeatability, and maintainability of future builds of the database?		
	Has an independent third-party subject matter expert reviewed the physical database design?		
Prototype System Components	Has the Customer been involved in defining which aspects of the system would be prototyped and reviewed?		

Process	Measurements of Success	Yes	No
Prototype System Components (Continued)	Has Customer feedback been incorporated into the prototype?		
	Have proof of concept activities been performed for all aspects of the system believed to pose the greatest risk (i.e., those components of the system that are new to the environment, that do not adhere to existing standards, or that introduce architectures not currently validated in the environment)?		
Produce Technical Specifications	Has a gap analysis been performed between the system components identified in the Functional Specification and the system modules defined in the Tech Specs?		
	Have the Customers been involved throughout System Design in the review of the Tech Specs to ensure that they have both a sense of the progress being made, as well as confidence in the final design?		
	Is the Customer satisfied that the solution not only addresses the security requirements, but also adheres to existing organizational practices?		

Phase Risks / Ways to Avoid Pitfalls

PITFALL #1 – HOW DID BUILDING MY DREAM HOME TURN INTO SUCH A NIGHTMARE, OR HOW COULD I POSSIBLY HAVE EXCEEDED MY BUDGET BY THAT MUCH?

Everyone has a vision of a dream home, whether it is a cottage in the Adirondacks, a villa on the shores of the mighty Hudson, or a mansion that backs up to the 18th green at your favorite country club.

Building that dream home, however, can quickly turn into a nightmare if not approached correctly. The Project Team – architects, contractors, electricians, interior designers, inspectors, in addition to you and your loved ones – can quickly outnumber ants at most picnics. To complicate things even further, decisions made at every phase of the building process set the stage for the work that remains.

- The layout of your property may influence the style of house that you choose and the location and number of entrances

- The style of the house that you are building determines how many floors it will have and how it will be framed
- The design of each floor enables you to determine the exact layout of the rooms and how to run the wiring and plumbing
- How the rooms flow together lets you choose coordinated color schemes and common decorating themes
- And on and on …

The one thing that pulls it all together – the key to putting the "dream" in your dream home – is that clear, shared vision. Your dream home's worst enemies? ***Indecisiveness*** and ***impatience***.

Indecisiveness, (or the "but it's just a little change" syndrome), results in your "vision" being more like a blur. Decisions made early in the process establish the blueprint for your home, and set the Project Team in motion. The foundation is poured, the framing goes up, the plumbing is plumbed, etc. When after-the-fact decisions are introduced ("You know, we've thought about it, and we'd really like the kitchen moved three feet to the left.") there will be a ripple effect on the rest of the construction.

Impatience is that strong desire to see something happening, even though your vision is still being formulated – to pour that first load of cement, or to drive that first nail. This is analogous to putting the cart in front of the horse, if for no other reason than to convince yourself that there really is a cart and a horse. This does provide the illusion of quick results, but also often results with the wrong kind of cart, and an animal hooked up to it that, at best, looks somewhat like a horse … maybe … from a distance. Invariably, you're going to have to go back and redo some of what you had hoped was already behind you.

These factors combined can have the same effect on your budget as fast food has on your cholesterol. In other words … it's gonna go up, and it's gonna go up fast.

But how does this relate to building your new dream system?

Much like building a new home, building a new system requires that the foundation upon which it is to be built be established, "locked down", and communicated as early in the project as possible. That's the whole purpose of **Define Technical**

Architecture and **Define System Standards**, early in the System Design phase. And just like with the house, changes to the system architecture late in the project ***(indecisiveness)*** and jumping into module design or System Construction ahead of completing the architecture ***(impatience)***, can have a dramatic impact. That's why it's necessary to define your architecture and standards first, and to make sure they are as complete and as accurate as possible.

PITFALL #2 – UMM ..... WHAT?!?

Marcelle Marceau, the famous French mime, made a career out of mastering the unwritten and unspoken word. His ability to represent ideas or concepts and even to tell complete stories through only his actions entertained audiences around the world. Fortunately for Mr. Marceau, there was very little impact if his rendition of "Cooking a Gourmet Dinner" was mistakenly interpreted by an audience member as "Mailing My Shih Tzu to Schenectady."

The same obviously cannot be said for developing detailed Technical Specifications. Misinterpreting the requirements of a certain function, or the design of a specific module, can have significant impact on your project. This is further complicated due to the fact that these differences in interpretation are often not uncovered until well into the testing phases of the project, at which time the actions needed to correct the problems can be enormous.

That is why, when producing Technical Specifications, the appropriate level of detail is everything. Don't assume that the intended audience (your Application Developers) has the same level of understanding and expertise as your Analysts and Technical Leads have. For one thing, it is very likely that they have not been intimately involved in the requirements gathering or design activities. Therefore, they also do not have the same level of familiarity with the Customer, Stakeholder, or Consumer, or more specifically, with their business needs, as do those Project Team members that have been interacting with them regularly since the project started.

As a result, all of the information and details must be captured and communicated in the Tech Specs. You cannot assume that those individuals reading these specifications can correctly fill in the gaps, or that they'll even realize that there is a gap that requires filling!

So remember, when it comes to producing and validating your Technical Specifications, it pays to spend the time capturing the details up front, before you (and your Shih Tzu) find your Developers saying, "Return to Sender."

PITFALL #3 – HEY, BUDDY, CAN YOU SPARE SOME HARDWARE?

You've spent countless hours designing the best system ever devised. You've checked and double-checked to ensure that each and every requirement has been addressed, and that every data item is accounted for (your CRUD matrix is the talk of the town!). Not only that, but your team also managed to build the system in less time than was originally estimated, and you're already thinking about how sweet it will be to park in the Employee of the Month parking spot. All that remains is the testing.

And that's when the walls start to crumble. It seems that while you convinced yourself that you had devised a clever testing strategy, you were so focused on making sure that you could validate the system functionality that you may have overlooked one little detail … the hardware needed to support all of the testing environments. And now that you're neck deep in people looking for results, you've got to explain why testing will be delayed and why you've got to now find a way to obtain (translation – beg, borrow, steal, BUY?) the hardware to support integration testing. And user acceptance testing. And QA testing. Suffice it to say, there goes the parking spot.

Of course, this could all have been avoided by looking at the full testing picture. This includes not only defining how you plan to confirm that the system performs to expectations, but also that you've got the hardware, data, and all other resources needed to execute the tests. The time to think about this is now, during System Design.

Frequently Asked Questions

When is prototyping complete?

There is no absolute answer to this question. Theoretically, prototyping is complete when all Customer feedback has been received, reviewed, and accommodated for in the design. More realistically, the Project Manager will need to find a balance between the benefits of yet one more iteration and the associated cost to the project's budget and schedule. By clearly stating the expectations up front (i.e., the number of iterations accommodated for in the Project Schedule), the stage will be set to alter this approach up or down through the standard change management process being deployed on this project. Ultimately, the real question becomes, "Is the juice worth the squeeze?" - or stated another way, "At what cost is your Customer willing to pursue perfection?"

If you determine that the Customer environment in which you are working has a strong preference for an iterative prototype and design approach, you may want to consider choosing a methodology that supports iterative development (such as RAD). These methodologies allow for cycles of requirements definition throughout the development process, and are most typically used in rapidly changing Customer environments, or on projects that require quick delivery. To be successful, these approaches also are very dependent upon close Customer interaction throughout the prototype revisions.

How can the Project Team determine that all security concerns have been addressed?

Unfortunately, there is no shortcut available, and no substitute for an exhaustive review of the system's data elements, and the management of security around each element. Creation and review of a CRUD matrix, clearly delineating Consumers with authority to Create, Read, Update, and Delete system data, is one of the more traditional techniques used to ensure that the full range of security needs has been addressed. By understanding the processes through which these operations are performed, and mapping these processes to the Consumers authorized to execute them, a high degree of confidence in the security solution can be achieved.

Shouldn't definition of the technical architecture precede business requirements gathering? Don't I need to know what flashy new technology I can promise my Customers?

You must be the one who bought a backhoe to put up a birdhouse! Just as it's wise to have a good idea what the job entails before buying tools and equipment, it makes sense to have a firm grasp on business requirements before deciding on the details of the technical architecture. Business needs should drive the technology, not the other way around.

And as for those flashy promises… as the poet said, you'll have miles to go before you sleep when you have promises to keep.

Is there a software tool to produce technical specifications from the functional specifications? Isn't there an easier, automated way to come up with the system design?

Some day, you will be able to feed your business requirements into a software tool and have it come up with the Tech Specs. Some day, you will be able to just talk to your computer and have it produce the whole system for you, bug free.

Until that day is here, though, the Project Managers, the Business Analysts and the Technical Leads can remain gainfully employed trying to translate Customer whims into some sort of electronic reality.

Those who lived through the boom – and bust – of computer-aided software engineering tools, understand the promise – and the reality – of such concepts. Until computers learn to think, that job belongs to the people, and the creative process of designing a new system will rest with the humans on the Project Team, regardless of what computer tools they use to produce pretty deliverables.

What is the prototype? Is it a pilot? Proof of concept? System model? Why is it where it is in the lifecycle?

You're absolutely right, the word "prototype" is used to mean a whole variety of things. In the context of the NYS System Development Lifecycle, though, it serves as a low cost (and low risk) technique of validating the technical design and verifying that the business requirements are being correctly translated into system components.

The Functional Specification document has elements of a prototype in it, inasmuch as it contains the printed mock-ups of system interfaces that serve as a first "reality check" of the system design. Then, after the technical architecture and system standards are defined, a prototype of representative system components is developed, using the development tools of choice, if possible. Thus, the "look and feel" of the system is presented to the Customers without a great deal of expense and effort implementing the business rules.

It is where it is in the lifecycle because, generically speaking, that's the right place for it: after the requirements have been finalized and the technical architecture has been defined, but before a major effort has been expended detailing Technical Specifications for every module (and certainly before any real coding effort has occurred!)

How do I establish system standards if there are none? Why do I need them anyway?

Well, there is that old story about the Tower of Babel that sort of makes the point about why a common language ("standards" in the system development parlance) is preferable.

As far as how to go about creating standards when there are none (or worse yet, when the current IT landscape looks like the Tower of Babel), start with "expert opinion": ask competent people, knowledgeable about the chosen technology, what they would recommend (hopefully, some of them are on your team!). Have them write it down, in as much detail as possible, covering at the very least naming conventions, programming standards, and configuration management. Keep refining and augmenting the standards as your team encounters situations not covered by the existing ones.

Keep in mind that the ultimate purpose of the standards is not just having them around but using them, so be strident in your admonitions and vigilant in your QA procedures.

Why plan for data conversion and system deployment in the System Design phase (since neither occurs until much later in the process)?

Ah yes, the old school of "we'll cross that bridge when we come to it." As Project Managers, we would rather go by the "measure twice, cut once" theory. As per the project management

methodology (see Section I, Project Management Lifecycle), planning activities should be complete in the Project Planning phase (which maps to SDLC System Requirements Analysis and System Design phases).

Look at it this way – every system development activity has a chance of affecting other system development activities, and affecting folks outside the Project Team. These effects may range from slight to significant. Now, when would you rather know about them – ahead of time, so you can plan, anticipate, and prepare, or after the fact, so you can scramble, react, and catch up?

What level of detail is appropriate for Technical Specifications?

The theoretical answer is that you should be able to hand off Technical Specifications to a group of developers who have the requisite technical skills but know nothing about this particular system, and receive in return a product that closely matches user requirements.

In other words, the Technical Specifications should stand on their own, providing all of the necessary information to the developer. They should describe the business process in great detail, enumerating ALL pertinent business rules. They should describe the inputs and outputs precisely, providing detailed layouts and specific locations. They should not only mention the database records and elements involved, but also how they should be accessed and updated. They should describe every processing step in great detail, anticipating any question a developer may ask. They should describe every possible user action, and provide detailed instructions on how the system should react to each. They should provide instructions on how to test each module once it's been developed, how to integrate modules into sub-systems, and sub-systems into the system, and how to test the success of each integration.

In the ideal world, upon receiving and reading the Technical Spec, a developer should be able to start – and complete – the assignment without any further questions.

4 SYSTEM CONSTRUCTION

Purpose

System Construction consists of all of the activities required to build and validate the new system to the point at which it can be turned over for System Acceptance. Development efforts in this phase are based on the technical solution created during System Design, which, in turn, was based on the functional and operational requirements captured during System Requirements Analysis.

Included in this phase is the construction of all components of the system, including utilities required to adequately prepare and load the data. In addition, System Construction consists of a series of tests of the system components, with each set of tests being performed against a progressively larger grouping of components until the operation of the system in its entirety has been verified.

Since the ultimate goal of System Construction is to produce a system that is ready for acceptance testing by the Customers, an aspect of this phase is the creation of the various training materials and system documentation that support the new system. These materials need to address both the use and maintenance of the system, and will play an integral part in the System Acceptance and System Implementation phases of the lifecycle.

List of Processes

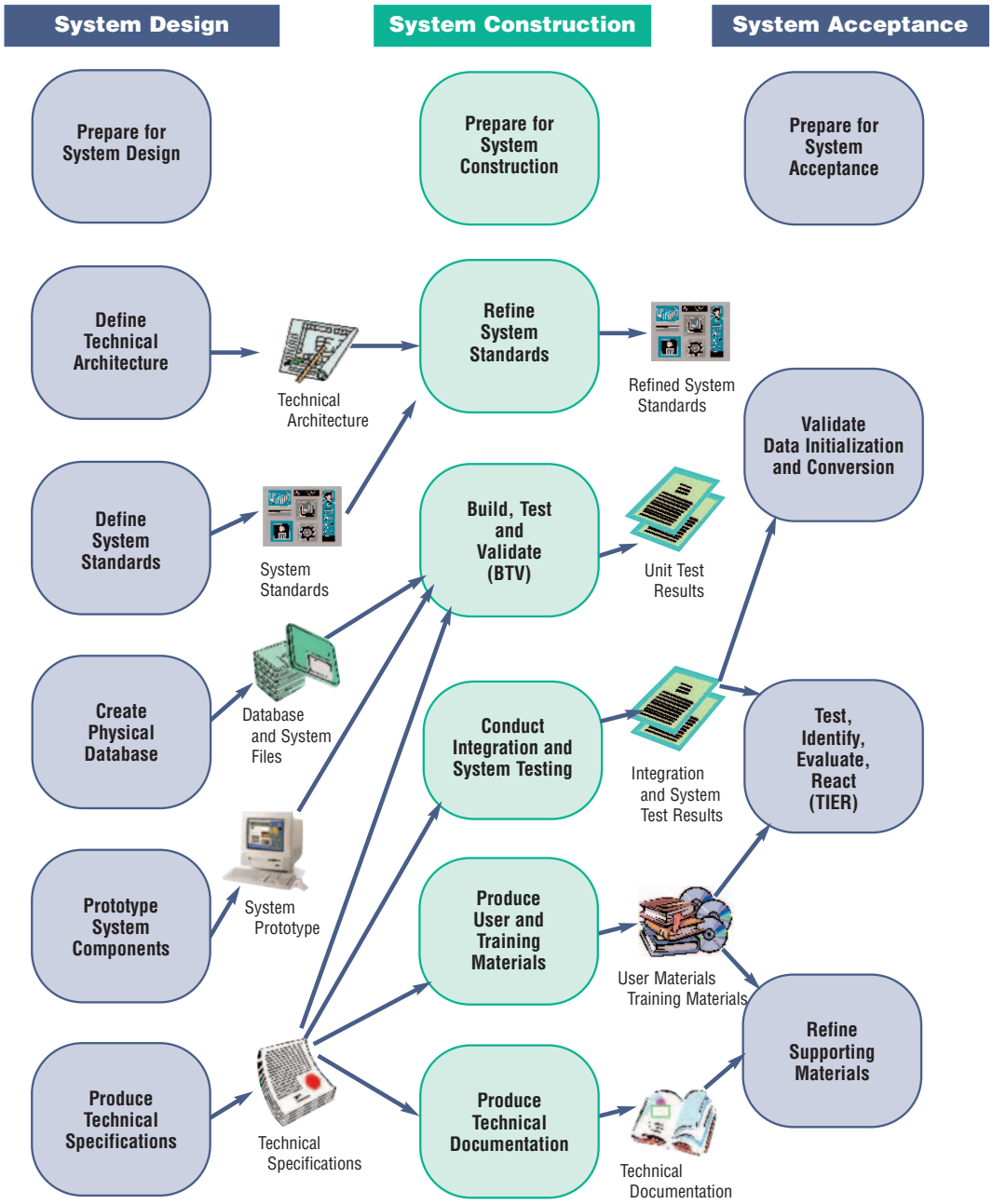
This phase consists of the following processes:

- **Prepare for System Construction,** where the system development and testing environments are established, and where the Project Team is instructed in the processes and tools that will be used throughout this phase.
- **Refine System Standards,** where standards established in System Design are enhanced and adjusted as the team becomes more familiar with the project environment, or in response to changes in the strategic or technical direction of the project.

- **Build, Test, and Validate (BTV),** where individual system components and utilities are constructed and tested to ensure that they perform to the technical and functional specifications.
- **Conduct Integration and System Testing**, where logically related components of the system are assembled and tested as single units, and a complete end-to-end system test is performed.
- **Produce User and Training Materials**, where all Consumer-related documentation and training materials are developed.
- **Produce Technical Documentation**, where all materials intended for the team of individuals ultimately responsible for the on-going maintenance and support of the system are created.

The following chart illustrates all of the processes and deliverables of this phase in the context of the system development lifecycle.

Figure 4-1


System Design
System Construction
System Acceptance
Prepare for System Design
Prepare for System Construction
Prepare for System Acceptance
Define Technical Architecture
Technical Architecture
Refine System Standards
Refined System Standards
Validate Data Initialization and Conversion
Define System Standards
System Standards
Build, Test and Validate (BTV)
Unit Test Results
Create Physical Database
Database and System Files
Conduct Integration and System Testing
Integration and System Test Results
Test, Identify, Evaluate, React (TIER)
Prototype System Components
System Prototype
Produce User and Training Materials
User Materials Training Materials
Refine Supporting Materials
Produce Technical Specifications
Technical Specifications
Produce Technical Documentation
Technical Documentation

List of Roles

The following roles are involved in carrying out the processes of this phase. Detailed descriptions of these roles can be found in the Introductions to Sections I and III.

- Project Manager
- Project Sponsor
- Business Analyst
- Data/Process Modeler
- Technical Lead/Architect
- Application Developers
- Technical Writer
- Software Quality Assurance (SQA) Lead
- Technical Services (HW/SW, LAN/WAN, TelCom)
- Information Security Officer (ISO)
- Technical Support (Help Desk, Documentation, Trainers)
- Customer Decision-Maker
- Customer Representative

List of Deliverables

The following table lists all System Construction processes, some techniques available for use in executing these processes, and process outcomes and deliverables.

