Project Life Cycle

PENNSYLVANIA JUSTICE NETWORK

Version 0.40
12/31/2014

Revision History

Version	Date	Author(s)	Revision Notes
0.01 DRAFT	7/23/2004	D. Bruner	Initial draft – Qualification and Initiation Phases
0.02 DRAFT	8/3/2004	D. Bruner	Input from T. Salerno, P. Silvagio, M. White
0.03 DRAFT	8/26/2004	D. Bruner	Final PMO team review – Qualification and Initiation Phases
0.04 DRAFT	9/7/2004	D. Bruner	Input from meeting held with JNET managers, 8/31/2004 – Qualification and Initiation Phase
0.05 DRAFT	10/5/2004	PMO Team	Input from JNET Executive Director and Business Manager; Added Requirements Engineering Phase
0.06 DRAFT	11/26/2004	D. Bruner	Input from meeting held with JNET managers, 10/20/2004; added Requirements Engineering and Analysis and Design of the Software Development Process
0.07 DRAFT	2/28/2005	D. Bruner	• Added section 3 - Project Execution and Control Phase (and templates identified in this section) • Added section 4 – Project Closure Phase (and templates identified in this section) • Moved sections on Software Development, Research, and COTS to appendices • Input from meeting held 2/28/2005
0.08 DRAFT	4/7/05	T. Salerno	• Updates to Glossary
0.08 DRAFT	6/10/05	T. Salerno	• Add Software Development Process Section
0.08	7/15/2005	T. Salerno	• Approved Version that includes the JNET Software Development Process
0.09	12/15/2006	T. Salerno	• Revised to reflect changes to the Project Qualification and Project Initiation Processes.
0.10	11/15/2007	T. Salerno	• Revised to include guidelines for managing event message development projects as well as the Commonwealth's software engineering methodology. Added material dealing with Project Management Plan and Project Closure Report development, and guidelines for managing small projects.
0.11	9/15/2008	T. Salerno	• Replaced the term JNET Metadata Library with *PEAR* • Incorporate content dealing with Requirements Management Plans • Changed references to *Communications and Training* to *Deployment and Support* • Changed references to *IT Operations* to *Applications Support*
0.12	8/15/2010	T. Salerno	• Added new JNET logo to title page • Updated Section 1.3 (Approach) • Updated Section 1.4 (JNET PMO overview) • Updated the Project Change Control Process Description
0.13	12/13/2010	T. Salerno	• Added content for Pilot Testing to Sections 2.0, 3.1.5, 3.5.1, and 3.5.2
0.14	3/9/2011	T. Salerno	• Updated Sections 2, 2.1.1, 2.1.2, 2.2.1, 2.2.2, 2.3, and 2.4 to reflect documentation template changes (e.g., Scope Document, Lessons-Learned Report, Charter Document changes) and the use of Star Team and of the Project Management Documentation Tracking Sheet.
0.15	7/18/2011	T. Salerno	• Addition of changes to system requirements definition process (see Sections 2.0, 3.1.1, 3.2.1, 3.2.2) • Removed references to PEAR and GJXDM (replaced latter with NIEM)

0.16	11/4/2011	T. Salerno	• Removed references to Public Safety Deputy CIO • Added references to the CA2 Process in the sections dealing with software development projects (Sections 3.2 to 3.6) • Removed references to and activities related to the obsolete JNET Application Assessment System/Database.
0.17	12/12/2011	B. Alpaugh	• Updated Document to reflect SOA Projects • Added Glossary definitions for SOA references.
0.18	6/19/2012	T. Salerno	• Updated various sections to reflect change in timing of lessons-learned exercises and changes in Project Closure Phase (i.e., made Lessons-Learned reporting optional, modified Project Sponsor Satisfaction Survey). • Updated software development methodology to reflect changes in CA2 process.
0.19	9/30/2013	T. Salerno	• Updated link to Enterprise Project Management Methodology (EPMM) in the *Document Overview*, Section 1.1. • Removed *Event Message Development* Section from Guide • Added the project sizing process to the Project Qualification Phase. • Added references to Project Logs • Added PMO responsibility for new application system release requests • Updated templates (Project Scaling, Deliverables Matrix, Project Log, Project Communications Plan, New JNET Application System Release Request
0.20	11/22/2013	T. Salerno	• Corrected and updated out-dated information • Started section on managing JNET IT Infrastructure and Product Upgrade Projects.
0.30	12/31/2013	T. Salerno	• Added Section 5 (IT Infrastructure and Product Upgrade Projects)
0.31	2/6/2014	T. Salerno	• Added Project Team Member Performance Assessments to Project Closing activities
0.40	12/31/2014	T. Salerno	• Replace references to OIT-ETSO to PACS (throughout) • Updated references in Section 1.1 • Added new Section 1.4 and moved *JNET PMO Overview* to Section 1.5 • Added optional component plans to the Project Management Plan (pages 5, 14, 17) • Added information detail to Step 5 on page 12. • Added Stakeholder Management Plan component to Project Management Plan content (pages 13 – 16) • Added PLC phase objectives and PMO activities on page 18 • Added detail to the description of step 2 in the Project Execution and Control process (page 21) • Added material from the *Software Extension to the PMBOK Guide Fifth Edition* to Section 3.1 (page 25) • Made minor modifications to the Software Testing Process Flow Charts and Descriptions (pages 42-44) • Modified Software Implementation Process Flowchart and Description (pages 46-47) • Updated the Glossary

Contents

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1. Introduction

1.1. Document Overview

This document, comprised of the sections listed below, provides the guidelines and tools needed to successfully and consistently initiate, control, and deliver JNET projects:

- Introduction – introduces JNET's Project Management Office (PMO) and sources of JNET projects to be managed through the Project Life Cycle.
- Project Life Cycle (PLC) Overview – provides a high-level introduction to JNET's tailored PLC for different types of JNET projects.
- PLC Phase Descriptions – depict the description and process flow of each of the major PLC phases.

This methodology is based on the principles outlined within the following:

- Commonwealth of Pennsylvania's Office of Administration Information Technology (OA-OIT) Enterprise Project Management Methodology:
  https://itcentral.pa.gov/ProjectManagement/Methodologies%20Roadmaps%20and%20Toolkits/Project%20Management%20Process%20Guide%202.0.docx
- The Project Management Institute's (PMI) Project Management Body of Knowledge (PMBoK)

1.2. Intended Audience

This document is geared towards JNET's professional staff, and the assumption is made that the staff is familiar with project management and software development practices and procedures. This document is not an all-inclusive textbook on project management or systems development.

1.3. Approach

The PMO's vision is to streamline processes and apply guidelines that truly add value to JNET's project portfolio.

JNET's PLC has been developed and released by major phases (e.g., Qualification, Initiation, etc.). Input has been solicited from staff members to tailor the guidelines to JNET's unique needs. The PMO is striving for continuous process improvement and welcomes ongoing comments and suggestions.

This will be a living document in that initial releases will represent a foundation on which to build based on knowledge gained over time. One challenge associated with this approach is to keep all staff members informed and up-to-date. The PMO communicates through the following channels:

- JNET Staff Meetings
- Project Planning Meetings
- Project Status Meetings and Reports
- Bi-weekly Critical Path Projects Status Meetings

A central tenet of project management at JNET is to *never allow process to become a roadblock to achievement*. Consequently, this PLC is intended to be a guide only, not a rigid standard. The document suggests a set of project management documentation, but does not require that the entire set be produced for every project. In reality, the amount of project documentation varies from project to project, depending on duration, complexity, risk and cost. The results of a project sizing exercise dictates which project management artifacts must be produced for any given JNET project (ref. Section 2.1)

1.4. Typical JNET Project Roles and Responsibilities

Project Sponsor (or Initiator) – Person who provides support and approvals throughout the life of the project. They may also have initiated the project. For JNET projects, it is usually the JNET Executive Director.

Stakeholder – Persons or organizations that are involved in and influence the project. Stakeholders can include the Project Sponsor, Functional Managers, the Project Manager, the project team, project product end-users, the public, and funding sources.

Project Manager – Person who has overall responsibility for managing the project from the first formal documentation of the project's initiation to its formal conclusion,

Project Team – Team responsible for performing project tasks as defined by the Project Manager.

Functional Managers – Individuals who hire and manage the day-to-day, non-project work activities of staff assigned to various functional areas of JNET, including IT Application Development, IT Application Support, the Business Office, Communications Office, and the Budget and Administration Office. They typically fill requests of Project Managers for Project Team members, and help oversee project activities performed by their staff members.

Business Lead – Person who provides business expertise and leadership for the project. This role is typically filled by the JNET Business Manager, JNET Security Officer, or JNET Business Analyst.

Technical Lead – Person who provides technical expertise and leadership for the project. At JNET, this is usually the JNET Application Development Manager or the JNET Application Support Manager.

1.5. JNET Project Management Office (PMO)

The Pennsylvania Justice Network (JNET) has seen significant growth in a number of areas including system functionality, the number of JNET member organizations as well as the number of end users. Anticipated continued growth challenges JNET to respond to change such that the 'status quo' in delivering system updates is no longer adequate. JNET's PMO was established in the year 2004 with the following objectives:

- To serve as a central control point for managing JNET's project portfolio.
- To develop a JNET-tailored PLC that introduces and layers project management techniques with software development practices.
- To serve as a center for excellence to champion improvement of project management (e.g., reduction in schedule overruns; satisfaction of project sponsors or stakeholders; satisfaction of Project Team Members).

Since that time, the PMO has evolved and, in addition to managing JNET's major projects and maintaining the JNET PLC, it also:

- Serves as a central resource for JNET Management to get information about its projects and major non-project activities.
- Provides Resource Allocation Planning Support—i.e., helps ensure that the right staff resources are assigned to the right projects at the right time.

1.6. Tracking JNET Projects

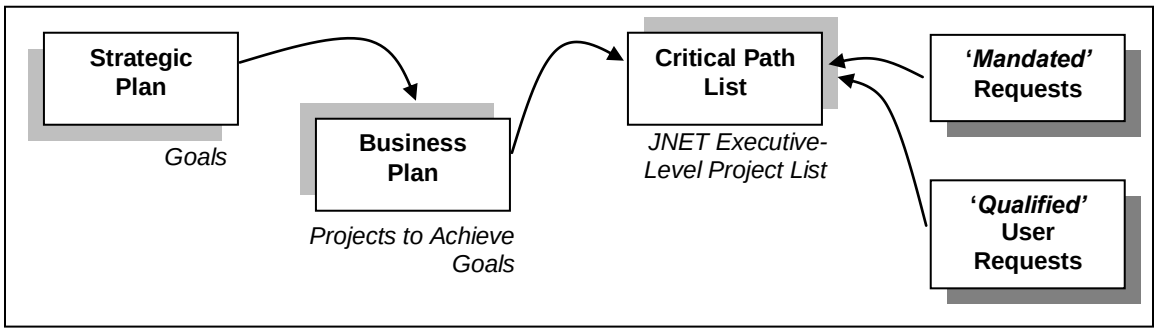
JNET's five-year Strategic Plan, the most recent version to be published in December 2014, identifies JNET's strategic goals. JNET's annual Business Plan identifies specific projects and links the projects to the goals in the Strategic Plan.

The *Critical Path Projects List* represents JNET's project portfolio. Critical Path projects originate in a number of ways:

- Projects are identified within JNET's annual Business Plan

- Project are identified through various channels to request or require JNET support of integrated justice system (or other) mandates
- Users' requests for enhancements passing JNET's project ranking criteria

A bi-weekly meeting is held with JNET's Managers, Team Leads, Business Analysts and the PMO team to review priority, status, and issues for projects appearing on the Critical Path List.

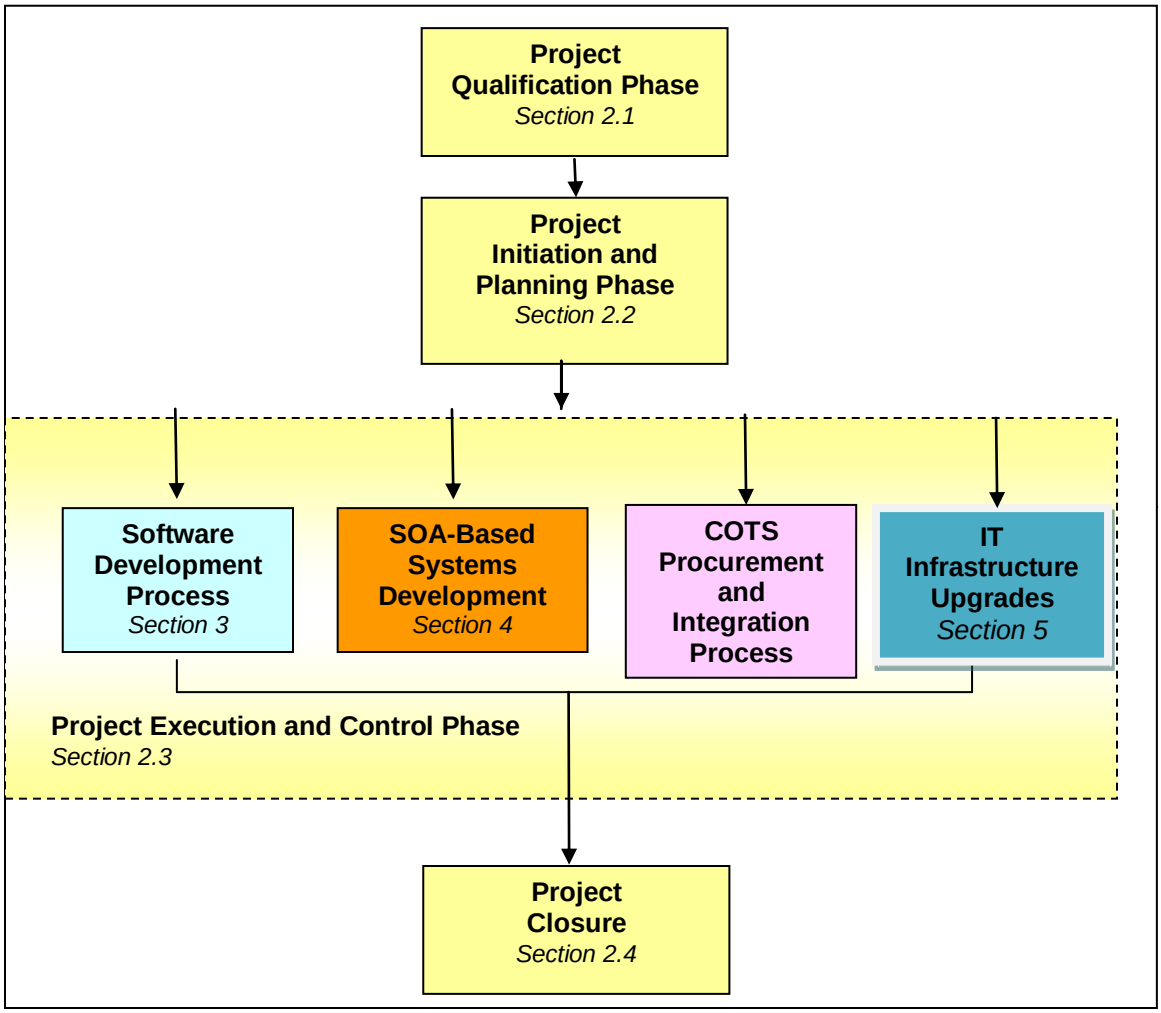


2. JNET Project Life Cycle

The JNET PLC provides a framework to consistently plan and successfully execute projects. JNET's PLC addresses project management methodologies as well as other processes that are routinely undertaken, including:

- Software Development – where JNET staff designs and implements applications, modules, or systems supporting its integrated justice network.
- Service Oriented Architecture (SOA)-Based Development – where JNET staff designs, constructs and implements applications utilizing the Information Service Bus (ISB) using SOA architecture.
- Commercial-off-the-Shelf (COTS) Procurement and Integration – where JNET procures a third-party vendor product and the JNET staff (or other contract staff) works to integrate the product into JNET's architecture.
- IT Infrastructure Upgrades – where JNET staff teams with PA Compute Services (PACS) to upgrade its major IT infrastructure, including servers, networking technology, database management systems, desktop and mobile computers, ISB middleware and messaging components.

The PLC addresses all aspects of typical JNET projects. The *project management* aspects of the major project phases remain constant regardless of the project type, while the detailed (or process-level) activities vary within the Project Execution and Control phase depending on the project type.



The following is a summary of JNET's PLC phases as well as inputs and outputs of each phase. Each of the phases is described in further detail in the following sections.

PLC Phase / Process	Inputs	Outputs
Project Life Cycle		
Qualification ***Commits JNET to begin the next phase of the project***	• JNET Annual Business Plan • Steering Committee or JAAS Request • Governor's Office Request • JNET Resource Allocation Plan • Project Scaling Worksheet	• Project Charter • Updated Project Priority List • Updated Critical Path Projects Report • Updated Resource Allocation Plan • Updated Project Management Documentation Tracking Sheet

Initiation and Planning
Involve all appropriate stakeholders to help develop a project management plan, define the project scope, create a work breakdown structure (WBS), and develop an initial project schedule.
	• Approved Project Charter
	• Results from project definition meetings
	• Resource Allocation Plan
	• Project Planning Templates
	  ○ Project Management Plan
	  ○ Work Breakdown Structure
	  ○ Project Schedule
		• Approved Project Management Plan
		  ○ Resource Management
		  ○ Communications Management
		  ○ Schedule (Time) Management
		  ○ Scope Management
		  ○ Requirements Management (Optional)
		  ○ Configuration Management (Optional)
		  ○ Release and Deployment (Optional)
		  ○ Quality Management (Optional)
		  ○ Risk Management (Optional)
		• Approved Scope Document (Optional)
		• Deliverables Responsibility Matrix
		• Project Log
		• Approved Initial Project Schedule
		• Initial Lessons-Learned Report (Optional)
		• Updated Resource Allocation Plan
		• Updated Critical Path Projects Status Report

PLC Phase / Process	Inputs	Outputs

Project Execution and Control
Provides for the completion of project tasks as well as monitoring, reporting and communicating status, progress, change and variances to the project's scope, budget or schedule
	• Project Control templates- Meeting Agenda, Meeting Minutes, Project Log, Project Change Request Form, Project Status Report
	• Project Deliverables Schedule
	• Work Breakdown Structure (WBS)
	• Resource Allocation Plan
		• Weekly or Bi-Weekly
		  ○ Project Schedule indicating % Complete
		  ○ Project Status Report (Optional)
		  ○ Updated Project Log
		  ○ Updated Critical Path Projects Status Report
		• Monthly
		  ○ Project Status Report (required)
		  ○ Updated Resource Allocation Plan
		• As Required
		  ○ Meeting Agendas
		  ○ Meeting Minutes
		  ○ Change Request Form
		  ○ Updated Project Management Plan
		  ○ Updated Project Management Documentation Tracking Sheet
		• End of Phase
		Updated Lessons-Learned Report (Optional)

Project Closure	• "Lessons learned" captured during the project • End-of-project meeting • Project Sponsor/Stakeholder Satisfaction Survey • Lessons-Learned Report	• Project Closure Report • Individual or team performance appraisals or recognition • Updated Critical Path List
Software Development Process		
Requirements Engineering ***Defines user and other business processes and needs and sets expectations for an approach to testing***	• Requirements Management Plan • Decisions and results of discussions relating to a Requirements Modeling approach • Decisions and results of data gathering activities • Decisions and results of discussions relating to high-level test planning • Outcome of peer review of requirements	• Approved Requirements Specification Document (RSD) • Approved Requirements Traceability Matrix • Application System Mock-Up (Optional) • Updated Project WBS/Work Plan
Software Design	• Approved Requirements Specification Document (RSD) • CA2 Initiation • System Mock-Up (Optional)	• Approved Design Package • Updated and Approved Requirements Traceability Matrix • System Prototype (Optional) • Approved CA2 Initiation • Updated Project WBS/Work Plan

PLC Phase / Process	Inputs	Outputs
Software Construction	• Approved Design Package • Approved System Prototype (Optional)	• Final approved Purchase Orders for hardware and software • Approved Application System Code • Approved Test Plan and Test Cases • Approved Deployment Document • Updated WBS/Work Plan
Software Testing	• Approved Application System Code in Installed in Test Environment • Approved Test Plan and Cases • Approved Pilot Test Plan and Survey • New system release request template • Source Code security vulnerability scans	• Approved Internal Test Results Report • Approved Pilot Test Results Report • Training Materials • Communication to End-Users and Technical Partners • CA^2 Certification • Approved Release Request • Approved Updated Deployment Document • Approved Updated Requirements Traceability Matrix • Updated Project WBS/Work Plan
Software Implementation	• CA2 Accreditation Activities • Approved Release Request • Approved Updated Deployment Document • Application Code in the PROD Environment	• Accredited Software (CA2) or Remediation Plan • Approved Operable System in the PROD Environment • Approved Updated Requirements Traceability Matrix • Updated Project WBS/Work Plan

PLC Phase / Process	Inputs	Outputs
Service Oriented Architecture (SOA)-Based Development Process		
Initiation	• Online Web Services Access Request Form • Data Source agreements with consumers • Business process details • JNET and NIEM documents • Service security and message payload	• Approved Web Services Access Request form • Service Level Agreement (new or updated) • Initial data element identification
Planning	• Business Requirements Gathering • Requirements Analysis • Service Orchestration Architecture • Technical Requirements • User Interface Requirements (if necessary) • Architectural Design and Security • CA2 Initiation	• Business and UI Requirements Specification document • Technical requirements specification document • Design Document • Approved architectural design document • Approved CA2 Initiation – Move to Certification/Accreditation • Sample XML • Service Description Document (SDD) • Initial SSP • IEPD Data Element Dictionary • IEPD Domain Model
Execution	• Web Services Description Language (WSDL) • Schemas and Samples • Software Design • Software Development • Software Integration • Software Testing • CA2 Certification Activities	• Design Document • User Interface • Web Service • Database • User transaction log and Audit Log • Completed Test Report
Production Deployment	• Completed and approved artifacts (including deployment instructions) • Fully tested message processing components residing in the JNET Test environment • Deployment documentation • CA2 Accreditation Activities	• UI deployed to Production • Web Service deployed to Production • Accredited Web Service • Application monitored by JNET Web Services Monitoring Tool • Completed SSP
COTS Integration Process (To be Developed)		
	•	•

