



Federal Student Aid Lifecycle Management Framework Overview

Version 1.0
January 2010



FSA Lifecycle Management (LCM) Framework

- Current LCM Framework
- Why a New LCM Framework?
- Lifecycle Stage Activities
- Lifecycle Management Framework
- Artifacts
- Benefits
- Appendix - Artifact Descriptions, Glossary



Approach

- Waterfall development methodology
- Focused on large-scale solution development only

Limitations

- Long lead time prior to problem identification
- Quality is assessed based on documentation deliverables rather than on the IT solution itself
- Costs associated with failing projects are higher than necessary



Mitigate Risk

- Reduce the likelihood of project failures by breaking down core project activities into manageable iterations
- Identify problems earlier by employing a suggested minimum of two iterations per release

Improve Quality

- Develop deployable solutions or solution components in phases, with each phase lasting approximately 12 months
- Improve solution quality through consecutive iterations
- Foster regular and open communication between user groups and development teams

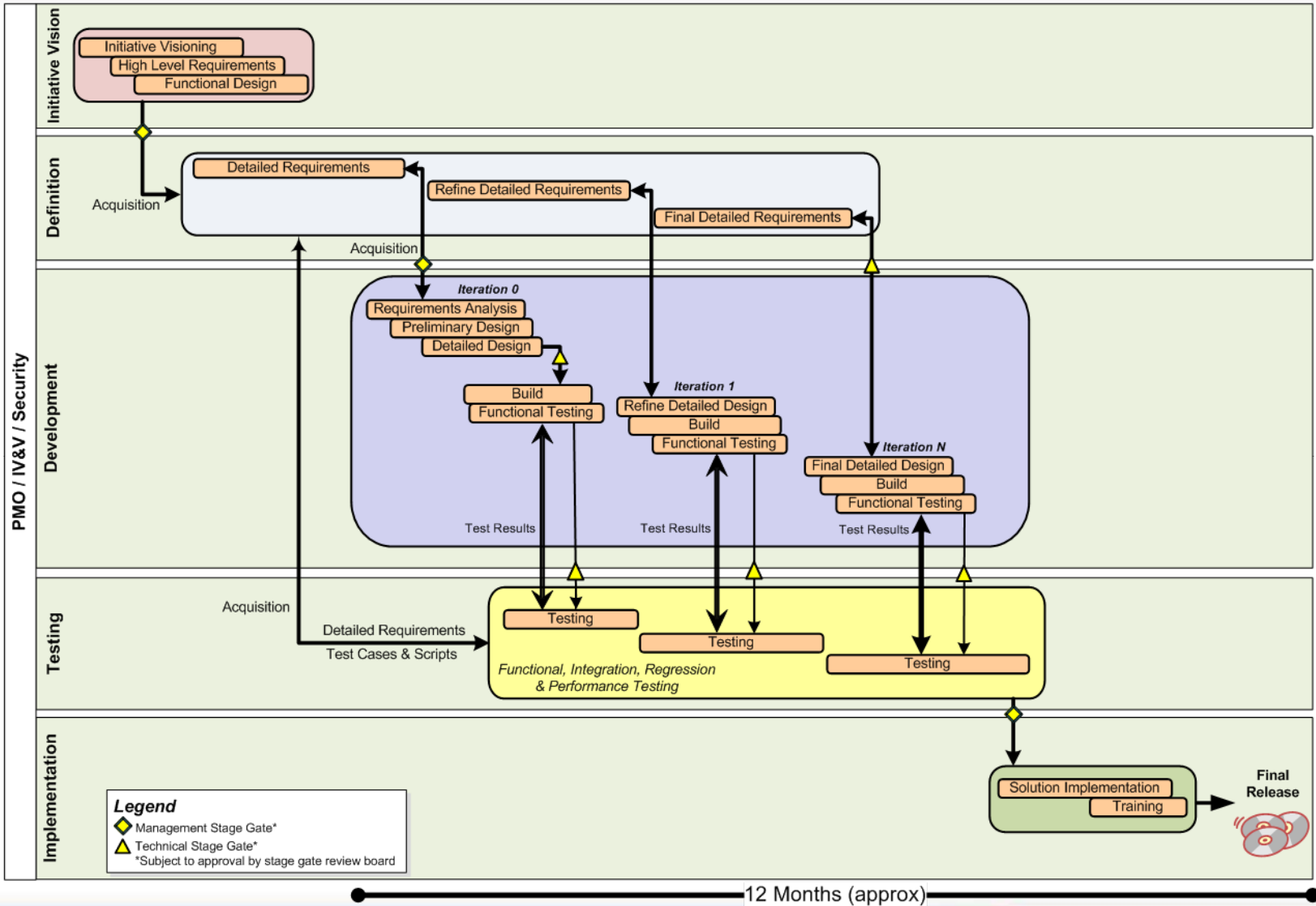
Lifecycle Stage Activities



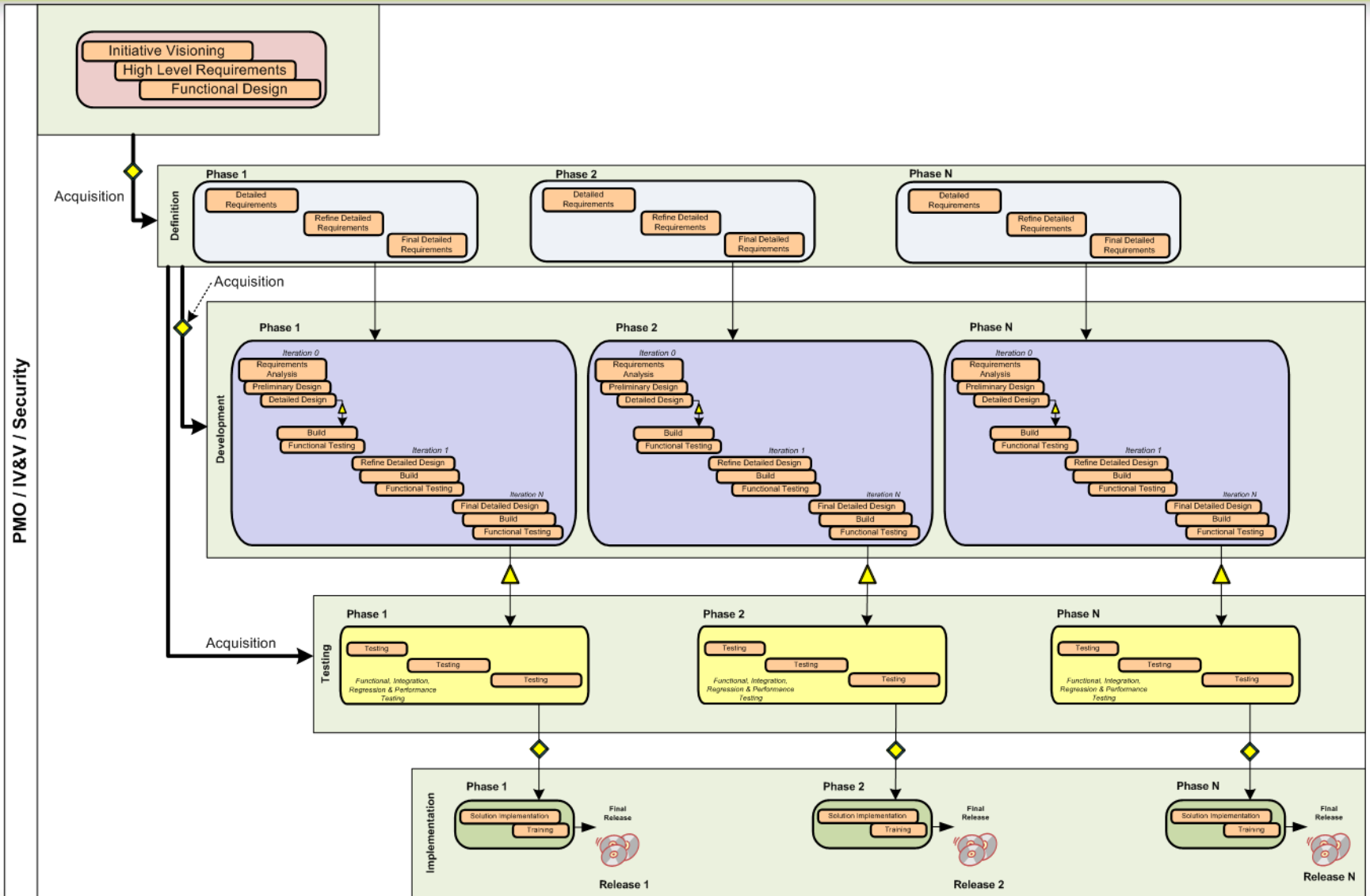
Stage Name	Common Stage Activities Include:
Initiative Vision	<ul style="list-style-type: none">• Conduct visioning, define high level requirements, and develop phasing plan
Definition	<ul style="list-style-type: none">• Develop detailed requirements and project management plan
