



Execution of Solution Phase Procedures

Version 1.1

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Version History

Version Number	Implemented By	Revision Date	Approved By	Approval Date	Description of Change
1.0	Chris Niedermayer	December 20, 2010			Final Version 1.0
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Contents

1.	Execution of Solution Phase	1
1.1	Execution of Solution Phase Description.....	2
1.1.1	High-Level Task Process Flow.....	3
1.1.2	Entry Criteria/Input	4
1.1.3	Control Gate Review Criteria	4
1.1.4	Tasks	4
1.2	Execution of Solution Phase Task Description.....	6
T4-1	Configure the Development, Testing, and Training Environments.....	6
T4-2	Create Physical Database.....	8
T4-3	Develop Software.....	10
T4-4	Finalize Test Strategy.....	13
T4-5	Conduct Security Activities	15
T4-6	Conduct User Acceptance Testing	18
T4-7	Create User Training Documentation.....	20
T4-8	Conduct User Training.....	22
T4-9	Develop Operations and Maintenance Documentation	24
T4-10	Update the Project Schedule and Other Project Artifacts.....	26
T4-11	Conduct Deployment Go/No-Go Decision Meeting.....	28



1. Execution of Solution Phase

The Department of Housing and Urban Development’s (HUD) Project Planning and Management (PPM) Life Cycle is the rigorous application of sound investment, project management principles and best practices for organizing and managing IT projects. As a component of HUD’s overarching Information Technology Management (ITM) Framework, it provides the context for the HUD IT governance process and describes the interdependencies between project management, investment management, and capital planning components.

The PPM Life Cycle covers all aspects of a project from the initial development of an idea through to its decommissioning. Because there is wide variance in the methods, techniques, and tools needed to support an IT project, the PPM Life Cycle is flexible and can be tailored to address the needs and requirements of each individual project regardless of its size. It aims to capture the minimum level of detail necessary to ensure project success. Each project, working in conjunction with the Office of the Chief Information Officer (OCIO), will capture decisions around PPM Life Cycle tailoring in the *Project Process Agreement* (PPA), which documents the reasons for using, combining, or skipping specific artifacts applicable to the project.

The PPM Life Cycle applies to all HUD IT projects, including but not limited to:

- New projects
- Major enhancements to existing projects
- Projects associated with steady state investments
- High-priority, fast-track IT projects
- New commercial-off-the-shelf (COTS) product acquisitions

There are seven major phases of the PPM Life Cycle; artifacts have been created for each phase. These artifacts are interrelated, either rolling up other artifacts, or building upon a concept to define a lower level of detail.

This document addresses the processes and related procedures for the Execution of Solution Phase, the fourth phase in the PPM Life Cycle.



Figure 1 - The Execution of Solution Phase Relative to the Entire PPM Life Cycle

The purpose of this document is to:

- Provide a detailed description of the phase
- Identify the tasks and activities that take place during the phase
- Give guidance and templates on completing the tasks and activities required to exit the phase
- Detail the roles and responsibilities associated with completing each of the tasks and activities for this phase



1.1 Execution of Solution Phase Description

The Execution of Solution Phase takes as its initial input the detailed design information captured in the approved design documents. (These design documents are a part of the Design Phase package approved by the Technical Review Sub-Committee (TRC), Customer Care Committee (CCC), or the Executive Investment Board (EIB) at the Design Phase control gate review.)

During the software development portion of the phase, the development team takes the detailed design information and transforms it into machine-executable form, and ensures that all of the individual components of the solution function correctly and interface properly with other components within the solution. As necessary and appropriate, the development team builds database(s) according to the specifications in the *Technical Design* document and the associated data dictionary, develops custom software programs, and integrates all software components (commercial/government-off-the-shelf (COTS/GOTS), custom-developed software, and databases). The development team also refines the *Data Conversion Plan*, if applicable.