IT Infrastructure and Product Upgrades

Phase	Inputs	Outputs
Planning	• Vendor information about upgrade • Current product licensing information • PACS readiness to support infrastructure item/product • PACS resources availability (including POC or PM) • JNET Configuration MindMap • Impacted JNET Application Systems Identification • JNET Staff Resources Skills Assessment • Vendor POC Identification • Vendor Resources Identification • Impacted Documentation Identification • JNET Project Qualification Inputs (see above) • PACS Procurement process	• JNET Project Qualification Outputs (see above) • Project Team Roster (including PACS and vendor Staff) • Purchase order initiation (if necessary)
Analysis	• Project Initiation Inputs (see above) • Current infrastructure review • Current product licensing assessment • Systems analysis resource(s) • Areas of improvement targeting • System requirements and performance metrics identification	• Project Initiation Outputs (see above) • Technical (system) requirements Specification Document • Product procurements (if necessary)
Design	• Technical (system) requirements specification • Architectural design resource(s) • Review and assessment of existing infrastructure design specifications • Consultation with PACS and/or Vendor • Project Execution and Control inputs (see above)	• Detailed Infrastructure Design Specs • New or updated MSL Document • Detailed implementation strategy • Approved validation/test plan • Project Execution and Control Outputs (see above)

Validation	• Project Execution and Control activities • Detailed implementation strategy • Approved validation/test plan • Procured infrastructure components (if applicable) • Infrastructure components installed in DEV and TEST environments • Deployment and Testing resources • Applications deployed to new infrastructure components in DEV and TEST environments	• Test results report: implementation strategy validated • Infrastructure upgrades and applications performing reliably in DEV and TEST • Approval to proceed • Deployment Plan/Instructions
Production Implementation	• Project Execution and Control activities • Deployment and Test resources • Procured infrastructure components (if applicable) • Deployment Plan/Instructions	• Infrastructure components released to production/ops environment • Applications released to new production/ops environment • Production checkout report • Updated JNET Configuration MindMap • Purchase order delivery
Post-Implementation Review	• Project Closure Inputs (see above)	• Project Closure Outputs (see above)

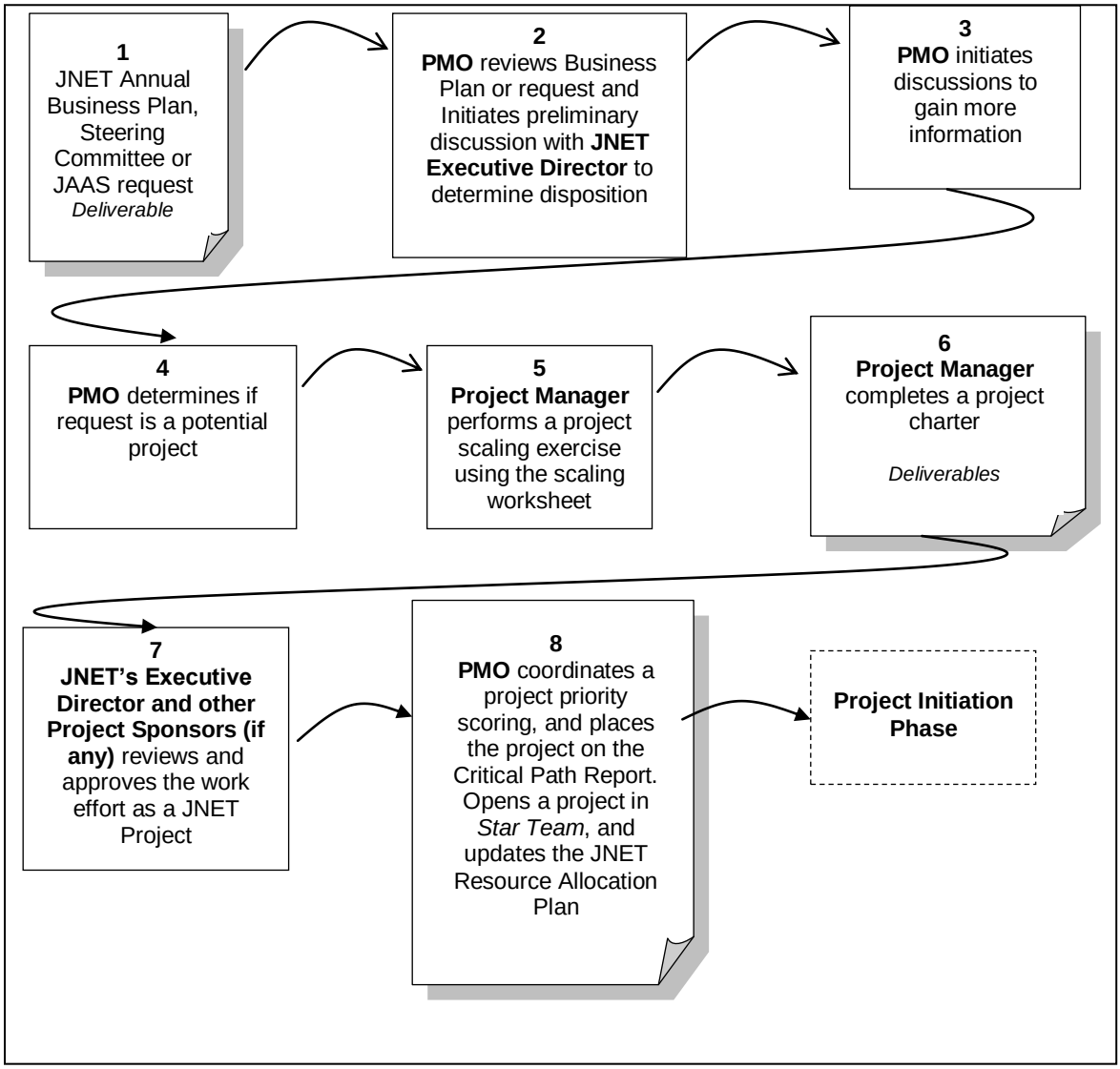
2.1. Project Qualification Phase

2.1.1. Description – Qualification Phase

The objectives of the Qualification Phase include: • Receive and consolidate ideas for undertakings relating to JNET. • Categorize incoming ideas and requests (as projects, non-project system enhancements, message-processing requests, etc.) • Rank and prioritize proposed projects (in relation to other JNET projects).	
Participants	❑ JNET Steering Committee and JNET Agency Advisory Subcommittee (JAAS) ❑ Project Requestor and/or Project Sponsor ❑ JNET Executive Director and Managers ❑ JNET PMO
Activities / PMO Checklist	❑ Schedule and conduct initial meetings with Requestors, as necessary, to gather information needed for the work products/deliverables. ❑ Open Project Documentation Repository in *Star Team*
Work Product(s) / Deliverables	❑ Project Scaling Worksheet ❑ Project Charter – o *Abridged* Version (for Level Three projects): ▪ Project Description (Background, Objectives, Scope, Customers) ▪ Project Roles and Responsibilities (Sponsor, PM, Stakeholders, Core Team) ▪ Project Information (Deliverables, Assumptions, Constraints, Risks, Dependencies with Other Projects, Success Criteria) ▪ Approval Signatures o Comprehensive Version (for Level One or Two Projects) ▪ Business Case (including cost savings potential and formula to be used) ▪ JNET Strategic Plan Alignment ▪ Project Management Team Identification (Sponsor, PM, Business Owner) ▪ Statement of Work ▪ Objectives ▪ Deliverables ▪ Preliminary Scope (what is in and out of scope) ▪ Project Risks (including an assessment of likelihood and impact) ▪ Assumptions ▪ Success Criteria ▪ General Timeline ▪ Staffing (JNET and External) ▪ Approval Signatures ❑ Project Prioritization Spreadsheet ❑ Project Review and Approval by Sponsor(s) ❑ Updated JNET Critical Path Projects List ❑ Updated Project Documentation Tracking Spreadsheet ❑ Updated JNET Resource Allocation Plan

Tools and Templates	❑ Project Scaling Worksheet ❑ JNET Project Charter (Comprehensive and Abridged versions) ❑ Business Case Analysis ❑ Project Prioritization Scorecard ❑ Critical Path Projects List

2.1.2. Process Flow – Qualification Phase



1 Potential JNET Projects typically are identified via the annual Business Plan development process, via formal and informal requests from the JNET Steering Committee, JNET Agency Advisory Subcommittee, Governor's Office, or the Secretary of Administration.

2 At the direction of the JNET Executive Director or the JNET Business Manager, the PMO reviews requests or Business Plan activities to determine disposition.

If the request is not approved to move forward, the JNET Executive Director, Business Manager, or PMO contacts the requestor to provide an update and explanation for the disposition.

3 If JNET's Executive Director or Business Manager approves the request to be assessed as a potential project, the PMO initiates discussions with the Requestor, as well as selected members of the JNET Office Staff, to gather the information required to complete this phase's deliverables.

4 The PMO reviews the request to make a final determination as to whether or not the request represents a potential project, defined as *a temporary endeavor undertaken to create a unique product, service, or result.*

If the PMO determines that the request is *not* a potential project, it will report it and assign it to the IS staff as an application system enhancement request or as a system maintenance activity.

5 If the PMO determines that the request *is* a potential project, the PMO Lead assigns a Project Manager who in turn gathers enough information from the project planning participants to scale or size the project, using the Project Scaling Worksheet. Projects are then classified as Level One, Two, or Three. A Level Three project is considered to be the least complex; Level One the most complex. The scaling score is used as a guide to determine the amount of project management rigor applied to the project, as well as the number of required project management deliverables.

6 The Project Manager then completes an initial draft of the Project Charter. If the Project is deemed to be Level Three, an abridged version of the Charter is used. If the project is a Level One or Two, a comprehensive version of the Charter is written. After review by the PMO Lead, the Project Charter is submitted to JNET's Executive Director and other Project Sponsors (if any) for review and approval.

7 The JNET Executive Director reviews and approves the work effort as a project to be managed through the PMO. If additional Project Sponsors are identified, they are asked to approve the Project Charter.

8 If the project is approved, the assigned Project Manager will coordinate a project prioritization exercise that involves the JNET management staff in assigning a score based on defined criteria, including: alignment with JNET goals and mission statement, urgency, impact on JNET's operating budget, cost savings potential, agencies and number of users impacted, JNET staff resources impacted, partner agency readiness, and impact on service levels. The higher the score attained, the higher the project priority. The PM also will open a Project in *Star Team*, where the project documentation will be stored. The Project Management Lead will add the project to the Project Documentation Tracking spreadsheet, the Critical Path Projects Status Report and the Resource Allocation Plan.

If the project is not approved, the PMO follows up with the requestor. The project request can be retained in the repository for consideration in the next planning year.

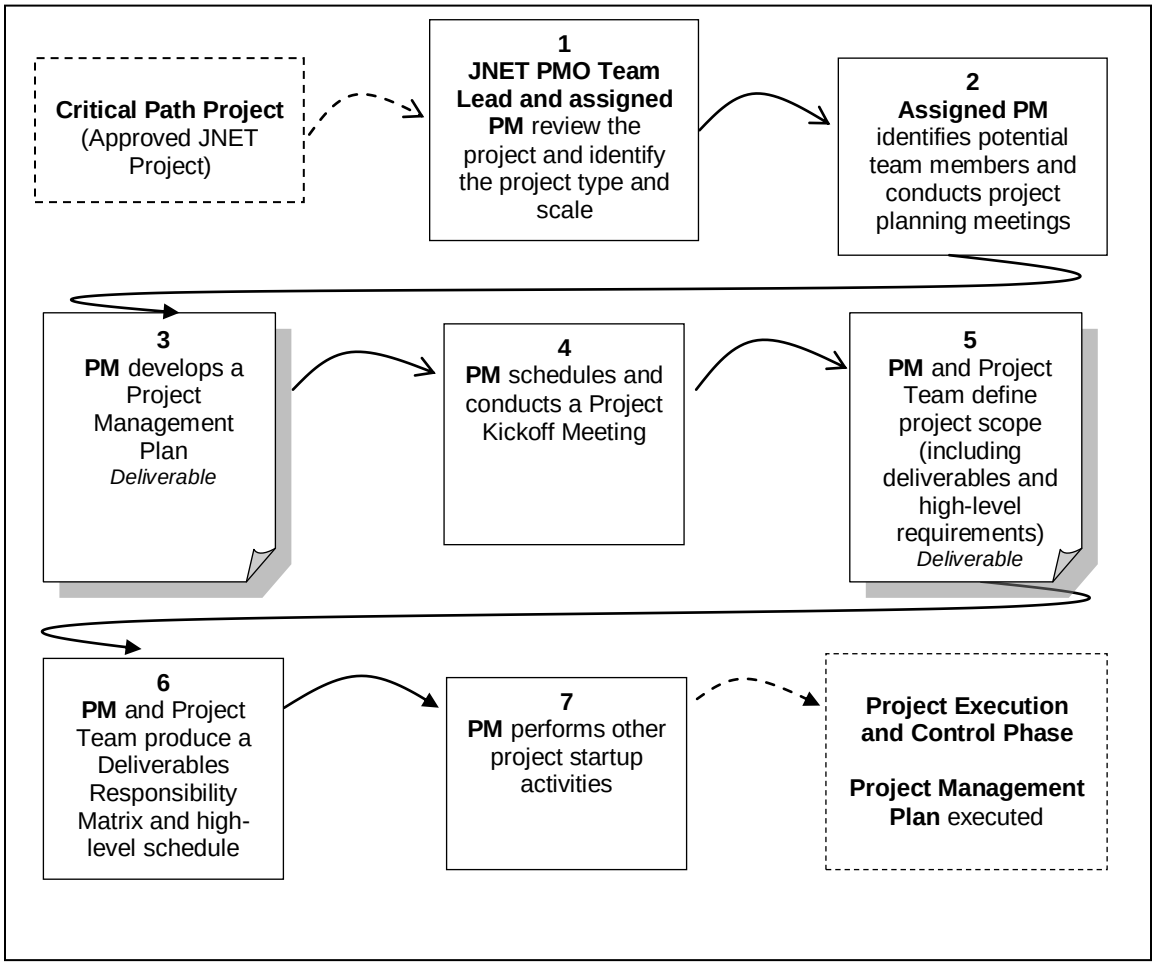
2.2. Project Initiation Phase

2.2.1. Description – Initiation Phase

The objectives of the Initiation Phase include: • Identify Project Team Members. • Thoroughly define a formal plan for managing the project. • Ensure involvement, communications, and commitment of Project Sponsors or Stakeholders who identified the need for the project as well as JNET Project Team Members.	
Participants	❑ JNET PMO ❑ JNET Managers and Team Leads ❑ Partner Agencies Management ❑ Project Team Members (JNET and External)
Activities / PMO Checklist	❑ Schedule and conduct project planning meeting(s) ❑ Stakeholder identification and needs analysis ❑ Prepare initial Project Management Plan that includes (at a minimum): o Communications Management Plan o Change Management Plan o Issues Management Plan Large or complex projects require, in addition to the above : o Stakeholder Management Plan o Resource Management Plan o Scope Management Plan o Risk Management Plan o Schedule Management Plan Optionally, small or large software systems development projects might include: o Requirements Management Plan o Configuration Management Plan o Quality Management/Testing Plan o Release and Deployment Plan ❑ Have Communications Plan reviewed and approved by OA's PR Staff *(optional)* ❑ Prepare a Project Log ❑ Schedule and conduct a Project Kickoff Meeting ❑ Define Project Scope ❑ Develop a Project Deliverables Responsibility Matrix ❑ Conduct meetings with project stakeholders / sponsors to present, review, and gain approval of the initial Project Schedule ❑ Conduct interim "lessons-learned" session *(optional)* ❑ Update the Project Management Documentation Tracking Spreadsheet
Work Product(s) / Deliverables	❑ Project Management Plan: o Key Project Charter components o Stakeholder Management *(optional)* o Resource Management *(optional)* o Communications Management o Schedule (Work Plan) Management o Scope Management *(optional)* o Requirements Management *(optional)* o Risk Management *(optional)* o Issues Management ❑ Project Log

	○ Project Charter (Level Three Projects) ○ Project Schedule (Level Three Projects) ○ Communications Plan (Level Three Projects) ○ Project Issues and Action Items ○ Project Risk Register ○ Project Decisions Log ○ Project Change Register ❑ Project Kickoff Meeting: ○ Team Introductions ○ Sponsor(s) Statement(s) ○ Project Management Plan Review ○ Roles and Responsibilities ❑ Project Scope Definition and High-Level Requirements: ○ High-Level Scope Statement (from Charter) ○ High-Level Functional and Operational Requirements ○ Deliverables ○ Affected Organizations, Systems and Processes ○ Specific Exclusions from Scope ○ Governance Structure and Resource Requirements ○ Overall Project Risk ❑ Initial Project Deliverables Schedule ○ Deliverables and Assigned Staff Resources ○ High-Level Estimates to Complete Each Deliverable ❑ Initial Lessons-Learned Report *(optional)* ❑ Updated Project Documentation Tracking spreadsheet ❑ Updated Critical Path List
Tools and Templates	❑ Project Charter (two versions) ❑ Project Management Plan (optional components, depending on project size and complexity) ❑ Project Scope Definition Enterprise Template ❑ Project Deliverables Responsibility Matrix and High-Level Schedule Template ❑ Lessons-Learned Report Template *(optional)* ❑ Project Control Documents ○ Meeting Agenda ○ Meeting Minutes ○ Project Log ○ Project Status Report ○ Change Request Form

2.2.2. Process Flow – Initiation Phase



1 The assigned PM and PMO Lead review all gathered information to determine the project type:

- Software Development
- webMethods (SOA) Development
- COTS Project
- Infrastructure Upgrade

and scale:

- Level Three – least complex, visible, costly
- Level Two
- Level One – most complex, visible, costly

The PM will customize the Project Management Plan and Schedule/Work plan based on the Project Type and Scale.

2 The assigned PM schedules and conducts *project planning meetings* to review the Project Charter and start developing an optional, formal Project Scope Statement.

The PM invites JNET Managers and/or potential JNET Project Team Members to these meetings to determine who will be assigned to the project. All departments, *listed below*, should be represented at these early meetings to ensure the appropriate levels of resources are identified throughout the life cycle:

- Business Office
- Communications
- Systems Development
- Quality Assurance
- JNET Applications Support

If external staff resources are required, it is essential that they be identified as well as a Lead or

point-of-contact (POC) from the participating agency or organization. All meeting participants will represent their functional area or area of expertise and will provide input to project definition and planning, which addresses the following:

- Task planning
- Risk management
- Quality management
- Issues management
- Documentation and deliverables
- Resource management and tracking
- Procurement control and reporting (if applicable)
- Communications
- Requirements management
- Project performance evaluation

3 Based on input received during the project planning meetings, the PM drafts the Project Management Plan which describes in detail how the Project will be managed. At a minimum, for Level Three projects, the plan should include a Communications Plan, a Change Management Plan and an Issues Management Plan. Level One and Two Projects should include, in addition, plans for managing stakeholders, resources, scope, schedule, and risk. Software Systems development projects can optionally include a Requirements Management Plan, System Testing Plan, Configuration Management Plan, and Deployment and Release Management Plan.

A. **Stakeholder:** Identifies project stakeholders, their level of influence, expectations or requirements. It also describes how the project will communicate with them, and how they will be involved in and kept engaged in the project.
B. **Resource:** Defines how resources will be (or have been) selected and how their performance will be managed, and when and how they will be released from the project. Identifies Project resources by name as well as the role they play in the project. It should include mention of the Resource Allocation Planning process that is in use at JNET as well as a description of managing resources in a matrix organization such as JNET.
C. **Communications:** Defines how project communications will be conducted. Should identify the Project Sponsor, the Stakeholders, the Project Team and how project status, etc, will be communicated to them (medium used, frequency). *The Communications Plan might or might not have to be reviewed and approved by the OA Public Relations Staff.*
D. **Schedule:** Defines how the Project Schedule will be built. Typically, The PM works with Team Leads and Team Members to build a Work Breakdown Structure (WBS), then we ask the same individuals to estimate work effort or duration for individual tasks. Mention should be made how we factor in vacations and other planned time off, as well as the fact that individual resources might have to work on several tasks simultaneously and thus cannot devote 100% of her/his time to individual task performance. We also note how requested changes to the Schedule will be documented, their impact assessed and approved (or disapproved).
E. **Scope Management:** Once the scope is defined (typically, not until after requirements are defined), it must be managed. That is, Project Change Management must be employed to eliminate scope creep.
F. **Quality Management/Testing Plan:** For software development projects, describes how the product will be tested—i.e., types of testing, and how each type will be planned and conducted.
G. **Requirements Management:** Every project has requirements and they should be documented to some extent and in some format. The Project Manager and/or Business Analyst assigned to the Project will prepare a plan to defines what type of requirements will be gathered, defined, prioritized, etc., who is responsible for gathering, defining, documenting, etc., and what process will be followed.
H. **Risk Management:** If JNET Management and the Project Sponsor agree, risks will be managed throughout the project. Describe here the process for identifying, analyzing, prioritizing risks and for monitoring and controlling the impact of risk occurrences.
I. **Issues Management:** Issues (problems, roadblocks) usually arise during projects, and it is imperative that they be identified, prioritized, assigned to owners, monitored and resolved. This section describes how issues will be managed during the project. Much of the detail can be taken from the JNET PLC documentation.
J. **Configuration Management:** For software development projects, describes the tools and processes to be used to ensure the integrity, correctness, and completeness of each software build, as well as how source file version control is applied.

K. Deployment and Release Management Plan: For software development projects, describes JNET's general process for releasing software systems into the production environment, and if this project's software releases will vary from that process.

4 The PM schedules and conducts a Project Kickoff Meeting with as many of the Project Team Members as have been identified to that point. All of the Project Stakeholders should be represented and the Project Sponsors should be present. A typical agenda will include a thorough review of the Project Charter and the Project Management Plan, as well as a review of the key project resources, their roles and responsibilities.

5 *OPTIONAL, for Level Two and Three Projects; REQUIRED for Level One Projects:* The PM coordinates the development of a detailed Project Scope Statement that includes:

- Scope Management Process
- High-Level Requirements
- Deliverables
- Timelines/Milestones
- Affected Organizations
- Affected Business Processes and Systems
- Overall Project Risk
- Governance Structure and Resource Requirements
- Specific Exclusions from Scope

The PM should ask the Project Sponsor(s) to approve the detailed Scope Statement.

6 Using the Scope Definition and list of high-level deliverables, the Project Team should build a Project Deliverables Responsibility Matrix and High-Level Schedule. Project Team members are identified as P*roducers*, R*eviewers* and A*pprovers* for each project deliverable. Then, a high-level target completion date is assigned to each deliverable.

It is important that the Project Sponsors and Stakeholders understand that this initial schedule is a rather rough estimate and the level of confidence in its accuracy is not high at this stage of the project. A more accurate schedule will be completed once requirements are fully elaborated in the Project Execution and Control Phase.

7 The PM completes other start-up activities such as creating project-specific templates for project control activities, including:

- Project Log
- Meeting Minutes
- Project Status Report
- Deliverable Acceptance Form

Particularly for projects that are long in duration, the Project Team can engage in an interim lessons-learned session in which a frank discussion and recording of what so far has gone well, what has not gone well, and suggestions for improvements.