Development	<ul style="list-style-type: none">• Design, build and test solution iteratively
Testing	<ul style="list-style-type: none">• Perform functional, integration, regression, and performance testing iteratively
Implementation	<ul style="list-style-type: none">• Conduct security reviews, implement solution, and train users
Operations & Maintenance	<ul style="list-style-type: none">• Operate and manage the solution, reviewing it periodically
Retirement	<ul style="list-style-type: none">• Retire the solution, archive data, and dispose of system



Lifecycle Management Framework – Single Phase



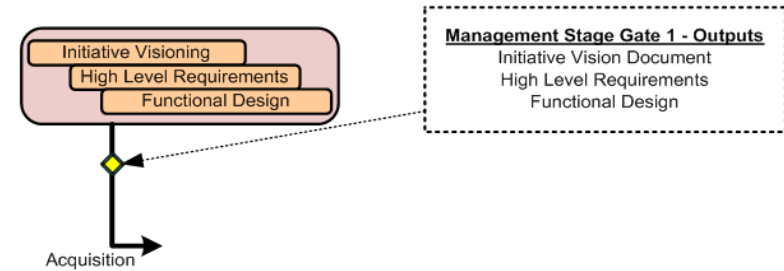
Lifecycle Management Framework – Multiple Phases (Large Projects)



Initiative Vision Stage



Key Activities Performed
<ul style="list-style-type: none">• Conduct Initiative Visioning• Develop High Level Requirements• Plan project phases• Acquisition
Artifacts Developed
<i>New to this Stage</i>
<ol style="list-style-type: none">1. Project Concept Document / Exhibit 300 / Operational Analysis2. Initiative Vision Document3. High Level Requirements Document4. Project Charter5. Project Management Plan6. Privacy Impact Assessment(PIA)7. Inventory Worksheet8. Implementation / Transition Management Plan9. Functional Design Document
<i>Updated from Previous Stages</i>
<ul style="list-style-type: none">• N/A
Stage Gate
<ul style="list-style-type: none">• Management Stage Gate 1