The appropriate members of the integrated project team (IPT) finalize the test case specifications, identifying the data required to support the testing activities. The development team conducts unit and system testing to verify that the software is in a sufficient state of readiness for integration and formal user acceptance testing by an assigned test group (i.e., persons other than the development team).

During the testing portion of the phase, the IPT determines – based on preliminary testing completed during the development stage – whether the solution is ready for implementation. During the test stage, formally controlled and focused testing is performed to uncover errors and bugs that need to be resolved. The specific validation tests include requirements validation, system integration, interface, regression, information security, performance, stress, usability, and user acceptance. The team may conduct additional tests to validate documentation and installation depending upon the specific circumstances of the project. All test results are appropriately documented in the *Test Report*.

The IPT finalizes the training plans and develops initial versions of the applicable user manuals and operations and maintenance manuals.

The overall objective of the Execution of Solution Phase is to convert the deliverables of the Design Phase into a complete solution that satisfies the requirements defined in the *Technical Design* document, *Requirements Definition* document, and the *Requirements Traceability Matrix*.

Based on information acquired in this phase, the IT project manager (PM) in collaboration with the IPT updates the *Project Schedule (WBS)* to reflect modifications to previously-defined tasks, incorporates new tasks for current and future phases, adjusts resource requirements and allocations, and records estimated and actual costs. The *Project Management Plan* and *Risk Management Plan* are updated to reflect any impact that the development, testing, training, and deployment efforts may have on the project.

The Execution of Solution Phase ends with a control gate review to determine the project's readiness to proceed to the Deployment Phase.