The project moves to the Project Execution and Control Phase.

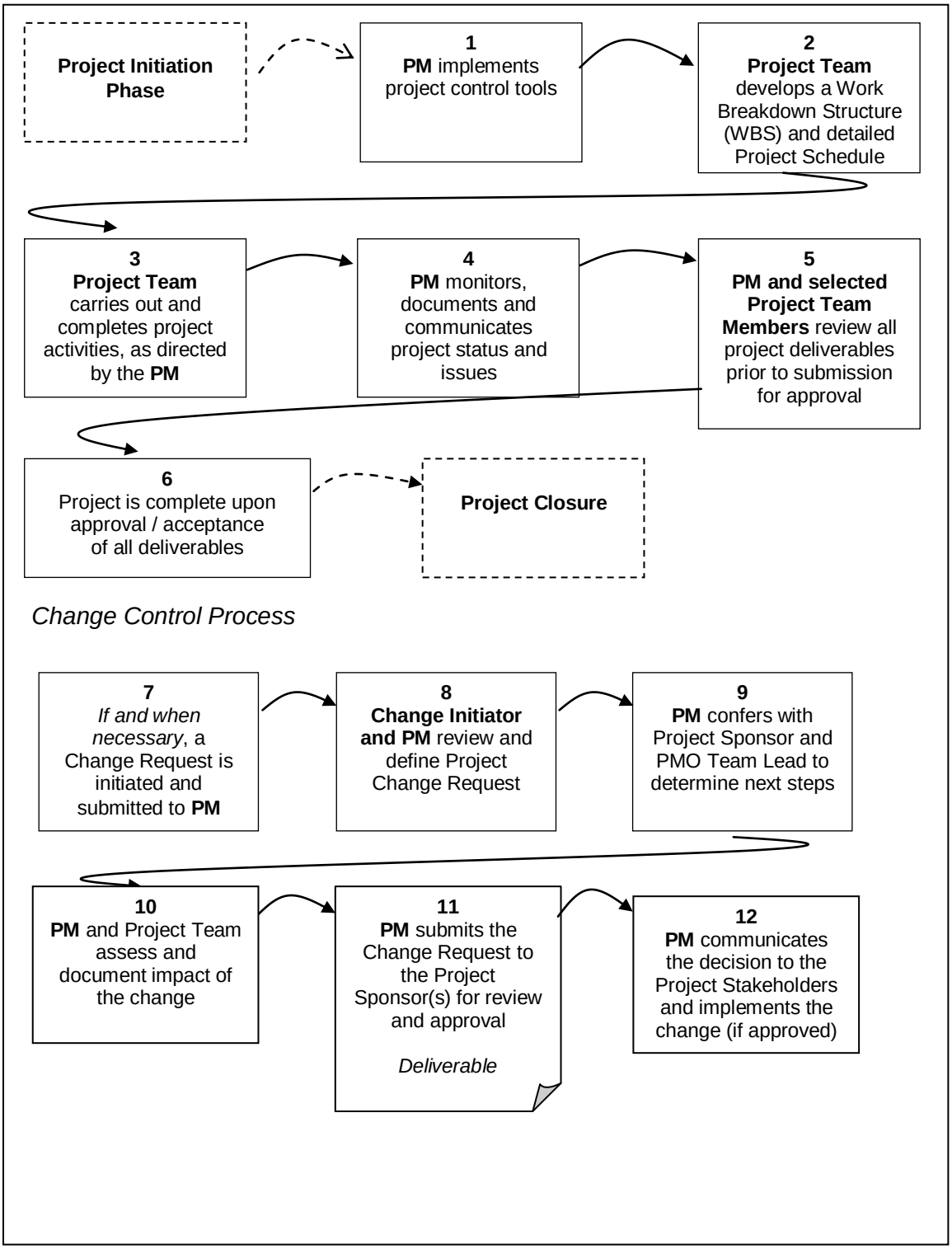
2.3. Project Execution and Control Phase

2.3.1. Description – Execution and Control Phase

The objectives of the Project Execution and Control Phase include: • Accomplish planned project work to meet project scope and objectives. • Manage projects according to the Project Management Plan. • Initiate project monitoring and reporting as project progress is tracked and deliverable reviews are conducted. The monitoring and reporting tasks recur throughout the life of the project. • Submit deliverables for review and approval in accordance with the Project Charter and Scope Document, and within the milestones identified in the Project Schedule. • Track and monitor project issues, action items, risks and key decisions. • Verify scope. • Ensure involvement, communications, and commitment of Project Sponsors or Stakeholders who identified the need for the project as well as JNET Project Team Members.	
Participants	❑ JNET PMO ❑ Project Sponsors and/or Stakeholders ❑ Project Team Members
Activities / PMO Checklist	❑ Acquire final project team ❑ Schedule and conduct recurring project status meetings ❑ Update and distribute project-specific control tools on a predefined, regular basis as outlined in the Project Management Plan (Project Schedule, Issues and Action Items List, Project Status Reports, Project Risk Register, etc.) ❑ Develop a Project Schedule or Work Plan o Deliverables and Assigned Staff Resources o Tasks and Sub-Tasks Needed to Produce the Deliverables o Sequence of Tasks o Resources Assigned to Tasks o Resource Calendars o Work Effort Estimates, Duration Estimates (*3-Point Estimating*) o Task Dependencies ❑ Monitor and track Change Requests through approval (or disapproval). Change Requests are used to document the need to change a project's scope, resources, budget, or previously approved deliverables. The PM maintains a log of all submitted Change Requests (approved and disapproved) in the Project Log (for Level One Projects) or separate Project Change Request Log. Upon approval of Change Requests, all impacted project documentation (as indicated on the Change Request Form) is updated, including the Project Schedule ❑ Facilitate conflict resolution ❑ Measure team member performance ❑ Produce Project Status Reports (minimum, monthly) that include: o Deliverables Progress o Activities Completed o In Progress Activities o Near Future Activities o Decisions Made to Date o Action Items Opened/Closed o Risks Identified o Changes Identified ❑ Update the Project Management Documentation Tracking spreadsheet. ❑ Schedule and conduct deliverable review meetings as needed. ❑ Conduct an interim lessons-learned session *(optional)*

Work Product(s) / Deliverables	❑ Updated versions of Project Control Documents o Project Schedule (refined and updated) o Project Log o Meeting Minutes o Project Status Reports ❑ Project Deliverables as specified in the approved Project Charter ❑ Change Request Form(s) as required ❑ Updated Lessons-Learned Report *(optional)* ❑ Updated Project Documentation Tracking Spreadsheet ❑ Updated Critical Path Project Status Report
Tools and Templates	❑ Microsoft Outlook Calendar ❑ Openscape Web Client ❑ IT Central ❑ Project Control Documents: o Project Log (for Level One Projects) o Issues and Action Items List o Meeting Agenda and Minutes o Project Status Reports o Project Risk Register o Deliverable Acceptance Form o Change Request Form o Change Request Log ❑ Project Schedule o General o Software Development o SOA-Based Systems Development

2.3.2. Process Flow – Execution and Control Phase



The Project Execution and Control phase is where project work is accomplished. The PM is responsible to coordinate people and other resources to carry out the plan as defined in the Project Charter and Project Schedule. Additionally, the PM ensures that project objectives are met by monitoring and measuring progress and taking corrective action when necessary. Regardless of the project type – Software Development, Infrastructure Upgrades, or COTS Implementation – the project control aspects remain consistent.

1 Project Execution and Control starts at the end of the Initiation Phase when the Project Sponsor approves the optional Project Scope Statement and initial Project Deliverables Schedule. Using templates, the PM will prepare appropriate control tools, including Project Issues and Action Items List, Project Risk Register, Project Status Reports, Meeting Agendas and Meeting Minutes, Change Requests and Change Register. (For Level One projects, these are combined in a Project Log.)

2 Using the Scope Definition and list of high-level deliverables, the Project Team should build a Work Breakdown Structure (WBS) or a simple task list. The latter can be based on existing templates or built from scratch. The steps involved in building a WBS include identifying all tasks and sub-tasks (if any) needed to produce each deliverable, sequencing the tasks in a logical manner, and defining dependencies between tasks. For most projects, tasks are defined as work that: can be realistically and confidently estimated, cannot be logically subdivided any further, entails about 8 to 80 hours of effort, and can be completed without the need for more information.

Once that is completed, resources should be assigned to each task and those resources should be asked to estimate the work effort required to complete each task. The Project Manager will use Microsoft Project or Microsoft Excel to develop a preliminary schedule based on the WBS, resource assignments and work effort estimates.

It is important that the Project Sponsors and Stakeholders understand that the schedule will be built using rolling wave planning-- a technique which acknowledges the fact that we can see more clearly what is closer to us in proximity, and as we look further ahead, our vision becomes less clear. Thus, the *initial schedule* is usually a rather rough estimate and the level of confidence in its accuracy is not high at this stage of the project. Depending upon the project's length and complexity, we may be able to plan as much as a few weeks or months in advance with a fair amount of clarity. This requires that we elaborate work packages in greater detail over time.

3 The Project Manager directs project activities as laid out in the Project Schedule/Work Plan. These activities include but are not limited to:

- Work Planning
- Requirements Management
- Risk and Quality Management
- Issues Management
- Documentation and Deliverables
- Resource Management and Tracking
- Procurement Control and Reporting
- Communications
- Project Evaluation

The Project Team Members carry out their assigned tasks and proactively alert the Project Manager of the completion of tasks or milestones as well as any issues potentially impacting the project. Team members are expected to regularly review the Project Schedule, Issues and Action Items List, and Change Request Log to stay current with the project.

4 Starting at Project Execution and throughout the life of the project, the PM is responsible to monitor, document, and communicate the following:

- Performance and variances against the Project Schedule/Work Plan
- Project-level issues and action items
- Project Status
- Change Request activities

The PM recommends corrective action – if and when necessary – to bring expected future project performance into line with the project plan.

5 Selected members of the Project Team participate in reviews of all deliverables. Sometimes, external stakeholders who are not part of the Project Team must be involved in deliverables review and approval.

Optionally, the Project Team conducts an interim lessons-learned session at his point.

6 Upon acceptance of all deliverables and completion of all project tasks and activities, the project moves to Project Closure.

7 *Steps 7- 12 (above) represent the Change Management Process*

Change management is required help the project team cope with changes throughout the life of the project. Change management requirements are defined for most projects in the *Project Management Plan.*

When someone involved with the project perceives the need for a change to the project's scope, a Change Request is initiated. The Change Request Form can be initiated by many different sources including the Project Sponsor or Project Manager, users, technical resources, Project Team Members, etc.

8 The initiator of the Change Request and the PM review and further define the Change Request, and it is recorded in the Project Log or Project Change Register.

9 The PM consults with the Project Sponsor, Project Team Members, or other appropriate individuals to determine if the change is to be acted upon and next steps.

10 If it is agreed that the Change Request is to be acted upon, the Project Manager coordinates an assessment of the impact of the required change. Changes required to any project deliverables are identified, and work effort to incorporate the change is estimated. The Change Request Form is updated with the impact assessment including a recommendation of whether the Project Schedule should be re-base lined upon approval of the Change Request.

11 The PM submits the Change Request to the Project Sponsor(s) for review and approval.

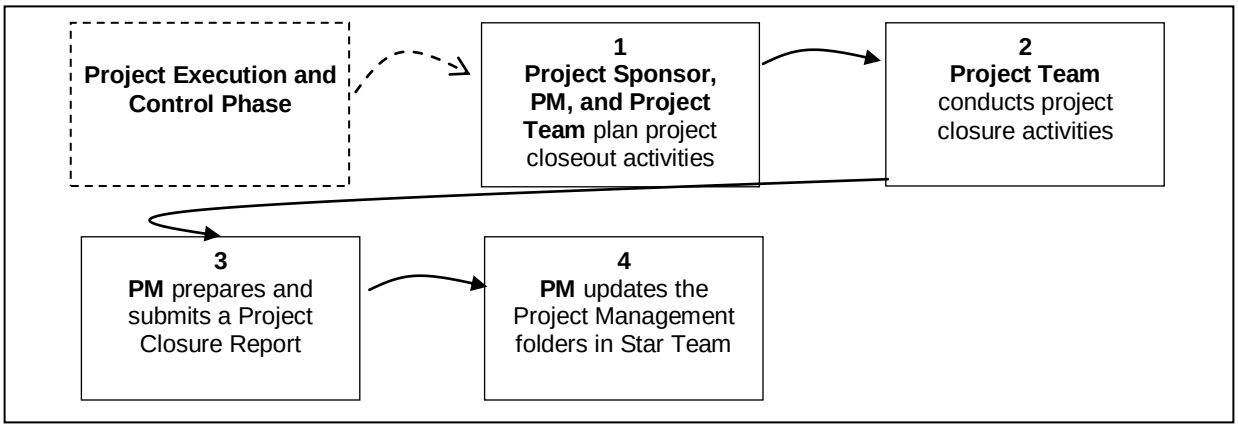
12 Upon approval of the Change Request, the PM communicates the approval of Change Request and updates (or directs the update of) appropriate project artifacts (i.e., base lined project schedule or deliverables). The Project Schedule is re-base lined according to agreements made during the assessment. The change is recorded in the Project Log or Project Change Register.

2.4. Project Closure

2.4.1. Description – Project Closure

The objectives of Project Closure include: • Compare the planned or anticipated project outcome with what was actually accomplished to determine what could have been done to improve the outcome • Capture useful feedback to enable and promote a continual learning process of organizational improvement • Release resources	
Participants	❑ JNET PMO ❑ Project Sponsor(s) and Stakeholders ❑ JNET Managers and Team Leads (Applications Development, Quality Assurance and Testing, JNET Applications Support, Business Office) ❑ Project Team Members (Business Office, Applications Development, Quality Assurance, JNET Applications Support)
Activities / PMO Checklist	❑ Review project files and update the Project Management Documentation Tracking spreadsheet. ❑ Produces a Project Lessons-Learned Report *(optional)* ❑ Develop and distribute a Sponsor Satisfaction survey, compile results ❑ Assess cost savings, calculate and document in the Critical Path Projects Status Report (*Completed Projects* tab) ❑ Provide resource performance reports (formal or informal) to Functional Managers ❑ Prepare and submit a Project Closure Report ❑ Indicate completion info and move the project to the Closed / Completed worksheet of the Critical Path List ❑ Update the Project Management Documentation Tracking Spreadsheet
Work Product(s) / Deliverables	❑ Lessons-Learned Report (Optional) ❑ Sponsor/Stakeholders Surveys ❑ Project Team Member Performance Assessments ❑ Project Closure Report ❑ Updated Critical Path List
Tools and Templates	❑ Meeting Agenda ❑ Meeting Minutes ❑ Lessons-Learned Report ❑ Project Team Member Performance Assessment ❑ Satisfaction Survey ❑ Project Closure Report

2.4.2. Process Flow – Project Closure



1 Near the completion of the project, the Project Manager outlines a plan to communicate the conclusion of the project to stakeholders, JNET management, and all other interested parties. The PM confers with the Project Sponsor, Project Team Members, or others to determine a project closure approach based on the nature or scope of the project. Approaches can range from compiling a Lessons-Learned Report from previously-conducted (end of phase) sessions to distributing and compiling results to an end-user questionnaire or survey.

   Project Teams should consider what was documented in the Project Charter, section 2.7.6, Acceptance Process and Project Closeout Criteria.

2 The Project Team conducts the agreed upon project closure activities. Results from the activities are captured so that best practices are available for future reference or integration into existing procedures and shared with appropriate staff. Decide what to do about unresolved issues and suggested but unapproved changes. Consider rolling them into the next phase of a project or into a new project.

   The Project Manager also reports on the performance of individual Project Team members to their Functional Managers. The reports can be formal or informal and should include recognition/rewards for good performance as well as advice about correcting inadequate performance.

3 The Project Manager will engage a Business Analyst to perform a cost savings assessment—i.e., if the Project Charter identified cost savings potential, an assessment of actual cost savings achieved as a direct result of the project will be conducted.

4 The Project Manager prepares a Project Closure Report, using “lessons-learned” information, as well as information returned in satisfaction surveys. The Report is submitted to the Project Sponsor(s) and to the JNET Management Team.

5 The Project Manager ensures that all project documentation is properly stored and visible in the *Star Team* Project Management folders.

3. Software Development Process

3.1 Overview of JNET Software Development Process

The JNET software development process integrates software development and quality assurance practices into a flexible yet orderly approach. It can be adapted to accommodate the specific needs of any JNET software project. Since the methodology does not provide specific guidance for every software development situation, Project Teams are encouraged to assess each project during the Project Initiation Phase to determine the appropriate software development approach and technique(s) to be used throughout the project. The Project Manager should know how to customize their approach to suit the needs of the Sponsor and Stakeholders, and to meet the project requirements.

As described in the *Software Extension to the PMBOK Guide Fifth Edition*, software project life cycles occupy a continuum from ***predictive*** to ***adaptive***. *Highly predictive* software project life cycles are characterized by emphasis on specification of requirements and detailed planning during the initiation and planning phase of a software project. Detailed plans based on known requirements and constraints reduce risk and cost. Milestones for key stakeholder involvement are also planned. *Highly adaptive* life cycles (also known as change-driven or agile) are characterized by progressive specification of requirements based on short iterative development cycles. Risk and cost are reduced by progressive evolution of initial plans, and key stakeholders are continuously involved. JNET software projects tend to be highly predictive, primarily because of the impracticality of continuous stakeholder involvement which is required in the highly adaptive model.

3.1.1. Software Development Techniques

The Project Team may pursue any one of a number of software development techniques as long as it adheres to approved Office of Administration-Office of Information (OA-OIT) standards (i.e., ITP-APP012: *System Development Life Cycle Policy*) and can be managed under the umbrella of the JNET PLC as defined in Section 2 of this guide. The following standard six processes are typically included in all JNET software projects:

- **Analyze:** Software Requirements Analysis Process
- **Architect:** Software Architectural Design Process
- **Design:** Software Detailed Design Process
- **Construct:** Software Construction Process
- **Integrate:** Software Integration Process
- **Test:** Software Quality Testing

3.1.2. Requirements Analysis

The primary goal of the *Requirements Analysis* Phase is to develop a basis of mutual understanding between the Project Sponsor or system owner, users, and the project team regarding the product requirements. This understanding results in an approved *Requirements Specification Document* (RSD). The RSD becomes the initial baseline for design and a reference for determining whether the completed product meets the approved requirements.

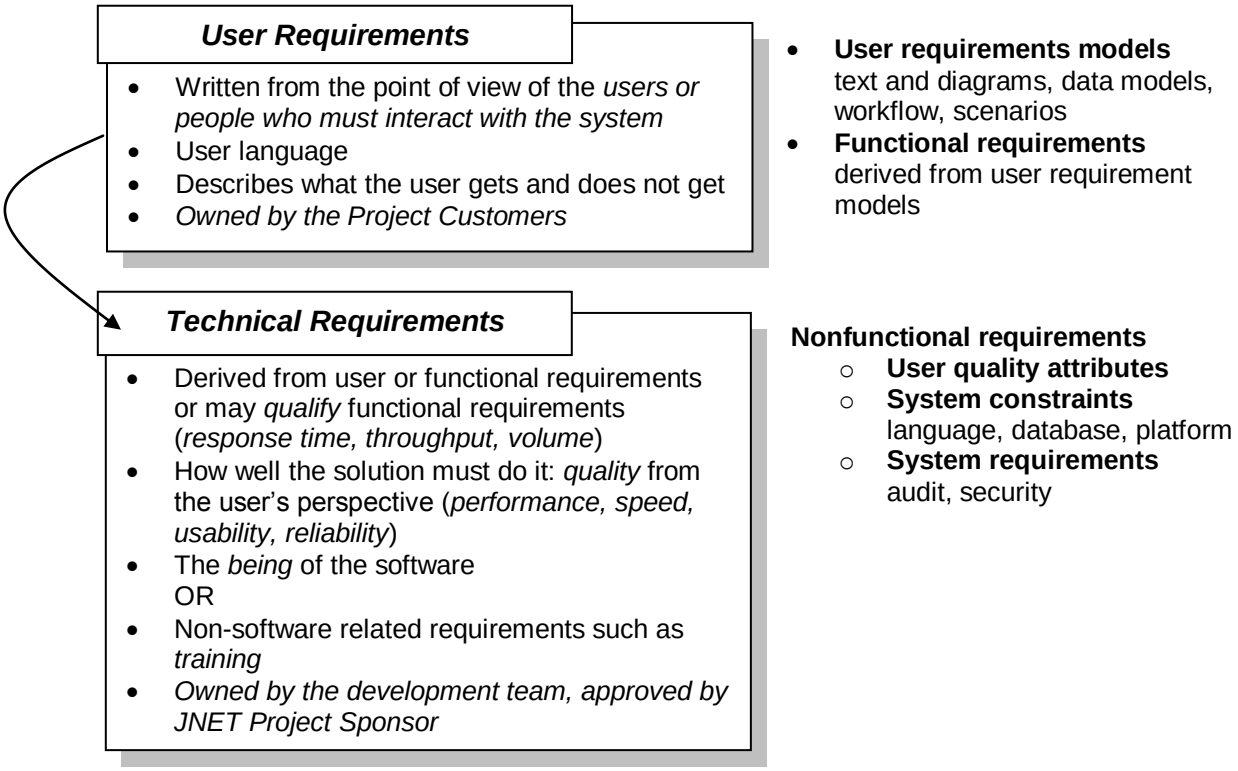
3.1.2.1. What is a Requirement?

- A condition or capability needed by a user to solve a problem or achieve an objective.
- A condition or capability that must be met or possessed by a system component to satisfy a contract, standard, specification, or other formally imposed document.
- A requirement describes the operational capability of a product and/or a process.
- It originates with user needs, functions, or features. It specifies what needs to be implemented and, for those that are allocated to technical requirements, how the system must behave and under what conditions and constraints that behavior will be realized.

Perspectives and audiences for requirements vary from project to project. Some are ‘functionally’ oriented (such as describes how the user and system behave and interact) and others are

'system' oriented (such as how and when a system responds to external stimuli, operating hardware constraints, etc.).