Figure 4-2

Processes	Techniques	Process Deliverables *(Outcomes)*
Prepare for System Construction	Interviews Site Walk-throughs Environmental Assessments	*Established Team and Environment for System Construction*
Refine System Standards	Brainstorming Policy and Standards Reviews Best Practice Assessments Lessons Learned Reviews	Updated System Standards
Build, Test, and Validate (BTV)	Coding Manual Testing Automated Testing Defect Tracking	Unit Test Results *Unit Tested System Components* *Unit Tested System Utilities* *Data Conversion Utilities*
Conduct Integration and System Testing	Manual Testing Automated Testing Defect Tracking Regression Testing	Integration and System Test Results *Validated System* *Validated System Utilities*
Produce User and Training Materials	Technical Writing Illustration On-line Content Development JAD Sessions Prototypes/Content Review	User Materials Training Materials
Produce Technical Documentation	Technical Writing Illustration On-line Content Development JAD Sessions Prototypes/Content Review	Technical Documentation

4.1 PREPARE FOR SYSTEM CONSTRUCTION

Purpose

The purpose of **Prepare for System Construction** is to get the technical environment and the Project Team members ready for successful completion of the full set of System Construction activities.

Description

Much of the preparation for System Construction is completely analogous to that required for System Design, since these phases have many of the same characteristics – potentially expanding team size, introduction of new tools, and the establishment and communication of new processes that must be followed. As with prior phases, it may be necessary to revisit project orientation materials to confirm that pertinent information resulting from the completion of System Design is adequately communicated to individuals joining the team. Additionally, since new development tools and processes may be used in this phase, the training needs of both existing and new team members will need to be assessed.

Roles

- Project Manager
- Project Sponsor
- Business Analyst
- Data/Process Modeler
- Technical Lead/Architect
- SQA Analyst
- Technical Services
- Information Security Officer
- Technical Support

The Project Manager must make sure that the Project Team understands the purpose of new development, management, and testing tools, and the processes that need to be instituted for their use. As the team size grows, so does the potential for mistakes or miscommunications. System Construction often occurs at a point in the Project Schedule when the pressures of meeting deadlines increases. Shortcuts, whether intentional or not, may appear to provide attractive alternatives to meeting commitments. The need to adhere closely to defined procedures is, therefore, even more important than ever before. It should begin in the early stages of System Construction with the education of the team in the processes to be followed.

The start of System Construction marks a point in the project where the overall technical environment becomes more complex and more critical than in prior phases. Due to the scope of activities required to construct and test an application, having access to applicable tools such as automated software development tools, software configuration management tools, testing tools, and defect tracking tools can be extremely valuable to support these efforts.

Due to an increased dependence upon development tools, and the breadth and variety of technical environments that need to be established and supported, sufficient time must be taken at the start of this phase to make sure that these technical environments are correctly installed and configured. This marks the first phase in which it is necessary to institute multiple, distinct technical environments to accommodate the various construction and testing efforts. The environments usually include:

- **Development**, where the individual team members perform their module construction and unit testing activities.
- **Quality Assurance**, where more universally controlled and managed integration and system testing efforts are conducted.

In System Acceptance, an **Acceptance** environment is established which mimics the eventual Production state of the system, and which is able to support load and performance testing. Ultimately, a final **Production** environment will also be needed in which the system will operate once it has been deployed, but this is more traditionally established in System Implementation.

Finally, since many of the System Construction activities involve testing the software being developed, it is important to ensure that everyone, including the Customers, recognize and understand their role in these testing efforts. Preliminary testing efforts should be confined to those individuals involved in the development of the various software modules. Once there is a high degree of confidence in the software, however, further functional testing should include the Customer Representatives to the extent possible. This will provide the greatest opportunity to ensure a correct interpretation of the requirements, and should simplify broader Customer testing efforts downstream in the lifecycle (specifically during System Acceptance). Limiting Customer involvement in these testing activities will introduce risks to the eventual success of the system, and any decision to embrace such an approach should only be made after a thorough evaluation of these risks.

4.2 REFINE SYSTEM STANDARDS

Purpose

The purpose of **Refine System Standards** is to continue to evaluate and evolve the system standards first identified in System Design.

Description

The evolution of system standards, including technical development standards, configuration management standards, and release management standards, continues throughout the entire construction and testing of the application. In most cases, standards refinement occurs as a natural by-product of informal day-to-day interactions between project team members. The Project Manager should encourage this by establishing structured, periodic assessments of existing standards as they apply to the project, and reviews of best practices or lessons learned in the early stages of development that may possibly be applied during later stages.

Roles

- Project Manager
- Project Sponsor
- Business Analyst
- Data/Process Modeler
- Technical Lead/Architect
- SQA Analyst

The need to reassess system standards may also be event-driven; for example, in response to a change made in the strategic or technical direction of the project. The decision to purchase components of the system instead of developing them from scratch, and the assessment of the impact of this decision, may warrant a re-evaluation of existing standards. Similarly, a proof-of-concept prototyping effort may yield results that indicate the need for a technical solution that is different from what was originally envisioned. Examining standards at such a time will enable the team to reconfirm their applicability to the project given the new circumstances.

While many Project Teams view this process as primarily focused on the refinement of technical standards that apply directly to the system being developed, the same evaluation and appraisal process can be applied to any of the processes or practices being followed by the development team. Periodic reviews and refinement of all such processes can help reduce project risks and ensure that the processes culminate in the desired results. Depending upon factors such as team size or project complexity, reviews can range from half-day facilitated

sessions to a simple five-minute discussion once a month during regular team meetings. The Project Manager must determine the approach that is most appropriate for each project. It is more important that the reviews are done, than *how* they are done.

Deliverable

- **Updated System Standards** – An updated document detailing the various standards and conventions to be applied and adhered to throughout the project lifecycle.

4.3 BUILD, TEST, AND VALIDATE (BTV)

Purpose

The purpose of the **Build, Test, and Validate (BTV)** process is to produce a complete set of software modules, and to perform the first round of validations on these components.

Description

As the name also implies, this process can be decomposed into three tightly coupled, and often parallel and iterative, subprocesses, as follows:

Build

The physical construction of the system components and utilities takes place during the Build portion of this process. In order to manage this effort, the Project Manager must have an exhaustive list of the modules to be built. With Tech Specs defining this list, development work can be logically partitioned (both in terms of identifying related work packets when distributing the work across the Project Team, and in terms of determining the sequence in which the development efforts will be approached), and progress can be measured and reported.

Roles

- Project Manager
- Project Sponsor
- Business Analyst
- Data/Process Modeler
- Technical Lead/Architect
- SQA Analyst
- Technical Services
- Customer Representative

Partitioning system components and deciding the order in which their development will take place is something that the Project Manager and Technical Lead should pay particular attention to. Done correctly, this can simplify the tracking and reporting of the team's progress to your Customer. In addition, it can enable the team to focus on more difficult or challenging areas of the system first, or on those areas upon which subsequent development efforts may be dependent. One last benefit is that by defining workable components of the system that can be built and demonstrated as a unit, it may be easier to involve the Customer in reviews, walk-throughs, and checkpoints. This is a great means of gaining early buy-in and enthusiasm for the system, and also for confirming that both the Project Team and Customer share a common vision and understanding of the system.

In order for the Application Developers to be able to code each module, they must have access to the Technical Specification associated with that module. Since it is likely that some of the Developers may not have been involved in creating these specs, the Business Analyst(s) should be available to answer questions dealing with the desired functionality and the Customer's intent behind the specs. Similarly, the Technical Lead should provide the technical background and expertise that the Application Developers may lack.

Test

With unit test plans created during System Design, the individual who developed the code typically performs unit testing of each module. Establishing a process in which this unit testing is performed independent of the developer may improve the quality of the test, but may also be impractical given staffing or schedule limitations. It is important that this testing be performed thoroughly, to validate each of the logic paths the software module needs to support, and to capture the results of the tests for future reference. Unit testing is usually performed within the development environment; however, specific actions may need to be taken to ensure that this environment is initialized with the appropriate data and test tools. The test plans should identify any conditions required prior to the start of the unit testing efforts.

In communicating the standards and specifics to which each module must conform, along with the criteria by which it will be tested, it may be useful to develop checklists for each programmer to use during development, and for each team member to use when performing QA of other team members' code. Since common routines may have different requirements or standards than GUI modules, which in turn may differ from other types of components, it may be appropriate to develop checklists specific to the type of module being developed.

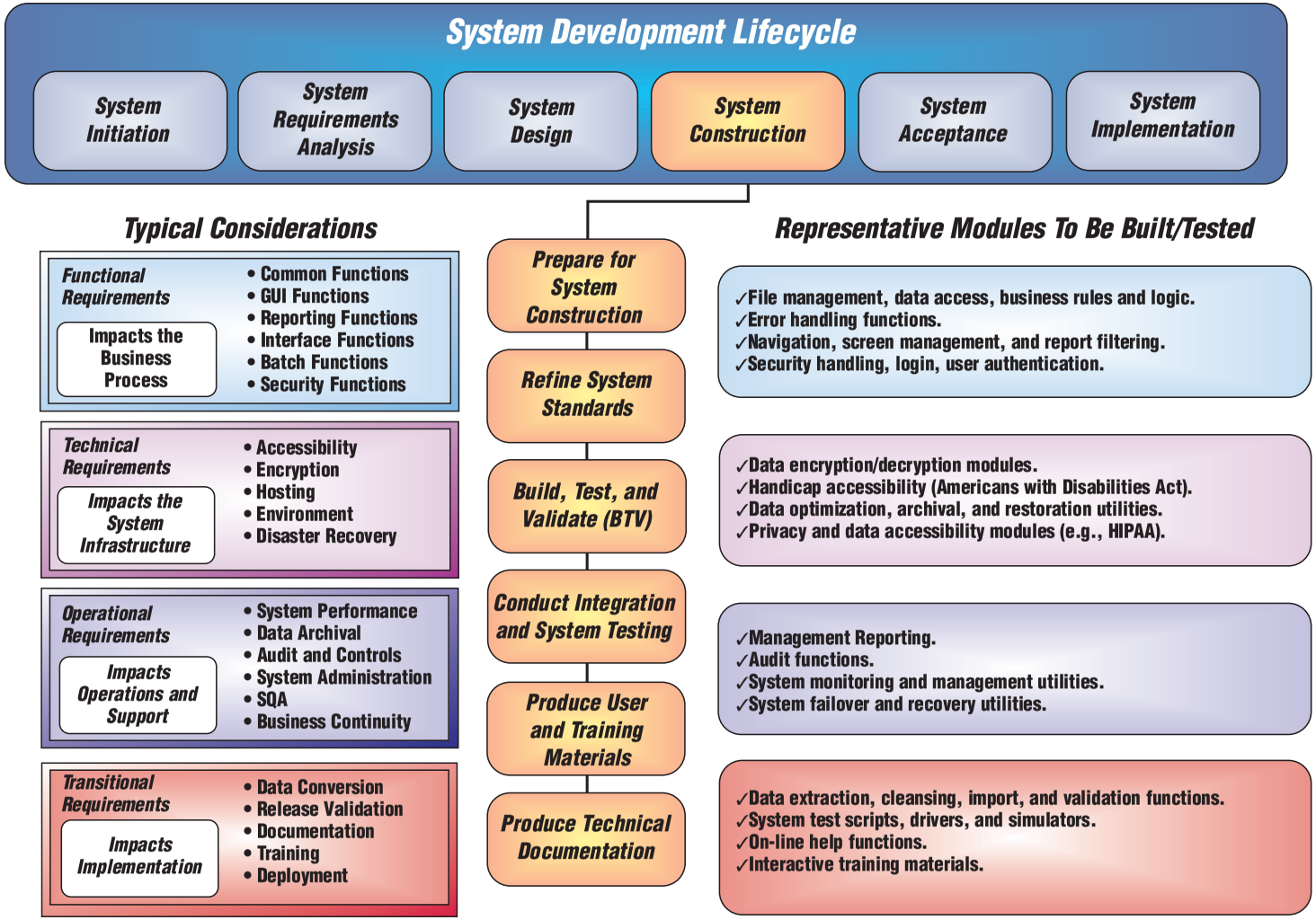
Validate

Validation consists of comparing the actual results of the testing against the expected results that were identified before any testing was performed. By putting these two sets of results side by side, the developer can determine if any corrections are required in the software. If so, another iteration of the build, test, and validate activities begins. This is also a point in the project when the Project Manager and Technical Lead must employ the concept of "peer reviews", in which team members review each other's code to confirm that the appropriate conventions and standards are being followed.

Peer Review is an indispensable tool for the BTV process. It reinforces the deliverable schedule, it promotes dissemination of technical and functional expertise, it advances the rapid implementation of best practices and understanding of lessons learned, and it is an invaluable early warning system for the Project Manager, alerting him or her to problems with the people, the process, the system, and the technology. From the perspective of team chemistry, it is important that the emphasis of these peer reviews be on providing constructive criticism that will result in the eventual building of a more robust and technically sound solution.

Understanding the overall premise of BTV, it is important to realize that this process must be applied for all types of modules being constructed.

Figure 4-3 System Construction Considerations



As more and more of the system is developed, it will be valuable to involve the Customer as much as possible so that adjustments can be accommodated early in the development cycle. Again, the functional aspects of the system are those that the Customers and Consumers can most closely associate with and relate to their day-to-day responsibilities. Frequent interaction with the system at this point in the process will enable them to visualize what it is they will be getting, and will help them to begin to adjust to and accept the changes that they will be faced with once the system is live.

While it is beneficial to get as much feedback as possible, it is also critical that the Project Manager differentiate between changes required to satisfy the functional requirements agreed to during System Requirements Analysis and changes that would result in alterations to the scope or direction of the project.

The most common cause of system development problems is "scope creep," arising from either a continuous adjustment of desired functionality by the Customer, or from an incorrect or incomplete analysis and design effort. The proper course of action is to invoke the change control process in the Project Management Lifecycle, and address the issue at its source, wherever it may be.

What you want to avoid at all cost is "team thrashing", where the developers are continuously buffeted with "new, improved" specs based on the latest understanding of user requirements.

Deliverable

- **Unit Test Results** – A comprehensive set of output identifying the individual unit tests that were performed, along with the detailed outcomes of each test. These test results are contained in the Unit Test Plan section of the Technical Specifications.

4.4 CONDUCT INTEGRATION AND SYSTEM TESTING

Purpose

The purpose of **Conduct Integration and System Testing** is to continually validate larger and larger combinations of modules until the entire system is operating correctly as a single unit.

Description

Having validated individual software components in Build, Test, and Validate, it is now time to begin validating the interaction among these components. The sequence and manner in which these software modules are combined should be defined in detail in the Integration Test Plans that were built during System Design. Where unit testing focused on the individual elements (as decomposed in the Technical Specifications), integration testing now needs to "roll up" the elements into logical groupings (Integration Test Packets) and sub-systems (as identified in the Functional Specification).

Roles

- Project Manager
- Project Sponsor
- Business Analyst
- Data/Process Modeler
- Technical Lead/Architect
- SQA Analyst
- Technical Services
- Customer Representative

Much of System Construction involves an iterative set of processes where the results of one activity may seed efforts in related activities. Results of integration testing may identify components of the system with defects that require re-execution of the Build/Test/Validate process; and once software modules have been modified and retested at the unit level, regression testing of the modules and any subsystems to which they pertain will again be required.

This is often a good point in the project to begin to capture metrics relating to the quality of the system being developed. Data relating to the number of defects identified in testing, the types of defects, criticality, etc., can all be useful in understanding the state of the new system and attempting to evaluate deficiencies in the development processes being followed. For example, if the same errors are repeatedly detected from release to release, it may be an indication that aspects of the quality assurance processes being applied are not adequate, or that the unit tests for a particular module are not stringent enough to fully validate its functionality. (Refer to Figure 4-4 for a sample Defect Log.)

It is essential to know exactly which versions of each software component are being tested in each release. Software Configuration Management tools can be used to manage these releases, allowing the Project Team to know the exact contents of the release being tested. By tightly controlling the testing environment, it is easier to identify the specific causes of any suspected defects in the system.

It may be useful to perform "root cause analysis" of the problems identified during integration testing. While all of them by definition are "system problems," some of them are straight-forward technical or system bugs, while others may indicate issues with the technical architecture, inaccuracies in the original requirements gathering, or deficiencies of application design, each of which requires a different course of action.

Ultimately, completion of this process should result in one of two conditions:

- All Integration Tests have been successfully executed, demonstrating that the system performs to the expectations of the Project Team, or
- The majority of Integration Tests have been successfully executed, identifying a known set of defects, which will require further resolution at some point in the future.

Should the latter situation arise, there may come a point at which it is appropriate for the Project Manager to discuss with the Customer the value of continuing this process at the expense of delaying the start of System Testing. If the known defects are relatively insignificant and do not prevent the system from satisfying the overall business objectives for which it was developed, it may be completely acceptable to initiate System Testing knowing that there may be some remaining Integration Testing issues to be resolved.

Having completed Integration Testing, System Testing now serves two purposes. First, it is the ultimate Integration Test, incorporating all modules into a single system. Second, it validates the operation of the system as it performs against the anticipated boundary, volume, and peak load conditions. Completion of System Testing results in a similar decision point to that which was encountered at the end of Integration Testing.

If any known defects exist, the Customer must be consulted to determine whether they are of sufficient significance to prevent the team from progressing into System Acceptance. If the known problems are sufficiently minor, then it may be reasonable to advance into System Acceptance knowing that there may be some remaining System Construction activities.

Deliverable

- **Integration and System Test Results** – A comprehensive set of completed test plans identifying all integration and system tests that were performed, along with the detailed outcomes of these tests, the list of defects identified as a result of these tests, and the results of any subsequent retests. These test results are contained in the Integration and System Test Plan sections of the Technical Specifications.

Figure 4-4 Defect Log

< Name of Agency >

Defect Log for <Testing Performed>

< System Name >

Agency	
Project Name	
Project Sponsor	
Project Manager	
Document Date	
Prepared By	

*Enter the name of the **Agency** for which the system is being developed.*
*Enter the **Project Name**, and the names of the **Project Manager** and the **Project Sponsor**.*
*Enter the **Date** as of which this document is current.*
*Enter the names of the Project Team members by whom the document was **Prepared**.*

Figure 4-4 (continued)

Defect Log for <Testing Performed>

Testing Performed: _____

Defect Identification			Test Results:			Defect Resolution:			Approval		
Defect #	Status	Test Case #	Tester	Date	Defect Description	Application Developer	Resolved Date	Resolution Description	Re-Tester	Date	Approved Date

*This form is used to log defects encountered when Integration, System, Data Validation or Acceptance **Testing** is **Performed**.*
Most of the information on this form comes from test results recorded on Integration, System, Data Validation, and Acceptance Test Plan templates (see Technical Specifications document template).
***Defect #** is assigned sequentially as defects are discovered.*
***Status** is either Open or Closed (following the Approval Date),*
***Test Case #, Tester** and **Date** refers back to the Test Plan.*
***Defect Description** is a narrative of how the test results differ from the expected results.*
***Defect Resolution** and **Approval** data comes from the applicable Test Plan.*

4.5 PRODUCE USER AND TRAINING MATERIALS

Purpose

The purpose of **Produce User and Training Materials** is to create materials to train the Consumers in the use of the system which can be used as reference materials once the system has been implemented.

Description

This process often overlaps with Build, Test and Validate, and even more commonly with Conduct Integration and System Testing. Materials may vary in format and level of detail, depending upon their anticipated use, but the important thing is that they be developed according to the expectations of the Customer. Specifically, System Requirements Analysis and System Design should have resulted in a detailed definition of the level of documentation and training materials needed.