Definition Stage



Key Activities Performed

- Plan project iterations
- Detailed Requirements Elicitation
- Identify IT infrastructure
- Acquisition

Artifacts Developed

New to this Stage

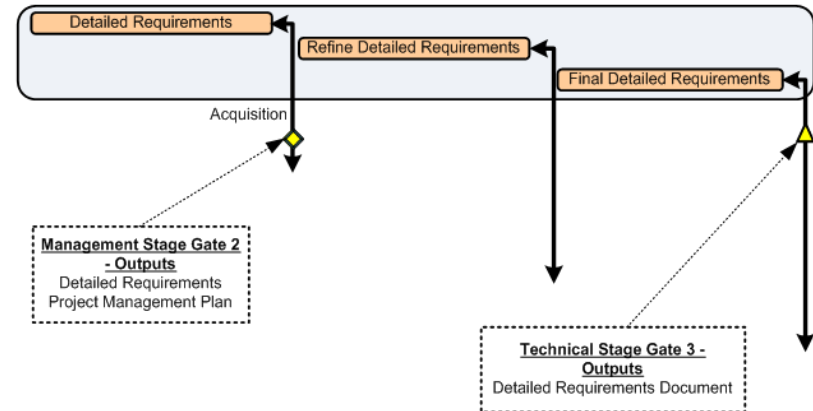
10. Detailed Requirements Document (UI Specification)
11. IT Contingency Plan
12. Master Test Plan
13. System Security Plan
14. Configuration Management Plan

Updated from Previous Stages

- Artifacts 1,5,6,7 & 8

Stage Gate

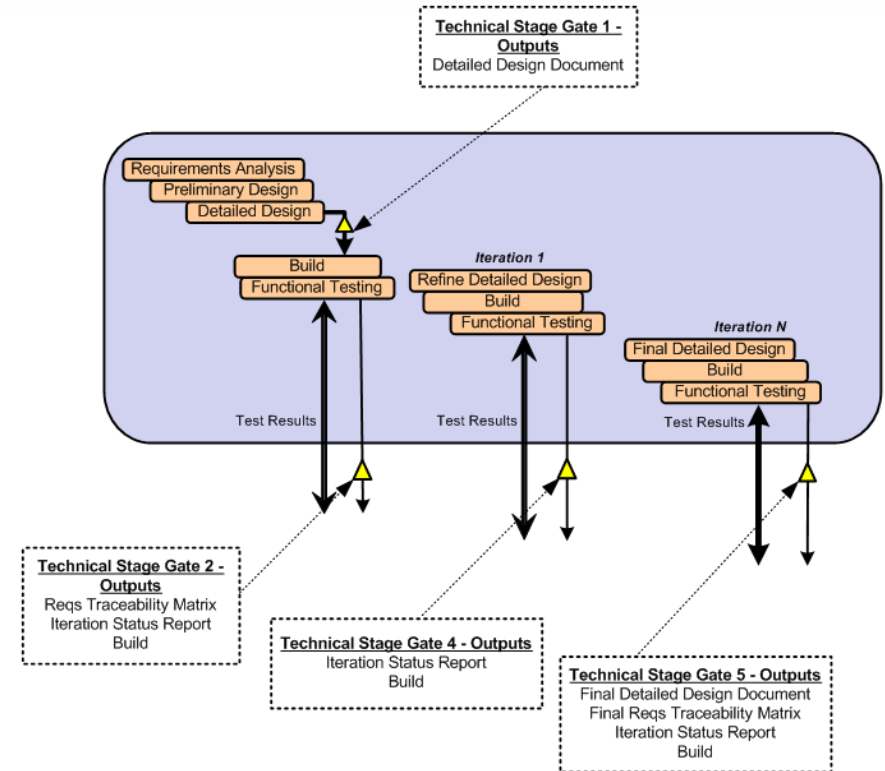
- Management Stage Gate 2
- Technical Stage Gate 3



Development Stage Overview (All Iterations)