1.1.1 High-Level Task Process Flow

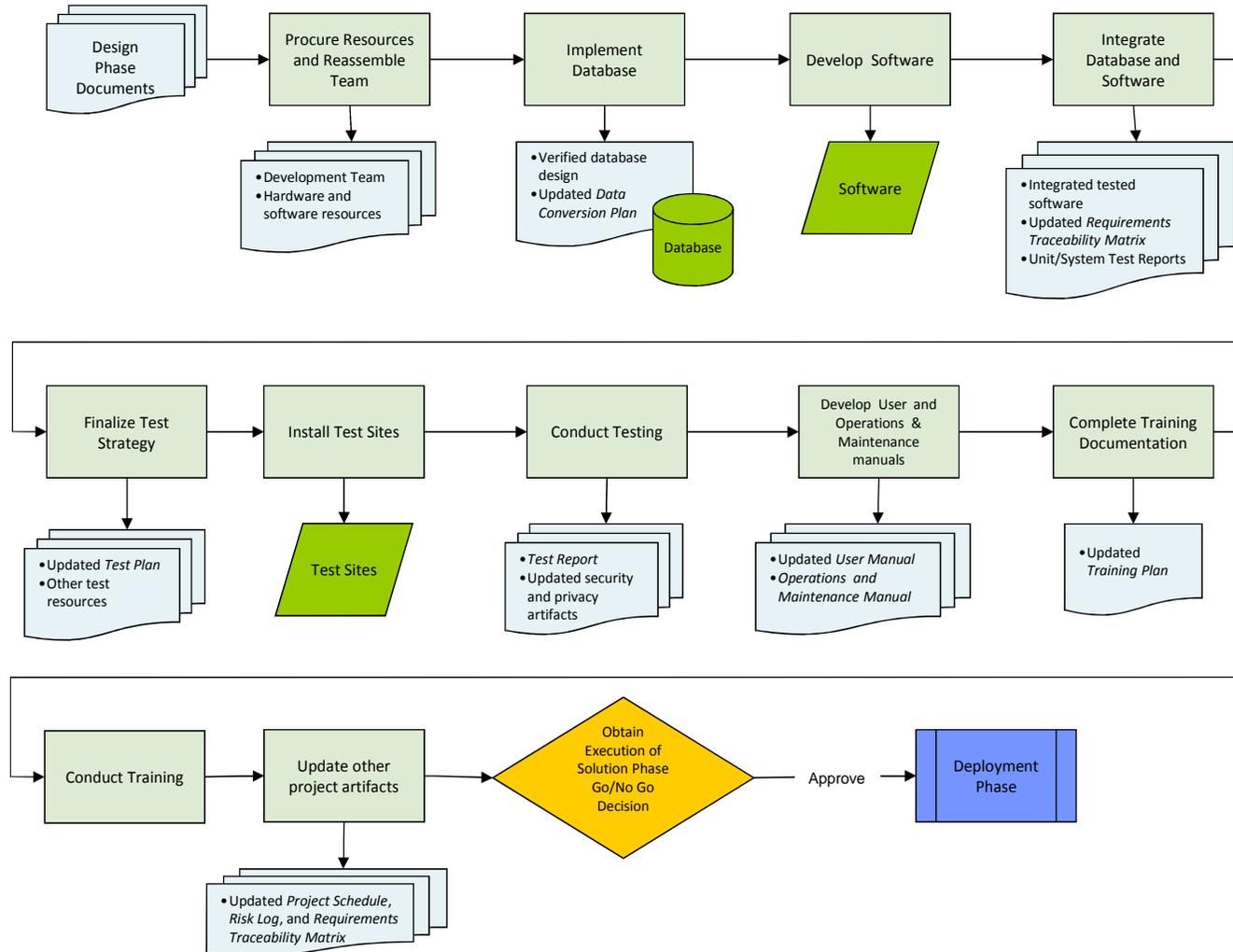


Figure 2 - Execution of Solution Phase Process Flow



1.1.2 Entry Criteria/Input

Before the Execution of Solution Phase can begin, the governance board(s) must have reviewed the Design Phase package and given approval for the project to begin the Execution of Solution Phase. The Design Phase package varies depending on the size and complexity of the project, and may include:

- *Request for Contract Services (HUD 720 Package)*, if necessary
- *Technical Design* document
- *Independent Verification and Validation Plan*
- *Data Conversion Plan*
- *Interface Control* document
- *Release Plan*
- *Implementation Plan*
- *System of Record Notice*
- *Training Plan*
- *Test Plan*
- Updates to the *Project Management Plan* and its subsidiary management documents
- Updates to the *Requirements Definition* document, *Requirements Traceability Matrix*, and *Solution Architecture* document
- Updates to the *Project Schedule (WBS)*
- Decision by TRC/CCC/EIB to proceed to the Execution of Solution Phase

1.1.3 Control Gate Review Criteria

In order to pass through the Execution of Solution Phase control gate, the project team must receive approval of the Execution of Solution Phase Package from the governance board(s). The Execution of Solution Phase package varies depending on the size and complexity of the project, and may include:

- *Test Report*
- *Operations and Maintenance Manual*
- *User Manual*
- Training materials
- *Test Plan*
- Security and privacy artifacts

1.1.4 Tasks

The following tasks take place in the Execution of Solution Phase:

- T4-1 Configure the Development, Testing, and Training Environments
- T4-2 Create Physical Database
- T4-3 Develop and Unit Test Software
- T4-4 Finalize Test Strategy
- T4-5 Conduct Security Activities
- T4-6 Conduct User Acceptance Testing
- T4-7 Create User Training Documentation
- T4-8 Conduct User Training
- T4-9 Develop Operations and Maintenance Documentation



Execution of Solution Phase Procedures

- T4-10 Update the *Project Schedule* (WBS) and Other Project Artifacts
- T4-11 Compile and Submit Execution of Solution Phase Package for Go/No Go Decision



1.2 Execution of Solution Phase Task Descriptions

T4-1 Configure the Development, Testing, and Training Environments

What Happens?

The hardware and software environments are configured to support the Execution of Solution Phase activities, including database implementation, coding, and testing.

Note: Some portions of this step may be skipped if the environments were already configured in the Design Phase.

Who Does What?

The IT project manager (PM) works with the configuration manager, database administrator (DBA), network manager, server manager, telecommunications manager, and the system development lead to verify that the development, test, and training environments are ready for the scheduled phase activities.