Roles

- Project Manager
- Project Sponsor
- Business Analyst
- Technical Writer
- Customer Decision-Maker
- Customer Representative

This is frequently the point in the lifecycle at which a Technical Writer may be introduced onto the Project Team. It is important to time the addition of the Technical Writer to the point in the Project Schedule at which the definition of the system is solid and unlikely to change significantly. As an example, the development of the on-line help that supports a set of screens and reports should only occur after consensus has been reached with the Customer regarding their content, layout and design. Developing help files prematurely could result in rework.

As the project progresses into System Acceptance, the documentation materials will be provided to the individuals responsible for performing the testing and validation of the system on behalf of the Consumers. Prior to System Acceptance, it is the responsibility of the Project Team to assess the quality and content of these materials, and to ensure that changes to the system resulting from Integration and System Testing efforts are accurately reflected in both the reference and training materials.

Regardless of whether or not the development of training materials requires actual software development (as would be the case should the system include automated or computer-aided

training modules), the production of user and training materials still follows the same Build, Test, and Validate cycles as the rest of the system. As each component is created, it should be evaluated against predefined criteria to ensure that it delivers the instructions and concepts it is intended to deliver. Similarly, appropriate quality assurance reviews must be performed to validate that correct standards and conventions are being followed.

Ideally, Customers will have been involved throughout the Integration and System Testing process. When finalizing the content of the User and Training Materials, it is often useful to take advantage of their experiences with the system by involving these same Customers in the evaluation of the structure and content of these materials. Having already experienced the system first-hand, their insights can prove invaluable in assessing the usefulness of these materials.

Deliverables

- **User Materials** – A collection of documents, either hard-copy or on-line, designed to assist Consumers in the use and operation of the application.
- **Training Materials** – Materials, for Consumers who are less familiar with the system, that provide instructions on the intent and use of the system.

4.6 PRODUCE TECHNICAL DOCUMENTATION

Purpose

Produce Technical Documentation consists of assembling and organizing all technical information and materials that will be needed for the long-term support, maintenance, and operation of the application.

Description

As with training materials and Consumer-oriented documentation, the level of detail and the format of technical documentation will vary from project to project. The audience for this

Roles

- Project Manager
- Project Sponsor
- Business Analyst
- Data/Process Modeler
- Technical Lead/Architect
- Technical Writer
- SQA Analyst
- Technical Services
- Information Security Officer
- Technical Support

documentation often includes Help Desk personnel and Technical Services, as well as people who will ultimately maintain this system. One approach to developing technical documentation is to revisit prior Technical Specifications and supporting materials (in the event that the development tools used do not automatically update this information). Depending upon the rigor and approach taken during System Design and Construction, a review of these specifications may determine that updates are needed to accurately reflect design changes introduced as the system was being built and tested. If this is the case, the Project Manager may need direction from the Project Sponsor as to whether or not the benefits derived from updating these materials warrants the investment.

Minimally, the logic and execution of the overall application should be documented. How this is accomplished should be based on organizational standards, either by updating existing documentation or by creating new and equivalent documentation. When in doubt regarding the correct approach, the SQA Analyst should be consulted for an understanding of the policies and conventions that should be followed.

Deliverable

- **Technical Documentation** – A collection of materials defining the technical aspects of the system. The intent of this documentation is to provide the team of individuals ultimately responsible for the application with a level of understanding sufficient to enable them to successfully operate and maintain it.

Measurements of Success

The success of the System Construction phase can be most expeditiously measured by the project variance – how closely the actual construction of the system follows the plan and the schedule. The ultimate measurement of success, of course, is the acceptance of the system by the Customer.

During each process, the Project Manager can assess how successfully the project is proceeding by utilizing the measurement criteria outlined below. More than one "No" answer indicates a serious risk to the eventual success of the project.

Figure 4-5

Process	Measurements of Success	Yes	No
Prepare for System Construction	Do your team members agree that they are positioned with the appropriate skills and training to perform the System Construction activities, or that a plan for addressing any gaps has been identified and communicated to them?		
	Do your team members agree that they have access to the appropriate systems and repositories?		
Refine System Standards	Has the Technical Lead conducted a review of the software configuration management process with all the team members?		
	Has the Technical Lead conducted a review of the Build/Test/Validate process (including peer reviews) with all the team members?		
Build, Test, and Validate (BTV)	Is the Project Team encountering no delays due to the environment not being ready or operating incorrectly?		
	Are new team members becoming productive within a week of joining the team?		
	Has the rate of defects declined at least 50% by the second BTV cycle?		
Conduct Integration and System Testing	Are the incremental application "builds" occurring smoothly?		
	Is the integration testing process resulting in low levels of rework (either due to technical deficiencies or due to design changes)?		
	Have the representatives of each Customer functional group had more than one opportunity to review the system deliverables to date?		
Produce User and Training Materials	Has the Customer agreed to the system training approach?		
	Has the Customer signed off the on the User and Training materials?		
Produce Technical Documentation	Do the team members producing technical documentation have an example to follow that is considered a model for technical documentation throughout the organization?		

Phase Risks / Ways to Avoid Pitfalls

PITFALL #1 – THROWING THE QA OUT WITH THE SCHEDULE

Most frequently, system development efforts encounter their first major delays in System Construction. This is where the proverbial rubber hits the road, exposing lack of technical expertise, weakness of design, laxity in requirements definition, and (why not go all the way back!) even errors in judgement during project selection and initiation.

The knee-jerk reaction of a green (or insecure) Project Manager is to prune the schedule of all "extraneous" tasks and whip the developers into a 24-hours-a-day frenzy of code production. Inevitably, the first casualties are the quality assurance activities. They "steal" precious time needed to re-write the ill-fitting module for the fifth time, and they do nothing to arrest the inexorably receding date of the latest elapsed milestone.

The reality, of course, is that in by-passing QA, the Project Manager is making sure that the system will not only be delivered behind schedule (if ever!) but also will not work correctly. Instead, the better course of action is to find and address the root cause of the apparent problem, recast the schedule using realistic assumptions, and reset expectations all around.

PITFALL #2 – HIDING IN THE "BLACK BOX"

System Construction invites the least amount of involvement from the Customer and Consumer community. After all, there is no "finished" product to show off, and the work itself is the exclusive province of the adepts of the complex arts of information technology, with their own acronymic language, arcane conventions, and peculiar interactions. The temptation is to let the team turn to itself, except for a necessary occasional interface with the data keepers or the server masters.

Not a good idea! No matter how perfect the prototype, how meticulous the Technical Specs, or how complete the requirements, during the course of construction inevitably something will come out differently, some questions will arise, and some issues will be identified. The longer the issues fester, the questions simmer, and the changes multiply, the greater will be the dichotomy between what was ordained, and what was produced.

PITFALL #3 – USING THE "PARTS IS PARTS!" APPROACH

Coming out of System Design, the Project Manager is faced with scores and scores of Technical Specs. Some are longer, and some are shorter, but they all seem pretty interchangeable, and frequently a Project Manager will make staff assignments based on some seemingly deliberate, but really arbitrary order – functional, technical, or using the system design document table of contents.

However, to ensure smooth integration testing and to maximize the utility of the peer and Customer reviews, it behooves the Project Manager (with the help of the Technical Lead, of course) to partition the development into discreet work packets that can be built, tested, and integrated independently, by small teams (or even single individuals).

Equally important is the proper sequencing of such work packets. High-risk, critical packets should always be developed first, to quickly head off major problems, avoid false confidence, and prevent unpleasant surprises.

PITFALL #4 – WHO NEEDS REAL DATA?

Priming the database with real base tables, and loading real data is a laborious, messy process, which seems especially more so for a mere test environment. With the proliferation of test data-generating tools, the temptation is to throw some plausible as well as some extreme values into the database, and let it rip.

Unfortunately, there are two problems with using this method exclusively. First, seeing no recognizable data on screens and in reports, the Customer is unable to relate to it in any meaningful fashion, and thus can only add limited value to the review process. Made-up data shifts focus from the content to the format, and makes fonts and colors have greater importance than algorithms and business rules.

Second, (paraphrasing Ken Orr,) data reflects reality, and reality knows no standards. No matter how accurate your prior analysis of data domains and the like, the real database that you will have to convert and load before the system becomes operational will bestow you with certain surprises.

Data specially generated to test certain conditions definitely has its place in both unit and system testing scenarios; but nothing can replace live, messy and impetuous, but inescapable and familiar, real data.

PITFALL #5 – THE 90% COMPLETE SYNDROME

Remember Zeno's paradox, wherein a runner in a 100-yard dash can never arrive at the finish line, because first he must run _ of the race, which leaves him 50 yards from the finish line; then he must run _ of the remaining race, which still leaves him 25 yards away; and as he continues in this fashion ad infinitum, he can never cross the finish line because he is always _ of the remaining distance away from it! It seems like many tasks enter the same sort of the twilight zone: they get to the 90% complete mark, but never quite make it to the "done with" category.

You have two weapons to combat the 90% complete syndrome. First, instead of asking what percentage is complete, ask how much effort is LEFT to be totally "done with" the task; that focuses the mind away from the hopeful, optimistic and eager-to-please 90%-complete assumption, and on the actual, realistic estimate of the remaining work. It also sets up an unambiguous test – if the person estimates 8 hours left, spends 10 hours on the task, and still tells you he needs another 8 hours to finish it, it's time to take out the second gun: third-party verification. Have another technician check out the work done, verify estimate to complete (ETC), and then take whatever action is appropriate.

PITFALL #6 – THE BIGGER THEY ARE, THE HARDER THEY FALL

Sometimes the size of the system, rather than its functional or technical complexity, becomes the primary challenge for the Project Manager.

Large systems are understandably and reasonably broken into many sub-systems, each comprising a number of modules. The Project Team is likewise partitioned into many smaller groups, some with only a single individual assigned to a single unit of work.

The challenge comes in coordinating all those small groups, and fitting the results of all those small units of work, together. A Project Team may resemble a connectionist network, where every node is connected bi-directionally to every other node; as the number of nodes grows, the number of connections grows much more rapidly: while only 2 connections exist between 2 nodes, 4 nodes require 12 connections, and as few as 12 nodes have 132 communications channels going all at once!

The same is true for integrating the work products. The groups may lose the "big picture" view of the project, and concentrate on their myopic, module-level view of the effort, which is likely to deviate from the application baseline. In the end, even if the products are physically compatible, they may need to be reworked to conform to a single standard.

A seasoned Project Manager will set up clear hierarchical channels of communication (limiting the number of nodes without limiting the flow of information!), encourage peer-to-peer communications at the Technical Lead level (leveraging collective expertise), and require peer reviews across development groups (reinforcing standards, disseminating best practices, and sharing lessons learned).

Frequently Asked Questions

Training and documentation are not IT's job. Why are these processes and deliverables part of the system development lifecycle?

This ***Guidebook*** is a firm proponent of the principle "If you want a professional job, hire a professional" and does not advocate forcing programmers to become trainers (or writers.) However, the responsibility for getting the Consumers trained, and for providing clear and helpful documentation to the Performing Organization, still rests with the project – and the Project Manager.

The Project Manager must add to the Project Team requisite resources to prepare and provide training, and to create technical and user documentation, whether those resources come from a separate technical writing group, are contracted from a training vendor, or developed by tapping into the hidden talents of the chip-heads.

What's a test script?

A test script is a series of instructions that guides someone involved in unit, integration, system or acceptance testing activities. Following a test script, the tester sets up a series of scenarios wherein certain conditions and inputs produce a specified expected result. Whether the results differ from stated expectations or confirm them, the test script provides instructions for recording and reporting variance as well as conformance.

Test scripts need to be comprehensive but also practical. They should test all possible types of state/input/process/output combinations, but not necessarily all values within each type (for example, if you are testing for the module's ability to detect odd numbers, it is not necessary to submit EVERY odd number to the test; a small representative sample of odd and even numbers should suffice).

Where in the lifecycle do you do a stress test?

Stress testing is usually done at the sub-system level, after system components have been integrated, and repeated again at the system level. Stress testing checks the system's ability to handle abnormally large (but theoretically possible) volumes of transactions, and to recover from abnormal conditions (such as power outages).

5 SYSTEM ACCEPTANCE

Purpose

System Acceptance is the point in the lifecycle at which every aspect of the application being developed, along with any supporting data conversion routines and system utilities, are thoroughly validated by the Customer Representatives prior to proceeding with System Implementation.

This entire phase is centered around gaining sufficient evidence of the system's accuracy and functionality to be able to proceed to System Implementation with the highest level of confidence possible in the success of the system. This phase differs from System Construction in that acceptance testing is the final opportunity to establish that the system performs as expected in an environment that mimics production as closely as possible. In addition, while the Customer Representatives were certainly engaged throughout prior testing efforts, they now assume an even more critical role in the testing efforts in that they now need to exercise the system in the same way that they will once the full system is implemented. With the testing roadmap established in earlier lifecycle phases, the Customer Representatives now take responsibility for maneuvering the system through its operations.

In addition to confirming the operation of the system and its fit to the business needs that it is intended to satisfy, System Acceptance is also the point in the lifecycle during which all supporting documentation and reference materials are updated to guarantee their consistency with the final delivered system.

List of Processes

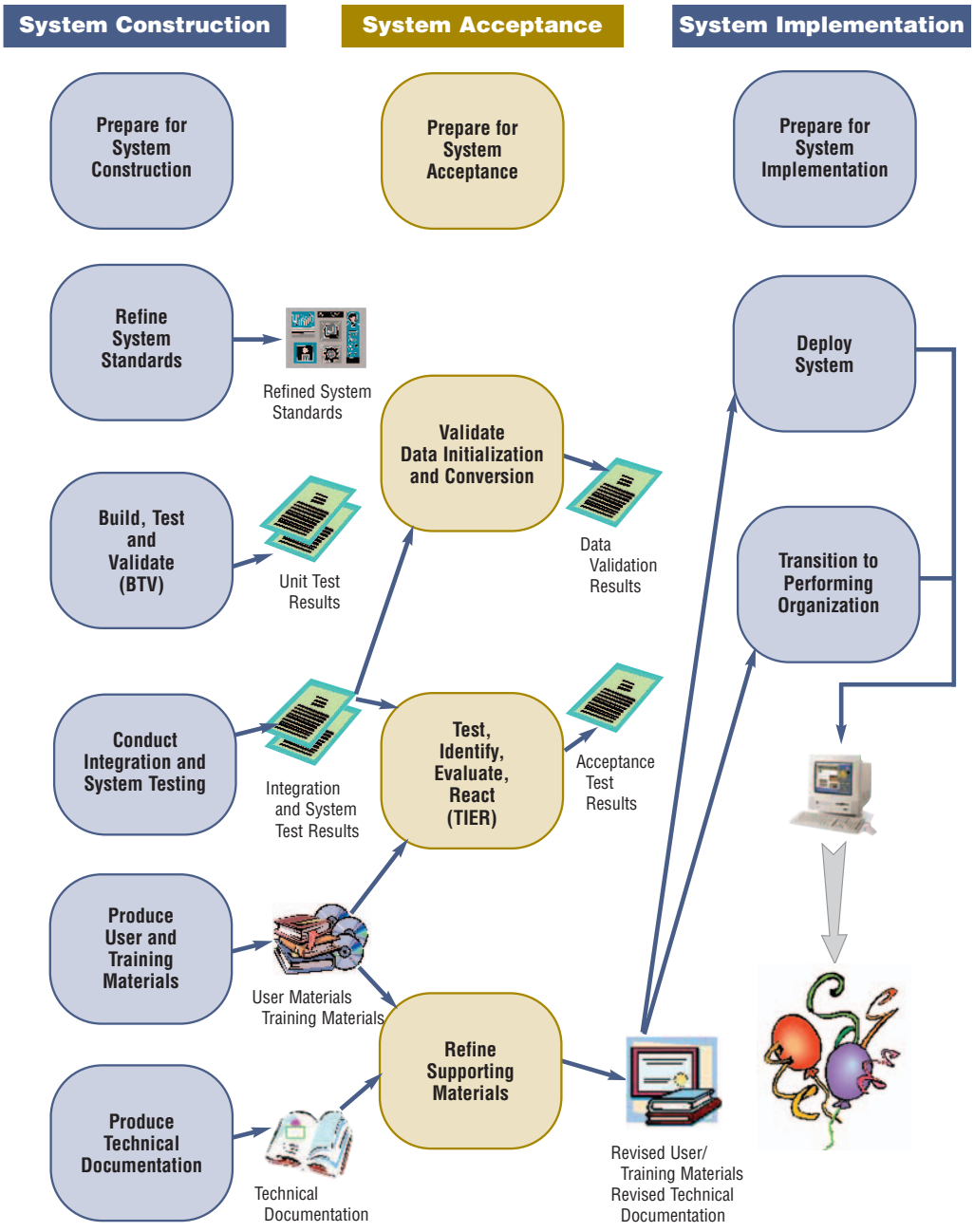
This phase consists of the following processes:

- **Prepare for System Acceptance,** where the system acceptance environment is established, and where the testing team is instructed in the use of processes and tools necessary throughout this phase.
- **Validate Data Initialization and Conversion,** where the processes and utilities used to populate the system database are tested to confirm that they provide a starting point from which the new system can begin processing.

- **Test, Identify, Evaluate, React (TIER),** where the system functions and processes undergo a series of exhaustive acceptance tests to validate their performance to specifications, and where examination of test results determines whether the system is ready to begin production.
- **Refine Supporting Materials,** where the various materials that support the use, operation, and maintenance of the system are updated to reflect any necessary adjustments resulting from acceptance test results.

The following chart illustrates all of the processes and deliverables of this phase in the context of the system development lifecycle.

Figure 5-1


System Construction
System Acceptance
System Implementation
Prepare for System Construction
Prepare for System Acceptance
Prepare for System Implementation
Refine System Standards
Refined System Standards
Validate Data Initialization and Conversion
Deploy System
Build, Test and Validate (BTV)
Unit Test Results
Data Validation Results
Transition to Performing Organization
Conduct Integration and System Testing
Integration and System Test Results
Test, Identify, Evaluate, React (TIER)
Acceptance Test Results
Produce User and Training Materials
User Materials Training Materials
Refine Supporting Materials
Produce Technical Documentation
Technical Documentation
Revised User/ Training Materials
Revised Technical Documentation

List of Roles

The following roles are involved in carrying out the processes of this phase. Detailed descriptions of these roles can be found in the Introductions to Sections I and III.

- Project Manager
- Project Sponsor
- Business Analyst
- Data/Process Modeler
- Technical Lead/Architect
- Application Developers
- Technical Writer
- Software Quality Assurance (SQA) Lead
- Technical Services (HW/SW, LAN/WAN, TelCom)
- Information Security Officer (ISO)
- Technical Support (Help Desk, Documentation, Trainers)
- Customer Decision-Maker
- Customer Representative
- Stakeholders

List of Deliverables

The following table lists all System Acceptance processes, some techniques available for use in executing these processes, and process outcomes and deliverables.