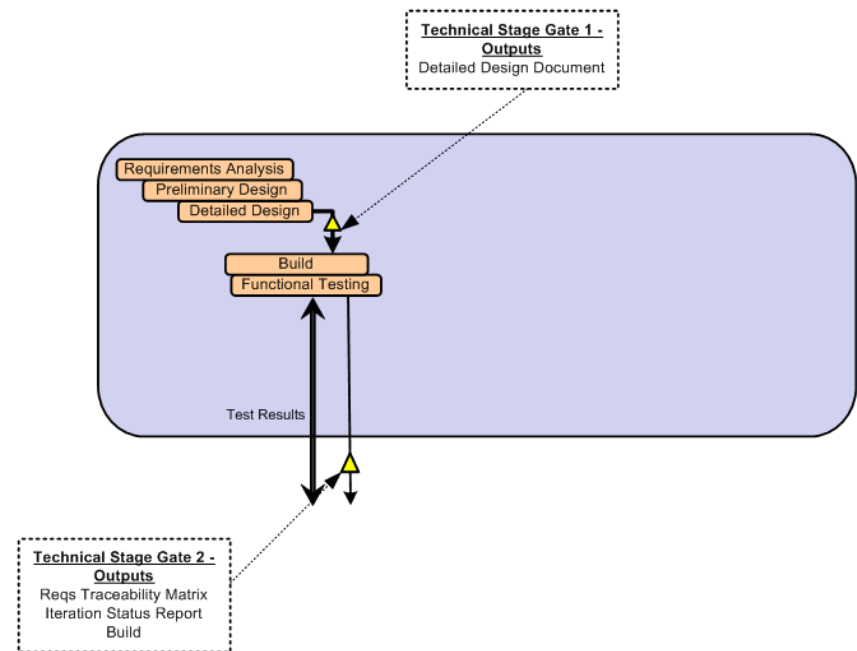
Key Activities Performed
<ul style="list-style-type: none"> Analyze Requirements Design, Build, & Test Solution Develop Requirements Traceability Matrix Code Review Acquisition
Artifacts Developed
<i>New to this Stage</i>
<ol style="list-style-type: none"> Preliminary Design Document Detailed Design Document Security Risk Assessment & Mitigation Plan Operations & Maintenance Plan Requirements Traceability Matrix Test Suites Iteration Status Report Solution Source Code (Build)
<i>Updated from Previous Stages</i>
<ul style="list-style-type: none"> Artifacts 1, 5, 8, 10, 11, 12, 13 & 14
Stage Gate
<ul style="list-style-type: none"> Technical Stage Gate 1, 2, 4, & 5



Development Stage – Iteration 0



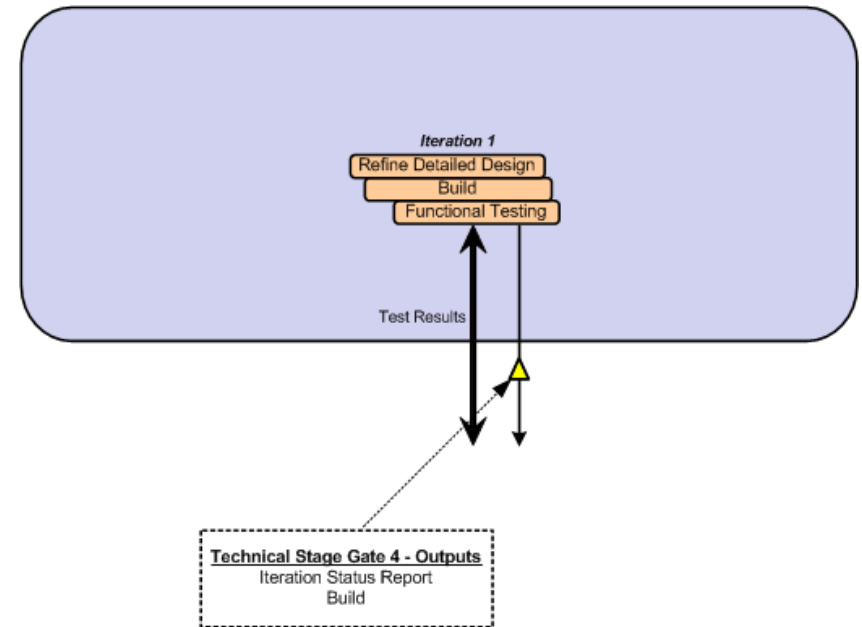
Key Activities Performed
<ul style="list-style-type: none"> Analyze requirements Design Solution Refine Iteration Plan Conduct Preliminary Design Review Build Solution Functional and User Acceptance Testing Develop Requirements Traceability Matrix Code Review
Core Artifacts Developed
<i>New to this Iteration</i>
<ul style="list-style-type: none"> 15. Preliminary Design Document 16. Detailed Design Document (Draft) 17. Security Risk Assessment & Mitigation Plan (POAM) 18. Operations & Maintenance Plan 19. Requirements Traceability Matrix 20. Test Suites 21. Iteration 0 Status Report 22. Solution Source Code (Build)
<i>Updated from Previous Iterations</i>
<ul style="list-style-type: none"> Artifacts 1, 5, 8, 10, 11, 12, 13 & 14
Stage Gate
<ul style="list-style-type: none"> Technical Stage Gates 2 & 3



Development Stage – Iteration 1



Key Activities Performed
<ul style="list-style-type: none">• Analyze Test Results and Requirements• Refine Solution Design• Refine Iteration Plan• Build Solution• Functional and User Acceptance Testing• Update Requirements Traceability Matrix• Code Review
Core Artifacts Developed
<i>New to this Iteration</i>
21. Iteration 1 Status Report
<i>Updated from Previous Iterations</i>
<ul style="list-style-type: none">• Artifacts 1, 5, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21 & 22
Stage Gate
<ul style="list-style-type: none">• Technical Stage Gate 4



Development Stage – Iteration N



Key Activities Performed

- Analyze test results & requirements
- Refine Solution Design
- Refine Iteration Plan
- Build Solution
- Functional and User Acceptance Testing
- Update Requirements Traceability Matrix
- Code Review