What Comes in?

- Hardware
- Software
- *Configuration Management Plan*
- *Solution Architecture* document
- *Technical Design* document
- *Test Plan*
- *Training Plan*

What Controls Need to be Used?

The team uses the controls listed below to create the relevant artifacts or complete the task activities:

- Infrastructure Installation guidelines

What is Produced?

Work Product	Responsibilities		Must Create	Should Create	Should Update	Must Update	Must Complete
Configured Environments	Responsible	Server manager	X				
	Accountable	IT PM					
	Consulted	IPT members, HITS team					
	Informed	TRC/CCC/EIB					

Detailed Tasks

The following defines the detailed sub-tasks that take place within this task:

T4-1.1 Install and Configure the Hardware and Software – The IT PM coordinates with the HUD Information Technology Service (HITS) team, as well as the server manager, network manager,



lead solution architect, database administrator, configuration manager, and other technical team members to configure existing and newly acquired hardware and software components.

T4-1.2 Perform Configuration Control –The configuration manager uses the *Configuration Management Plan* to identify the baseline software objects to be deployed into the development environment.

T4-1.3 Setup Access Privileges – The IT PM, with input from the business PM and the system development lead, identifies developers and testers who need access to the development and test environment (database, COTS/GOTS applications, development and testing tools, and other components). The IT PM coordinates with the relevant HUD entities to establish the necessary access rights.



T4-2 Create Physical Database

What Happens?

The database structure defined in the *Technical Design* document and *Data Dictionary* is created and verified.

Who Does What?

The database administrator, working with the configuration manager, requirements lead, and the system development lead, creates and deploys the database in the development environment.

The team loads the database, executing any applicable data conversion procedures, and validates that the installed and populated database meets the solution requirements and HUD’s data management standards.

The IT PM works with the database administrator and system development lead to update the database specifications in the *Technical Design* document and *Data Dictionary* to reflect any necessary modifications to the database structure.

What Comes in?

- Configuration Management Plan
- Solution Architecture document
- Technical Design document

What Controls Need to Be Used?

The team uses the controls listed below to create the relevant artifacts or complete the task activities:

- HUD data management standards
- Technical Design template, template instructions, and checklist

What Is Produced?

Work Products	Responsibilities		Must Create	Should Create	Should Update	Must Update	Must Complete
Physical Database	Responsible	Database administrator	X				
	Accountable	IT PM					
	Consulted	Configuration manager Requirements lead System development lead					
	Informed	TRC/CCC/EIB					
Technical Design	Responsible	IT PM				X	
	Accountable	Database administrator					
	Consulted	System development lead Requirements lead					
	Informed	TRC/CCC/EIB					



Detailed Tasks:

The following defines the detailed sub-tasks that take place within this task:

T4-2.1 Build Database – The database administrator, working with the configuration manager, requirements lead and the system development lead, creates and deploys the database in the development environment. The database administrator uses the specifications laid out in *Technical Design* document and *Data Dictionary* to guide the database build. The team verifies that the data model is consistent with HUD data management standards and does not introduce any anomalies to the development environment (and potentially the production environment).

The database administrator may use a standard data modeling tool such as CA ERwin to manage the data model.

T4-2.2 Test Database – The database administrator loads data into the database, applying any applicable data conversion procedures. The database administrator, requirements lead, and system development lead review the database structure to ensure that the technical implementation meets specifications and aligns with business requirements. They also verify that the converted data meets business requirements and support development and unit testing efforts.

The IT PM, database administrator, requirements lead, and system development lead evaluate any deviations from expected results and assess the acceptability of the deviations. They determine the impact of any changes to the database structure and/or data conversion strategy on the information value and/or project schedule. With input from other IPT members, the IT PM and database administrator refine the database structure and/or data conversion approach as required.