Figure 5-2

Processes	Techniques	Process Deliverables *(Outcomes)*
Prepare for System Acceptance	Interviews Site Walk-throughs Environmental Assessments Acceptance Test Plan Review	*Established Team and Environment for System Acceptance*
Validate Data Initialization and Conversion	Manual Testing Automated Testing Defect Tracking Regression Testing	Data Validation Test Results *Validated Data Initialization and Conversion Software*
Test, Identify, Evaluate, React (TIER)	Manual Testing Automated Testing Defect Tracking Regression Testing	Acceptance Test Results *Validated System* *Validated System Utilities*
Refine Supporting Materials	Technical Writing Illustration On-line Content Development Content Review	Revised User/Training Materials Revised Technical Documentation

5.1 PREPARE FOR SYSTEM ACCEPTANCE

Purpose

The purpose of **Prepare for System Acceptance** is to ensure that the testing environment to be used during System Acceptance is ready and operational, and to take any steps needed to prepare the acceptance testing team to successfully achieve their testing goals.

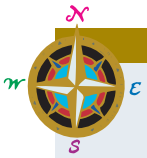
Description

This phase of the SDLC is significant because it is the last time that rigorous testing will be performed on the system before it goes into production. It is also very likely the first time that Customer Representatives will be able to exercise the application in a near-production environment, which adds a unique perspective to the testing efforts.

Preparation of both the testers and the environment in which they will operate is crucial to the success of this phase. User and training materials must be distributed in advance of this effort, and any training sessions needed to familiarize the testers with the application must be conducted.

Roles

- Project Manager
- Project Sponsor
- Business Analyst
- Data/Process Modeler
- Technical Lead/Architect
- Application Developer
- SQA Lead
- Technical Services
- Information Security Officer
- Technical Support
- Customer Decision-Maker
- Customer Representative
- Stakeholders



In an ideal situation, those participating in the testing should receive the exact training and materials intended for Consumers, so that the usefulness and acceptability of the materials can be validated.

In addition to familiarizing the testing team with the system, preparatory efforts must clarify for the team all testing roles and responsibilities, the timeline allocated to these efforts, and all processes to be followed regarding recording of testing results and reporting of defects. Although prior testing activities should have included Customer Representatives as part of the test team, it is common for this team to include an increased number of representatives so that real production operations can be better emulated. As a result, the testing team may now consist of participants who may not be as accustomed to rigorous testing activities as were members of the integration and system testing team, who typically have a more systems-oriented background. Therefore, expectations of these individuals need to be clearly defined, as do such elements as the testing strategy to be followed, the extent of testing to be performed, the definition of acceptance, etc.

Preparation of the environment in which acceptance testing will be performed is primarily focused on confirming that it is as close to the production environment as possible and on migrating the application from the QA to the Acceptance environment.

5.2 VALIDATE DATA INITIALIZATION AND CONVERSION

Purpose

The purpose of the **Validate Data Initialization and Conversion** process is to confirm before the system begins production that all utilities and processes needed to load data into the system work correctly, and that any data carried forward from another system is migrated completely and accurately.

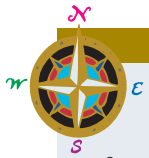
Description

As important as it is to ensure that the new application functions properly, it is equally important to ensure the accuracy of the data being processed by the system. This effort starts with the initial loading of data, also known as “Day 1” data. The data is most often populated using two main methods – the manual loading of information required by the new system that cannot be extracted or obtained from an existing system, and the automated loading of information currently available in one or more existing data sources.

Roles

- Project Manager
- Project Sponsor
- Business Analyst
- Data/Process Modeler
- Technical Lead/Architect
- Application Developer
- SQA Lead
- Technical Services
- Information Security Officer
- Technical Support
- Customer Decision-Maker
- Customer Representative
- Stakeholders

The acceptance testing team must exercise all aspects of the data initialization and loading of information into the system database. Testing of the data load should be conducted very much like the testing of the application itself, with all participants capturing the test results and identifying any defects. The goal is to determine whether the quality of the data load process and the resulting data are sufficient to proceed with implementing the system. Any data problems that jeopardize the eventual success of the system clearly need to be addressed. It may be perfectly acceptable, however, to advance into further application testing activities with a known set of low-impact data problems, as long as the impact of these defects on subsequent testing efforts is understood in advance, along with a defined timeframe by which the errors need to be corrected.



The key difference between acceptance testing activities and all prior testing efforts is that while it was reasonable to expect iterative testing cycles in earlier phases, the goal of acceptance is to demonstrate that the deployment and use of the system will be successful in a production-like setting. Therefore, whether validating data initialization efforts or specific system functions (as described in the following process), all activities performed in this phase should already have been successfully demonstrated in System Construction, albeit in a slightly different environment.

This does not mean that that there won't be decision points throughout this phase at which test results will need to be evaluated, usually as part of an overall set of test results, to determine the proper course of action. Once these test results are in hand, then an informed decision can be made to either move ahead with continued testing, or to address known issues as they are discovered, only moving forward when the error condition has been corrected.

Deliverable

- **Data Validation Test Results** – A comprehensive set of completed test plans identifying all data initialization and conversion tests that were performed, along with the detailed outcomes of these tests, the list of defects identified as a result of these tests, and the results of any subsequent retests. These test results are contained in the Acceptance Test Plan section of the Technical Specifications.

5.3 TEST, IDENTIFY, EVALUATE, REACT (TIER)

Purpose

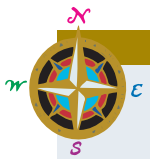
The purpose of the **Test, Identify, Evaluate, and React** process is to execute a complete suite of tests against the application in a production-like environment, assess the results of the tests, and determine whether it is appropriate to proceed with System Implementation, or whether corrective actions are required to address any defects encountered.

Description

Roles

- Project Manager
- Project Sponsor
- Business Analyst
- Data/Process Modeler
- Technical Lead/Architect
- Application Developer
- SQA Lead
- Technical Services
- Information Security Officer
- Technical Support
- Customer Decision-Maker
- Customer Representative
- Stakeholders

This process is analogous in many ways to the Conduct Integration and System Testing process in System Construction. While the primary responsibility for conducting the testing has moved from the Application Developers to the Customer Representatives, many of the principles that applied to earlier testing efforts apply here as well. The need for capturing testing metrics remains essential for conducting quality assurance practices, and the adherence to rigorous configuration management and release migration procedures remains crucial to understanding exactly which versions of the software are being tested at any given time.



Because the Customer is anxious to implement the new system and restore testing personnel to their primary business functions, acceptance testing tasks are often underemphasized. Thorough testing procedures cannot be stressed strongly enough. Failure to perform these tasks with high quality and attention to detail could cause serious problems in the future, perhaps after the system has been placed into production. Time invested at this stage will save time overall.

Throughout this process, any problems identified by the testers must be recorded and tracked to closure on defect logs. Continual interaction is essential between those doing the testing and those who developed the application. The Project Manager must closely manage the activities in order to ensure adherence to the Project Scope and Schedule.

Another factor to consider during this process is that organizations may choose to perform parallel operations during acceptance testing. This requires a continuation of existing business processes at the same time that the new system is being tested. This may mean that while transactions are entered into the new system, they will also need to be entered separately into any existing legacy systems, or may need to be captured in whatever manual systems are currently being utilized. This often requires additional staff or extra hours in order to keep up with the additional workload, but allows the results of the two processes to be compared for accuracy. If this parallel approach is taken, the extra burden on the Performing Organization will need to be estimated and communicated to the Stakeholders so that they can make an informed decision regarding any additional costs, the duration for which the organization can sustain these costs, and the benefits resulting from this approach.

Regardless of whether or not parallel operations are planned, the recommended approach for testing applications is to drive a time-boxed set of coordinated tests that adhere to the TIER approach, as follows:

Test: Following the initialization of the Acceptance environment, acceptance testing will occur, during which all perceived defects in the application are recorded. The exact frequency with which these defects are reported will vary with each project – the important point to note here is that communication of these defects needs to be constant throughout the testing to avoid the 'big bang' effect that can occur when all issues are reported only upon completion of the testing.

Identify: The Project Manager will engage the appropriate team members to analyze each reported defect to determine the cause of the defect being reported, and to identify whether or not a true system error has been encountered. While defects are often related to adjustments needed in the application software, it is equally possible that the root cause of a reported

defect is the tester's misunderstanding of exactly how the system was designed to operate. Changes to normal business operations due to new functionality, combined with the revised look and feel of the application, often result in system errors being reported that in fact are examples of the system working exactly as designed.

The Project Manager should keep in mind that system errors or defects may be reported that result more from a misinterpretation of expected functionality as opposed to a technical defect. Even though the system may be operating exactly as defined, this scenario may point to other non-technical errors associated with the system. It may be possible that the on-line help system may not sufficiently describe the system's operations, or that a component of the overall training package may require an increased level of detail in one or more areas. Take advantage of System Acceptance to evaluate the entire system and its supporting materials, and make adjustments now while you can still get out in front of the final implementation.

Evaluate: If a defect in the application is identified, the Project Team will work together to identify the appropriate corrective action. A decision will be made regarding whether or not system modifications are required, whether data loaded in the prior process needs to be corrected, whether operational procedures need to be adjusted, or whether some other form of correction is required. Once a corrective action is identified, it will then be prioritized, along with all other on-going activities, to determine if this issue is of sufficient impact to warrant adjustments being made during System Acceptance. Since all testing efforts should adhere to the Project Schedule, the underlying question becomes, "Can the system be placed into production with the existence of this condition, or is its impact such that implementation of the system is not possible due to inability to perform essential business operations"? If an acceptable work-around exists, or if the impact is minimal, then a determination can be made to handle the correction as part of a normal production support issue once the system is implemented.

React: Once the appropriate actions and priorities have been identified, the defect will be resolved. For those defects requiring changes to the application, the appropriate changes should be made, tested, and re-released to the Customer Representa-

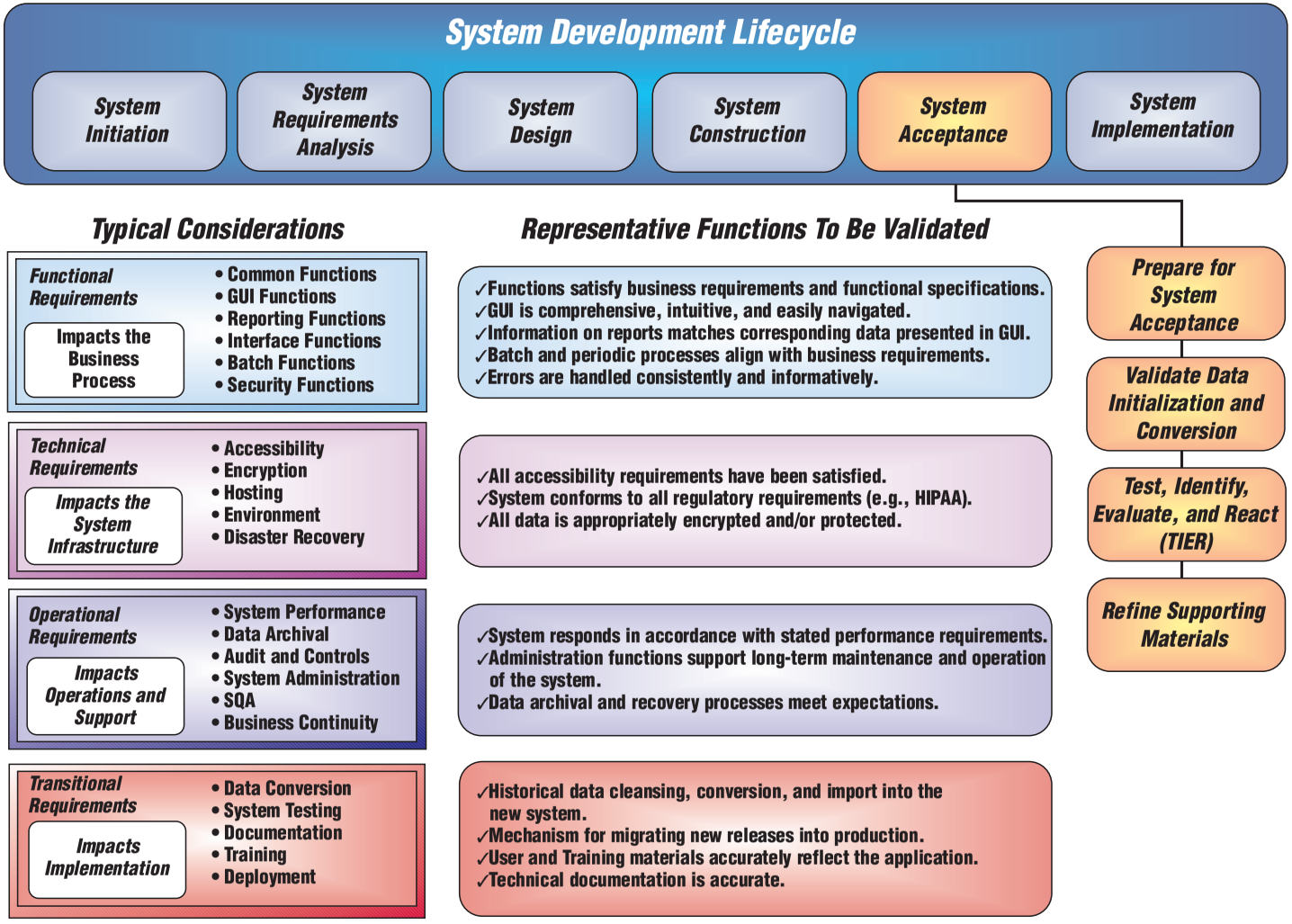
tives for validation. For all other defects, the agreed-to resolution should be communicated to all parties.

The key to successful completion of System Acceptance is the clear definition of go/no-go criteria that can be used to define the set of circumstances that would preclude placing the application into production. Should a "show stopper" be identified in these final days of testing, the Project Team must estimate and plan the appropriate corrective actions and retesting needed to resolve the problem, and then adjust the testing schedule accordingly using the standard Project Change procedures. However, if the list of issues at the end of acceptance testing contains only low priority, low impact modifications, (i.e., those that do not significantly inhibit the use of the application), testing can be considered complete. At this point, the project should progress to the next phase, with all remaining issues addressed through the application support mechanisms.

Deliverable

- **Acceptance Test Results** – A comprehensive set of completed test plans identifying all acceptance tests that were performed, along with the detailed outcomes of these tests, the list of defects identified as a result of these tests, and the results of any subsequent retests. These test results are contained in the Acceptance Test Plan section of the Technical Specifications.

Figure 5-3 System Acceptance Considerations



5.4 REFINE SUPPORTING MATERIALS

Purpose

Refine Supporting Materials ensures that all materials relating to the new application are kept up-to-date with any changes that may be introduced during System Acceptance.

Description

Roles

- Project Manager
- Project Sponsor
- Business Analyst
- Data/Process Modeler
- Technical Lead/Architect
- Technical Writer
- SQA Lead
- Technical Services
- Information Security Officer
- Technical Support
- Customer Decision-Maker
- Customer Representative
- Stakeholders

Despite the best efforts of the Project Team throughout the earlier phases of the lifecycle, it is common for acceptance testing activities to uncover issues that require changes to the application. In the best cases, these may be nothing more than small cosmetic changes. In extreme cases, defects detected during testing could result in major subsystems of the application being redesigned and rewritten. Regard- less of the situation, all supporting materials, (both Consumer- and Technical Support-oriented), should be reviewed to make sure that they still accurately reflect the system that will be deployed in System Implementation.

Deliverables

- **Revised User/Training Materials** – An updated set of materials aimed at assisting Consumers with the use and operation of the application, reflecting any changes that were introduced as a result of acceptance testing efforts.

- **Revised Technical Documentation** – A corresponding set of updated technical materials, again reflecting any changes introduced as a result of acceptance testing efforts and defining aspects of the application that will be useful to those individuals responsible for on-going system maintenance.

Measurements of Success

The ultimate measurement of success for System Acceptance is the agreement by the Customer to move the system into production.

Meanwhile, the Project Manager can still assess how successfully the project is proceeding by utilizing the measurement criteria outlined below. More than one "No" answer indicates a serious risk to the eventual success of the project.

Figure 5-4

Process	Measurements of Success	Yes	No
Prepare for System Acceptance	Do you have the commitment from Customer Decision-Makers to make the right people available to the extent necessary for the duration of Acceptance activities?		
	Does your testing community agree that they are adequately prepared for the Acceptance activities?		
	Does everyone have access to and the correct security level for the system?		
Validate Data Initialization and Conversion	Can you say with confidence when each outstanding data initialization and conversion defect in the log will be corrected?		
	Do your Customers agree with your assessment?		
Test, Identify, Evaluate, and React (TIER)	Can the developers fixing the defects determine, based on the defect log and test results, what the problem scenario was and what outcome was expected vs. what was experienced?		
	Are retesting efforts demonstrating that reported defects are being resolved with new releases, and that the same issues are not being reported from iteration to iteration?		
Refine User and Training Materials	Have you made changes to the user/training materials as a result of your experiences in user training and acceptance testing in this phase?		
	Have you made changes to the Technical Documentation as a result of its review by a representative of the group that will assume responsibility for the system once it's deployed?		

Phase Risks / Ways to Avoid Pitfalls

PITFALL #1 – YOU EXPECT ME TO DO WHAT?

The long Construction cycle is finally over. The system is pretty much done. Your team knocked itself out delivering what was promised, on time, within budget. You can hardly curb your enthusiasm as you call the Customer Decision-Maker to invite his cohort to spend a few weeks in the trenches slugging it out with the remaining system bugs. Curiously, all you get is dead silence, followed by a string of strangely unintelligible exclamations. Oops!

Customers (and Consumers), especially ones not experienced with formal system acceptance activities, assume that the new system will just materialize on their desktops, free of defects and perfect in every way. They view it the same way they view shrink-wrapped software packages, and have no idea how much effort goes into getting the system to the turnkey stage. It is a great shock for them to learn that, in addition to letting the system developers know what they wanted at the beginning, they need to verify at the end that what the developers actually developed meets their expectations.

Since the acceptance activities are fairly rigorous and protracted, it behooves an astute Project Manager to set those expectations way up front. Disarm them with the intention of making sure they got what they asked for, detail for them the acceptance activities and the expected level of participation and commitment, and keep reminding them, as System Acceptance nears, of their promises of people and time.

PITFALL #2 – WHAT THEY WANT VS. WHAT THEY ASKED FOR

OK, you avoided the pitfall #1 above, and an eager and agreeable group of Customers traipsed over to your neck of the woods to try out the new system. However, the honeymoon is over real quick when they actually try out the new functions. Between System Requirements Analysis and System Acceptance, time has passed, things changed and people moved around, and now nobody remembers who wanted what and why; they just know that what they see is not something they want to get.

One of the hardest things to manage during the system development lifecycle is expectations. Keeping a good audit trail should help. How good were your deliverable definitions? How tight were your acceptance criteria? Were those deliverable approval signatures written in blood – or water?

The answers to these questions spell a difference between orderly change control, and unmitigated disaster.

PITFALL #3 – FLOATING THE GARBAGE DOWNSTREAM

Finally, you avoided both of the above pitfalls, and the Customer Representatives are oohing and aahing about the system design … until they actually try to DO something. Then, all heck breaks loose: the navigation is off, the business logic is faulty, the system crashes, and the dreaded hourglass just keeps flipping over and over and over and over… endlessly…until the Customers see red behind the Blue Screen of Death. It is obvious that the system was not tested properly, and the Customers naturally resent it. Nasty rumors begin to spread, and instead of the welcome mat, the Consumers ready tar and feathers for the system deployment ceremonies.