Core Artifacts Developed

New to this Iteration

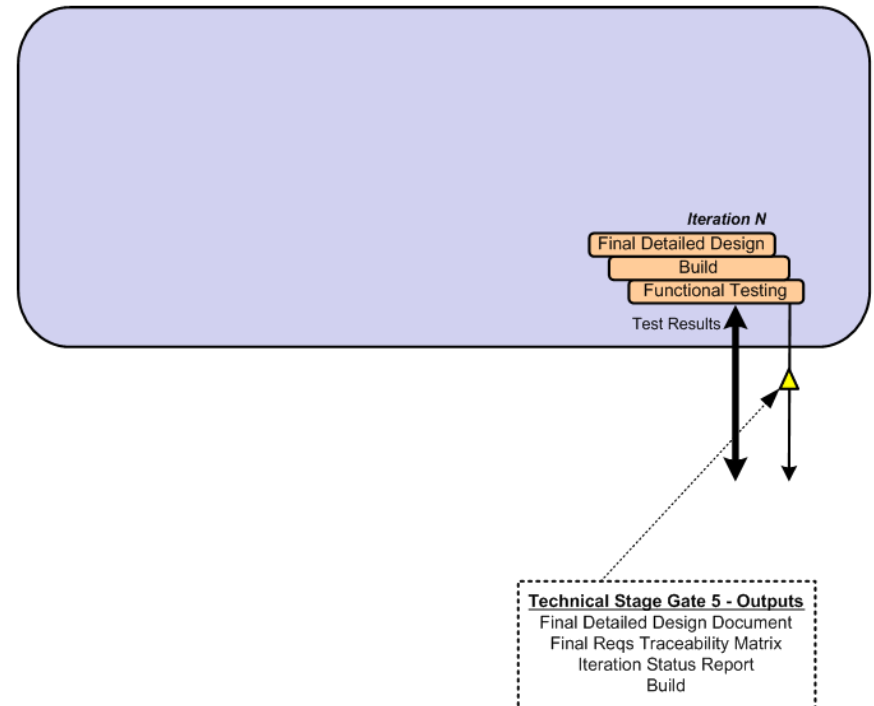
21. Iteration N Status Report

Updated from Previous Iterations

- Artifacts 1, 5, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21 & 22

Stage Gate

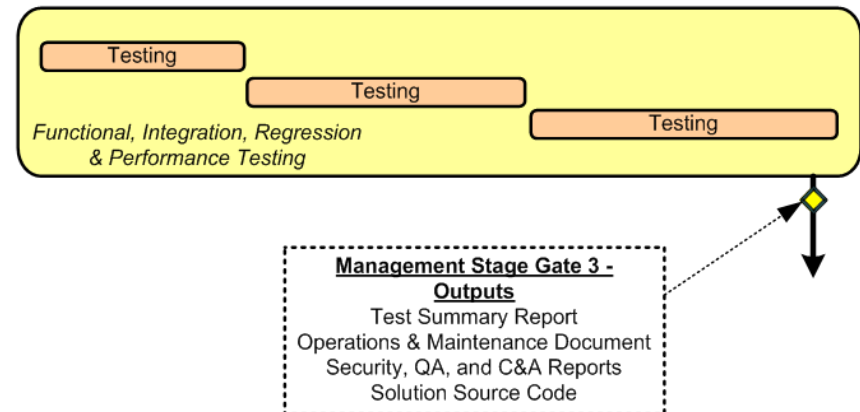
- Technical Stage Gate 5



Testing Stage



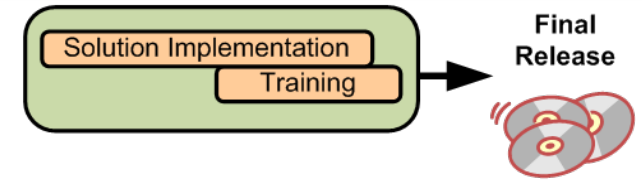
Key Activities Performed
<ul style="list-style-type: none">• Iterative Testing• Functional, Integration, Regression & Performance Testing after the final iteration• Security Reviews, Quality Assurance (QA) Testing, and Certification & Accreditation (C&A) Testing
Core Artifacts Developed
<i>New to this Stage</i>
23. Test Summary Report 24. User Acceptance Test Summary Report 25. Production Readiness Review Report 26. Training Plan
<i>Updated from Previous Stages</i>
<ul style="list-style-type: none">• Artifacts 1, 5, 8, 11, 13, 14, 16, 17, 18, 19, 20, 21 & 22
Stage Gate
<ul style="list-style-type: none">• Management Stage Gate 3