3.1.2.2. Types of Requirements



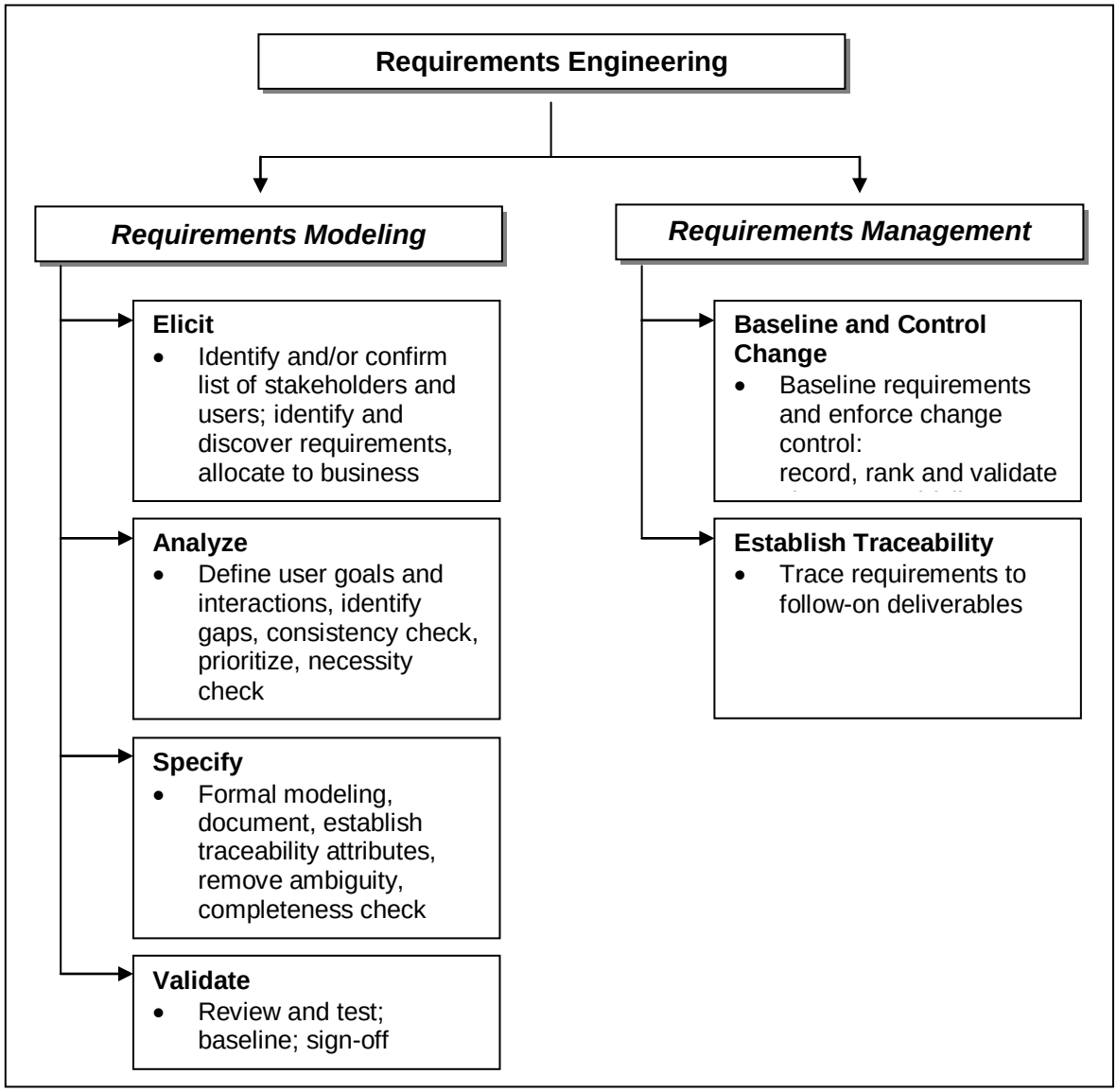
What is Requirements Engineering?

Requirements engineering refers to all the activities involved in discovering, detailing, testing, documenting, and maintaining requirements. It includes the activities involved in understanding the business needs and transforming those into requirements that are allocated to software.

Requirements engineering involves both *modeling* and *managing* requirements. *Modeling* requirements involves much human interaction, investigation, and discovery. Models can be text, graphics, or a combination of both. Models communicate the requirements needed.

Requirements management establishes and maintains an infrastructure for requirements, which allows for change, and establishes practices that ensure that the right software is being developed and that it is being built correctly. Managing requirements is more technical and mechanical, although some of the management activities, such as prioritizing requirements, require direct and heavy interaction with users.

All of the Requirements Engineering concepts represented in the graphic below are addressed in JNET's PLC.



3.1.3. Software Architecture and Design

The Software Design Process maps the '*how to do it'* aspect of the Requirements Specification Document (RSD) which defined '*what to do'*. The focus of this phase is on the functions and structure of the software to be developed.

This methodology allows for the project team to decide the most appropriate design technique for the project at hand. Various factors might affect the selection of analysis and design techniques, just as the techniques affect the project tasks and deliverables. The following are examples of common design techniques:

- Function-oriented or hierarchical design methods model the software product by breaking it into components, identifying the inputs required by those components, and identifying the outputs produced by them. Function oriented design methods include structured

analysis and design. The models or used by this method include data flow diagrams, data dictionaries, structure charts, and process specifications.

- Data-oriented design methods use program structures that are derived from the data structures. Tree diagrams are typically used to represent both the data and program structures.
- Object-oriented design methods produce a software architecture based on objects manipulated by the system, such as the presentation layer, infrastructure, data layer, and processing layer. The models used by this method include use case models, workflow diagrams, business scenarios, and business rules compilation.

The chosen design technique can combine or eliminate tasks typically associated with each of the examples above.

3.1.3.1. Typical Areas of Focus within Software Design

Regardless of the chosen design technique, the following factors are typically investigated and addressed during this phase.

User Interface	The user interface should be appropriate for the users, content, and operating environment of the software. Levels of interfaces for all categories of users should be addressed.
Data Model or Data Dictionary	A data model is a representation of a collection of data objects and the relationships among them. All data elements are to be included as well as detailed information about them, such as attributes, known constraints, input sources, output destinations, and known formats.
System Architecture	The system architecture encompasses the technical and application architecture for software. The *technical architecture* serves to provide the technical requirements (hardware, software, server configuration) for the software to work. The application architecture serves to provide the design and layout of the requirements specific to the software system as a whole.
System Interfaces	The system interface depicts how the software will interface (or interact) with other applications or systems. The following issues need to be considered when designing system interfaces: • System inputs and outputs • Method of interface • Volume and frequency of data • Platform of interfacing system • Format of data • Automatic or manual initiation of interface • Verification of data exchange • Validation of data
System Security Controls	Any security or access requirements identified during Requirements Engineering phase are used to design the security controls for the software. Security controls must consider any relevant standards as specified by the Office of Administration, JNET, or regulating agency. The following need to be considered: • The users and organizations that will have access to the software and what access restrictions they will have. • Controls for the software product, such as user identification code and network access code. • Access restrictions to be applied at the system, subsystem, transaction, record, or data element levels. • Physical safeguards to protect hardware, software, or information from natural hazards and malicious acts.

Capacity Planning	This lays out the strategy to accommodate estimated software usage, network bandwidth, disk storage capacity, load test environment, production environment.
Conversion Planning	Conversion planning is needed If the software product will replace an existing automated system. The major components to be considered include conversion procedures, an outline of the installation of new and converted data stores, conversion programming, and implementation planning. Many factors influence data conversion including the design of the current and new system as well as the processes for data input, storage, and output. The structure of the data to be converted can limit the development of the system and affect the choice of software. Confirmation of file integrity is required including a determination of what the output of the new system should be compared to the current system. The objective of the file conversion is the creation of new files that are complete, accurate, and ready to use. The following elements should be considered in conversion planning: • Portions of the conversion process to be performed manually • Parallel runs of the old and new systems during conversion • The function of the data in the current and new system might not always be the same and needs to be defined • The order that data is processed in the current and new system • Volume considerations such as the size of the database and the amount of data to be converted • User work and delivery schedules, time frames for reports, end-of-period procedures, or the criticality of the data might influence data conversion scheduling • Data purification tasks • Plan for the disposition of obsolete or unused data that is not converted

3.1.3.2. Prototyping

Early in the Design phase, the Project Team determines how the design will be represented to the Project Sponsor or users – through informal documentation, a prototype, or prototype iterations. *Prototypes* are partial models of a system. They can be built to better understand requirements and resolve requirements uncertainties, or, if they are built with a new technology that will be used for implementation, to verify the architecture and reduce technology risk. In either case, prototyping is usually an iterative process. Prototypes can be represented through 'manual' methods such as with paper and pens, whiteboards and markers, etc. or through review of online screen layouts to demonstrate screen content and navigational flow.

3.1.3.3. Design Reviews

Early in the Design phase, the Project Team determines the level of review of the design deliverables. The levels of review might include the following:

- Peer Reviews – conducted with the Project Team Members to review each of the general and/or detailed design deliverables to ensure that team members are in agreement to the deliverables produced.
- Walkthroughs or Structured Walkthroughs – appropriate for reviewing the technical accuracy and completeness of general and/or detailed design deliverables and can be conducted with various levels of formality and with different types of participants.
- Critical Design Review – a formal technical review of the detailed system design to demonstrate that the detailed system design can be implemented on the selected platform and accounts for all software and data requirements, as well as to verify that all design constraints (e.g., performance, interface, security, safety, resource, and reliability) are accommodated by the proposed design.

The design reviews are focused on quality to ensure the following:

- The team is following the agreed upon design approach

- Adequate measures are being taken to reduce risk on technical, cost, and scheduling issues
- The performance characteristics of the design solution are acceptable
- Testing will be sufficient to ensure software product correctness
- The software will be maintainable
- Provisions for automatic, semi-automatic, and manual recovery from hardware or software failures are adequate
- The design is:
  - Complete, unambiguous, and well documented
  - Necessary, sufficient, and directly traceable backward to requirements and forward to test case scenarios
  - Compatible with every other related specification, piece of equipment, facility, and item of system architecture, especially regarding information flow, control, and sequencing
  - Consistent with the ability of current development and user personnel
  - Consistent with JNET standards and guidelines

3.1.4. Software Construction

In this phase, the detailed system design is transformed into a working software product. Any hardware or software procured to support the programming effort is installed in the JNET Development (DEV) environment.

The source code is generated using the approved system design specifications. Supporting modules, including any database utilities, are coded. The source code is grouped into process able units, and all high-level language units are compiled into object code. Unit testing is performed to determine if the code satisfies the specifications and is complete, logical, and error free. Code scanning for potential Internet security vulnerabilities is also conducted during construction—as required by Commonwealth policy. The systems development management team determines which issues identified during scanning require attention, including remediation.

The operating or deployment documentation required for installing, operating, and supporting the software product through its lifecycle, is also produced in this phase. A testing strategy and detailed test cases are prepared. The acquisition and installation of the operating environment hardware and software are initiated at this point as well.

The following high-level tasks should be considered, and conducted if necessary:

- Initiate procurement of hardware and software needed for the operating (Test and Production) environments
- Establish the programming environment
- Write (code) programs
- Conduct unit testing
- Conduct code scanning for potential security vulnerabilities
- Update the requirements traceability matrix
- Develop test scenarios
- Plan the deployment to TEST and to PRODUCTION
- Produce deployment documentation and initiate deployment activities
- Establish the system/integration testing environment

3.1.5. Software Integration and Testing

Software integration and testing activities focus on interfaces between and components of the software product, such as functional correctness, system stability, overall system operability,

security, and performance requirements. Software integration and testing performed incrementally provides feedback on quality, errors, and design weaknesses early in the integration process.

In this phase, software components are integrated and tested to determine whether the software product meets predetermined functionality, performance, quality, interface, and security requirements. Once the software product is fully integrated, system testing is conducted to validate that the software product will operate in its intended environment, satisfies all user requirements, and is supported with complete and accurate operating documentation. After a successful system test conducted by the JNET Quality Assurance/ Test Team, either a user acceptance test (UAT) or a formal pilot test is conducted. The latter is usually conducted in the Production environment.

Typical high-level tasks in this phase are:

- Conduct system and integration testing
- Conduct regression testing
- Report testing results
- Fix bugs uncovered during testing
- Update the requirements traceability matrix (optional)
- Refine the deployment documentation
- Prepare training materials

3.1.6. Software Implementation

Once a successful system test has been completed, preparations to place the new system into operation can begin. Most of the conversion tasks are detailed in the Deployment Document. The conversion or transition to “production” or “operational” mode is achieved using one of the following commonly-used installation strategies:

- *Abrupt cut-over*- On a specific date, the old system is terminated and the new system is placed into operation.
- *Parallel conversion* – Both the old and the new system are operated for some time period.
- *Location conversion* – When the same system will be used at multiple locations, it is usually converted at one location first (using either abrupt or parallel conversion). As soon as the site has approved the system, it is farmed to the other sites.

The conversion to a production mode usually includes a validation test—i.e., running the system in a live environment, using real data. During this validation, a number of items are usually tested- (a) system performance, (b) human engineering, (c) methods and procedures, and (d) backup and recovery.

The final phase (the accreditation phase) of the CA^2 process also occurs at this point. The EISO Team performs intrusion testing, a vulnerability assessment and penetration testing in the Production environment. An executive summary of the results is provided; the system either is accredited or a remediation plan is requested.

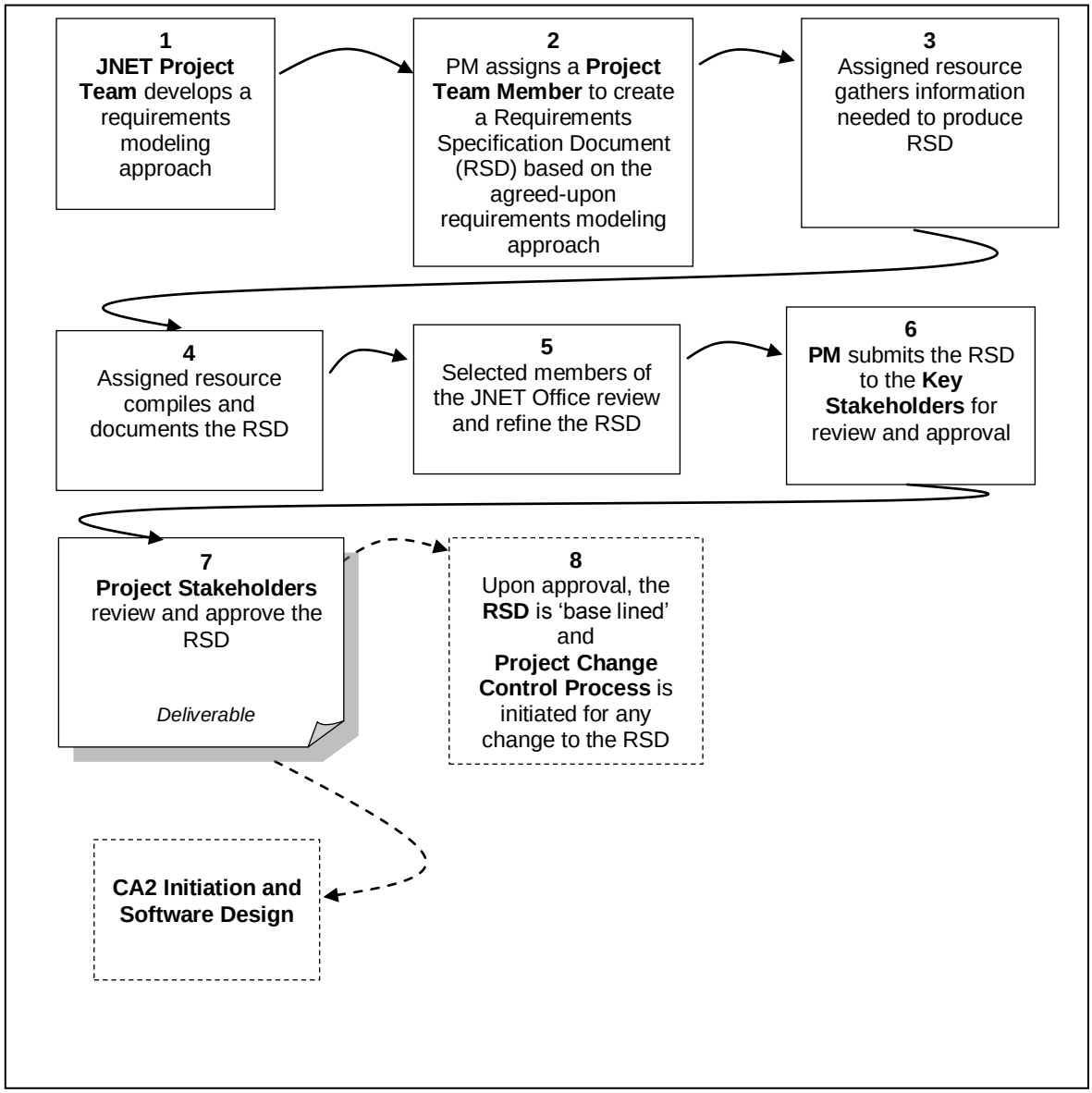
The implementation phase typically includes user training and user documentation that guides them though the use of the new system or the old system’s new features.

3.2. Requirements Engineering

3.2.1. Description – Requirements Engineering

The objectives of Requirements Engineering include: • Capture and analyze the users' business processes and needs. • Translate those processes and needs into formal product or system requirements. • Ensure involvement, communications, and commitment of Project Sponsors or Stakeholders who identified the need for the project as well as JNET Project Team Members.	
Participants	❑ JNET PMO ❑ Project Sponsor(s), Stakeholders, and Representative JNET Users ❑ JNET Managers and Team Leads (Business Office, Applications Development, Testing/Quality Assurance, JNET Applications Support) ❑ Project Team Members ❑ Peer Review Team (Business Office, Communications Office)
Activities / PMO Checklist	❑ Schedule and conduct Project Team meeting to determine requirements modeling approach ❑ Schedule and conduct requirements gathering sessions, meetings ❑ Compile and analyze input received ❑ Develop Requirements Specification Document (RSD) ❑ Review with Peers (PMO, Business Office, Communications Office), the Developer(s), Tester(s), and Business Partners ❑ Project Manager and Business Partner (if necessary) approval
Work Product(s) / Deliverables	❑ Requirements Specification Document (RSD) (Project Team) ❑ Application System Mock-Up (Development Team) ❑ Optional Requirements Traceability Matrix (BA or QA Team) ❑ Updated Project WBS/Work Plan (PMO)
Tools and Templates	❑ Requirement Types Matrix ❑ Requirements Specification Document (RSD) Template ❑ Requirements Traceability Matrix Template

3.2.2. Process Flow – Requirements Engineering



1 Upon approval of the Project Charter and Project Schedule, the Project Team works together to develop a requirements modeling approach for the project. The team chooses an analysis approach or technique that fits both the technical and cultural aspects of the project. No single approach is mandated; rather the decision should be based on JNET best practice, experience of the team members, and Commonwealth guidelines. The approach should consider:

- The type, size, and scope of the project.
- The number, location, and technical expertise of the users.
- The anticipated level of involvement of the users in the data collection and analysis process.

There are four key elements in developing a requirements analysis approach:

- *Determining the type of requirements that apply to the project*
  The Project Team reviews and completes the Requirement Types Matrix. This helps to refine the scope of the effort as well as identify who will need to be involved in requirements modeling.
- *Determining the data gathering approach and activities*

The team reviews the list of project participants to ensure all business and technical interests are represented. The team also determines the type(s) of data gathering activities to solicit and capture requirements, such as interviews, surveys, Joint Application Design (JAD) sessions, questionnaires, or review of existing policies, procedures, training materials, and systems.

- *Determining requirements analysis approach and modeling tools to be used*
  The team determines if any specific tools are to be employed, such as the Justice Information Exchange Model (JIEM) tool; other data or object models; use case diagrams, text, or maps; context diagrams; business rules; scenarios; etc.
  Requirements *analysis* might start within this phase or in the Analysis and Design Phase. For example, the team might decide to complete As-Is / To-Be Workflow charts within the Requirements Phase and document them within the RSD. Other modeling techniques might be started within the Analysis and Design Phase, such as use cases or data or object models, and would be captured in a design document or package.
- *Determining how the requirements will be documented*
  The team determines if one or multiple documents will be used to capture user, technical, functional, and non-functional requirements as well as the visual presentation (e.g., text supported by graphics versus a spreadsheet). The team also determines the level at which the requirements are captured. For example:
  - High-level: *provide the capability to view orders*
  - Low-level: *orders are grouped by categories: outstanding, closed, past due*

2 The Project Manager assigns a Project Team Member (usually someone serving as a Business Analyst) to create a Requirements Specification Document (RSD) based on the agreed-upon requirements modeling approach (Step 1). The requirements document should include sections to correlate to the types of requirements identified on the Requirements Types Matrix and can be used as a tool during data gathering activities.

The RSD needs to be numbered in a hierarchical numbering scheme to show decomposition of each requirement to trace it through the remaining life cycle phases (please see step 5).

3 The JNET Business Analyst conducts data gathering activities based on the agreed-upon requirements modeling approach (Step 1).

Following data gathering activities, requirements *analysis* might start within this phase or might start in the Analysis and Design Phase. For example, the team might decide to complete As-Is / To-Be Workflow charts within the Requirements Phase and document them within the RSD. Other modeling techniques might be started within the Analysis and Design Phase, such as use cases or data or object models, and would be captured in a design document or package.

4 The Project's Business Analyst compiles all notes and input captured during data gathering activities into the RSD template.

5 Selected members of the JNET Business and Communications Teams participate in a thorough (peer) review of the RSD and traceability matrix. Concurrently, a review with the Developer(s) and Tester(s) is conducted.

A key consideration in reviewing requirements is to ensure they have the following 'SMART'[1] characteristics:

- ***S****pecific*: without ambiguity, using consistent terminology, simple and at the appropriate level of detail.
- ***M****easurable*: it is possible to verify that this requirement has been met. What tests must be performed, or what criteria must be met to verify that the requirement is met?
- ***A****ttainable*: technically feasible. What is your professional judgment of the technical "do-ability" of the requirement?
- ***R****ealizable*: realistic, given the resources. Do you have the staffing? Do you have the skill? Do you have access to the development infrastructure needed? Do you have access to the run-time infrastructure needed? Do you have enough time?
- ***T****raceable*: linked from its conception through its specification to its subsequent design, implementation and test.