In the heat of the construction homestretch, the temptation is to take short-cuts assuming any problems can be fixed downstream: cutting corners on software quality assurance at the unit test level, hoping to make it up during integration testing; skipping functionality reviews, hoping that the Customers will catch the errors during acceptance testing; even short-shrifting the initial training, hoping to make up for it during Implementation.

The problem is, there is never enough time in subsequent phases either. Plus, the expectations have not been set up. So if you float the consequences of bad decisions downstream, you'll just have a bigger pile of trash to deal with, instead of unfurling your sails and parading across the finish line.

PITFALL #4 – "IT'S TOO LATE, BABY!"

Another consequence of trying to short-cut the process upstream and hoping to make it up downstream is that a point comes when it's too late to address some issues. In System Acceptance, it's too late to fix system performance problems. It's too late to correct data conversion routines. It's too late to redefine core functionality, and it may even be too late to introduce minimal business process changes.

Problems like that cannot be fixed in this phase. If you can't avoid them, what you need to do is go back, and loop the life-cycle over. For data conversion problems, you probably need to go back to Construction. For performance problems, to Design. And as for problems with core functionality (with apologies to Carole King) – "Something inside has died" and you'd better push the old STOP button and rewind to the beginning; then, maybe, "there will be good times again."

PITFALL #5 – PLAYING THE BLAME GAME

When the Customer is unhappy with the new system, and is threatening to "pull the plug" on acceptance, the temptation on the part of many members of the team is to play the blame game: it's someone else's fault! The database administrators blame the network people; the network folks blame the system developers; and the programmers blame the ultimate catch-all: user error. The problem is, among all the finger-pointing, the real problem goes unsolved.

As Project Manager, your job is to keep the team together and remind people that only by pulling together will they prevail. Insist on everyone acting as a team, concentrating on solutions rather than problems, and helping each other rather than blaming the other guy.

Frequently Asked Questions

What do I do when my Project Budget does not include a QA function?

The simple fact is that quality is an indispensable part of any effort (from both project management and system development perspectives). Building a product without quality controls is wrought with risk: it will not satisfy your Customer, and will reflect poorly on your reputation.

Assuming that you cannot do a change control to add a QA function to your Project Budget, the good news is that, in a pinch, you can do without a separate QA function by incorporating quality assurance into every procedure and task, and taking on quality control responsibilities yourself.

You need to incorporate rigorous review cycles into production and acceptance of every deliverable, by using peer review mechanisms as well as inviting external SME's. As is stated in the text above, "It is more important *that* the reviews be done than *how* they are done." Sometimes even having non-technical independent observers sitting in on reviews brings extra gravity and rigor to the proceedings. Another trick is getting the Customers even more closely involved in reviewing works in progress and providing feedback.

Finally, you will need to roll up your sleeves and personally check out test scripts and acceptance procedures, and join in the testing activities – not necessarily to do any significant testing yourself, but to ensure that it gets done thoroughly and correctly.

Who should be doing the testing? I can't trust the developers to check their own work! Can I?

There are organizations where the testing function is separated into its own business unit. There are other organizations that have a separate QA function, but its members join the Project Teams at certain parts of the lifecycle, and perform testing on site. Finally, there are organizations that incorporate quality in everything they do, and thus have no separate QA function.

Each approach has its own pluses and minuses, but the important concepts are:

1. Test plans and scripts need to be developed before any coding is done
2. Test scripts need to be executed faithfully, and the results communicated immediately to the developers
3. System development should not proceed until the defects have been corrected
4. The same defects in different testing cycles point to a serious problem that has to be resolved before any further work is done

As far as the developers are concerned, sure you can trust them! To check each other's work, that is.

Who owns development of acceptance test plans? Who should the Project Manager enlist in their development?

Since Customer Representatives execute acceptance test plans, they ought to participate in their development. They need to understand the process, and be comfortable with its documentation. Plus, they probably can think up testing scenarios that the developers would never imagine!

The ownership of the process, though, still rests with the Project Team, and ultimately with the Project Manager.

6 SYSTEM IMPLEMENTATION

Purpose

The purpose of **System Implementation** can be summarized as follows: making the new system available to a prepared set of users (the deployment), and positioning on-going support and maintenance of the system within the Performing Organization (the transition). At a finer level of detail, deploying the system consists of executing all steps necessary to educate the Consumers on the use of the new system, placing the newly developed system into production, confirming that all data required at the start of operations is available and accurate, and validating that business functions that interact with the system are functioning properly. Transitioning the system support responsibilities involves changing from a system *development* to a system *support and maintenance* mode of operation, with ownership of the new system moving from the Project Team to the Performing Organization.

A key difference between System Implementation and all other phases of the lifecycle is that all project activities up to this point have been performed in safe, protected, and secure environments, where project issues that arise have little or no impact on day-to-day business operations. Once the system goes live, however, this is no longer the case. Any miscues at this point will almost certainly translate into direct operational and/or financial impacts on the Performing Organization. It is through the careful planning, execution, and management of System Implementation activities that the Project Team can minimize the likelihood of these occurrences, and determine appropriate contingency plans in the event of a problem.

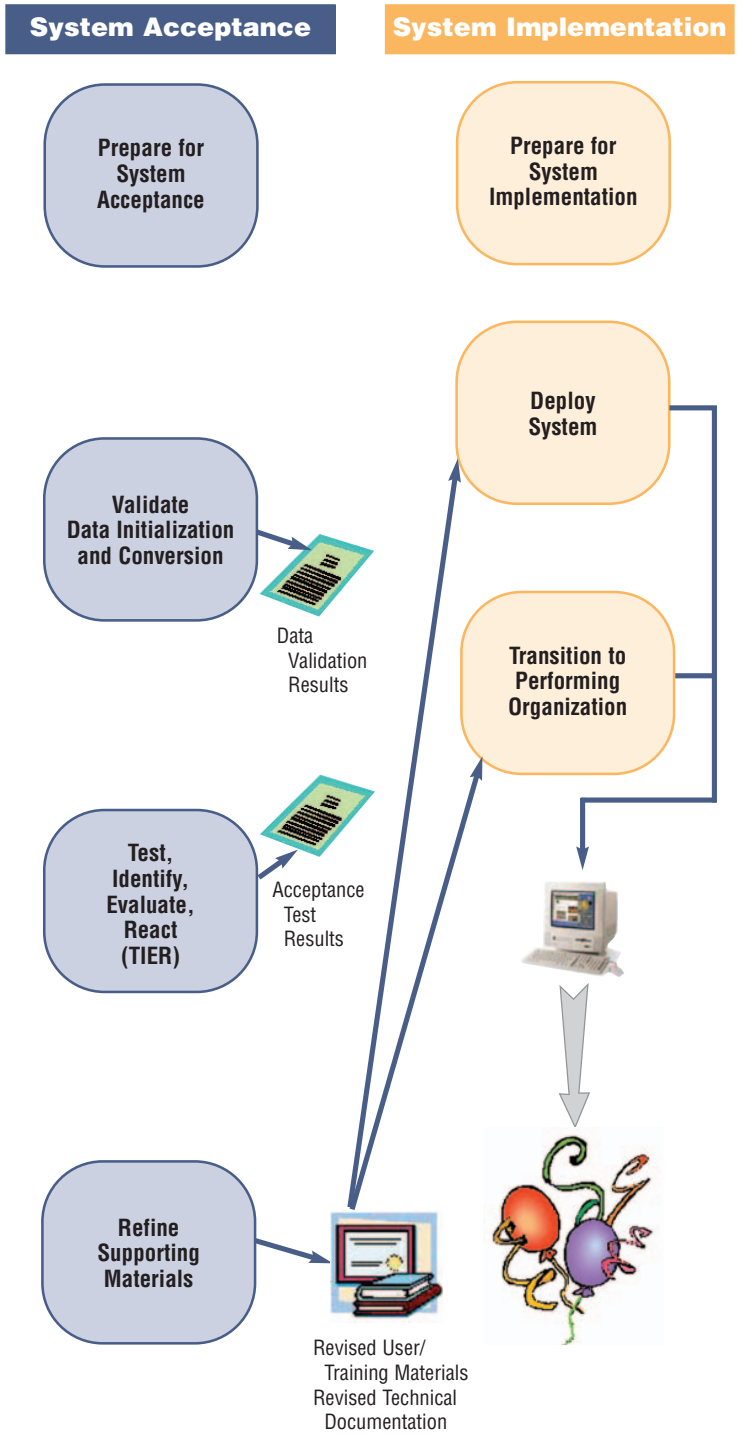
List of Processes

This phase consists of the following processes:

- **Prepare for System Implementation,** where all steps needed in advance of actually deploying the application are performed, including preparation of both the production environment and the Consumer communities.
- **Deploy System,** where the full deployment plan, initially developed during System Design and evolved throughout subsequent lifecycle phases, is executed and validated.
- **Transition to Performing Organization,** where responsibility for and ownership of the application are transitioned from the Project Team to the unit in the Performing Organization that will provide system support and maintenance.

The following chart illustrates all of the processes and deliverables of this phase in the context of the system development lifecycle.

Figure 6-1


System Acceptance
System Implementation
Prepare for System Acceptance
Prepare for System Implementation
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Data Validation Results
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Acceptance Test Results
Refine Supporting Materials
Revised User/ Training Materials
Revised Technical Documentation

List of Roles

The following roles are involved in carrying out the processes of this phase. Detailed descriptions of these roles can be found in the Introductions to Sections I and III.

- Project Manager
- Project Sponsor
- Business Analyst
- Data/Process Modeler
- Technical Lead/Architect
- Application Developers
- Software Quality Assurance (SQA) Lead
- Technical Services (HW/SW, LAN/WAN, TelCom)
- Information Security Officer (ISO)
- Technical Support (Help Desk, Documentation, Trainers)
- Customer Decision-Maker
- Customer Representative
- Consumer
- Performing Organization
- Stakeholders

List of Deliverables

The following table lists all System Implementation processes, some techniques available for use in executing these processes, and process outcomes and deliverables.

Figure 6-2

Processes	Techniques	Process Deliverables *(Outcomes)*
Prepare for System Implementation	Interviews Distribution of Materials Coordination of Training Logistics	*Established Team and Environment for System Implementation*
Deploy System	Training Sessions Manual Business Operations Parallel Operations	*Migrated and Initialized Data* *Operational System*
Transition to Performing Organization	Training Sessions Phased Ownership	*Ownership of System by Performing Organization*

6.1 PREPARE FOR SYSTEM IMPLEMENTATION

Purpose

The purpose of **Prepare for System Implementation** is to take all possible steps to ensure that the upcoming system deployment and transition occurs smoothly, efficiently, and flawlessly.

Description

Roles

- Project Manager
- Project Sponsor
- Business Analyst
- Data/Process Modeler
- Technical Lead/Architect
- SQA Lead
- Technical Services
- Information Security Officer
- Technical Support
- Customer Decision-Maker
- Customer Representative
- Consumer
- Performing Organization
- Stakeholders

In the implementation of any new system, it is necessary to ensure that the Consumer community is best positioned to utilize the system once deployment efforts have been validated. Therefore, all necessary training activities must be scheduled and coordinated. As this training is often the first exposure to the system for many individuals, it should be conducted as professionally and competently as possible. A positive training experience is a great first step towards Customer acceptance of the system.

During System Implementation it is essential that everyone involved be absolutely synchronized with the deployment plan and with each other. Often the performance of deployment efforts impacts many of the Performing Organization's normal business operations. Examples of these impacts include:

- Consumers may experience a period of time in which the systems that they depend on to perform their jobs are temporarily unavailable to them. They may be asked to maintain detailed manual records or logs of business functions that they perform to be entered into the new system once it is operational.
- Technical Services personnel may be required to assume significant implementation responsibilities while at the same time having to continue current levels of service on other critical business systems.
- Technical Support personnel may experience unusually high volumes of support requests due to the possible disruption of day-to-day processing.

Because of these and other impacts, the communication of planned deployment activities to all parties involved in the project is critical. A smooth deployment requires strong leadership, planning, and communications. By this point in the project lifecycle, the team will have spent countless hours devising and refining the steps to be followed. During this preparation process the Project Manager must verify that all conditions that must be met prior to initiating deployment activities have been met, and that the final 'green light' is on for the team to proceed.

More than at any other point in the project, the Project Manager must plan for failure, and must have a defined set of contingency plans to be executed in the event of a problem encountered during deployment. Stakeholders and all key decision-makers must clearly understand and agree to the various "go/no go" criteria by which decisions will be made whether or not to proceed with the deployment. In the event of a failure, time lost as a result of an ill-defined course of action can be costly not only in terms of Project Budget, but equally important, in terms of Customer and Consumer confidence.

The final process within the System Development Lifecycle is to transition ownership of the system support responsibilities to the Performing Organization. In order for there to be an efficient and effective transition, the Project Manager should make sure that all involved parties are aware of the transition plan, the timing of the various transition activities, and their role in its execution.

Due to the number of project participants in this phase of the SDLC, many of the necessary conditions and activities may be beyond the direct control of the Project Manager. Consequently, all Project Team members with roles in the implementation efforts must understand the plan, acknowledge their responsibilities, recognize the extent to which other implementation efforts are dependent upon them, and confirm their commitment.

6.2 DEPLOY SYSTEM

Purpose

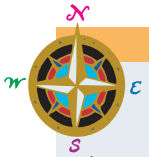
The purpose of the **Deploy System** process is to perform all activities required to successfully install the new system and make it available to the Consumers.

Description

Deploying the system is the culmination of all prior efforts – where all of the meetings, planning sessions, deliverable reviews, prototypes, development, and testing pay off in the delivery of the final system. It is also the point in the project that often requires the most coordination, due to the breadth and variety of activities that must be performed. Depending upon the complexity of the system being implemented, it may impact technical, operational, and cultural aspects of the organization. A representative sample of high-level activities might include the installation of new hardware, increased network capabilities, deployment and configuration of the new system software, a training and awareness campaign, activation of new job titles and responsibilities, and a completely new operational support structure aimed at providing Consumer-oriented assistance during the hours that the new system is available for use (to name a few). Whatever the realm of activities related to the new system, their impacts should be addressed in the Organizational Change Management Plan, while specific deployment activities should all be encompassed in the Project Implementation and Transition Plan, (both created during the Project Planning phase of the Project Management Lifecycle.)

Roles

- Project Manager
- Project Sponsor
- Business Analyst
- Data/Process Modeler
- Technical Lead/Architect
- SQA Lead
- Technical Services
- Information Security Officer
- Technical Support
- Customer Decision-Maker
- Customer Representative
- Consumer
- Performing Organization
- Stakeholders



Depending upon the environment or the type of system being implemented, this phase may also warrant additional activities including 'sunsetting' (retiring) any related legacy systems, executing parallel runs, and managing external communications.

All Consumer training should be performed prior to physically migrating the system to the production environment. This will enable the Consumers to begin to familiarize themselves with the system, and will help to establish their expectations regarding what the system will and will not do.

When it comes to training, sometimes the timing of the training can be as important as the content. Conducting the training after the system has been rolled out to the Consumers may cause them to form poor perceptions of the system, simply due to the difficulties associated with an unnecessarily lengthy learning curve. Similarly, holding the training sessions too far in advance of the deployment presents Consumers with the challenge of having to recall what was taught, again leading to possible frustration and unhappiness with the system.

The sequencing of deployment activities is just as important as it was with previous testing activities. This sequence of events should be encompassed in the Deployment and Transition Plan section of the Technical Specification, and will address and prioritize any necessary training activities, set-up activities needed to prepare the production environment (desktop, LAN, servers, data center, etc.), and data conversion and validation activities. This deployment plan will also define the steps for physically migrating the system and any associated utilities to production, and for validating the accuracy and completeness of this migration after these steps have been performed. During deployment, Project Team members may often be required to work extra hours to meet aggressive timeframes, or additional staff may be brought in temporarily to assist with large data entry efforts. Proper planning and sequencing of the deployment can help to minimize these situations, and reduce the chance of any missteps that could result in having to restart the deployment process, or lengthen the implementation schedule.

As the system is enabled, and the Project Team validates that the application is performing to expectations, there may be times when certain system functions seem suspect. One of the challenges most frequently faced by Project Teams is to determine the root cause of potential issues. Discrepancies that exist within the data could be due to defects in the application's business logic, or could be the result of data that was improperly migrated into the system. Similarly, the inability of a Consumer to access specific features of the system could be caused by improperly configured hardware, or incorrectly

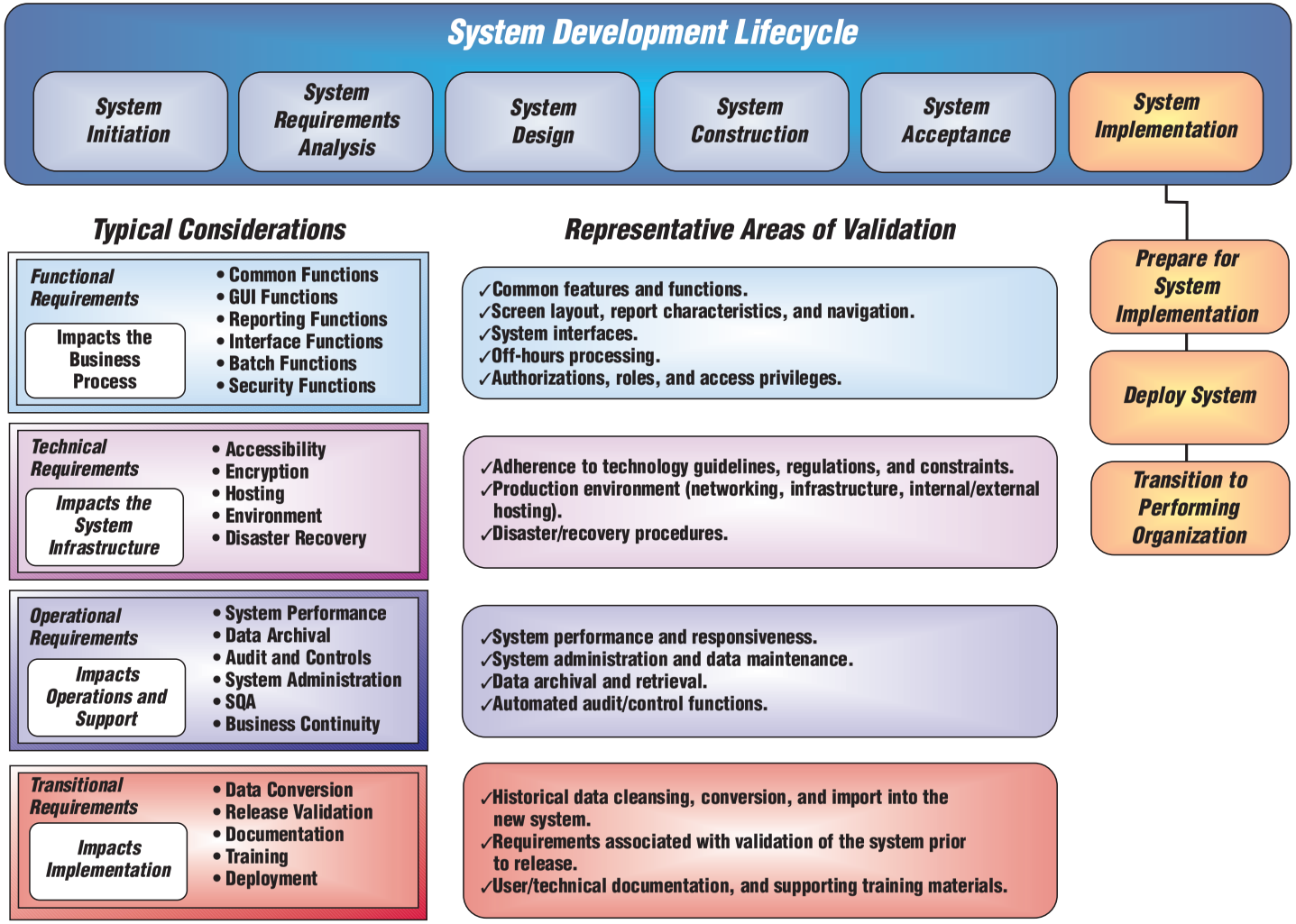
established security privileges. To minimize confusion and reduce the opportunity for such issues to surface, every attempt should be made to immediately validate each step of the deployment as it is performed.