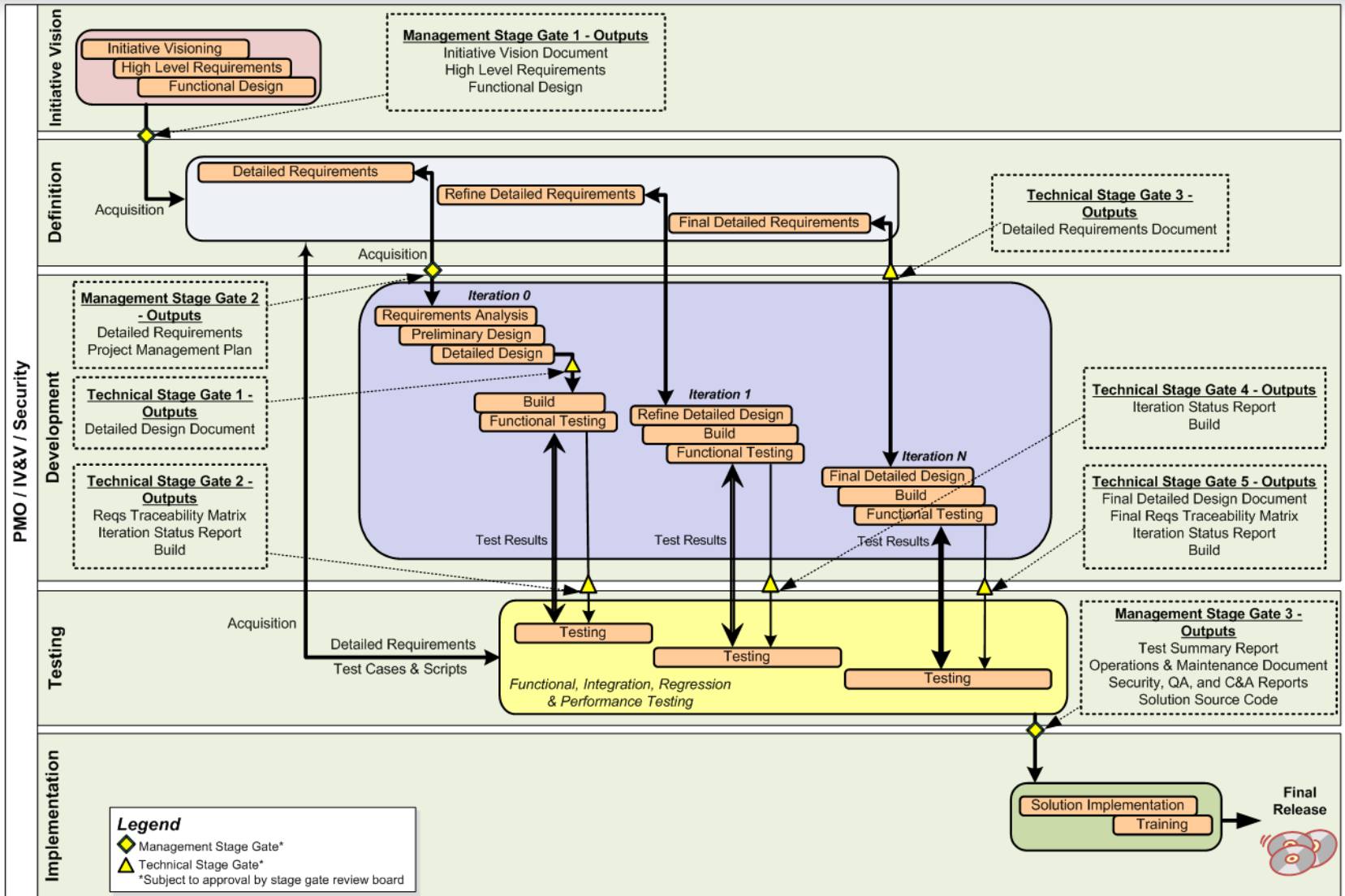
Implementation Stage



Key Activities Performed
<ul style="list-style-type: none">• Obtain Program and Technical Review• Deploy Solution
Artifacts Developed
<i>New to this Stage</i>
27. Solution User Manual
28. Release Version Description
29. Security, C&A, and Post-Implementation Evaluation
<i>Updated from Previous Stages</i>
<ul style="list-style-type: none">• Artifacts 1, 5, 8, 11, 13, 14, 17, 18, 25 & 26
Stage Gate
<ul style="list-style-type: none">• N/A



Lifecycle Management Framework



Project Artifacts Aligned by Lifecycle Stage



Lifecycle Stage	Initiative Vision	Definition	Development	Testing	Implementation	Operations & Maintenance	Retirement
Artifacts	1. Project Concept Document /e300 / Operational Analysis						
	2. Initiative Vision						
	3. High Level Requirements Document						
	4. Project Charter						
	5. Project Management Plan (Schedule, Requirements, Quality, Risk & Performance)						
	6. Privacy Impact Assessment (PIA)						
	7. Inventory Worksheet						
	8. Implementation / Transition Management Plan						
	9. Functional Design Document						
	10. Detailed Requirements Document						
	11. IT Contingency Plan						
	12. Master Test Plan (Integration, System, Performance, User Acceptance, Test Readiness Checklist)						
	13. System Security Plan						
	14. Configuration Management Plan						
	15. Preliminary Design Document						
	16. Detailed Design Document						
	17. Security Risk Assessment & Mitigation Plan (POAM)						
	18. Operations & Maintenance Plan						
	19. Requirements Traceability Matrix						
	20. Test Suites						
	21. Iteration Status Report						
	22. Solution Source Code						
	23. Test Summary Report						
	24. User Acceptance Test Summary Report						
	25. Production Readiness Review Report						
	26. Training Plan						
	27. Solution User Manual						
	28. Release Version Description						
	29. Security, C&A and Post-Implementation Evaluation						
	30. System Retirement Plan						
	31. System Disposal Plan						