[1]Mannion and Keepence, 1995

7 The Project Manager submits the RSD to the Project Sponsor/Key Stakeholder Business Partners for review and approval.

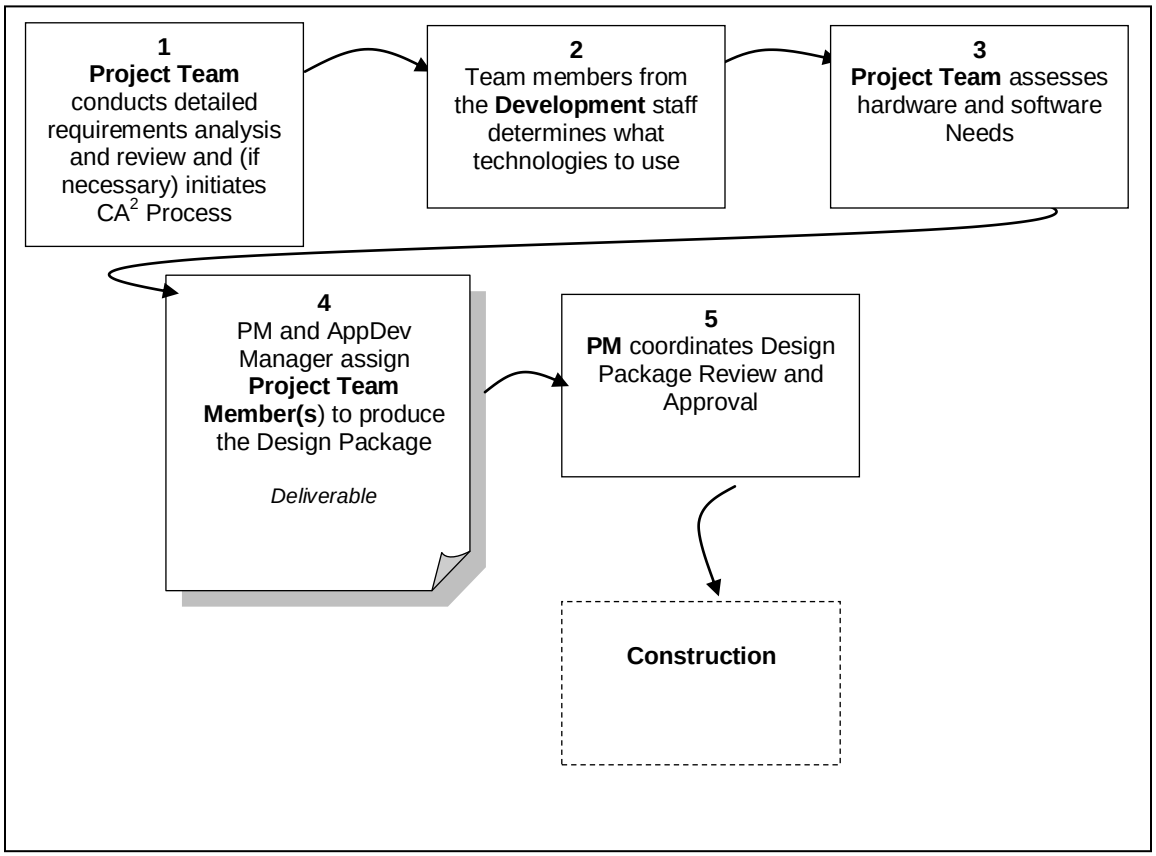
8 Upon approval, the RSD is considered *base lined*. From this point forward in the project, Change Control procedures are followed to add, significantly change the scope or meaning of, or delete requirements. Please refer to the Project Execution and Control Phase for further details on Change Control.

3.3. Software Design

3.3.1. Description – Software Design

The objectives of Software Design include: • To model how the software products will be built to satisfy the identified requirements. • To communicate software design information to facilitate system construction decisions and planning. • To present the software system into design entities and describe the properties and relationships among those entities.	
Participants	❑ JNET PMO ❑ Project Stakeholders ❑ Project Team Members
Activities / PMO Checklist	❑ Initiate the CA^2 Process ❑ Determine analysis and design approach, deliverables to be produced and levels of review of the deliverables ❑ Work with the Application Development Manager to re-assess developer resource requirements and work-effort estimates
Work Product(s) / Deliverables	❑ Design Package (Architecture and/or Development Team) ❑ *Optional* System Prototype (Application Development) ❑ Enterprise Data Center (EDC) Documentation ❑ CA^2 Approval to Proceed to Certification Phase ❑ Updated Project WBS/Work Plan (PMO)
Tools and Templates	❑ Use Case Diagram Template ❑ JNET Design Template ❑ SinglePoint App (for CA^2)

3.3.2. Process Flow – Design



1 If the Commonwealth Application Certification and Accreditation process is required, the JNET CA² Coordinator will initiate the CA² Process.

The Project Team also conducts detailed analysis and review of the requirements and finalizes the business models. This might include:

- Developing high-level process maps to help refine the understanding and expectations of the project's impact on the business processes.
  '*As-Is'* maps represent the current business situation and its existing infrastructure and constraints. '*To-Be'* maps represent the situation as users would like it to be in some future implementation.
- Matching business requirements to the prospective distributed application features.
  For example, identifying the business activities, business objects and their relationships that support the desired features. These are documented in a formal, high-level model. Also, determining the interaction between activities and objects to check their consistency and validate the model against the requirements.

NOTE: This task might have been completed in the *Requirements Engineering* Phase.

The Project Team selects a design technique that works well with JNET architectural and design standards. The software design technique should be based upon the unique aspects of the project, along with project and organizational constraints. Some of the issues to be addressed include:

- How will the design be represented to the Project Sponsor or users – through informal documentation, a prototype, or prototype iterations?
- Who will review and approve the design deliverables?

The Project Team also addresses the issue of how the design will be documented (e.g., a single, encompassing Design Specification document as opposed to a number of files or documents referred to as a Design Package).

2 Project team members from the Application Development and Architecture staffs decide which system development technologies to use—i.e., define the application architecture. This task involves considering network technologies and making decisions as to how the systems' *data, processes,* and *interfaces* are to be distributed among the business locations.

The task is accomplished by analyzing data and process models that might have been created during Requirements Engineering.

3 The purchase of any hardware and software must be initiated well in advance of the planned need for these products. This cannot begin, of course, until enough information about the ultimate design of the product. However, adequate time must be allotted in the Project Schedule for the selection, procurement, installation, testing and training associated with each purchased product.

4 The Project Team conducts *detailed system design* which might include the following based on the design technique chosen in Step 2:

- Finalize user interface
- Build data model or data dictionary
- Build use case model
- Build or update business process model
- Design system architecture
- Review capacity issues / develop capacity plan
- Review integration issues / develop integration plan
- Review conversion issues / develop conversion plan
- Review operations and services issues / develop plan
- Develop proof of concept / prototype

The results of the above design steps are captured or updated in a variety of files or documents which are incorporated into the Design Specification document or Design Package.

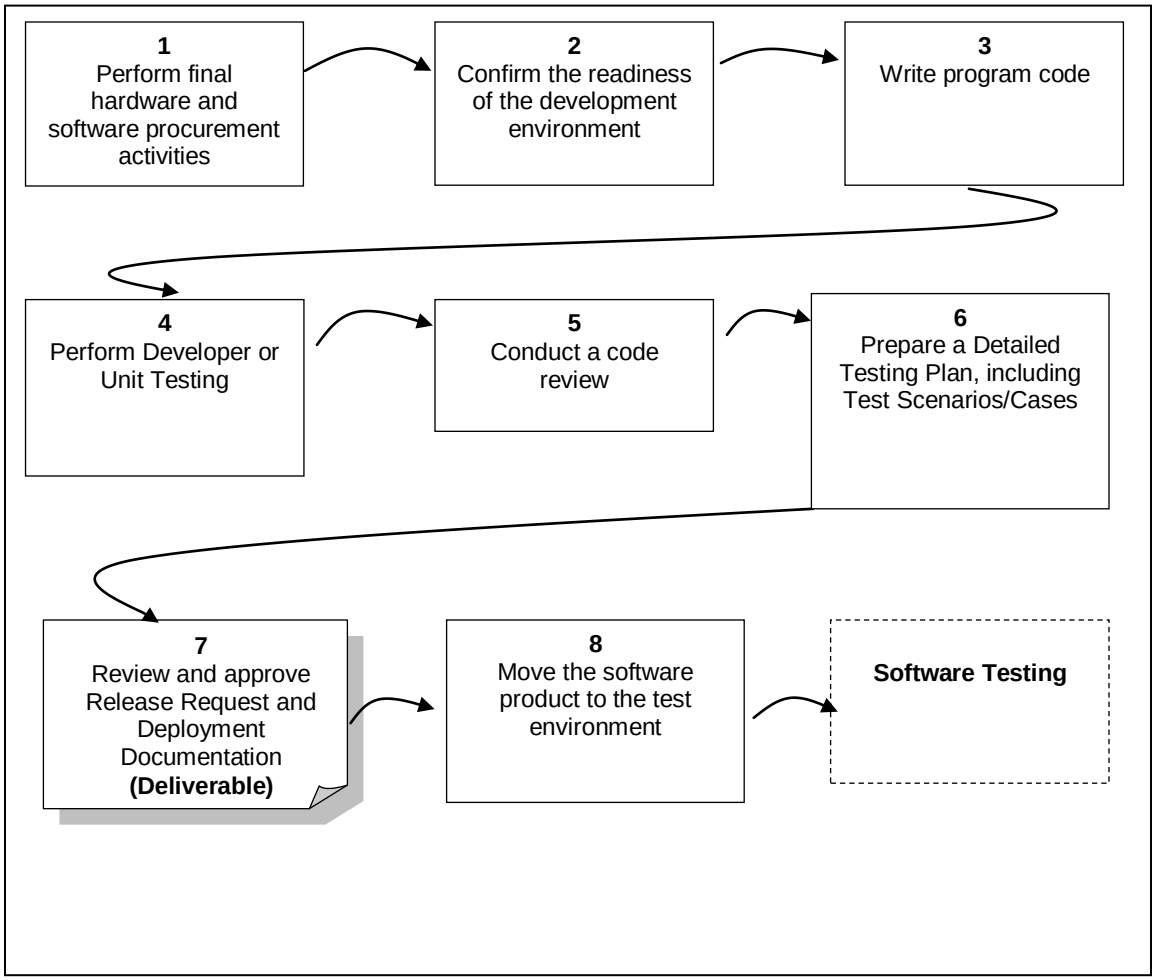
5 The PM ensures that the appropriate Project Stakeholders have reviewed and approved the Design Specs.

3.4. Software Construction

3.4.1. Description – Software Construction

The objectives of Software Construction include: • Install any hardware and/or software procured to support the programming effort • Produce integrated software components • Plan detailed testing at various predefined levels • Plan the system deployment to the test and production environments	
Participants	❑ JNET PMO ❑ JNET Managers and Team Leads (Applications Development, Quality Assurance/Testing, Applications Support) ❑ Project Team Members (Applications Development, Quality Assurance/Testing, JNET Applications Support)
Activities / PMO Checklist	❑ Final hardware and software procurement ❑ Establish the development environment ❑ Write programs and conduct unit testing ❑ Develop test scenarios ❑ Plan the transition to operational status, and perform all required deployment tasks ❑ Perform Project Execution and Control Tasks
Work Product(s) / Deliverables	❑ Final hardware and software purchase orders (JNET Applications Support and EDC) ❑ Application code (Application Development) ❑ Detailed Test Plan / Schedule, Test Scripts (QA/Testing) ❑ Deployment Documentation (Application Development) ❑ Updated Project WBS/Work Plan (PMO)
Tools and Templates	❑ Deployment Document Template ❑ Test Plan/Test Cases Template(s)

3.4.2. Process Flow – Software Construction



1 If hardware and software must be purchased to meet the application system requirements, the necessary procurement activities should be performed at this time.

2 This activity involves the assembling and installation of hardware, software, communications equipment, databases and other items required to support the programming effort. Test the components to verify the operating characteristics and functionality of the hardware and software.

It is important to allot time for the project team to become familiar with any new products.

This is also a good time to review programming standards.

3 This activity involves generating source and object code, executables and scripts for the software product. Source code should be written in accordance with existing programming standards. Source code and executables should be uniquely identified and stored according to configuration management standards and procedures.

Writing programs typically includes the following:

- Generating source code, executables and related scripts
- Generating the physical files and database structure
- Generate video screens, report generation codes and printing instructions
- Generating programs to convert existing systems or data (if necessary)
- Conducting preliminary testing of completed units.

4 Unit testing is used to verify the input and output for each module. Each module is tested individually and the module interface is verified for consistency with the design spec. Important processing paths through the module are tested for expected results. Error handling paths are also tested. All test results should be logged. Errors are analyzed, corrected and re-tested. The cycle is repeated until all errors have been corrected.

   Whereas unit testing is generally the responsibility of the Developer, the Team Lead should be aware of the unit test results.

5 Depending on the size and complexity of the software development effort, code inspections should be conducted at successive stages of code construction. A code inspection is a static analysis technique that relies on visual examination of code to detect errors, violations of development standards, and other problems. These inspections usually are performed by an Application Team Lead, but might also be performed by experts outside the project. Ideal times for code reviews are when coding and unit testing is complete, and when the first developer-performed integration tests are complete.

6 A detailed test plan is created in this phase. The plan includes an identification of the various levels of testing that will be performed (e.g., integration and system testing, regression testing, and user acceptance testing), who is responsible for each layer of testing, how testing will be conducted, etc.

   Moreover, test scenarios are created to run test scripts and scenarios based on the processes and requirements from the design package. The test scenarios might be captured in a document template or as part of a software testing toolkit.

7 The Release Request and Deployment Documents are reviewed and approved as defined by the JNET Deployment Process.

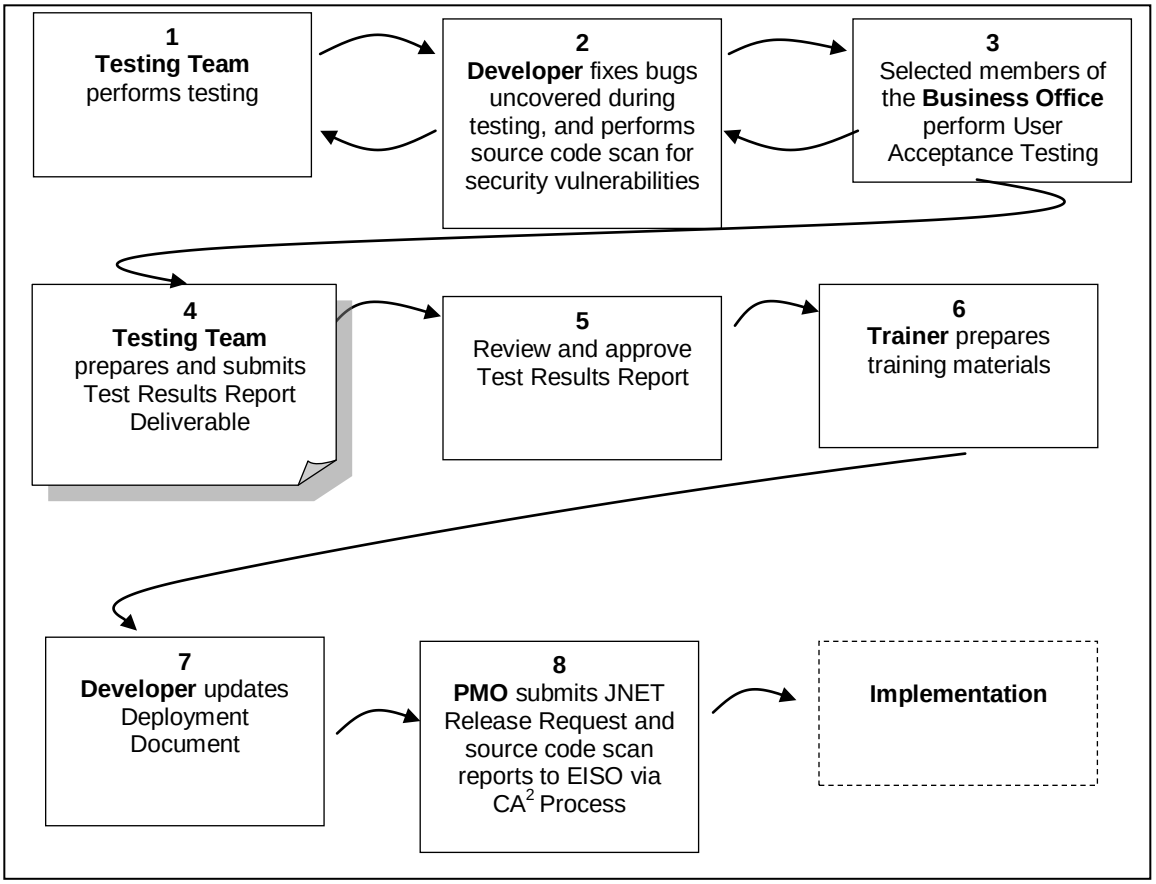
8 Once approved, the product is moved to the JNET Test environment by the JNET Applications Support Staff, according to the instructions in the Deployment Instructions Document.

3.5. Software Testing

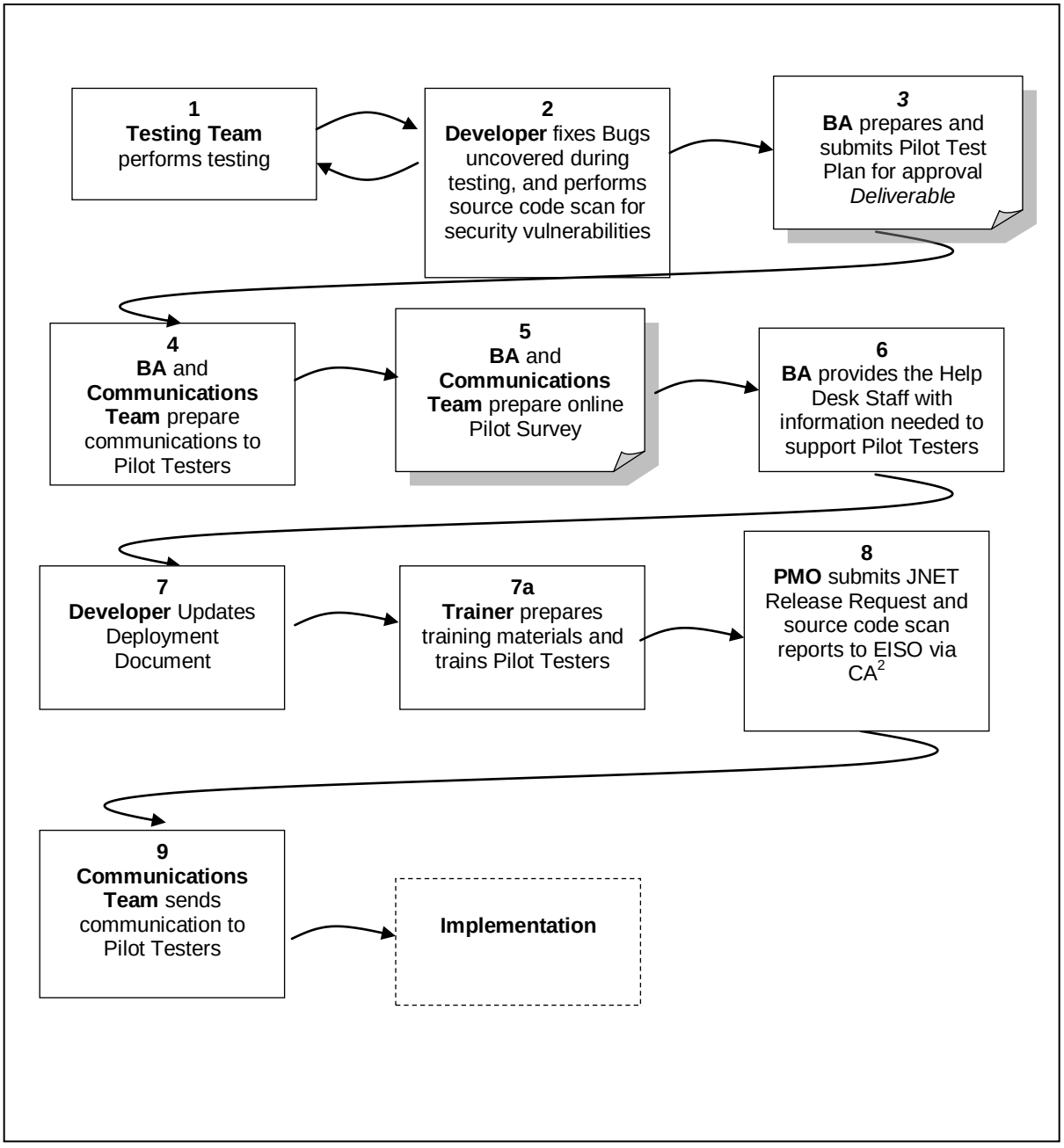
3.5.1. Description - Testing

The objectives of Software Testing include: • Ensuring that the system meets predetermined functional, operability, security and performance requirements. • Providing feedback on quality, errors and design weaknesses early in the integration process. • Ensuring that the system is supported with complete and accurate operating documentation. • Ensuring that end-user communications and end-user training materials are prepared.	
Participants	❑ JNET PMO ❑ Project Sponsor(s), Stakeholders, and End Users ❑ JNET Managers and Team Leads (Communications, Applications Development, Quality Assurance, JNET Applications Support) ❑ Project Team Members ❑ Enterprise Information Security Office (EISO)
Activities / PMO Checklist	❑ Project Execution and Control Activities ❑ Conduct System and Integration Testing ❑ Conduct Regression Testing ❑ Establish Acceptance Test Environment (Optional) ❑ Conduct User Acceptance Testing (Optional) ❑ Fix bugs uncovered during Testing ❑ Re-Test (if necessary) ❑ Perform source code scan using the IBM Rational AppScan tool, remediate code, and submit scan reports to EISO via the CA^2 process. ❑ Update Requirements Traceability Matrix (Optional) ❑ Plan a Pilot Test in Production (Optional) ❑ Complete Training Materials ❑ Plan End-User Communication ❑ Refine Deployment Documentation (if necessary)
Work Product(s) / Deliverables	❑ Internal JNET Test Report (QA/Testing) ❑ Optional Pilot Test Survey (BA) ❑ CA^2 Certification ❑ Training Materials (Communications/Training) ❑ Updated Project WBS/Work Plan (PMO)
Tools and Templates	❑ Pilot Tester Survey ❑ Test Results Report ❑ IBM Rational AppScan ❑ Single Point App (for CA^2)

3.5.2. Process Flow - Software Testing without Pilot



3.5.2 Process Flow - Software Testing with Pilot



1 System testing is conducted in the JNET Test environment, using test cases and the methodology described in the System Test Plan. The results of each test are recorded, and upon completion, included as part of the project test documentation stored in Star Team..

When errors are discovered, the test team leader determines the severity of the error and the necessary subsequent action. If the errors are severe, the team leader can recommend suspension of system testing until corrections are made.

2 If appropriate, minor problems can be corrected and regression tested by the Developer(s) within the time allotted for the System Test. As soon as internal testing by the QA/Test Team is completed, the Developer can perform a source code scan using the IBM Rational AppScan tool to detect any potential vulnerabilities. After the final code scan, submit the required reports for review by EISO in the CA^2 process.

3 User representatives—in many cases, these are members of the JNET Communications/Training Staff or Business Analysts/Subject-Matter Experts—participate in testing from the system owner perspective. The focus is on whether the system meets all established business and functional requirements.

If a Pilot Test is to be conducted, the Project's Business Analyst (BA) prepares and submits a Pilot Test Plan for approval.