Ideally, there will be no aspect of the implementation that was not previously tested during System Acceptance. Whether or not this is true, there is always the possibility that routines or utilities that worked properly in one environment may not work identically in another. With this in mind, the Project Team should always validate the success of each step of the deployment, and wherever possible, should take appropriate steps to enable the team to "fall back" to a prior state should the severity of a problem warrant such an action.

Additionally, the Project Manager should be aware that not everyone is open or receptive to change. As a system is rolled out to its target audience, the team must remain keenly attentive to how it is perceived. The fact that functions that were present in the legacy system no longer exist or work differently may cause some Consumers to see the new system negatively. And while the new system may provide overall benefits to the business or agency, those benefits may come at the expense of additional work responsibilities to some of the individuals who interact with the system (e.g., the new system may require the entry of additional data that was not previously required). By understanding some of the dynamics behind how the system is being received, the Project Team may be better able to identify or publicize some of the benefits that the system provides. A well-defined Organizational Change Management Plan should have anticipated and addressed these issues.

One effective way to gauge the use and acceptance of the system is for the Project Team to maintain open communications channels with the Technical Support or Help Desk operation, if one exists. This will provide a broader view of potential issues or suggestions that can then be addressed proactively.

Figure 6-3 System Implementaion Considerations



6.3 TRANSITION TO PERFORMING ORGANIZATION

Purpose

The purpose of the **Transition to Performing Organization** process is to successfully prepare the Performing Organization to assume responsibility for maintaining and supporting the new application.

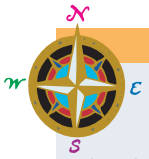
Description

In many organizations, the team of individuals responsible for the long-term support and maintenance of a system is different from the team initially responsible for designing and developing the application. Often, the two teams include a comparable set of technical skills. The responsibilities associated with supporting an operational system, however, are different from those associated with new development.

Roles

- Project Manager
- Project Sponsor
- Business Analyst
- Data/Process Modeler
- Technical Lead/Architect
- SQA Lead
- Technical Services
- Information Security Officer
- Technical Support
- Customer Decision-Maker
- Customer Representative
- Consumer
- Performing Organization
- Stakeholders

In order to effect this shift of responsibilities, the Project Team must provide those responsible for system support in the Performing Organization with a combination of technical documentation, training, and hands-on assistance to enable them to provide an acceptable level of operational support to the Consumers. This system transition is one element (albeit a major one) of the overall Project Implementation and Transition Plan, developed as part of the PM Lifecycle. The Project Manager should review the transition plan to confirm that all defined actions have been successfully completed.



One common approach to successfully transitioning support responsibilities is to implement a phased transition schedule that gradually shifts increasing ownership of the system to the Performing Organization. Early phases would have the Performing Organization's support and maintenance team primarily observing the Project Team as part of knowledge transfer, while later phases would have the support team acting as the first line of response. The exact phases and their timing should be determined as part of transition planning earlier in the lifecycle. Regardless of the approach selected, communication of the overall plan and responsibilities needs to be clear so that System Implementation can be brought to a clean and clear end.

Measurements of Success

System Implementation serves as its own Measurement of Success; indeed, a smooth System Implementation culminates – and validates – the entire system development effort.

Nevertheless, even before the final turnover, the Project Manager can utilize the measurement criteria below to assess how successfully the implementation is proceeding. More than one "No" answer indicates a serious risk to the success of this phase – and the entire project.

Figure 6-4

Process	Measurements of Success	Yes	No
Prepare for System Implementation	Has anyone verified that every Consumer has the right level of system access and security?		
	Is there a checklist of all system components that can be used to verify that all the right versions of all components of the system are in the production environment?		
	Do the managers of Technical Services and Technical Support agree with your estimate of extra work for their units associated with new system deployment?		
Deploy System	Do your team members agree that their part of the effort as outlined in the Project Implementation and Transition Plan is reasonable and achievable?		
	Do the training evaluation forms filled out by Consumers and Customers being trained in the new system reflect scores equal or higher to those anticipated in the Project Implementation and Transition Plan?		
	Have you had to "freeze" or "fall back" in system deployment activities no more than originally anticipated in the deployment plan?		
	Is the volume of support calls within the range originally anticipated in the deployment plan?		
Transition to Performing Organization	Has the Performing Organization agreed to transition all of the remaining defects along with the system itself?		

Phase Risks / Ways to Avoid Pitfalls

PITFALL #1 – DAMN THE TORPEDOES, FULL SPEED AHEAD!

Admiral David "Old Salamander" Farragut may have won the battle of Mobile Bay in 1864 with that command, but for a typical Project Manager, a planned "freeze point" should serve far better when the first mine explodes under the new system.

During the course of System Implementation, the Project Manager should have many points where the process can be frozen while the minesweepers fan out or a hole is patched. Think of it as a space shuttle countdown – NASA has frozen the clock with as little as 31 seconds before launch when the conditions warrant and a problem was discovered.

Having multiple pre-planned go/no go points during Implementation will spare you many grey hairs and sleepless nights.

PITFALL #2 – ABANDON SHIP! WE MESSED UP PRODUCTION!

The more extensive and complex the system, the better the chance that something will go wrong in production, no matter how well the System Acceptance phase went. That's why it behooves the Project Manager not only to execute a comprehensive check of the entire production environment EVERY time anything is moved to production, but also to have an orderly fall-back plan for restoring production to a workable condition when – not if – something goes wrong.

Some error conditions are obvious and unmistakable – wrong heading on a screen, an improperly calculated total on a report; others are insidious in their perniciousness – a database update mechanism that deletes rows infrequently and at random, or miscalculates results by a small fraction. Those conditions may persist for days before being detected, and present insurmountable challenges in absence of a deliberate plan for retreat.

Save snapshots of the database; concatenate transactions; mothball but do not discard older versions of application code. Be ready to roll back or to jump back and roll forward – as long as you are not rolling off the deck of a sinking ship.

PITFALL #3 – IT'S ALL MY FAULT!

There is enough blame to go around in a typical System Implementation scenario. Something gets forgotten, something does not work right, something happens that is not planned for… and a good first step in fixing the problem is acknowledging the responsibility for it. However, sometimes the fault is not yours – even if someone is convinced it is.

Take, for example, a Consumer's reaction to the new system, especially if said Consumer was not directly involved in System Acceptance. It is possible, indeed likely, that some feature of the new system will be at odds with what the Consumer thinks it ought to be. After all, it was requested by somebody else, and somebody else again built it. So a vocal Consumer will complain that the new system is wrong.

This situation is dangerous on two fronts: first, if accepted on its face value, it may mean rework, delays or worse; second, if not handled correctly, it may taint the perception of the new system and may lead to more complaints.

This is another case where solid, signed documentation really pays off. Prove that the functionality works just as it was requested. Enlist the help of the Project Sponsor, the Customer Decision-Makers, and any other "persuasive peers" (who are most likely just as anxious to have the system well received as you are), to explain the rationale behind design decisions and the process for change. And don't accept any more blame than is properly yours.

PITFALL #4 – THE IMPLEMENTATION THAT NEVER ENDS

There is a song that never ends, it just goes on and on, my friends… at least until you stop singing it (probably because people are throwing things at you). But what if you are stuck in the Implementation phase that just does not seem to end? As soon as you fix all the technical problems, a Consumer reports a new bug, and you go through the cycle of fixing and testing and moving and checking, and then another Customer requests an urgent change, and the implementation cycle starts all over again, and then you encounter another technical issue, and it just goes on and on and on…

Somewhere – preferably sooner rather than later – you have to cut the cord, cross the Rubicon, make like a tree and leave well enough alone.

It certainly helps if you have a planned turnover procedure and a solid Project Transition Plan. It is also beneficial to have a Project Sponsor who understands the difference between system development and system support. And most of all, it is necessary to have courage and resolve to say "Basta!" "Finito!" and "Arrivederci!" (and not necessarily in Italian, either.)

Frequently Asked Questions

What is a pilot? How do we do it? How do we move out of the pilot phase?

In system development parlance, a "pilot" is one of the techniques for deploying the system. Another technique is called "phased implementation," although both terms are sometimes used interchangeably.

There are four main ways to roll out the new system. One – you can do it all at once, deploying all parts of the system to all the Consumers in one fell swoop. Two – you can deploy it piecemeal, releasing some of the system today, a little bit more tomorrow, taking it easy, rolling it out one part at a time. (That's what we'll call "phased implementation.") Three – you can release the whole system in one shot, but only to a small group of friendly users. Once you verify that your test community survived the experience, you roll the system to another group, moving up the chain until you dare to expose your creation to your harshest critics. That's what we'll call a "pilot". Finally, for very large and mission critical systems, you can do phased implementation in a pilot mode – roll out parts of the system to small groups.

Each approach has its pluses and minuses. Specifically for the pilot, the advantages are lessened exposure and an extra opportunity to test the system before releasing it to the world. The great disadvantages are having to maintain and coordinate two parallel processes, stretching out the deployment, and tying up Project Team resources for an extra long time.

If you do decide on a pilot, make sure the pilot group represents if not all, then at least the lion's share of business requirements. And once you document that the system can handle them adequately – move on. It is very important to limit your actions to addressing legitimate system bugs only; if you start tweaking and enhancing and adding functionality, you will never get out of the pilot phase.

Does the system need to be perfect before deployment?

"Perfect" according to whom? What may be acceptable for one Customer may not be good enough for another; and unless you involve your whole user base in accepting a fully functional system, you will not know whether your system is "perfect"; and by then – guess what – you've deployed it!

If you had a good representative cross-section of Customers and Consumers doing your System Acceptance, if you had cogent acceptance testing plans for them, if the Customer Decision-Makers signed off on acceptance test results, and if your team is confident in your deployment plan – by all means, take the leap, and release your baby into the wild.

Appendices

Appendices

This section provides Project Managers with a compilation of references and resources to use as they seek to further their education and skills in project management.

Appendix 1 is a **Glossary** of the project management terms used throughout the Guidebook.

Appendix 2 is a repository of all the **Templates** used throughout the ***Guidebook*** (but without the annotations, instructions, and field descriptions). This has been included to facilitate individual Project Managers' use of templates for their projects. These may be copied or downloaded from the PMO website for easy adaptation and use.

Appendix 3 includes **Suggested Reading** materials, websites and resources that may be of use to Project Managers.

1 GLOSSARY

Acceptance Management – A process to be used throughout the project to obtain approval from an authorized Customer Decision Maker for work done on the project to date. This process is defined and included in the Project Plan. The approval at each stage means that the deliverable(s) for that stage are completed to the satisfaction of the Customer. In order for a deliverable to be considered "complete" and "acceptable", it is measured against pre-determined acceptance criteria.

Accessibility – Access to information and data for Customers with disabilities comparable to that accorded Customers who do not have disabilities.

Activity – Is equivalent to a process and is a piece of work accomplished during a project. A process can be broken down into tasks.

Attribute – A data element that holds information about an object (entity).

Audit – *See* Project Audit.

Baseline – An initial measurement that can serve as the basis for future comparisons. Applies to the Project Schedule.

Benchmark – A standard against which measurements or comparisons can be made.

Best Practices – Certain procedures recognized during the course of the project by the Project Manager, Project Sponsor, or Project Team, that, when exercised, improved the production of a deliverable, streamlined a process, or ways to improve standardized templates, etc. These best practices must be documented and shared with other Project Managers so that they can be repeated.

Brainstorming – A technique used to stimulate creative thinking and overcome impasses to problems. Team members gather in a room and offer ideas for solutions to a problem(s). No idea is rejected no matter how absurd or impractical. Often a practical solution surfaces and a decision is reached by group consensus.

Business Rules – Practices associated with certain business processes that are required by regulation, law, accounting controls or business practices. Rules should be defined in as much detail as possible using techniques such as structured English.

Business Continuity Planning/Disaster Recovery (BCP/DR) – The process of developing advance arrangements and procedures that would enable an organization to respond to a disaster and resume its critical business functions within a predetermined period of time, minimize the amount of loss, and repair or replace the damaged facilities as soon as possible. Source: Disaster Recovery Institute International – Glossary of Industry Terms (www.drii.org).

Business Process Re-engineering (BPR) – A technique used to optimize organizational processes.

Capability Maturity Model (CMM) – A description of the stages through which software organizations evolve as they define, implement, measure, control, and improve their software processes. This model provides a guide for selecting process improvement strategies by facilitating the identification of current process capabilities and the issues most critical to software quality and process improvement.

Change Control – A plan for handling changes to a project aimed at minimizing the negative effect on a projects outcome. Change is defined as ANY adjustment to any aspect of the Project Plan or to any already approved deliverable(s).

Charter – *See* Project Charter.

Client-Server – A system architecture where a host computer or 'server' provides data and services to requesting or 'client' workstations.

Computer-Aided Software Engineering (CASE) – A tool that automates and improves aspects of the System Development Life Cycle (SDLC).

Configuration Management – A discipline applying technical and administrative direction to identify and document the functional and physical characteristics of a system component, control changes to those characteristics, record and report change processing and implementation status, and verify compliance with specified requirements.

Constraint – Something that establishes boundaries, restricts, limits or obstructs any aspect of the project.

CSSQ – The interdependent quadruple constraints of the project (scope, cost, schedule and quality), represented by project scope, project budget, project schedule, and quality management plan.

Consumer – *See* Roles and Responsibilities, Section 1 Introduction.

Cost/Benefit Analysis – A comparison of the cost of the project to the benefits it would realize, to determine whether the project or portion of the project should be undertaken.

Critical Success Factor (CSF) Interviewing – A process in which a series of strategic questions are asked to identify what objectives and goals need to be met in order for the project to demonstrate success.

CRUD Matrices – *See* Matrix Diagram. A tool used to cross reference the Process Model to the Logical Data Model and to identify which business functions map to which data elements. CRUD is defined as follows: C (for CREATE), R (for REPLACE), U (for UPDATE) and D (for DELETE).

Customer – *See* Roles and Responsibilities, Section 1 Introduction.

Customer Representatives – *See* Roles and Responsibilities, Section 1 Introduction.

Customer Decision-Makers – *See* Roles and Responsibilities, Section 1 Introduction.

Database – An integrated collection of data (entities and attributes) organized to avoid duplication of data and allow for easy retrieval.

Database Schema – A view of the physical database detailing the specifics of the tables, fields and their relationships, and identifying keys, indexes, and triggers.

Data Flow Diagram – A picture diagramming how data flows through a system. It depicts the external entities (which are sources or destinations of data), the processes which transform that data, and the places where the data is then stored.

Data Dictionary – Reference material that describes and defines each piece of data used in a system. This may include entity and attribute definitions, discuss relationship characteristics and provide sizing information.

Decision Trees – A branching chart showing the actions that occur from various combinations of conditions and decisions.

Defect – A flaw in a system or system component that causes the system or component to fail to perform its required function.

Defect Tracking – The process of ensuring that all test cases have been executed successfully. If cases have not executed successfully and defects have been identified, a log is generated to track the defects so that the Project Team can correct them and perform a retest.

Deliverable(s) – A product or service satisfying one or more objectives of the project.

Effort Estimate – An estimate of the amount of effort necessary to perform each project task.

Encryption – The coding of data either at its source or as part of a data stream to prevent unauthorized access to the data. For example, information transmitted over a telecommunications line is scrambled at one end, and unscrambled at the other.

Entity – A distinct object that is represented in the database containing source data or acting to collect data. An example would be a Customer table.

Entity Relationship Diagram (ERD) – A pictorial representation of the relationships between entities. This diagram can be helpful in communicating information needs with business users and can also provide information to technical specialists for design of physical databases, foreign keys, business views, and so forth.

External Stakeholder – *See* Roles and Responsibilities, Section 1 Introduction.

Flowchart – A graphical representation of the flow and interaction of a process or system.

Functional Decomposition – The process of dividing higher-level functions into sub-functions and processes.

Gap Analysis – *See* Matrix Diagram.

Graphical User Interface (GUI) – The front-end of an application through which the user interacts with the system by utilizing buttons, the mouse, drop down menus, etc. The GUI is the face of the application where the user will see data displayed.

Hosting – A service in which a provider or organization may house an application and support the software and hardware needs required to run that application. This may also include the housing and management of a networking and or telecommunications infrastructure.

Internal Stakeholders – *See* Roles and Responsibilities, Section 1 Introduction.

Issue Management and Escalation – A process for capturing, reporting, escalating, tracking, and resolving problems that occur as a project progresses.

Joint Application Design (JAD) – A process that brings the Project Team, Customers, and Stakeholders together to clarify, define, and gain consensus on business requirements. JAD sessions are formal meetings involving a detailed agenda, visual aids, and a facilitator who moderates the session and an analyst who records the specifications. By utilizing JAD, Customers become directly involved in the application design.

Local Area Network/Wide Area Network (LAN/WAN) – Local area networks provide a means to link multiple computers within a single location. LANs may be interconnected with one another or with wide area networks, using interface devices such as bridges, routers and gateways. WANs provide a link for widely separated locations.

Lessons Learned – Information resulting from feedback on the project, and based on the assessment of project performance, that may benefit the Project Manager as well as managers and team members of similar projects.

Matrix Diagram – A format used to clarify or highlight the relationship between two factors. For example, the matrix diagram may be used during gap analysis to validate that all business requirements identified during JAD sessions have been accommodated in the process and logical data model deliverables. The matrix displays requirements down the left side of the grid, while processes or data elements are tracked across the top of the grid. A checkbox at the intersection of a requirement and a process or data element would indicate that the requirement has been successfully accounted for in a deliverable.

Mission – The mission of the organization drives the development of the business case. When the business case is developed, it will explain how the expected outcome of the project supports the organization's mission.

Multi-Tier/Client-Server (MT/CS) – A client-server system architecture (*See* Client-Server), where a software application is decomposed into operational areas or layers (e.g., database, business objects, and presentation layers), which are then physically distributed across multiple computers.