Project Artifacts Aligned by Capability Area



Lifecycle Stage / Capability Area	Initiative Vision	Definition	Development	Testing	Implementation	Operations & Maintenance	Retirement
Business Strategy	2. Initiative Vision Document						30. System Retirement Plan
Program Management	1. Project Concept Document /e300 / Operational Analysis						
	4. Project Charter						
	5. Project Management Plan (Schedule, Requirements, Quality, Communication, Risk, & Performance)						
Requirements Management	3. High Level Requirements Document						
	9. Functional Design Document						
	10. Detailed Requirements Document						
	19. Requirements Traceability Matrix						
Privacy / Records Management	6. Privacy Impact Assessment (PIA)						
	7. Inventory Worksheet						
Solution Development	8. Implementation / Transition Management Plan						
	11. IT Contingency Plan						
	15. Preliminary Design Document						
	16. Detailed Design Document						
	18. Operations & Maintenance Plan						
	21. Iteration Status Report						
	22. Solution Source Code						
	26. Training Plan						
	27. Solution User Manual						
	12. Master Test Plan (Integration, System, Performance, User Acceptance, Test Readiness Checklist)						
Quality Management	20. Test Suites						
	23. Test Summary Report						
	24. User Acceptance Test Summary Report						
	25. Production Readiness Review Report						
Security Management	13. System Security Plan						
	17. Security Risk Assessment & Mitigation Plan (POAM)						
	29. Security, C&A and Post-Implementation Evaluation						
Change Management	14. Configuration Management Plan						
Infrastructure Management					28. Release Version Description Document		
							31. System Disposal Plan



- Centers on solution delivery rather than intermediate documentation artifacts
- Lowers software development risk through early and continuous delivery of workable software
- Promotes Service Oriented Architecture
- Supports software development consistent with FSA's Target State Vision
- Supports the new Federal Student Aid EDSS acquisition strategy





Appendix

Artifact Descriptions



Item #	Artifact / Description	Template	Exemplar
1	Project Concept Document / Exhibit 300 / Operational Analysis The Project Concept Document explains the scope and purpose of a funding request, supported by alternatives analysis and financial information. The Exhibit 300 justifies the business case for an investment, to fill the gap in the organization's ability to meet the strategic goals and objectives with the least life-cycle costs of all the various possible solutions and provide risk-adjusted cost and schedule goals and measurable performance benefits. The Operational Analysis (OA) document is a periodic assessment of cost, performance, and risk trends of operational assets over time and is essential for minimizing ownership costs and the impact of performance problems. Project Concept Document, Exhibit 300 and Operational Analysis will be developed by Federal Student Aid.		
2	Initiative Vision Document The Initiative Vision Document describes in detail Federal Student Aid's stakeholder needs and business problems to be addressed by the features or capabilities of the new Initiative, high-level business processes, and system context of the envisioned solution.	✓	✓
3	High Level Requirements Document The High Level Requirements Document captures high level functional and non-functional requirements in the form of declarative statements.	✓	✓
4	Project Charter The Project Charter identifies the project by specifying a need or problem to be solved. It outlines the project and covers its scope, project objectives, project roles and responsibilities, project approach and project deliverables. This document will be developed by Federal Student Aid.		
5	Project Management Plan The Project Management Plan describes how contractors should address planning and scoping; governance; organizational change management; stakeholder management; requirements management; communications management; risk management; issues management; resource management; quality management; performance management; status reporting; evaluation; and, closure of the project.	✓	
6	Privacy Impact Assessment (PIA) The Privacy Impact Assessment is used to identify if a system contains privacy information and lets the public know what information is collected and how it is secured. Information collected may include Social Security Numbers, PINs, Addresses, Dates of Birth, etc.	✓	
7	Inventory Worksheet The Inventory Worksheet is used to classify a system as either a general support system (GSS) or a major application (MA), identify data sensitivities, and to ensure that the system has the appropriate level of security.	✓	

Artifact Descriptions



Item #	Artifact / Description	Template	Exemplar
8	Implementation /Transition Management Plan	✓	
	The Implementation Plan describes the planned procedures for releasing the new system or system module to production. It lists deployment goals; critical success factors; deployment tasks; resources, and tools; task and resource dependencies; task responsibilities and timelines for completion; and significant risks and contingency plans. The Transition Management Plan includes all aspects of how the organization will shift from a legacy system to a new system. This plan covers the responsibilities associated with maintenance and support to a new contractor from the development contractor.		
9	Functional Design		
	The Functional Design document provides a discrete and focused business operation or activity and how an information technology solution supports that operation. A Functional Design typically applies to a project, assisting in the translation of requirements into a solution vision, high-level business and system specification.		
10	Detailed Requirements Document	✓	✓
	The Detailed Requirements Document captures detailed functional and non-functional requirements in the form of declarative statements. If required by the solution, this template may also be used to capture user interface specifications.		
11	Information Technology Contingency Plan		
	The Information Technology Contingency Plan documents the critical business functions need to be resumed and in what order, what technical components are affected in the case of a disaster, and the key individuals who should be familiar with their duties under the plan.		
12	Master Test Plan	✓	
	The Master Test Plan provides a central artifact to govern the planning and control of the test effort. It defines the general approach that will be employed to test the solution and to evaluate the results of that testing, and is the top-level plan that will be used by managers to govern and direct detailed testing activities.		
13	System Security Plan	✓	
	The System Security Plan describes general system information such as its Federal Information Processing Standards (FIPS) 199 categorization, type of data processed, points of contact, system environment, applicable Federal laws and guidelines, and sensitivity of information processed by the system. It includes the management, operational, and technical controls required for the system. System Boundary Document and all other project related security documentation must be developed in compliance with NIST Special Publication (SP) 800-18 and SP 800-53. Further security compliance information can be found at: http://csrc.nist.gov/publications/PubsSPs.html . As deemed necessary, contractors may obtain a copy of the Federal Student Aid Security Architecture Model and other security documentation by contacting their Contracting Officer post award.		