4 Prepare a formal Test Report. Summarize the test procedures executed, any problems that were detected and corrected, and the projected schedule for correcting any open problem reports.

If a Pilot Test is being conducted, the Communications Team and Business Analyst prepare communication to the Pilot Testers

5 The Testing Lead and Application Development Manager will review the Test Report and recommend (a) approval to proceed; or (b) approval to proceed after additional system corrections made or additional testing take place.

If a Pilot Test is being conducted, the Communications Staff and Business Analyst prepare the online Survey Form that will be used for recording survey results.

6 At this point, the Trainer will know the new system features and functions well enough to prepare training materials. Since the system implementation schedule should be established at this point, the Training Team can also start to schedule training sessions (if applicable).

If a Pilot Test is being conducted, the Business Analyst or JNET Trainer provides the JNET Help Desk with information it needs, including formal training (if required). The JNET Trainer will prepare and delver training to the Pilot Testers

7 The Developer updates Deployment Documentation.

7a *If a Pilot Test is being conducted, the Training Team will prepare training materials and delver training to the Pilot Testers.*

8 The PM submits a New JNET Application Release Request to move the new application system into the Production environment (ref. Star Team: JNET Document Library – Configuration and Change Management Templates – Production Release Process Artifacts – Release Management Plan_v1.0.docx)

The PM also asks JNET's CA^2 Coordinator to submit the source code scan reports to EISO.

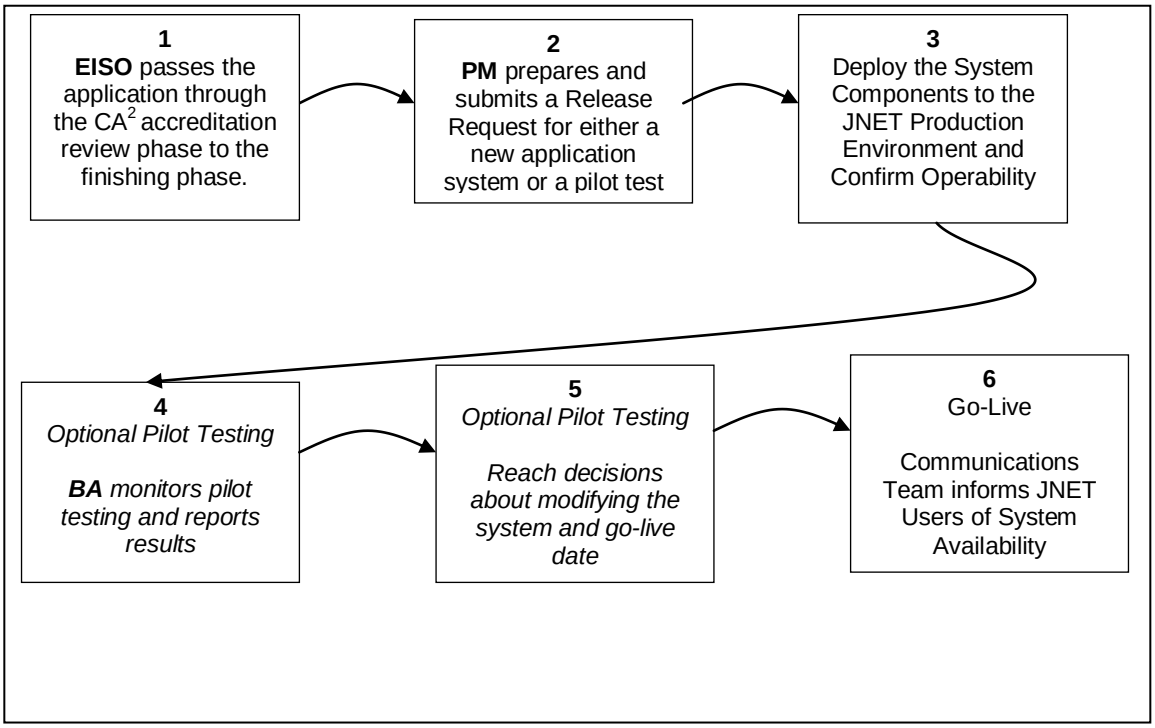
9 *If a Pilot Test is being conducted, the Communications Team will distribute a notice to the Pilot participants, the Help desk Staff and other stakeholders.*

3.6. Software Implementation

3.6.1. Description - Implementation

The objectives of Software Implementation include: • Ensuring that everyone who must be involved in the system installation activities are identified and informed in advance of his or her role, as well as the target installation date(s). • Ensuring that all appropriate software quality checks have been performed and that the software is "production-ready." • Ensuring that an appropriate, clear communication about the software implementation is made to the JNET user community. • A trouble-free, quick, non-disruptive installation in the JNET PROD environment. • An operational system that meets all the functional and non-functional requirements that were established during the Requirements Engineering Phase. • Ensuring that web applications are fully accredited by the Commonwealth Application Certification and Accreditation Process (CA^2)	
Participants	❑ JNET PMO ❑ *Pilot Testers (Optional)* ❑ Project Sponsor(s), Stakeholders, and End Users ❑ JNET Managers and Team Leads ❑ Project Team Members ❑ EISO
PM Activities Checklist	❑ Coordinate CA^2 accreditation phase activities ❑ Prepare and distribute a Release Request (and supporting Deployment Documentation) ❑ Provide Deployment and Support Staff with Suggested Verbiage for End-User Communication ❑ Prepare and Send Notice to JNET Users and Technical Partners ❑ Install Software in the Production Environment ❑ Validate System Operability ❑ *OPTIONAL: Conduct a Pilot Test*
Work Product(s) / Deliverables	❑ Deployment Documentation (Application Development) ❑ CA^2 Accreditation (EISO) ❑ New JNET Application Release Request (PMO) ❑ Communication to Pilot Testers and/or all JNET Users (Communications) ❑ Operable System in the Production Environment (IT Staff) ❑ *OPTIONAL Pilot Test Survey and Pilot Test Results Report (BA)* ❑ Updated Project WBS/Work Plan (PMO)
Tools and Templates	❑ *OPTIONAL: Pilot Tester Survey* ❑ Release Management Plan, v.1.0 (ref. Star Team -JNET Document Library – Configuration and Change Management Templates – Production Release Process Artifacts) ❑ Deployment Instructions/Document ❑ Single Point System (for CA^2 activities)

3.6.2. Process Flow – Software Implementation



1 The EISO Staff conducts web and host scans on the application running in the Test/Staging environment. They either pass the application to the CA² Finishing Phase or ask the JNET Staff to review and respond to vulnerabilities uncovered by the scanning tools.

2 For new JNET Application System implementations or to initiate pilot testing of new application systems, the Project Manager completes and submits Release Request using the *JNET New Application Release Request* template. (Ref. Star Team - JNET Document Library – Configuration and Change Management Templates – Production Release Process Artifacts – Release Management Plan_v1.0.docx). The PM must ensure that all applicable items on the Release Request Checklist have been completed.

3 After the Release Request is approved and the release scheduled, the software changes are installed in the JNET Production environment according to the instructions in the Deployment Documentation.

The integrity and quality of the installed software product is verified by executing the installation tests defined in the Deployment Documentation. The test is designed to validate all functions of the software product. If the software product being installed is a modification to an existing system, all remaining functions and code that might have been affected by the new software should be tested. At a minimum, the following should be tested:

- Security Functions
- Integration with current software
- Interfaces with other systems

Any problems should be documented in a Trouble Ticket and forwarded to the appropriate resources for corrective action.

4 If a Pilot Test has been planned, The BA or Communications Team can notify the Pilot testers to start testing system functionality. The BA monitors the testing and reports results to the Development Team.

5 Based on pilot testing results, decisions about modifying the system prior to go-live are reached.

6 Once a go-live date is agreed to, the Communications Team informs all JNET users of the system's availability, training and reference resources, etc.

4. Service Oriented Architecture (SOA) based Development Process

4.1. Overview of JNET SOA Based Standards and Policy

The primary objective of this section is to describe the process that is used to create new information exchanges via web services in the service oriented architecture. Historically, JNET message exchanges have been unique agency-to-agency transfers of information designed to meet a specific business need. However, JNET has adopted Service Oriented Architecture (SOA) which creates readily re-usable data exchanges.

SOA is an industry architectural pattern that formalizes the development of information exchanges, primarily in the form of web services. More importantly, SOA bases message exchanges on real life business practices. Rather than develop unique technology or information exchanges, SOA architecture focuses the development and deployment of services on real-world problems and needs. When services are built with an eye towards the needs of agencies and practitioners in the field, services take a more practical, business oriented, and most importantly, reusable form.

In addition to SOA, JNET has adopted the National Information Exchange Model (NIEM) and Global Reference Architecture (GRA). GRA standardizes the development and documentation of information services within the justice community. A web service built to GRA specifications will have a common documentation and design that easily facilitates sharing with external partners. NIEM predicates that all data contained within a service or exchange is consistent with national standards. All NIEM exchanges leverage these same codes, allowing for easy re-use between agencies.

Service oriented architecture is not the same as web services, however, web services are an instantiation of SOA with SOAP and Web services Description Language (WSDL). Typically, JNET uses web services as a major component of SOA.

JNET has developed JNET Web Service Security Policy documentation to ensure that the use and consumption of JNET messaging and services is secure and meets Commonwealth and JNET standards. Agencies wishing to utilize JNET's SOA are required to adhere to JNET's Web Service Security Policy when consuming or producing JNET-based services. A copy of this document is available in Star Team by following this link: WebServicesSecurityPolicy.doc

4.2. Overview of JNET SOA Based Development Process

There are three perspectives of SOA: Service Requestor, Data Provider, and Service Agency. In some cases, JNET performs the role of one, two, or all three services. This JNET SOA lifecycle will describe the development process from all three perspectives. The following diagram will display the relationships between the three perspectives.

4.2.1. Service Requestor

A service requestor is any organization that needs a service to obtain data. A service requestor can be another commonwealth agency, a business partner agency, or a contract agency authorized to receive data transferred by the state. A service requestor initiates a service request in writing using the JNET Web Service Request Form.

4.2.2. Data Provider

A data provider is any organization that holds data and is willing to share that information with another organization. Data providers hold the data in a database or repository. The providers may be obligated to share certain data elements with other agencies as part of their ordinary business processes. Some of them may provide a web service to share that data. If they do not have a web service, JNET will have to create a web service to transfer the data.

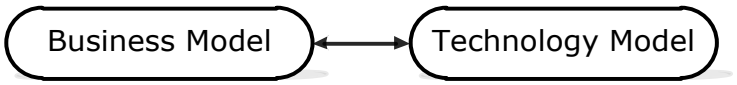
4.2.3. JNET as a Service Provider

JNET serves as a service discovery agency when it brokers data transfers between two organizations. Currently it is rare that an agency that provides data has a web service and can directly supply the service to the requestor. In cases where JNET provides the service, it acts as a broker rather than a discovery agency. JNET brokers the requests and provides the data from the providers. In some cases, JNET owns the data and provides a service to other systems and in some cases JNET makes it available a user interface.

Criminal justice agencies rely on JNET to bridge the information gap between agency data needs and provider resources. JNET will either provide a web service for transactions or provide endpoints for customers who use web services to request and receive information. Internal services refer to the condition where customer requests JNET to build a web service to provide data. External services refer to the condition where the customer has a web service and needs JNET to provide a secure endpoint. Negotiations during the Project Qualification phase will determine the customer needs and JNET's response to those needs. JNET operates as an SOA Competency Center and evaluates project requests or provider data on the merits of the proposal.

4.3. Phases

SOA projects can be considered a specialization of the normal software development process (ref. Section 3, above). The main difference is the introduction of a Service Model. In the traditional SDLC, the system is viewed from two aspects; a business model in the form of requirements and use cases and a technology consisting primarily of design documents.



SOA introduces the concept of a Service Model that bridges the gap between the Business Model and the Technology Model.

In GRA, the Service Model is in the form of a Service Specification Package (SSP). The SSP is a defined set of artifacts in a structured zip file. The GRA SSP specification defines many required and optional artifacts which can be found here: GRA Service Specification Guideline. The major artifacts that should be tracked in the project are listed in the table below:

Artifact	Description
Service Description Document (SDD)	The SDD provides a comprehensive description of the service. It contains the following sections: 1. Service Overview 2. Business Scenarios 3. Service Interoperability Requirements 4. Additional Information 5. Service Model
Business Process Model (BPM)	Document showing the business process model for the service. Ideally this would be in the form of Business Process Modeling Notation (BPMN) however

	a Visio cross-functional flow diagram is sufficient.
Information Exchange Package Definition (IEPD)	The IEPD contains the data model and NIEM schema for the service payload. Some SOA projects will reuse an existing IEPD others will require new IEPD development.
Web Service Description Language (WSDL) file	A machine readable XML representation of the service interface used by development tools to create the web service and web service clients.

Since the SSP bridges the Business and Technology Model, its development spans the Requirements Engineering and Software Design phases of the normal JNET Software Development process. The following sections are a supplement to Section 3 detailing the additional processes and deliverables for SOA projects (click here).

4.3.1. Requirements Engineering

The objectives of Requirements Engineering include:	
• Capture and analyze the users' business processes and needs. • Translate those processes and needs into a service process model and information model.	
Participants	❑ Service requester, Data Owner, Stakeholders, and Representative JNET Users ❑ Business Analyst ❑ Systems Analyst ❑ Data Architect
Activities / PMO Checklist	❑ Schedule business process and information modeling sessions with Business Analyst, Data Architect, Systems Analyst, data owner, service requester and other stakeholders as required. ❑ Compile and analyze input received ❑ Develop first half of Service Description Document (SSD) ❑ Project Manager and Business Partner (if necessary) approval
Work Product(s) / Deliverables	❑ Service Description Document - Sections 1 and 2 ❑ Business Process Model ❑ IEPD - Data Element Dictionary ❑ IEPD – Domain Model
Tools and Templates	❑ Service Description Document (SDD) Template

4.3.2. Software Design

The objectives of Software Design include:	
• Translate the service business and information model into a WSDL and XML Schema. • Translate those processes and needs into a service process model and data model. • Develop the system architecture for the service solution. • Develop detailed design documentation for the webMethods and DataPower modules.	
Participants	❑ Data Architect ❑ Business or Systems Analyst ❑ Lead Developer

Activities / PMO Checklist	❑ Data Architect completes WSDL and Schema for web service interface. ❑ Data Architect and Systems Analyst complete SDD and SSP ❑ Conduct SSP Review with team. ❑ Develop Architecture Design ❑ Review Architecture Design with team. ❑ Develop Detail Design for webMethods and DataPower ❑ Review Detail Design with team.
Work Product(s) / Deliverables	❑ Complete SDD ❑ Web Service Description Language (WSDL) ❑ Complete IEPD (schema and mapping document) ❑ Servicing Implementation Definition Document (SIDD) ❑ Service Specification Package (SSP) ❑ Architecture Design Document ❑ Detailed Design Document (webMethods, DataPower)
Tools and Templates	❑ Service Description Document (SDD) Template

4.3.3. Software Construction, Testing and Implementation

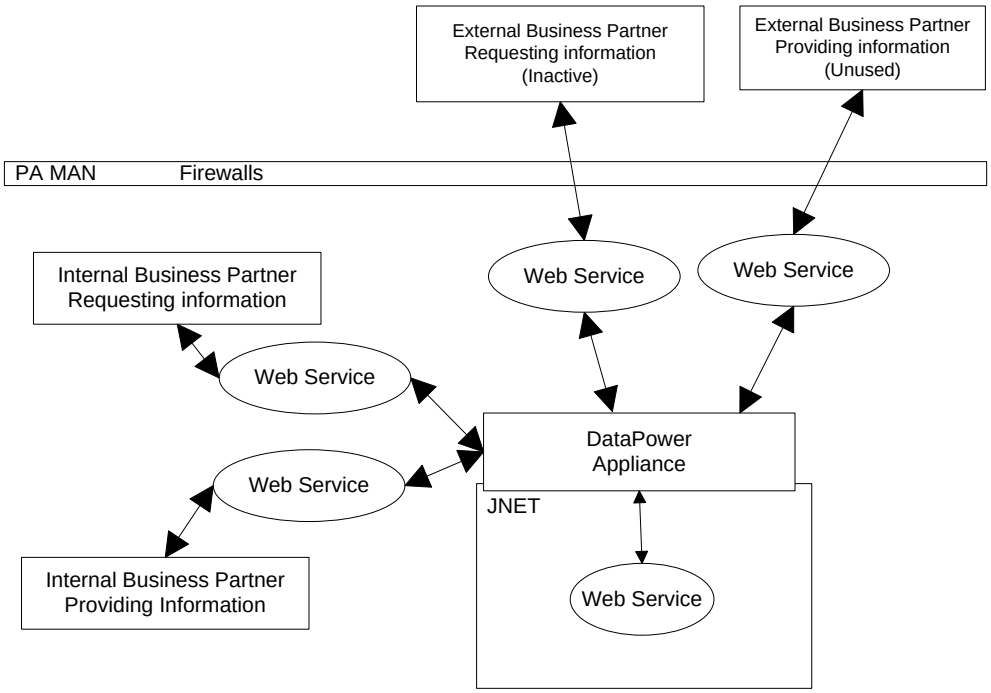
The software construction, testing and implementation phases mirror the normal software development process in section 3.1.4 through section 3.1.6 above. Sections 4.4.1 through section 4.4.3 (below) detail the steps for the system development process for the SOA software development.

4.4. Configuration Differences

There are three (3) primary configuration differences managed by JNET.

1. Business Partner requesting information from JNET
2. Business Partner submitting information to JNET
3. JNET Provided Web Services User Applications

The following diagram depicts the three (3) configurations listed above

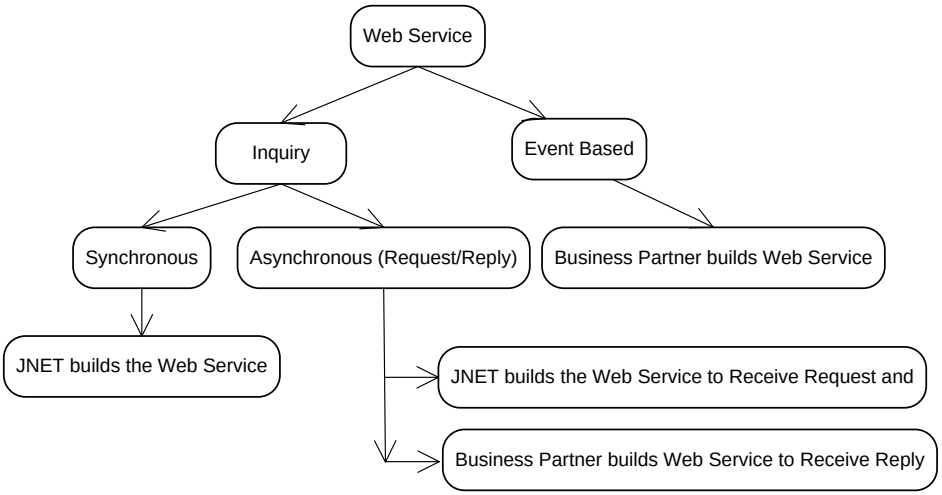


4.4.1. Business Partner Requesting Information

Business partner who needs information provided by JNET will make a request for data through a JNET web service using either the Event Message/Web Service Request Form (to use existing web services) or the New Event Message/Web Service Request Form (to ask JNET to develop a new web service). See diagram below. *The steps outlined here assume that the request if for JNET to build a new web service*.

1. Business partners request data through the JNET New Web Service Request Form. JNET senior management and staff will use the Web Service Request Form to consider the request. Some business partners are Commonwealth agencies and some business partners are outside of the Commonwealth.
2. If the requesting business partner is not a member of the Commonwealth, JNET Management may have to analyze the business needs of the external agency and determine if they are entitled to the information they are requesting. Alternatively, if the external entity is a third-party vendor for a qualified agency, JNET's legal counsel may have to evaluate the proposal before the project starts. If that is the case, additional policy rules and approvals may be required before the project starts.
3. If the project qualifies, a JNET Project Manager will be assigned who will initiate contact with the data provider and set up a meeting to discuss the project. The data source provider will consider the project and evaluate the impact of the project and timetable against its resources. The JNET Business Analyst will begin collecting high- level business requirements. The process time decreases if the data provider has already agreed to the project objectives through prior engagement.
4. The Project Manager will begin the project and assemble the resources to complete the project initiation (ref. Section 2.2, above). He or she will provide the JNET Web Service Policy documents to the requesting business partner.
5. The Project Manager, with the assistance of the JNET Executive Director will work with the data provider to reach an agreement for the data exchange with the requestor. If there is a policy change, the Executive Director will work with the legal department to create any new policy or establish any Service Level Agreement.

6. The Business Analyst will define and document functional requirements and business rules. During the requirements gathering, the Business Analyst will also review the provider's data and determine if JNET could provide additional services to other agencies. The Systems Analyst will create technical requirements. The Systems Analyst will work with the business partner to identify the relationships and mapping. The Analysts will complete the first half of the SDD.
7. Once the business requirements (functional and business logic) and the technical requirements (system) are completed and approved, the JNET Application Support Manager will work with the Data Architect to determine the best method to connect the data source to the data requestor. The Data Architect will complete the Service Design Document including the WSDL to make the Service Specification Package. The JNET Application Support team will complete an Operational Impact Analysis to determine the level of effort needed to achieve the infrastructure goals of the project.
8. The JNET Application Development Team (webMethods and DataPower Developers) will create the design document. Using the figure below, the Application Development Team will evaluate the requesting agency's current condition and offer a solution.



9. If the business partner needs a synchronous inquiry, JNET will build the web service once the design document and policy have been completed and approved. The business partner will have to create a web service consumer. If the business partner needs an asynchronous inquiry, JNET will build a web service to receive the request and the business partner will have to build a web service to receive the reply. If JNET provides the information through an event message, the business partner will build the web service. The Data Architect will create an architecture design document
10. During this process, the JNET Project Manager may have to clarify staff workload expectations between all parties. The PM will also work with the internal business partner to get work status reports. Once the business partner sets up their endpoint, JNET will configure the DataPower Appliance to connect to their endpoint and pass the information from the web service to the external agency. JNET may also transform the message for the endpoint.
11. JNET and the business partner will finish building the required web service components and test the design in the Test Environment. The Data Architect will create the procedure for configuring the DataPower appliance in Test and Production
12. Once all testing is complete, JNET will promote the web service to the Production Environment and complete production checkout testing. The Project Manager will advise the data provider(s) and service requestor agency of the deployment (ref. Section 3.6, above).
13. The Project Manager will close the project (ref. Section 2.4, above).