Normalization – A process by which complex data relationships are simplified with the goal being to eliminate redundancies in the database design. This process simplifies data management and software development efforts while improving data consistency and optimizing system performance.

Outsourcing – The practice of contracting out a project, a portion of a business, or an IT operation.

Parallel Testing – The concurrent testing of both the current and new system with identical data to compare the outputs for consistency and accuracy.

Peer Code Reviews – A formal repeatable review technique that gathers peers to examine a deliverable or work product for defects so they can be corrected early in the development cycle.

Performing Organization – *See* Roles and Responsibilities, Section 1 Introduction.

Phase – A series of processes organized into a distinct stage of project development. The end of a project phase usually coincides with the approval of a major deliverable.

Post-Implementation Report – A summary of information gathered as a result of conducting the Post-Implementation review. The report documents the successes and failures of the project and provides a historical record of the planned and actual budget and schedule. It also contains recommendations for improvement to be used by other projects of similar size and scope.

Process – A series of tasks performed to bring about a result.

Process Flow Diagram – A diagram used to analyze the flow of a process, find problems, create solutions, and measure efficiency. Symbols are used in a visual representation that can quickly point out delays, unnecessary events, and other problem areas.

Project – A temporary endeavor undertaken to create a unique product or service.

Project Audit – A process designed to ensure that the Quality Assurance activities defined in Project Planning are being implemented and to determine whether quality standards are being met.

Project Lifecycle – A collection of phases whose number and names are determined by the control needs of the Performing Organization.

Project Management – Direction and coordination of human and material resources for a project using management techniques to achieve cost, scope, schedule, quality, and customer satisfaction objectives.

Project Manager – *See* Roles and Responsibilities, Section 1 Introduction.

Project Repository – A collection or archive of all information and documents from the project.

Project Sponsor – *See* Roles and Responsibilities, Section 1 Introduction.

Project Team – *See* Roles and Responsibilities, Section 1 Introduction.

Proof-of-Concept – A technique used to confirm the feasibility of one or more components of the technical solution. A Proof-of-concept approach helps to minimize cost by 'testing the waters' first on an idea or a design.

Prototyping – The process of building a small working version of a system design as a means of hedging risk, and attaining Customer buy-in. Prototyping can provide a better understanding of Customer requirements, validate those requirements, and sometimes perform as a proof-of-concept tool.

Pseudo Code – A tool for specifying program logic in English-like readable form, without conforming to the syntactical rules of any particular programming language.

Quality Assurance – Evaluation of project performance on a regular basis to ensure that the project will satisfy the established quality standards.

Quality Control – Monitoring of project results to ensure compliance with the appropriate established quality standards and to eliminate causes of non-compliance.

Quality Standards – Criteria established to ensure that each deliverable created meets a certain level of quality agreed to by the Customer and Project Manager.

Rapid Application Development (RAD) – A technique that allows users to participate in an iterative design and development process. Conceptually, the project 'loops' through the Design, Construction and Acceptance stages, followed by a re-Design, revised Construction, Acceptance, and so on.

Regression Testing – The process of testing new software components in an environment where other existing modules (or the entire application) are also tested to ensure that the new components do not negatively impact any existing software. Prior to a release to production, the Project Team will execute test cases that have previously been successfully executed to determine that the new piece of software works within the context of the system.

Release Management – A process used to manage the release of software into different test environments. It is typical for projects to identify a release engineer or department to monitor versions of software and their release into the next environment. For example, if modifications to existing code are made and tested in the QA environment, the process to move that code to acceptance would be executed according to the procedure outlined in the release management process.

Risk – An anticipated event with the potential to positively or negatively affect the project.

Risk Assessment – A process to identify which risks are likely to affect a project, documenting them, and determining which require a mitigation plan.

Skills Inventory – A record of the skills learned and used on the project by the Project Team.

Software Engineering Institute (SEI) – The Software Engineering Institute (SEI) is a federally funded research and development center sponsored by the U.S. Department of Defense through the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics [OUSD (AT&L)]. The SEI's core purpose is to help others make measured improvements in their software engineering capabilities. (*See* www.sei.cmu.edu.)

Software Quality Assurance – (1) A planned and systematic pattern of all actions necessary to provide adequate confidence that a software work product conforms to established technical requirements. (2) A set of activities designed to evaluate the process by which software work products are developed and/or maintained. (Derived from IEEE-STED-610.)

Stakeholders – *See* Roles and Responsibilities, Section 1 Introduction.

Storyboarding – A technique to use during a JAD session to aide in the brainstorming process. Ideas are written down on cards and posted immediately on a wall by the participants. Once all the ideas are posted, several passes of categorization take place. Some ideas may be dropped via group consensus; others may be enlarged or improved.

Strategic Plan – A formal document produced by the Performing Organization outlining organizational goals and direction over a designated period of time. The Strategic Plan drives the proposed solution developed during Project Origination.

Structured English – A precise form of English that uses the logical structures of structured coding to represent policies and procedures.

System Context Diagram – A graphical representation of how the system fits into the current environment. It shows all interfaces to and from the system and allows the Project Team to visualize how the new system will interact with other systems, outside entities and Consumers.

System Load Analysis – A process to ensure that the application or system developed will operate under peak usage conditions. For example, if transaction levels are consistent every day and every month except during peak holiday hours, system load analysis will help identify the performance requirements necessary to avoid failure for those instances. It is important to consider these requirements during the Requirements Analysis and Design phases of the SDLC.

Task – A single piece of work itemized in the Project Schedule to which effort and resources must be applied.

Test Cases – Individual test scenarios that may be executed singularly or in combination to test modules or strings of modules. Test cases should be developed by the Project Team to test what is expected, as well as what should not be expected.

Test Plan – A series of test cases that when compiled into a whole constitute a testing plan for the Project Team to follow. A well-formulated test plan should ensure that all internal components and system interfaces operate as they should according to the Functional and Technical Specifications.

Test Scripts – Pieces of code which when executed for a test case or a test plan are automatic. The advantage of developing test scripts are to help save time when testing components on a regular basis with large amounts of data, or if planning to execute a test plan on a recurring basis, such as with regression testing.

Total Quality Management (TQM) – Both a philosophy and a set of guiding principles that represent the foundation of a continuously improving organization. The application of quantitative methods and human resources to improve the materials and services supplied to an organization, all the processes within an organization, and the degree to which the needs of the Customer are met, now and in the future.

Unified Modeling Language (UML) – UML is a modeling language used to define a system prior to construction, much like a blueprint is used prior to building a house. It allows the Project Team to specify, visualize, and document an application, including its structure and design, in a way that meets all of the user business requirements. There are several tools on the market that utilize the UML methodology. For more information see www.uml.org.

Use Cases – A modeling technique within UML, used to define business requirements from the point of view of the user. Use cases help provide an understanding of the functionality of the system and interactions among objects and form the basis of both system construction and system testing. A use case is a sequence of actions that an actor (usually a person), but perhaps an external entity, (such as another system) performs within a system to achieve a particular goal.

Walkthroughs – A technique for performing a formal review which takes place at review and inspection points throughout the lifecycle being utilized, to observe and verify what has been accomplished.

Work Breakdown Structure (WBS) – A grouping of project elements or components which defines the total project scope. A WBS is deliverable-oriented and each descending level represents an increasingly detailed definition of a component.

Work Flow Diagram – A graphical representation of the organization's workflow. Which is helpful when documenting the current working model and when looking for opportunities to improve a process.

2 GUIDEBOOK TEMPLATES

New York State
Project Business Case

PROJECT IDENTIFICATION

Project Name: _____ Date: _____
Agency: _____
Business Unit/Program Area: _____
Project Sponsor: _____ Project Manager: _____

Business Need/Problem:

Solution (as described in Proposed Solution):

Consistency/Fit with Organization's Mission:

New York State
Project Business Case

Anticipated Benefits: (both qualitative and quantitative)

Original Cost Estimate: (from Proposed Solution)

Cost/Benefit Analysis:

Special Fund Sources:

New York State
Proposed Solution

PROJECT IDENTIFICATION

Project Name: _____ Date: _____

Business Unit/Program Area: _____

Project Sponsor: _____ Project Manager: _____

Summary of Business Need for the Project (from the Business Case):

Proposed Solutions / Project Approach:

Alternatives considered	Why chosen/not chosen

Project Objectives:

Consistency/Fit with Organizational Strategic Plan:

New York State
Proposed Solution

BUDGET/RESOURCES:

Estimated Costs:			
Type of Outlay	Initial (Development)	Annual (Recurring)	Remarks
Hardware			
Software			
Supplies			
User Training			
Consultant Services			
Other:			
TOTAL			
Estimated Resources/Personnel:			
Program Areas	hours	hours	
	hours	hours	
	hours	hours	
Information Services	hours	hours	
Consultant Services	hours	hours	
	hours	hours	

Risks:

Organizational Impact:

Additional Comments:

New York State
Proposal Decision Notice

PROJECT IDENTIFICATION

Project Name: _____ Date: _____

Agency: _____

Business Unit/Program Area: _____

Project Sponsor: _____ Project Manager: _____

Proposal Decision:

Decision	Indicator	Date
Project Proposal Approved		
Additional Information is Required for Decision		
Project Proposal Declined		

Project Selection Committee Signatures:

Project Selection Committee Member Name	Signature	Date

Project Proposal Approved:

Target Date for Project Initiation start:

Project Sponsor Assigned:

Project Manager Assigned:

New York State
Proposal Decision Notice

Additional Information Required for Decision:

Specific Additional Information Required:

Proposal re-submission date for the next Project Selection Cycle:

Other comments:

Project Proposal Declined:

Explanation of decision:

Screening results:

Evaluation results:

Prioritization/Selection results:

New York State
Project Charter

PROJECT IDENTIFICATION

Project Name: _____ Date:_____

Project Manager: _____ Project Sponsor: _____

New York State
Project Charter

PROJECT DESCRIPTION

Project Background:

Project Objective:

Critical Success Factors:

Required Resources:

Constraints:

Project Authority:

New York State
Project Charter

PROJECT CHARTER APPROVAL

Project Sponsor Name: _____

Action: Approve: ☐ Reject: ☐

Comments:

Project Sponsor Signature: _____

Date: _____

AGREEMENT TO SECURE REQUIRED RESOURCES

Approver Name: _____ Role: _____

Approver Comments:

Approver Signature: _____

Date: _____

Project Initiation Kick-off Meeting Agenda

Project: _____

Date:_____

Time: From: _____ To: _____

Location: _____

Invitees:

Attendees:

AGENDA

	Presenter Name	Time (minutes)
Introductions		
Sponsor's Statement		
Project Request & Background		
Project Goals & Objectives		
Project Scope		
Roles & Responsibilities		
Next Steps		
Questions		

ADDITIONAL INFORMATION

Handouts:

Project Initiation Kick-off Meeting

Project: _____

Date:_____

Time: From: _____ To: _____

Location: _____

DECISIONS

Decision Made	Impact	Action Required?

ISSUES

Issue Description	Impact	Action Required?

ACTION ITEMS FOR FOLLOW UP

Action	Responsible	Target Date

New York State
Project Scope Statement

PROJECT IDENTIFICATION

Project Name: _____ Date: _____

Project Sponsor: _____ Project Manager: _____

New York State
Project Scope Statement

A. BUSINESS NEED/PROBLEM:

B. PROJECT OBJECTIVES (FROM PROJECT CHARTER):

C. PROJECT RESULTS:

D. PROJECT CONTENT:

New York State
Project Schedule Worksheet

PROJECT IDENTIFICATION

Project Name: _____ Date: _____

Project Sponsor: _____ Project Manager: _____

New York State
Project Schedule Worksheet

PROJECT SCHEDULE INFORMATION

Phase	Process	Task	Estimated Hours	Dependent Upon	Role

New York State
Project Quality Management Plan

PROJECT IDENTIFICATION

Project Name: _____ Date: _____

Project Sponsor: _____ Project Manager: _____

New York State
Project Quality Management Plan

PART A. QUALITY PLANNING – IDENTIFIED QUALITY STANDARDS

New York State
Project Quality Management Plan

PART B: QUALITY ASSURANCE ACTIVITIES

New York State
Project Quality Management Plan

PART C: QUALITY CONTROL ACTIVITIES

New York State
Preliminary Budget Estimate

PROJECT IDENTIFICATION

Project Name: _____ Date: _____

Project Sponsor: _____ Project Manager: _____

New York State
Preliminary Budget Estimate

BUDGET INFORMATION

Phase	Process/Task	Labor Cost	Material Cost	Travel Cost	Other Cost	Total Cost	Planned Date of Expenditure
	TOTAL Budget						

COMMENTS: (List any assumptions pertaining to the costs entered above.)

Agency Name
Project Name

Project Status Report

As of (Date)

Distribution:

Original Copy
Project Repository

Project Team
(List names)

Stakeholders
(List names)

Prepared By:
(Project Manager name)

Project Status Report

STATUS SUMMARY:

SCHEDULE:

Project Phase	Project Process	Planned Start	Actual Start	Planned End	Actual End	Explanation of Variance

FINANCIAL INFORMATION:

A	B	C	D	E	F	G
Original Project Estimate	Total Approved Changes	Total Current Estimate	Amount Expended to Date	Estimated Amount to Complete	Forecast Total	Project Variance
Explanation of Variance:						

Project Status Report

ISSUES AND ACTION ITEMS:

Issue Identification					**Action Plan**			
Issue #	Date	Priority	Issue Name	Description	Action	Owner	Due Date	Status
1.								
2.								
3.								

Project Status Report

ACCOMPLISHMENTS THIS REPORTING PERIOD:

For Reporting Period of xx/xx/xxxx – xx/xx/xxxx

PLANNED ACTIVITIES FOR NEXT REPORTING PERIOD:

For Reporting Period of xx/xx/xxxx – xx/xx/xxxx

ACCEPTANCE AND CHANGE MANAGEMENT:

Deliverable Acceptance Log

Deliverable Name	Sent for Review (Date)	Sent for Approval (Date)	Action Approve/Reject	Action Date

Change Control Log

Change #	Log Date	Initiated By	Description	Action Accept/Reject	Action Date	Reject Description

Lost Time:

Project Status Report

Closed Issues:

Staffing

Team Member	Role	Information/Notes

New York State
Project Communications Plan

PROJECT IDENTIFICATION

Project Name: _____ Date: _____

Project Sponsor: _____ Project Manager: _____

New York State
Project Communications Plan

Stakeholder	Message/Information Need	Delivery Vehicle	Frequency
Project Sponsor			
Project Manager			
Project Team Member			
Quality Team Member			
Procurement Team Member			
Other Stakeholder			

New York State
Project Communications Plan

EXISTING SYSTEMS:

METHOD FOR UPDATING THE COMMUNICATIONS PLAN:

OTHER COMMUNICATIONS INFORMATION:

New York State
Project Plan

PROJECT IDENTIFICATION

Project Name: _____ Date: _____

Project Sponsor: _____ Project Manager: _____

REVISION HISTORY

Revision #	Revision Date	Section Revised	Revision Description

New York State
Project Plan

EXECUTIVE SUMMARY

New York State
Project Plan

DESCRIPTION OF STAKEHOLDER RESPONSIBILITY

Name/Title	Agency/ Department	Project Role	Responsibility	Phone	Email

New York State
Project Plan

PROJECT PLAN DOCUMENTS SUMMARY

Documents to be Created in Project Initiation	**Documents to be Created in Project Planning**
Project Charter	
Project Scope Statement	*Refined* Project Scope
Project Schedule Worksheet	Project Schedule
Project Quality Management Plan	*Refined* Project Quality Management Plan
Preliminary Budget Estimate *Including Staff Acquisition Plan and Materials Acquisition Plan*	Project Budget
List of Risks	Risk Management Worksheet
Description of Stakeholder Involvement	*Refined* Description of Stakeholder Involvement
Communications Plan	*Refined* Communications Plan
	Change Control Process
	Acceptance Management Process
	Issue Management and Escalation Process
	Organizational Change Management Plan
	Project Team Training Plan
	Project Implementation and Transition Plan

New York State
Project Deliverable Approval Form

PROJECT IDENTIFICATION

Project Name: _____ Date: _____

Project Sponsor: _____ Project Manager: _____

DELIVERABLE INFORMATION

Project Phase: _____ Date: _____

Deliverable Name: _____ Author: _____

ACCEPTANCE CRITERIA

Criteria:

New York State
Project Deliverable Approval Form

REVIEWER INFORMATION

Reviewer Name: _____ Role: _____
Deliverable Name: _____
Recommended Action: Approve: ☐ Reject: ☐
Reviewer Comments:

Reviewer Signature: _____
Date: _____

APPROVER INFORMATION

Approver Name: _____ Role: _____
Action: Approve: ☐ Reject: ☐
Approver Comments:

Approver Signature: _____
Date: _____

New York State
Project Deliverable Approval Form

PROJECT MANAGER INFORMATION

_____
Name (Print)

_____ _____
Signature Date

Project Planning Kick-off Meeting Agenda

Project: _____

Date:_____

Time: From: _____ To: _____

Location: _____

Invitees:

Attendees:

AGENDA

	Presenter Name	Time (minutes)
Introductions		
Sponsor's Statement		
Project Request & Background		
Project Goals & Objectives		
Project Scope		
Roles & Responsibilities		
Next Steps		
Questions		

ADDITIONAL INFORMATION

Handouts:

Project Planning Kick-off Meeting

Project: _____

Date:_____

Time: From: _____ To: _____

Location: _____

DECISIONS

Decision Made	Impact	Action Required?

ISSUES

Issue Description	Impact	Action Required?

ACTION ITEMS FOR FOLLOW UP

Action	Responsible	Target Date

New York State
Project Budget

PROJECT IDENTIFICATION

Project Name: _____ Date: _____

Project Sponsor: _____ Project Manager: _____

New York State
Project Budget

BUDGET INFORMATION

Phase/Process/Task	Labor Cost	Material Cost	Travel Cost	Other Cost	Total Cost per Activity	Planned Date of Expenditure
TOTAL Budget						

COMMENTS: (List any assumptions pertaining to the costs entered above.)