Artifact Descriptions



Item #	Artifact / Description	Template	Exemplar
14	Configuration Management Plan		
	The Configuration Management (CM) Plan provides an overview of the organization, activities, overall tasks, and objectives of CM for an initiative. It addresses: baseline work products, describes the mechanism to track and control changes/change requests, and the mechanism to establish and maintain baseline integrity.		
15	Preliminary Design Document	✓	✓
	The Preliminary Design Document provides a high level design, using a number of different architectural views (to include use case diagrams) to depict different aspects of a system. It is intended to capture and convey the significant architectural decisions that have been made on the system in the early stages, allowing the high-level design to be effectively evaluated before proceeding to the detailed design stage.		
16	Detailed Design Document	✓	✓
	The Detailed Design Document provides a detailed design, using a number of different architectural views (to include use case diagrams) to depict different aspects of the system. It is intended to capture and convey the detail necessary to allow coders to develop the system, and to support critical design reviews before beginning development.		
17	Security Risk Assessment and Mitigation Plan (Plan of Action & Milestones Report)		
	The Security Risk Assessment and Mitigation Plan provides an assessment of a system's security controls and determines the extent to which those controls have been implemented correctly - operating as intended and producing the desired outcome with respect to meeting system security requirements and a plan to mitigate findings. The security assessment also includes a list of any recommended corrective actions. The Plan of Action & Milestones Report addresses and tracks all weaknesses identified by audits, assessments, reviews and evaluations.		
18	Operations and Maintenance Plan	✓	
	The Operations and Maintenance Plan documents all ongoing activities necessary to operate and maintain the system in good functioning condition. This plan includes a description of the resources required and their responsibilities, operational procedures for system startup and restart, backup and recovery, system archiving, and job scheduling. In addition, this plan addresses any training required by the user community in order to use the system.		
19	Requirements Traceability Matrix		
	The Requirements Traceability Matrix associates requirements with portions of the build designed to satisfy them. Testing is also tied to the requirements on which they are based to ensure that the build meets all requirements.		
20	Test Suites	✓	
	Test Suites outline a set of several test scenarios, test suites, test procedures and test scripts for a component or system under test.		

Artifact Descriptions



Item #	Artifact / Description	Template	Exemplar
21	Iteration Status Report The Iteration Status Report documents the status, results and outcomes of each iteration.		
22	Solution Source Code Solution Source Code is a collection of statements or declarations written in some human-readable computer programming language.		
23	Test Summary Report The Test Summary Report gives a summarization of the system test phase of the project. The report includes support materials pertaining to the software version, deviations from those areas that were agreed to in the System Test Plan, gives an overall assessment of the product that was tested, and provides an overall status of the incidents found during the system test activity.	✓	
24	User Acceptance Test Summary Report The User Acceptance Test Summary Report gives a summarization of the user acceptance test phase of the project. The report includes support materials pertaining to the software version, deviations from those areas that were agreed to in the User Acceptance Test Plan, gives an overall assessment of the product that was tested and gives an overall status of the incidents found during the user acceptance test.	✓	
25	Production Readiness Review Report The Production Readiness Review Report records the result of the performance readiness review that is performed during the 'validation' phase of the Construction and Validation stage. It is the final Risk Assessment briefing and checklist document developed before the system goes live.		
26	Training Plan The Training Plan documents the training to be provided or arranged for Federal Student Aid end-users and support staff, including: prerequisites, courses, course curricula, and attendees.	✓	
27	Solution User Manual The Solution User Manual describes in detail the user/system interaction facilities offered by the system, which allow the users to leverage the system functionality in support of their business processes.	✓	
28	Release Version Description Document The Release Version Description Document is used to track and control versions of software and hardware being released to implementation, testing, or the final operational environment.	✓	

Artifact Descriptions



Item #	Artifact / Description	Template	Exemplar
29	Security, Certification and Accreditation (C&A) and Post-Implementation Evaluation		
	The Security, C&A and Post-Implementation Evaluation Report documents the results of the Security, Certification and Accreditation (C&A) and Post Implementation Evaluation. The purpose of the report is to review and ensure that each general support system's and major application's security controls are implemented and/or documented in compliance with the U.S. Department of Education, U.S. Office of Management and Budget (OMB), and National Institute for Standards and Technology (NIST) guidance.		
30	System Retirement Plan	✓	
	The System Retirement Plan describes the system retirement strategy, the solution retirement requirements list, and the data/documentation plan.		
31	System Disposal Plan	✓	
	The System Disposal Plan documents the data that needs to be preserved when the system is disposed of, the timeline for the disposal activities, the software components and data to be preserved, the equipment and software disposal plan, the security measures to be taken to dispose of the system and its data, and the archival of lifecycle products.		



- Artifact: A document, deployable component or other tangible result that is produced by an activity.
- Build: Develop physical solution
- Code Review: Systematic examination of computer source code intended to identify reusable components, and find and fix mistakes, improving both the overall quality of software and the developers' skills.
- Design: Create specifications to translate logical solution into a physical solution
- Iteration: Creation of a portion of a release, comprised of requirements, design, construction and testing activities
- Phase: Major milestone in the implementation of a solution, may be deployed in releases
- Release: Creation and deployment of a portion of the solution that has business value in a time frame of approximately nine months

Version History



Version Number	Release Date	Description
0.1	10/08/2009	Developed initial draft
0.2	10/22/2009	Included reference to User Interface Specification. Minor formatting changes
1.0	01/08/2010	Updated with recommendations from PMO and Application Development Group.