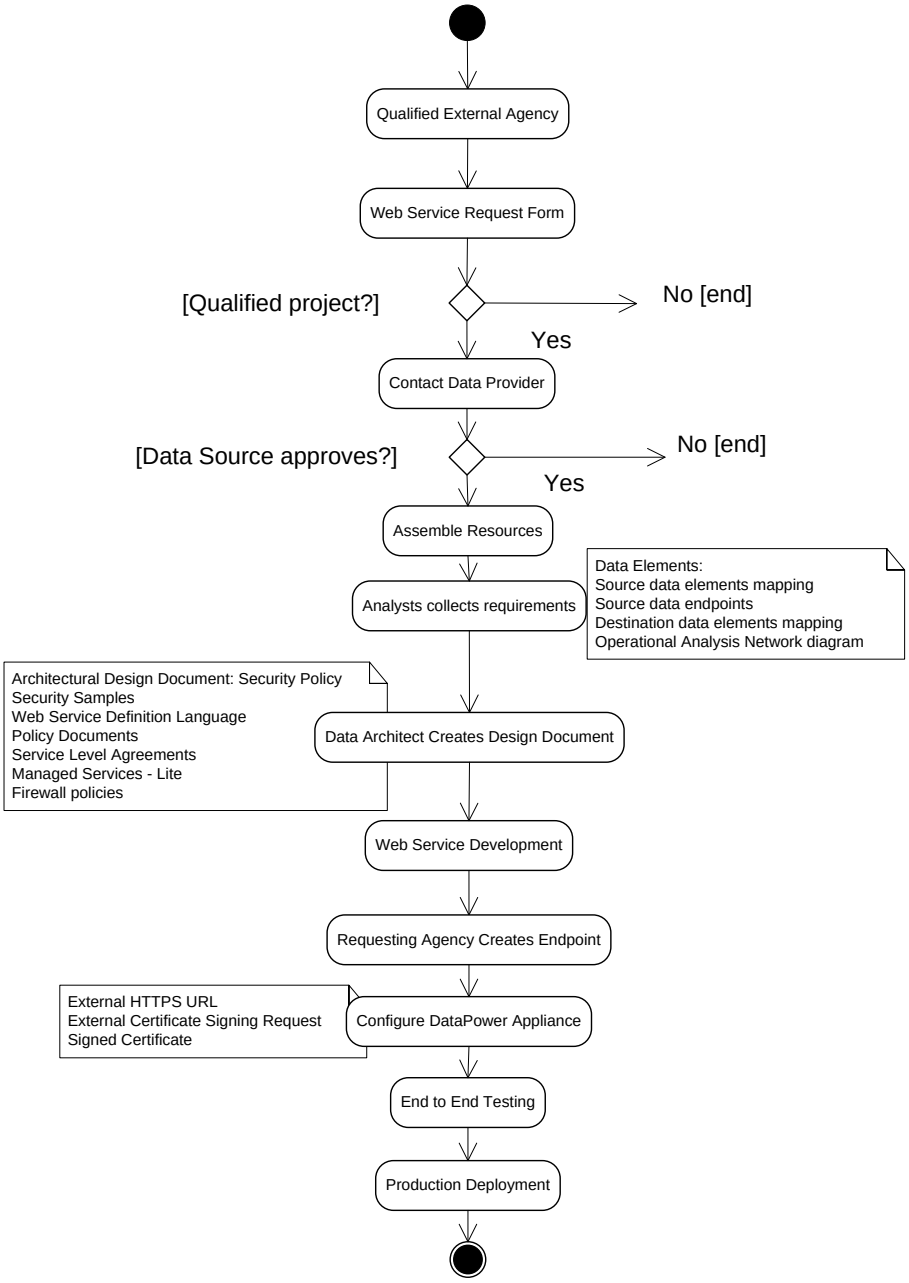


Figure 1 –Business Partner Requesting Information

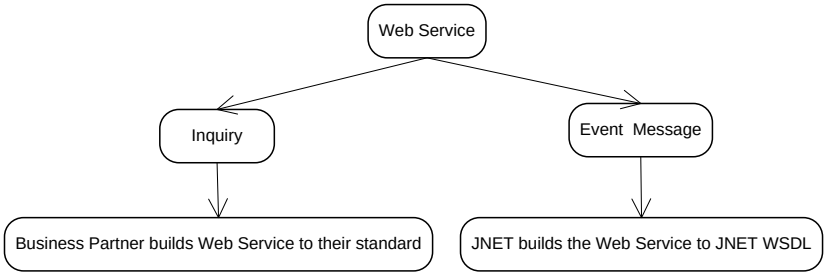
4.4.2. Business Partner Providing Information

There are two conditions under which a business partner provides information: (a) a business partner has information and they offer it to JNET or (b) JNET seeks the data provider and makes a request for the data. Regardless, JNET will create a web service to transfer the data.

1. JNET Management will evaluate the data from the business partner and will agree to build a web service to obtain the data. If this is from a request on behalf of another agency, JNET will work with both agencies to exchange data and follow the steps in 4.4.1 and 4.4.2. (see above).
2. If the project qualifies, a JNET Project Manager will be assigned who will contact the data provider and set up a meeting to discuss the project. If the provider agency already has a web service, the JNET office will work with them to connect to the DataPower appliance. The

data source provider will consider the project and evaluate the impact of the project and timetable against its resources. If the data provider has already agreed to the objectives of the project through a prior engagement, the project can skip this step. The JNET Business Analyst will analyze the data and determine which connected agencies would benefit from the data.

3. If the project involves an external provider, JNET's legal counsel may have to evaluate the proposal before the project starts. If there is a policy change, the executive director will work with the legal department to create any new policy. The additional policy rules and approval may be required before the project formally starts.
4. The PM will begin the project and assemble the rest of the resources to complete the project initiation. The Business Analyst will create functional requirements. During the requirements gathering, the BA will also include the analysis of the provider's data and advise the team members of additional services to other agencies.
5. The data architect will provide the Web Services Security Policy document to the provider business partner, if this was not included in a prior meeting.
6. The PM, with the assistance of the Executive Director, will work with the data provider to reach an agreement for the data exchange. If there is a policy change, the executive director will work with the legal department to create any new policy or establish any Service Level Agreement (SLA). Once the policy has been completed and approved, the PM will engage the JNET team to begin analysis. The Business Analyst will assist the Data Architect to develop first half of Service Description Document (SSD).
7. The JNET Application Support Team will complete an Operational Impact Analysis to determine the level of effort needed to achieve the goals of the project. The application support team will work with the Data Architect to determine the best method to connect the data source to the data recipient. The Systems Analyst will work with the business partner to identify the relationships and mapping.
8. The Business Analyst and the Systems Analyst will build their requirements. Once the requirements (Functional, Technical, and Business Logic) are completed and approved, the data architect will complete the Service Design Document including the WSDL to make the Service Specification Package (SSP). The Data Architect will also create an architecture design document.
9. Once the network diagram and all the planning documentation and have been completed, approved, and handed off to the web service development team, they will create the design document. Using the figure below, the application development team will evaluate the requesting agency's current condition and offer a solution.



10. If JNET is requesting information from a web service provider, JNET will build a web service to the provider agency's standards. If the provider sends information through an event message, JNET builds the web service to JNET standard. The Application Developers will use the web services WSDL to create a web service to accept the information. JNET will either send the data forward to other business partners who have requested the data or display that information in a user interface. The data architect will create the procedure for configuring the DataPower appliance in Test and Production.
11. JNET and the business partner will finish building the required web service components and test the completed software in the test environment.

12. Once all testing is complete, JNET will promote the web service to the production environment and complete Production checkout testing. The Project Manager will advise the provider agency of the deployment (ref. Section 3.6).

    i. The Project Manager will close the project (ref. Section 2.4).

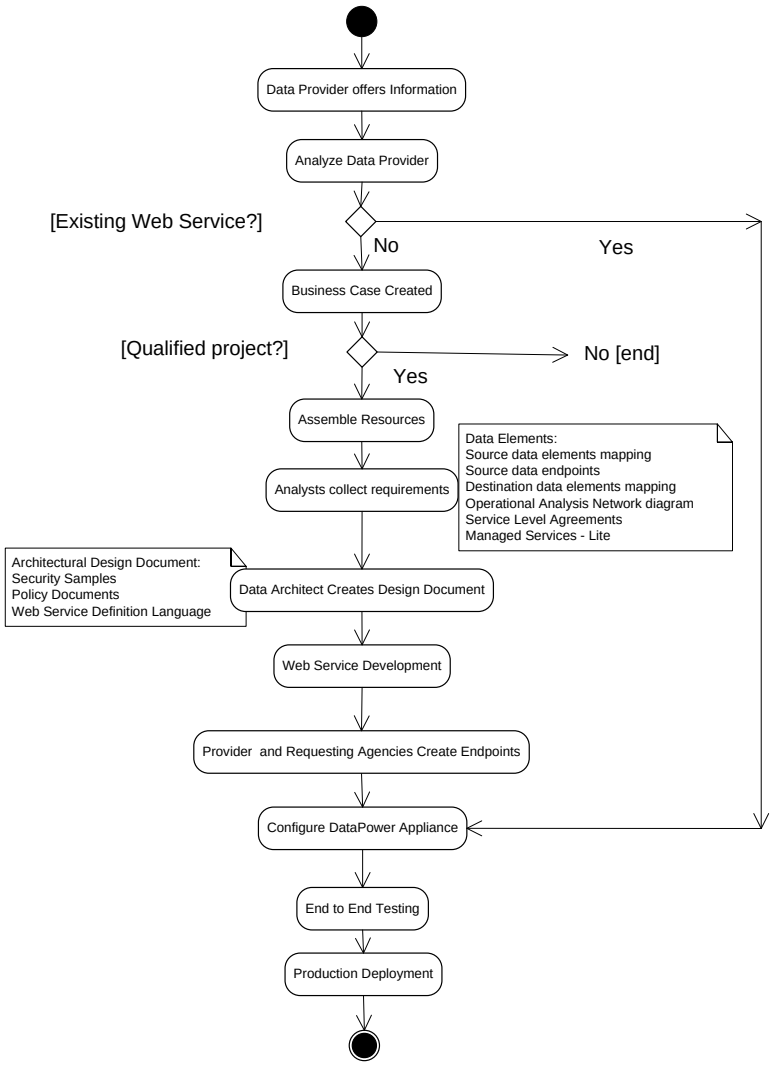


Figure 2 –Business Partner Providing Information

4.4.3. JNET Applications using Web Services

In addition to exchanging data between business partners, JNET often develops application systems that utilize web services to make requests for data. In these instances the formal JNET New Web Service Request Form is not used. The project follows the normal software development lifecycle (ref. Section 3, above). The steps included below are only those that pertain to the development and use of web services that involve exchanges with external data sources.

1. During the project qualification phase of the project, the Project Manager may have to analyze the business needs of the intended audience of the application and provide documentation on the relative security roles that can access the information provided. The JNET Business Office, based on the recommendation of the PM and the Security Officer, will establish the minimum user provisioning credential to access the new application. The PM,

with the assistance of the Executive Director will work with the data provider to reach an agreement for the data exchange.

2. During the project qualification process, all the organizations must reach an agreement on how to handle testing. Data provider organizations can balance their needs and test system availability to the project goals. The provider organization and JNET will work together to determine the security level and training requirements a user needs in order to access the data.

3. The Data Architect will provide the security documentation to the Application Developer. The JNET application support team will complete an Operational Impact Analysis to determine the network changes and level of effort needed to achieve the goals of the project.
4. The Application Development Manager will work with the Data Architect to determine the best method to connect the data source to the data requestor. The Application Support team will complete any updates to existing Service Level Agreements.
5. Once the requirements (System, Functional, Business Logic and User Interface) are completed and approved, the Analysts will turn them over to the application development team. The Business Analyst will assist the Data Architect to complete the first half of the Service Design Document (SDD). The Data Architect will complete the Service Design Document including the WSDL to make the Service Specification Package (SSP).The Application Development team will create the design document. The Project Manager will create the work breakdown structure to identify tasks, dependencies, and resources.
6. The Project Manager will engage the JNET team to begin any development to create the web services necessary for the application and user interface.
7. The Data Architect will create an architectural design document and create the procedure for configuring the DataPower appliance in Test and Production.
8. The Application Developers access the schema and samples that they need to begin to develop the queries and web services that provide the functionality. The data owners will provide documentation on relationships and mapping schema to JNET. WebMethods Developers will begin query development to obtain the information. If there are multiple web services necessary to achieve the objectives of the project, the Application Development Team will aggregate the web services for the user interface.
9. Once the Developers complete their queries, they will build the web services. Additionally, they will build the Business Bean/Component and the data access object, if necessary. The Developer working on the user interface will begin integrating the request interface into the web service query and the results into the display interface.
10. The Project Manager will request an operational impact analysis from the application support manager to identify the firewalls, server, connectivity, and prepare for the necessary user security levels. If necessary, the application support team will create or update the Service Level Agreement.
11. In an ideal situation, the test environments and the production environments mirror each other for adequate testing results. This would allow a thorough test from requestor to provider and back. However, a test connection between every external organization's test environments and JNET is often not possible.
12. In situations where it is not possible to test production systems with test records, the PM should arrange for a pilot test. This may mean that the PM gets preliminary approval for pilot testing and the Business Analyst recruits pilot users early in the project. The PM can outline expectations for both the data provider and the intended users. The goal is a realistic evaluation of a new application in a real environment. Historically, pilot testing has succeeded better in the production environment than in the test environment (ref. Section 3.5).
13. Since test records in a production environment could present problems for agencies that rely on production data for ordinary operations. JNET and the business partners should have testing agreements worked out as early as step 2, above.

14. Once all testing is complete, the Developers will schedule the Production deployment of the web service application and user interface.
15. Once pilot testing has completed, we will release the application to the approved JNET users.

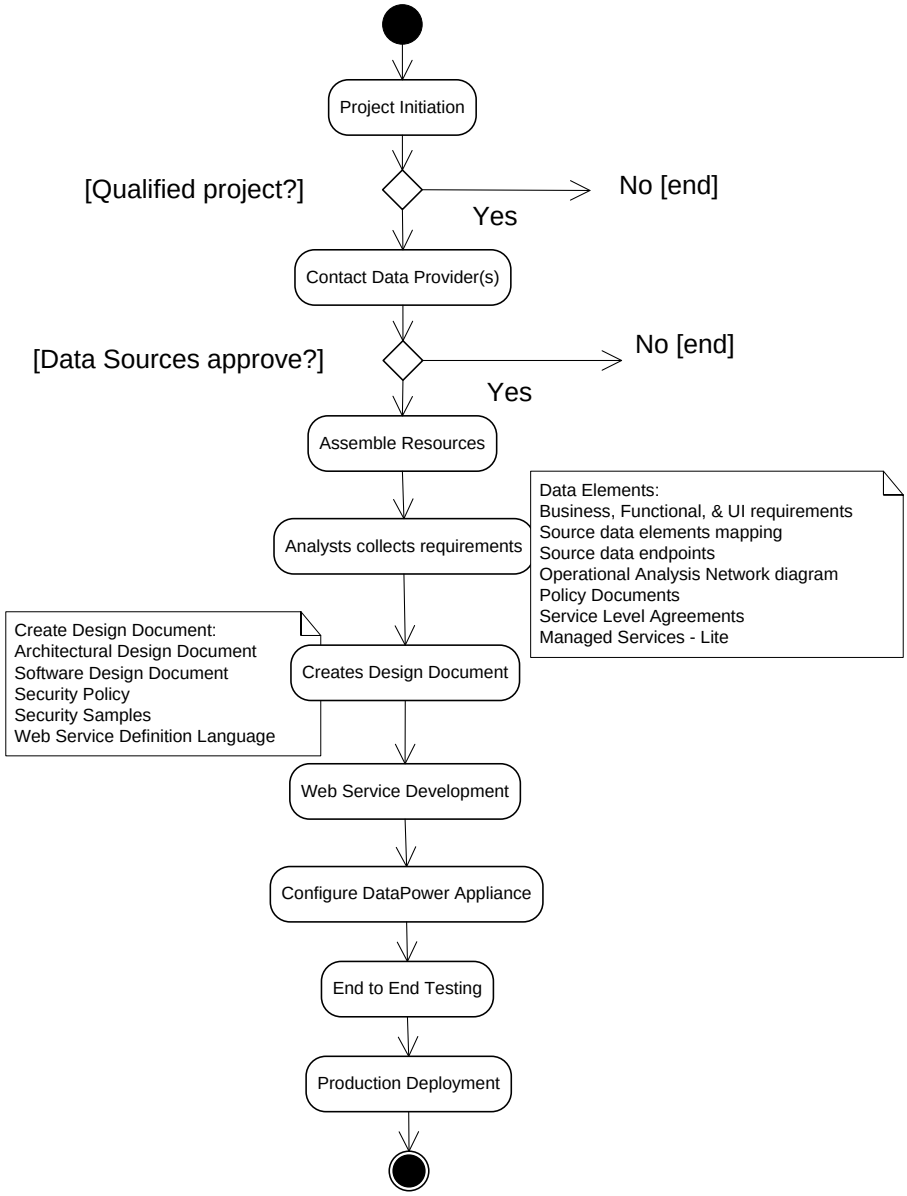


Figure 3 - JNET Web Services User Application

5. IT Infrastructure and Product Upgrade Process

5.1. Overview

This section describes the major steps involved in managing IT infrastructure and IT product upgrades at JNET. *IT Infrastructure* includes server hardware and software, data communications, connectivity (LAN/WAN), and middleware (SOA or MI). *Products* are typically specific vendor-supplied IT infrastructure components – e.g., server hardware or server operating systems (OS), database management systems (DBMS), routers, integrated service bus (ISB), etc. Primarily because of the impact that upgrades to these types of products can have on the production or operations environment, it is important that they be managed at least as carefully as application system software development projects. As with application system development projects, the general project life cycle phases and activities described in section 2, above provide the general framework in which the unique activities associated with IT infrastructure and product upgrades occur.

5.2. Planning Phase

The critical planning phase occurs in the context of project qualification (see Section 2.1); i.e., the planning activities defined here are important for developing the Project Charter and high-level project scope.

5.2.1 Planning

Participants	❑ Project Manager ❑ JNET System Architecture and Development Manager, JNET QA/Testing Lead, JNET Application Support Manager ❑ Project Sponsor(s) ❑ PA Compute Services (PACS) ❑ Product vendors ❑ JNET Application Support Staff
Activities Checklist	❑ Review vendor information about the upgrade ❑ Confirm product licensing ❑ Confirm PACS readiness to support the infrastructure or product upgrade ❑ Confirm availability of and identity of PACS staff resources committed to the project ❑ Review JNET's Configuration MindMap ❑ Identify impacted JNET application systems ❑ Identify JNET staff resources needed to work on the project ❑ Identify the vendor's POC and staff resources required to work on the project ❑ Identify impacted system documentation
Work Product(s) / Deliverables	❑ JNET Project Qualification Phase outputs (see above, page 9)
Tools and Templates	❑ JNET Configuration Mind Map ❑ JNET Project Qualification Tools and Templates (see page 9, above) ❑ ServiceNow

5.3. Analysis Phase

The analysis activities are conducted within the project initiation framework (see Section 2.2, above). In this phase, all of the hardware, software (including application system software), communications and LAN/WAN connectivity components are thoroughly reviewed and analyzed for the upgrade's impacts. Moreover, areas are targeted for improvement and metrics gathered to be used to assess if the target improvements have been achieved. This information is captured as technical requirements. And, if necessary, products are procured through PACS processes.

5.3.1 Analysis

Participants	❑ Project Manager ❑ JNET System Architecture and Development Manager, JNET QA/Testing Lead, JNET Application Support Manager ❑ PACS ❑ Product vendors ❑ OA Legal Staff (if required for licensing assessment) ❑ JNET Application Support Staff ❑ JNET Architecture and Technical Analyst(s)
Activities Checklist	❑ Assess product licensing compliance and confirm that a sufficient number of licenses are owned. ❑ Review and assess impacted IT infrastructure for its ability to support the upgrade ❑ Identify and target areas for improvements ❑ Perform a thorough risk analysis ❑ Document technical requirements
Work Product(s) / Deliverables	❑ Requirements Specification ❑ Procurements ❑ Project Initiation Phase Work Products and Deliverables (see pages 12-13)
Tools and Templates	❑ JNET Technical Requirements Specification Template ❑ JNET Project Initiation Tools and Templates (see page 13, above) ❑ PACS Service Catalog ❑ ServiceNow

5.4. Design Phase

The design phase is applicable primarily if new IT infrastructure components are being introduced that significantly affect the infrastructure design. Design phase activities are conducted within the project execution and control framework (see Section 2.3, above). The team member assigned to play the role of IT Infrastructure Architect will use the technical requirements produced in the Analysis Phase, vendor documentation, and any existing infrastructure design documents to produce detailed infrastructure design specifications. Those specs will also be provided to PACS

in their required format. In addition, a detailed implementation strategy will be developed during this phase, as well as a Validation/Test Plan and Test Cases.

5.4.1 Design

Participants	❑ Project Manager ❑ JNET System Architecture and Development Manager, JNET QA/Testing Lead, JNET Application Support Manager ❑ PACS ❑ Product Vendors ❑ JNET Application Support Staff ❑ JNET Architecture and Technical Analyst(s) ❑ JNET QA/Tester(s)
Activities Checklist	❑ Review technical requirements ❑ Review existing IT infrastructure design documentation ❑ Review existing OIT MSL Document(s) ❑ Review vendor documentation ❑ Produce new or revised detailed IT infrastructure design specifications ❑ Develop upgrade implementation strategy ❑ Develop a validation/test plan and test cases ❑ Project execution and control activities
Work Product(s) / Deliverables	❑ Detailed Infrastructure Design Specs (new or updated) ❑ Upgrade Implementation Strategy ❑ Validation/Test Plan (including Test Cases) ❑ Project Execution and Control Phase Work Products and Deliverables (see pages 17-18)
Tools and Templates	❑ JNET IT Infrastructure Design Document Template ❑ Design documentation tools or templates required by PACS ❑ JNET Test Plan and Test Cases Templates ❑ JNET Project Execution and Control Tools and Templates (see page 18, above)

5.5 Validation Phase

Validation phase activities are conducted within the project execution and control framework (see Section 2.3, above). During this phase, the new or upgraded IT infrastructure components, as well as impacted application systems, are deployed in the JNET DEV and TEST environments, according to implementation strategy. Detailed deployment instructions are developed and documented using both the implementation strategy document and experiences gained during the actual deployments. If application systems and/or web services are impacted and must be modified, the Developers assigned to the Project make and unit test those changes n the upgraded DEV environment. The QA/Test Team then uses the Test Plan and Test Cases developed during the design phase to thoroughly test the hardware and software (including application system software) and networking components impacted by the upgrade. If test results

are positive, approval to proceed is granted. Finally, if JNET users must be notified if the impending changes, communications must be prepared at this time.