New York State
Project Risk Management Worksheet

Order Risks Risk Probability/Impact: Very Low - Low - Medium - High - Very High Priority Level: 1.00 - 10.00

Project Duration: Less Than 3 Month 3–6 Months 6–12 Months 1–3 Years More Than 3 Years

Baseline As-of Date: _____

Risk	Risk Probability	Impact Description	Level of Impact	Date of Impact	Priority Level	Risk Management Plan

New York State
Project Change Request

PROJECT IDENTIFICATION

Project Name: _____

Project Manager: _____

CHANGE REQUEST INFORMATION

Request Date: _____

Requested By: _____ Agency: _____

Description of Change:

Scope Impact:

Schedule Impact:

Quality Impact:

Cost Impact:

New York State
Project Change Request

REVIEWER INFORMATION

Reviewer Name: _____ Role: _____

Recommended Action: Approve: ☐ Reject: ☐

Reviewer Comments:

Reviewer Signature: _____

Date: _____

New York State
Project Change Request

APPROVER INFORMATION

Approver Name: _____ Role: _____

Action: Approve: ☐ Reject: ☐

Approver Comments:

Approver Signature: _____

Date: _____

PROJECT MANAGER INFORMATION

_____

Name (Print)

_____ _____

Signature Date

New York State
Organizational Change Management Plan

PROJECT IDENTIFICATION

Project Name: _____ Date: _____

Project Sponsor: _____ Project Manager: _____

New York State
Organizational Change Management Plan

PEOPLE CHANGE MANAGEMENT

Organizational Change Activities	Individual/Group(s) Affected	Individual/Group(s) Responsible for Implementation	Required Completion Date	Status

New York State
Organizational Change Management Plan

PROCESS CHANGE MANAGEMENT

Organizational Change Activities	Individual/Group(s) Affected	Individual/Group(s) Responsible for Implementation	Required Completion Date	Status

New York State
Organizational Change Management Plan

CULTURE CHANGE MANAGEMENT

Organizational Change Activities	Individual/Group(s) Affected	Individual/Group(s) Responsible for Implementation	Required Completion Date	Status

New York State
Project Team Training Plan

PROJECT IDENTIFICATION

Project Name: _____ Date: _____

Project Sponsor: _____ Project Manager: _____

TRAINEE INFORMATION

Name	Project Role	Agency	Phone	Email	Skills Required

New York State
Project Team Training Plan

TRAINING PLAN

Name	Type of Training	Description	Planned Start	Planned Completion	Actual Start	Actual Completion	Certification

New York State
Project Implementation and Transition Plan

PROJECT IDENTIFICATION

Project Name: _____ Date: _____

Project Sponsor: _____ Project Manager: _____

New York State
Project Implementation and Transition Plan

PROJECT IMPLEMENTATION PLAN

Implementation Activity	Owner	Who is Affected?	Who is Involved?	Timing/ Dependency

New York State
Project Implementation and Transition Plan

PROJECT TRANSITION PLAN

Transition Activity	Owner	Who is Affected?	Who is Involved?	Timing/ Dependency

Project Execution and Control Kick-off Meeting Agenda

Project: _____

Date: _____

Time: From: _____ To: _____

Location: _____

Invitees:

Attendees:

AGENDA

	Presenter Name	Time (minutes)
Introductions		
Sponsor's Statement		
Project Request & Background		
Project Goals & Objectives		
Project Scope		
Roles & Responsibilities		
Next Steps		
Questions		

ADDITIONAL INFORMATION

Handouts:

Project Execution and Control Kick-off Meeting

Project: _____

Date:_____

Time: From: _____ To: _____

Location: _____

DECISIONS

Decision Made	Impact	Action Required?

ISSUES

Issue Description	Impact	Action Required?

ACTION ITEMS FOR FOLLOW UP

Action	Responsible	Target Date

New York State
Progress Report

To:	Report Period Ending:
From:	Project Name:

The tasks I completed this reporting period are:
■

The tasks I plan to complete next reporting period are:
■

I lost time due to: (Specify hours and cause):
■

Issues:

Description	Date Identified	Impact

Scheduled Vacation/Training:

Description	Start Date	End Date	# of Hours

Time Reporting by Task:

Task ID	Description	Original Estimate	Hours this Week	ETC	Hours to Date
	Reporting Period Total				

New York State
Project Acceptance Form

PROJECT IDENTIFICATION

Project Name: _____ Date: _____

Project Sponsor: _____ Project Manager: _____

PROJECT SPONSOR INFORMATION

Project Sponsor Name: _____

Action: Accept: ☐ Reject: ☐

Project Sponsor Comments:

Project Sponsor Signature: _____

Date: _____

PROJECT MANAGER INFORMATION

_____

Name (Print)

_____ _____

Signature Date

New York State
Project Post-Implementation Survey

GENERAL INFORMATION

Project Name: _____ Date: _____

Your Name: _____ Your Performing Organization: _____

Your Role on the Project: _____ Dates of Your Involvement: _____

Questions	Rating (1-3)	Comments (What worked well? What could have been done better? What recommendations do you have for future projects?)
PRODUCT EFFECTIVENESS		
How well does the product or service of the project meet the stated needs of the Performing Organization?		
How well does the product or service of the project meet your needs?		
When initially implemented, how well did the product or service of the project meet the stated needs of the Performing Organization?		
To what extent were the objectives and goals outlined in the Business Case met?		
What is your overall assessment of the outcome of this project?		
CSSQ MANAGEMENT		
How well did the scope of the project match what was defined in the Project Proposal?		
How satisfied are you with your involvement in the development and/or review of the Project Scope during Project Initiation and Planning?		
Was the Change Control process properly invoked to manage changes to Cost, Scope, Schedule, or Quality?		

New York State
Project Post-Implementation Survey

Questions	Rating (1-3)	Comments (What worked well? What could have been done better? What recommendations do you have for future projects?)
PRODUCT EFFECTIVENESS		
Were changes to Cost, Scope, Schedule, or Quality, effectively managed?		
Was the established change budget adequate?		
As project performance validated or challenged estimates, were the estimates effectively revised and the current and future tasks re-scheduled?		
How closely does the initial Project Schedule compare with the actual schedule?		
How did the estimated Project Budget compare with the total actual expenditure?		
How effectively was the Quality Management Plan applied during Project Execution?		
How effective was the quality assurance process?		
How effective were project audits?		
How effective was the utilization of best practices from prior projects in the Performing Organization?		
RISK MANAGEMENT		
How well were team members involved in the risk identification and mitigation planning process?		
To what extent was the evolution of risks communicated?		
How accurate were the risk probabilities on the Risk Management Worksheet?		
How effectively was the Risk Management Worksheet updated or reviewed?		
How comprehensive was the Risk Management Worksheet? (i.e. did many events occur that were never identified?)		

New York State
Project Post-Implementation Survey

Questions	Rating (1-3)	Comments (What worked well? What could have been done better? What recommendations do you have for future projects?)
COMMUNICATIONS MANAGEMENT		
How effective were the informational materials available to orient team members?		
How satisfied were you with the kick-off meetings you participated in?		
How effectively were the project team meetings conducted?		
How effectively and timely were Progress Reports provided by Team Members to the Project Manager?		
How effectively were stakeholders involved in the project?		
Was communication with stakeholders adequate?		
How well were your expectations met regarding the frequency and content of information conveyed to you by the Project Manager?		
How well was project status communicated throughout your involvement in the project?		
How well were project issues communicated throughout your involvement in the project?		
How well did the Project Manager respond to your questions or comments related to the project?		
How useful was the format and content of the Project Status Report to you?		
How useful and complete was the project repository?		
ACCEPTANCE MANAGEMENT		
How effective was the acceptance management process?		
How well prepared were you to receive project deliverables?		

New York State
Project Post-Implementation Survey

Questions	Rating (1-3)	Comments (What worked well? What could have been done better? What recommendations do you have for future projects?)
ACCEPTANCE MANAGEMENT (Continued)		
How well defined was the acceptance criteria for project deliverables?		
Was sufficient time allocated to review project deliverables?		
How closely did deliverables match what was defined within Project Scope?		
How complete/effective were the materials you were provided in order to make a decision to proceed from one project lifecycle phase to the next? If materials were lacking, please elaborate.		
ORGANIZATIONAL CHANGE MANAGEMENT		
How effectively and timely was the organizational change impact identified and planned for?		
How pro-active was the Organizational Change Management Plan?		
Was sufficient advance training conducted/ information provided to enable those affected by the changes to adjust to and accommodate them?		
Overall, how effective were the efforts to prepare you and your organization for the impact of the product/service of the project?		
How effective were the techniques used to prepare you and your organization for the impact of the changes brought about by the product or service of the project?		

New York State
Project Post-Implementation Survey

Questions	Rating (1-3)	Comments (What worked well? What could have been done better? What recommendations do you have for future projects?)
ISSUES MANAGEMENT		
How effectively were issues managed on the project?		
How effectively were issues resolved before escalation was necessary?		
If issue escalation was required, how effectively were issues resolved?		
How effectively were issues able to be resolved without impacting the Project Schedule or Budget?		
PROJECT IMPLEMENTATION & SUPPORT		
How effective was the documentation that you received with the project product/service?		
How effective was the training you received in preparation for the use of the product/service?		
How useful was the content of the training you received in preparation for the use of the product/service?		
How timely was the training you received in preparation for the use of the product/service?		
How effective was the support you received during implementation of the product/service?		
PERFORMANCE OF THE PERFORMING ORGANIZATION		
How effectively and consistently was sponsorship for the project conveyed?		
How smooth was the transition of support from the Project Team to the Performing Organization?		

New York State
Project Post-Implementation Survey

Questions	Rating (1-3)	Comments (What worked well? What could have been done better? What recommendations do you have for future projects?)
PERFORMANCE OF THE PERFORMING ORGANIZATION (Continued)		
Was there a qualitative difference in the level of support provided by the Project Team during implementation and by the Performing Organization after transition?		
Did the Project Team adequately plan for and prepare the Performing Organization for its ongoing responsibilities for the product or service of the project?		
PERFORMANCE OF THE PROJECT TEAM		
Overall, how effective was the performance of the Project Manager?		
How well did the Project Team understand the expectations of their specific roles and responsibilities?		
How well were your expectations met regarding the extent of your involvement in the project (effort time commitments etc.)?		
How effective was each Project Team member in fulfilling his/her role?		
How effective was team member training?		

New York State
Project Post-Implementation Survey

GENERAL QUESTIONS

Question	Response
What were the most significant issues on this project?	
What were the lessons learned on this project?	
What on the project worked well and was effective in the delivery of the product?	
What other questions should we have asked? What other information would you like to provide to us about this project?	

New York State
Project Post-Implementation Report

PROJECT IDENTIFICATION

Project Name: _____ Date: _____

Project Sponsor: _____ Project Manager: _____

Report Prepared By: _____

CATEGORIES: Categories of the report correspond to the categories in the Project Post-Implementation Survey.

For each category, the Overall Rating is the average of the ratings provided on completed survey forms for that category (1=Not at All, or Poor, 2=Adequately, or Satisfactory, 3=To a great extent, or Excellent)

A. PROJECT EFFECTIVENESS

_____

Overall Survey Rating:

New York State
Project Post-Implementation Report

B. CSSQ MANAGEMENT

Overall Survey Rating:

C. RISK MANAGEMENT

Overall Survey Rating:

D. COMMUNICATIONS

Overall Survey Rating:

New York State
Project Post-Implementation Report

E. ACCEPTANCE MANAGEMENT

Overall Survey Rating:

F. ORGANIZATIONAL CHANGE MANAGEMENT

Overall Survey Rating:

G. ISSUES MANAGEMENT

Overall Survey Rating:

New York State
Project Post-Implementation Report

H. PROJECT IMPLEMENTATION AND TRANSITION

Overall Survey Rating:

I. PERFORMANCE OF PERFORMING ORGANIZATION

Overall Survey Rating:

J. PERFORMANCE OF PROJECT TEAM

Overall Survey Rating:

New York State
Project Post-Implementation Report

K. KEY PROJECT METRICS

Cost

Schedule

Scope

Quality

New York State
Project Repository Table of Contents

PROJECT IDENTIFICATION

Project Name: _____ Date: _____

Project Sponsor: _____ Project Manager: _____

TABLE OF CONTENTS

- Project Proposal
- Business Case
- Project Charter
- Project Scope Statement
- Project Schedule
- Quality Management Plan
- Budget Estimate
- List of Risks/Risk Management Worksheet
- Description of Stakeholder Involvement
- Communications Plan
- Post-Implementation Survey(s)
- Post-Implementation Report
- Change Control Forms
- Signed Approval Forms
- Meeting Notes/Minutes/Correspondence
- Project Status Reports
- Progress Reports
- Project Work Products/Deliverables
- End of Phase Checklists

< Name of Agency >

Business Requirements Document

< System Name >

Agency	
Project Name	
Project Sponsor	
Project Manager	
Document Date	
Prepared By	

Business Requirements Document

TABLE OF CONTENTS

Business Requirements Document

3.0 SPECIFIC REQUIREMENTS

3.1 Business Unit

Description

3.1.1 Business Function 1

Description

- Business Requirement 1 (Priority)
- Business Requirement 2 (Priority)
- Etc.

3.1.2 Business Function 2

Description

- Business Requirement 1 (Priority)
- Business Requirement 2 (Priority)
- Etc.

Business Requirements Document

4.0 BUSINESS REQUIREMENTS NOT BEING IMPLEMENTED

APPENDIX A – Requirements Definition Supporting Details

< Name of Agency >

Functional Specification

< System Name >

Agency	
Project Name	
Project Sponsor	
Project Manager	
Document Date	
Prepared By	

Functional Specification

TABLE OF CONTENTS

Functional Specification

3.1 Sub-system

Sub-System Description

3.1.1 Component Type

Component Type Description

3.1.1.1 Component 1

- Component Description
- Component Mockup (where appropriate)
- Component Business Flow
  - Cross-reference to Business Requirement(s), Logical Data and Process Models
  - Flowchart
  - Detailed Business Rules for each Flowchart element

3.1.1.2 Component 2

- Component Description
- Component Mockup (where appropriate)
- Component Business Flow
  - Cross-reference to Business Requirement(s), Logical Data and Process Models
  - Flowchart
  - Detailed Business Rules for each Flowchart element

Functional Specification

4.0 OTHER SPECIFICATIONS

4.1 Technical Specifications

4.2 Operational Specifications

4.3 Transitional Specifications

5.0 BUSINESS REQUIREMENTS NOT BEING IMPLEMENTED

Functional Specification

APPENDICES – SUPPORTING DOCUMENTS

< Name of Agency >

Technical Architecture

< System Name >

Agency	
Project Name	
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Prepared By	

Technical Architecture

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Technical Architecture

3.0 SYSTEM ARCHITECTURE DESIGN

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3.1.1 Component Functions

3.1.2 Technical Considerations

3.1.3 Selected Product(s)

3.1.4 Selection Rationale

3.1.5 Architecture Risks

3.2 System Architecture Component B

Technical Architecture

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4.1.1 Developer Workstation Configuration

4.1.2 Supporting Development Infrastructure Configuration

4.2 QA Environment

4.2.1 QA Workstation Configuration

4.2.2 Supporting QA Infrastructure Configuration

4.3 Acceptance Environment

4.3.1 Acceptance Workstation Configuration

4.3.2 Supporting Acceptance Infrastructure Configuration

< Name of Agency >

System Standards

< System Name >

Agency	
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2.2 Reporting

2.3 Application Navigation

2.4 Error Prevention and Correction

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2.8 Database, Data Access and Data Views

2.9 Miscellaneous Standards

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3.2.2 Database Management

3.3 Acceptance Environment

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3.1.1.2 Interface Prototype

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3.1.1.12 Common Elements Used

3.1.1.13 Module Review Process

3.1.1.14 Audit Tracking

3.1.1.15 Special Considerations

Technical Specifications

3.1.1.16 Unit Test Plan

Unit Test Case

Unit Test Case Number:
Unit Test Case Name:
Purpose of Test Case:
Unit Test Data:
Data Source A Value(s):
Data Source B Value(s):
Navigation:
Navigation Directions
Expected Results:
Narrative
Comments:
Additional Testing Consideration

Unit Test Results:

Tester:
Name
Date Time
Results:
Passed: _____ Failed: _____
Justification:

3.1.2 Module A-2

3.2 Sub-System B

3.2.1 Module B-1

3.2.2 Module B-2

Technical Specifications

4.0 INTEGRATION TEST PLAN

4.1 Integration Packet 1

Integration Test Case
- Integration Test Case Number:
- Integration Test Case Name:
- Module List:
- Purpose of Integration Test Case:
- Integration Test Data:
  - Data Source A — Value(s):
  - Data Source B — Value(s):
- Navigation:
  - Navigation Directions
- Expected Results:
  - Narrative
- Comments:
  - Additional Testing Consideration

Integration Test Results:
- Tester:
  - Name:
  - Date: — Time:
- Results:
  - Passed: _____ — Failed: _____
  - Justification:
- Verifier:
  - Name:
  - Date: — Time:

4.2 Integration Packet 2

Technical Specifications

5.0 SYSTEM TEST PLAN

5.1 System Test Packet 1

System Test Case
- System Test Case Number:
- System Test Case Name:
- Module List:
- Purpose of System Test Case:
- System Test Data:
  - Data Source A — Value(s):
  - Data Source B — Value(s):
- Navigation:
  - Navigation Directions
- Expected Results:
  - Narrative
- Comments:
  - Additional Testing Consideration

System Test Results:
- Tester:
  - Name:
  - Date: — Time:
- Results:
  - Passed: _____ — Failed: _____
  - Justification:
- Verifier:
  - Name:
  - Date: — Time:

5.2 System Test Packet 2

Technical Specifications

6.0 ACCEPTANCE TEST PLAN

6.1 Acceptance Test Packet 1

Acceptance Test Case
- Acceptance Test Case Number:
- Acceptance Test Case Name:
- Module List:
- Purpose of Acceptance Test Case:
- Acceptance Test Data Preparation:
  - Data Preparer:
- Data Sources and Values:
- Acceptance Case Description:
  - Business Rules, Requirements and Conditions being tested:
  - Navigation directions:
- Expected Results:
  - Narrative
- Comments:
  - Additional Testing Consideration
- Acceptance Test Results:
  - Tester:
    - Name:
    - Date: Time:
  - Results:
    - Passed: _____ Failed: _____
    - Justification:
  - Defect Resolution:
    - Application Developer:
    - Resolved Date:
  - Re-Tester:
    - Name:
    - Date: Time:
  - Results:
    - Passed: _____ Failed: _____
    - Justification:
  - Approval:
    - Name:
    - Date: Time:

6.2 Acceptance Test Packet 2

Technical Specifications

7.0 DEPLOYMENT AND TRANSITION PLANS

7.1 Consumer Training and Deployment

7.2 Data Preparation

7.3 Software Migration

7.4 Production Start-up

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7.6 Performing Organization Training and Transition

8.0 OPERATIONAL CONSIDERATIONS

< Name of Agency >

Defect Log for <Testing Performed>

< System Name >

Agency	
Project Name	
Project Sponsor	
Project Manager	
Document Date	
Prepared By	

Defect Log for <Testing Performed>

DEFECT SUMMARY

Defect Identification		Test Results			Defect Resolution		Approval		
Defect #	Status	Test Case #	Tester	Date	Application Developer	Resolved Date	Re-Tester Date	Date	Approved

Defect Log for <Testing Performed>

DEFECT DETAILS

Defect #:		Defect Details Updated By:		Date:	
Defect Description					
Resolution Description **or** **Action Plan**					

3 SUGGESTED READINGS

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Internet Resources

www.cio.com - Internet site for "CIO Magazine" featuring articles and information on technology management.

www.fastcompany.com - Internet site for "Fast Company" magazine featuring articles and information on project management trends and issues.

www.pmblvd.com - Project management "portal" site offering links to a wide variety of management-related information.

www.pmi.org - Home site for the Project Management Institute offering resources, links and information about the institute and general project management issues.

www.projectworld.com - Resource for seminars and conventions related to the project management discipline.

www.gantthead.com – Project management advise site developed "by project managers for project managers." A key feature includes templates and descriptions of "typical" project deliverables.

Like any subject on the Internet, there are millions of pages dedicated to project management. And like any other subject, finding the useful information is a challenge. Although this is not an exhaustive list of project management resources on the web, these sites are an excellent launch point for additional information.

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