5.5.1 Validation

Participants	❑ Project Manager ❑ JNET System Architecture and Development Manager, JNET QA/Testing Lead, JNET Application Support Manager, JNET Communications Manager ❑ PACS ❑ Product Vendors ❑ JNET System Developers ❑ JNET Application Support Staff ❑ JNET Architecture and Technical Analyst(s) ❑ JNET QA/Tester(s)
Activities Checklist	❑ Review implementation strategy ❑ Deploy infrastructure or product upgrade in JNET's DEV and TEST Environments ❑ Re-deploy impacted application system software and/or web services in upgraded DEV environment ❑ Modify application systems software and/or web services as needed and unit test in the DEV environment ❑ Produce and document detailed implementation instructions for all impacted components ❑ Deploy modified apps to TEST ❑ Thoroughly test/validate the changes to the infrastructure, application system software and/or web services. ❑ Decide on date to implement in PRODUCTION ❑ Determine if user communications are required ❑ Project execution and control activities
Work Product(s) / Deliverables	❑ JNET Release to TEST Request ❑ Detailed Deployment/Implementation Plan and Instructions ❑ Test Results Report ❑ End-User Communications (if necessary) ❑ Approval to implement in the PRODUCTION/Operational environment ❑ Project Execution and Control Phase Work Products and Deliverables (see pages 17-18) ❑ Deployment Checklist
Tools and Templates	❑ JNET Release Request Form ❑ JNET Deployment Instructions Template ❑ MSL Document Template ❑ JNET Test Results Report Template ❑ JNET Project Execution and Control Tools and Templates (see page 18, above)

5.6 Production Implementation Phase

Activities in this phase continue to be conducted under the project execution and control umbrella. Upon approval to implement the upgraded and impacted components in the operational environment, the JNET Application Support Team (and/or PACS, and/or product vendor) follows the detailed instructions developed in the validation phase to deploy to JNET's PRODUCTION environment. The JNET QA/Test Team confirms that the implementation has been successful. If necessary, the JNET Communications Team notifies JNET Portal users and Business partners of the upgrade.

5.6.1 Production Implementation

Participants	❑ Project Manager ❑ JNET System Architecture and Development Manager, JNET QA/Testing Lead, JNET Application Support Manager, JNET Communications Manager ❑ PACS ❑ Product Vendors ❑ JNET System Developers ❑ JNET Application Support Staff ❑ JNET QA/Tester(s)
Activities Checklist	❑ Submit JNET Release Request and Detailed Deployment Plan/Instructions ❑ Schedule upgrade implementation date ❑ Perform upgrade tasks ❑ Perform production checkout ❑ Notify JNET Users and Business partners (if applicable) ❑ Project execution and control activities
Work Product(s) / Deliverables	❑ JNET Release to PROD Request ❑ Detailed Deployment/Implementation Plan and Instructions ❑ Production Checkout Report ❑ End-User Communications (if necessary) ❑ Project Execution and Control Phase Work Products and Deliverables (see pages 17-18)
Tools and Templates	❑ JNET Release Request Form ❑ JNET Deployment Instructions Template ❑ MSL Document Template ❑ JNET Project Execution and Control Tools and Templates (see page 18, above)

5.7 Post- Implementation Review Phase

All post-implementation review activities are completed within the context of the Project Closure Activities, detailed in Section 2.4, above.

6. Glossary

Term	Definition
Acceptance Criteria	The criteria that a software component, product, or system must satisfy in order to be accepted by the system owner or the authorized acceptance authority.
Acceptance Testing	See *System Acceptance Testing*
Activity	A major unit of work to be completed in achieving the objective of a project. An activity incorporates a set of tasks to be completed, consumes resources, and results in work products. An activity may contain other activities in a hierarchical manner. All project activities should be described in the Project Plan.
Actor	Anything that needs to interact with the system to exchange information. To the system, an actor can be a customer, user, department, organization, or another system.
Analysis	See also *System Analysis*.
Application Enhancement	See *System Enhancement*
Application Programs	Language-based machine-readable representations of what a software process is supposed to do, or how a software process is supposed to accomplish a task.
Application System	See *Information System*
Audit	An independent examination of a work product to assess compliance with specifications, standards, quality or security requirements, contractual agreements, or other predetermined criteria.
Baseline	A set of configuration items (software components and document) that has been formally reviewed and agreed upon, that serves as the basis for further development, and that can be changed only through formal change control procedures.
Baseline Plan	A preliminary master project plan that includes schedule and resource assignments for the entire project.
Baseline Requirements	The set of project requirements that have been approved and signed off by the system owner during the Requirements Definition Phase. The software product design is based on these requirements. The baselined requirements are placed under configuration control.
Beta Test	See also *Pilot Test* or *Validation Test*.
Bug	Term commonly used to describe an error or problem that has surfaced in a software program.
Bug-Fix	Changes required to a program to correct a problem (or bug).
Business Analyst	A systems analyst that specializes in business problem analysis and technology-independent requirements analysis.
Business Process Redesign (BPR)	Also called *business process re-engineering*, it is the study, analysis and redesign of fundamental business processes to reduce costs and/or improve value added to the business.
CA^2 Process	Commonwealth Application Accreditation and Certification—the process by which in-house developed and purchased web-based, internet-facing application systems are assessed for security vulnerabilities.
Code Review	A meeting at which software code is presented to project personnel, managers, users, or other functional areas for review, comment, or approval.

Component	A group of objects packaged together into one unit.
Computer-Aided Software Engineering (CASE)	The use of computers to aid in the software engineering process. May include the application of software tools for software design, requirements tracing, code production, testing, document generation, and other software engineering activities.
Configuration Control	An element of configuration management consisting of the evaluation, coordination, approval/disapproval, and implementation of changes to configuration items after formal establishment of their configuration identification.
Configuration Control Board	A group of people responsible for evaluating and approving/disapproving proposed changes to configuration items, and for ensuring implementation of approved changes.
Configuration Item	An aggregate of hardware of software components that are designated for configuration management and treated as a single entity in the configuration management process.
Configuration Management	See *Software Configuration Management*.
Constraint	A restriction, limit, or regulation that limits a given course of action or inaction.
Cost Estimate	A formal estimate of the cost to develop and support a project. Estimates should reflect all activities such as design, development, coding, distribution, service, and support of the products; staffing; training and travel expenses; subcontractor activities; contingencies; and cost for external services (e.g., technical documentation production and Quality Assurance audits and reviews).
Critical Path	The sequence of dependent project tasks that have the largest sum of most likely durations. The critical path determines the earliest possible completion date of the project.
Data Flow Diagram	A tool that depicts the flow of data through a system or processing performed by that system. Synonyms include bubble diagram and process model.
Data Requirements	A representation of users' data in terms of entities, attributes, relationships and rules.
Database	A collection of interrelated files.
Database Administrator (DBA)	Person responsible for the database technology, database design and construction consultation, security, backup and recovery, and performance tuning.
Database Management System (DBMS)	Specialized computer software available from computer vendors that is used to create, access, control, and mange the database. Examples are Microsoft SQL Server and Oracle Database.
Deliverable	A work product that is identified in the Project Plan and is formally delivered to the system owner/sponsor and other project stakeholders for review and approval.
Deployment	See *System Implementation*.
Design	See *System Design*.
Detailed System Design Document	A work product deliverable that describes the solution to the automation task as described by the requirements. Contains sufficient detail to provide necessary direction for writing the Program Specifications and allows developers maximum technical freedom.
Development Phase	The period of time in the software lifecycle during which a software product is created from the design specifications and testing is performed on the individual software units.
Feasibility	The measure of how beneficial or practical the development of an information system will be to an organization.

Feasibility Analysis	The process by which feasibility is measured and assessed.
Feature Creep	The uncontrolled addition of technical features to a system under development without regard to schedule and budget.
Forward Scheduling	Establishes a project start date and then schedules forward from that date. Based on the planned duration of required tasks, their inter-dependencies, and the allocation of resources to complete those tasks, a projected project completion date is calculated.
Function	A set of related and *ongoing* activities of the business. A function has no start and end; it just continuously performs its work as needed.
Functional Manager	Individuals who hire and manage the day-to-day, non-project work activities of staff assigned to various functional areas of JNET, including IT Application Development, IT Application Support, the Business Office, Communications Office, Budget and Administration Office. They typically fill requests of Project Managers for Project Team members, and help oversee project activities performed by their staff members.
Functional Requirement	A requirement that specifies a function that a software component, product, or system must be able to perform.
Functional Testing	Testing conducted to evaluate the compliance of software product with specified functional requirements. Testing that focuses on the outputs generated in response to selected inputs and execution conditions.
Gantt Chart	A simple horizontal bar chart that depicts project tasks against the calendar. Each bar represents a named project task. The tasks are listed vertically in the left-hand column. The horizontal axis is a calendar timeline.
IEPD	Information Exchange Package Documentation. A written description of specific information that is exchanged between a sender and a receiver. Also includes sample XML instances and documented business rules.
Implementation Requirements	A *nonfunctional* requirement that supports the development and maintenance concepts and approaches in the areas of operating environment, conversion, installation, training, and documentation.
Incremental Development	A software development technique in which requirements definition, design, implementation, and testing occur in an overlapping, iterative (rather than sequential) manner, resulting in incremental completion of the overall software product.
Inspection	A static analysis technique that relies on visual examination of development produces to detect errors, violations of development standards, and other problems. Code inspection and design inspection are two types.
Integration Testing	An orderly progression of testing in which software components are combined and tested to evaluate the interaction between them.
Interactive Analysis and Design	A development methodology that use facilitated team techniques, such as Joint Application Development or Rapid Application Development, to rapidly develop project requirements that reflect the users' needs in terminology that the users understand. Group facilitation techniques are especially important when several user organizations have unique project requirements that are specific to their mission and goals.
Interface Requirement	A *nonfunctional* requirement that specifies an external item with which a software product or system must interact, or that sets forth constraints on formats, timing, or other factors caused by such an interaction.
Interface Testing	Testing conducted to evaluate whether software components pass data and control correctly to one another.
Joint Application Development (JAD)	A technique that complements other systems analysis and design techniques by emphasizing participative development among system owners, users, designers, and builders.

Joint Requirements Planning (JRP)	A subset of JAD, it is a process whereby highly structured group meetings are conducted to analyze problems and define requirements.
Maintenance	The process of supporting a software product or system after delivery to maintain operational status, correct faults, improve performance or other attributes, or adapt to a changed environment.
Methodology	A collection of methods, procedures, and standards that defines an integrated synthesis of engineering approaches to the development of a work product.
Milestone	An event that signifies accomplishment or completion of major deliverables during a project.
NIEM	National Information Exchange Model
Nonfunctional Requirements	A description of other features, characteristics and constraints that define a satisfactory system.
OA	Governor's Office of Administration. Agency of which JNET is a part.
OIT	Office of Information Technology. Deputate within the Office of Administration, of which JNET is a part.
PACS	PA Compute Services: a hybrid cloud-based IT infrastructure services provider for agencies under the Governor's jurisdiction.
Performance Requirement	A *nonfunctional* requirement that imposes conditions on a functional requirement (e.g., a requirement that specifies the speed, accuracy, or memory usage with which a given function must be performed).
PERT Chart	A graphical network model that depicts a project's tasks and the relationships between those tasks.
Phase	A partition of the software lifecycle that reduces a project to manageable size and represents a meaningful and measurable set of related tasks that are performed to obtain specific work products.
Pilot Test	Also called *Beta Test* or *Validation Test*, this is a test of the system running in a live environment using real data. A number of items are tested, including system performance, peak workload processing performance, human engineering, backup and recovery
PMBOK	*Project Management Body of Knowledge*: Standards developed and published by the Project Management Institute (PMI) for the project management profession; identifies the most effective global practices in project management. In the form of a *Guide*, it provides a foundation that is fundamental for the universal standard practice of project management across industries, geographies and project types.
Procedure	A written description of a course of action to be taken to perform a given task.
Process	An ordered set of steps performed for a given purpose. Processes define or control the development of the project work products. The use of processes will ensure a consistent methodology across all platforms in producing the lifecycle deliverables.
Product	See *Work Product*
Project	A [temporary] sequence of unique, complex, and connected activities having one goal or purpose and that must be completed by a specific time, within budget, and according to specification.
Project Charter	Sometimes called a Statement of Work or a Project Definition, it is a formal document that provides background information for the project request, describes the business driver, defines the project objectives, scope, project approach, major deliverables, responsibilities, and target completion dates for major milestones.
Project Folder	A central repository of material pertinent to a project. Contents typically include all work products, memos, plans, technical reports, and related items.

Project Lifecycle (PLC)	A methodology that governs all aspects of planning, execution and closure of projects.
Project Manager	The individual with total business responsibility for all activities of a project. The Project Manager directs, controls, administers, and regulates a project.
Project Plan	Either a separate document or a section of the *Project Charter* that describes the technical and management approach to be followed for a project. The plan typically describes the work to be done, the resources required, the methods to be used, the procedures to be followed, the schedules to be met, and the way to project will be organized. The plan includes a list of deliverable, actions required, and other key events needed to accomplish the project.
Project Team	The Project Manger and all the other personnel resources assigned as the core group for a project. The project team might include representatives of partner organizations who are active participants in the project.
Prototyping	A technique for developing and testing a preliminary version of the software product (either as a whole or in modular units) in order to emulate functionality without such encumbering feature as error handling, help messages, security controls, and other utilities that are not part of the design logic. This allows the project team to test the overall logic and workability of required functions and requirements meet the intended objectives. Prototyping is often used in conjunction with interactive analysis and design techniques.
Rapid Application Development (RAD)	Techniques that emphasize extensive user involvement in the rapid and evolutionary construction of working prototypes of a system to accelerate the systems development process.
Rapid Prototyping	A type of prototyping in which emphasis is placed on developing prototypes earlier in the development process to permit early feedback and analysis in support of the development process.
Regression Testing	Selective retesting of a software component to verify that modifications have not caused unintended effects and that the software component still complies with its specified requirements.
Requirement	A condition of capability needed by a system owner and user to solve a problem or achieve an objective. A condition or capability that must be met or possessed by the software product to satisfy a contract, standard, specification, or other formally imposed documents.
Requirements Analysis	The process of studying system owner and user(s) needs to arrive at a definition of system, hardware, or software requirements.
Requirements Definition Phase	The period of time in the project or software lifecycle during which the requirements for a project's final deliverable or a software product are defined and documented.
Requirements Specification	A work product deliverable that specifies the manual and automated requirements for a software product (or other project final deliverable) in non-technical language that they system owner and users can understand. Typically included are *functional* requirements, and *non-functional* requirements such as performance requirements, and interface requirements. Describes in detail what will be delivered in the product release.
Resource Leveling	A strategy used to correct resource over-allocations by some combination of delaying or splitting tasks.
Risk	The possibility of suffering loss.
Risk Management	An approach to problem analysis that is used to identify, analyze, prioritize, and control risks.
Scope	Defines the boundaries of a project—what part of the business is to be studied, analyzed, designed, constructed, implemented and ultimately

	improved.
Scope Creep	The unexpected growth of user expectations and business requirements for a project's final deliverable as the project progresses. The project schedule and budget can be affected by such changes.
Service Oriented Architecture (SOA)	The concept that information delivery from multiple sources is a service that can be provided either through direct user request or from a system request to distribute capabilities from different ownership domains. SOA is not limited by any specific technology. Web Services are a port of SOA using SOAP and WSDL.
Service Description Document (SDD)	A document that provides a comprehensive description of the web service and contains the following sections: Service Overview, Business Scenarios, Service Interoperability Requirements, Additional Information, and the Service Model.
SOAP	The protocol specification for exchanging structured information in the implementation of Web Services in computer networks. It relies on Extensible Markup Language (XML) for its message format, and usually relies on other Application Layer protocols, most notably Hypertext Transfer Protocol (HTTP) and Simple Mail Transfer Protocol (SMTP), for message negotiation and transmission.
Slack Time	The amount of delay that can be tolerated between the starting time and completion time of a task without causing a delay in the completion of an entire project.
Software	Computer programs, procedures, and associated documentation and data pertaining to the operation of a software product or system.
Software Configuration Management	(1) A discipline that effectively controls and manages all modifications to a software component, product, or system. Technical and administrative processes and tools are used to identify and document the functional and physical characteristics of the configuration items, manage and track changes to those items, record and report change processing and implementation status, and verify compliance with specified requirements. (2) A software Engineering Institute Capability Maturity Model key process that is designed to establish and maintain the integrity of the software work products throughout the system's lifecycle.
Software Lifecycle	The period of time that begins when a software product is conceived and ends when the software is retired. A network of phases and processes that function together to guide the development and maintenance of software products. Each process produces a set of deliverables as it moves through the lifecycle.
Software System	A software product and the documentation, hardware, and communications needed to implement and operate the product and accomplish a specific function or set of functions. See also *Information System*.
Specification	A document that specifies in a complete, precise, verifiable manner the requirements, design, behavior, or other characteristics of a component, product, or system.
Stakeholder	Any person who has an interest in an existing or new information system. A stakeholder can be a technical or a non-technical worker.
Structured Analysis	An analysis technique that uses a graphical language to build models of software products or systems. The four basic features in structured analysis are data flow diagrams, data dictionaries, procedure logic representations, and data store structuring techniques.
Structured Design	A process-centered technique that transforms the structured analysis models into good software design models. A modeling tool called structure charts is used to illustrate software structure to fulfill business requirements.

System	A collection of hardware, software, firmware, and documentation components organized to accomplish a specific function or set of functions.
System Development Lifecycle (SDLC) or Methodology (SDM)	The very formal and precise methodology that identifies the processes, activities, tasks, management responsibilities, and work products that are required for each software development and maintenance project. A key objective of the methodology is to provide measurable, repeatable processes to assure that project development and maintenance methodologies are consistent throughout the information systems environment.
System Enhancement	Adapting an existing system to new business requirements or new design requirements. Usually initiated by *system owners*. Sometimes called Application Enhancement.
System Maintenance	Applying upgrades or patches to the underlying production platforms on which information systems run.
System Owner	The organizational unit that funds and has approval authority for a system development or system enhancement project. Typically, system owners are also system users.
System Test	A test to ensure that application programs written and tested in isolation work properly when they are integrated into the total system. This test usually involves system owners, users, developers and analysts. Testing is done using test data that was previously developed by a Systems Analyst.
Systems Acceptance Test	A final system test performed by end-users using real data over an extended period of time.
Systems Analyst	Facilitates the development of information systems and computer applications by bridging the gap that exists between non-technical system owners and users and technical system designers and builders.
System Conversion or Implementation	The delivery of a developed and tested system into production (meaning day-to-day operation).
Systems Support	The ongoing technical support for users, as well as the maintenance required to fix any errors, omissions or new requirements that may arise.
Task	The smallest unit of work subject to management accountability. A task is well-defined work assignment for one or more project team members. Related tasks are usually grouped to form activities. An task is the lowest level of work division typically included in the Project Plan and Work Breakdown Structure.
Task Dependency	A relationship of one task to another where the start of end date of the second task is related to the start or end date of the first task.
Test Bed	An environment containing the hardware, instrumentation, simulators, software tools, and other support elements needed to conduct a test.
Test Case	A set of test inputs, execution conditions, and expected results that are developed for a particular objective, such as to exercise a particular program path or to verify compliance with a specific requirement.
Test Criteria	The criteria that a software component or product must meet in order to pass a given test.
Test Documentation	Documentation describing plans for, or results of, the testing of a software component or product. Documents typically include test case specifications, test incident reports, test logs, test plans, test procedures, and test reports.
Test Log	A chronological record of all relevant details about the execution and results of a test.

Test Phase	The period of time in the software lifecycle in which the components of a software product are evaluated and integrated, and the software product is evaluated to determine whether or not the requirements have been satisfied.
Test Plan	A document specifying the scope, approach, resources, and schedule of intended testing activities. The plan identifies test items, the features to be tested, the testing tasks, who will do each task, and any risks requiring contingency planning.
Test Procedure	Detailed instructions for the setup, execution, and evaluation of the results for a given test case.
Test Report	A document that describes the conduct and results carried out for a software component or product.
Test Script	As users enter test data, that data is recorded in a special type of repository as a script. Ultimately, the test script is executed against the program to test that it executes properly and also to measure the program's response time.
Testing	An activity in which a software component or product is executed under specified conditions, the results are observed and recorded, and an evaluation is made.
Total Quality Management (TQM)	Comprehensive approach to facilitating quality improvements and management within a business and its products and services.
Traceability	The degree to which a relationship can be established between two or more products of the development process, especially products having a predecessor-successor relationship to one another.
Transaction Analysis	A technique used to derive structured charts for a software product that will process transactions. Transaction analysis is used to divide complex data flow diagrams into smaller, simpler data flow diagrams—one for each transaction that the product or system will process. Structure charts are developed from the simple data flow diagrams. The individual structure charts for the separate transactions are then combined to form one large structure chart that is very flexible and can accommodate user changes.
Use Case	A behaviorally related sequence of steps (a scenario), both automated and manual, for the purpose of completing a single business task.
Unit	A separately testable element specified in the design of a computer software component. A software component that is not subdivided into other components.
Unit Testing	Testing of individual hardware or software units or groups of related units. The isolated testing of each flowpath of code with each unit. The expected output from the execution of the flowpath should be identified to allow comparisons of the planned output against the actual output.
Usability	The ease with which a user can learn to operate, prepare inputs for, and interpret outputs of a software product.
User	The general population of individuals who use a software product or system. User activities can include data entry; read only; add, change and delete capabilities; querying; and report generations.
User Interface	An interface that enables information to be passes between a user and hardware or software components of a computer system.
User Manual	A document that presents the information necessary to use a software product to obtain desired results. Typically described are product or component capabilities, limitations, options, permitted inputs, expected outputs, possible error messages, and special instructions.
User Testing	Two types: *Functional Testing* (see above) and *Usability Testing* which is used to uncover problems related to ease-of-use.
Validation Testing	Runs the system in a live environment using real data. Also called *beta testing* or *pilot testing*.

Walkthrough	An analysis technique in which a team of subject matter experts review a segment of code or documentation, ask questions, and make comments about possible errors, violations of development standards, and other problems.
Web Service	The main enabling technique for SOA. Functions as middleware and as a modeling and management tool for composed business processes.
Web Services Definition Language (WSDL)	An XML format for describing network services as a set of endpoints operating on messages containing either document-oriented or procedure-oriented information. These operations and messages are described and then bound to a concrete network protocol and message format to define an endpoint. Related concrete endpoints are combined into services.
Work Breakdown Structure (WBS)	A hierarchical decomposition of a project into phases, activities and tasks.
Work Product	Any tangible item that results from a project function, activity, or task. Examples of work products include process descriptions, plans, procedures, computer programs, and associated documentation, which may or may not be intended for delivery to the system owner and other project.