T3-1.1 Update Data Documentation – The IT PM works with the database administrator and system development lead to update the database specifications in the *Technical Design* document and *Data Dictionary* to reflect any necessary modifications to the database structure. If changes are significant, the enterprise architecture representative on the IPT reviews the changes for adherence to HUD enterprise data management and quality standards. The IT PM also updates the *Data Conversion* plan if necessary. The IT PM uses the *Technical Design* and *Data Conversion Plan* templates, instructions, and checklists to guide the update of the *Technical Design* document and the *Data Conversion Plan*.



T4-3 Develop Software

What Happens?

The business requirements captured in the *Requirements Definition* document and the *Requirements Traceability Matrix* and the specifications in the *Technical Design* document are transformed into machine operating instructions and software code. The software code is unit and system tested.

Who Does What?

The system development lead monitors the development of the software. The developers code and/or configure the software and conduct unit and system testing. The requirements lead updates the *Requirements Traceability Matrix*. The IT PM and system development lead update the *Solution Architecture*, *Technical Design*, and the *Interface Control* documents as necessary.

What Comes in?

- *Technical Design* document
- *Data Conversion Plan*
- *Configuration Management Plan*
- *Solution Architecture* document
- *Interface Control* document
- *Requirements Traceability Matrix*
- *Requirements Definition* document

What Controls Need to Be Used?

The team uses the controls listed below to create the relevant artifacts or complete the task activities:

- HUD coding and development standards (e.g., Oracle/SQL Server and Java coding standards)
- Section 508 compliance standards
- HUD IT security and privacy standards and guidelines
- Federal IT security and privacy standards and guidelines
- Templates, instructions, and checklists for the *Requirements Traceability Matrix*, *Solution Architecture*, *Technical Design*, and the *Interface Control* documents

What Is Produced?

Work Product	Responsibilities		Must Create	Should Create	Should Update	Must Update	Must Complete
<i>Requirements Traceability Matrix</i>	Responsible	Requirements Lead				X	
	Accountable	IT PM					
	Consulted	Business PM and other IPT members					
	Informed	TRC/CCC/EIB					



Work Product	Responsibilities		Must Create	Should Create	Should Update	Must Update	Must Complete
Software	Responsible	System development lead Developers	X				
	Accountable	IT PM					
	Consulted	Lead solution architect					
	Informed	TRC/CCC/EIB					
<i>Solution Architecture, Technical Design, and the Interface Control documents</i>	Responsible	IT PM			X		
	Accountable	System development lead					
	Consulted	IPT					
	Informed	TRC/CCC/EIB					

Detailed Tasks:

The following defines the detailed sub-tasks that take place within this task:

- T4-3.1 Develop Software** – The developers, under the guidance of the system development lead and the lead solution architect, select, tailor, and use those standards, methods, tools, and computer programming languages that are documented, appropriate, and established by HUD for performing software development activities. The developers transform the business requirements and design specifications into software components, modules, and machine-executable code that adhere to HUD coding standards and the project’s quality assurance expectations.
- T4-3.2 Execute Data Conversion Plan** – The development team executes the data conversion scripts to verify that the converted data is compatible with the developed software and to facilitate unit testing.
- T4-3.3 Conduct Unit Testing** – The developers code each module, ensure that it compiles without error and adheres to coding standards, and then test it as a standalone entity. This unit testing of software modules and programs uses both valid and invalid data developed specifically for the execution of the test. Unit testing employs dynamic testing techniques that execute the software module with both expected and erroneous data and compares actual with expected results. The goal of unit testing is to exercise all functions of the software module and all logic paths within the module.
- T4-3.4 Assess Readiness for Formal Acceptance Testing** – The IT PM, system development lead, and developers review the unit test results to provide assurance that the software has completed thorough unit/module/system testing during the development stage and is ready for turnover to the formal, controlled test environment. The scope of the review is to inspect the test products and test results obtained during development testing for completeness and accuracy, and to verify that test planning, test cases, scenarios, and scripts provide adequate coverage of documented solution requirements. In addition, the team reviews the test environment, test setup, and test data to ensure they are adequately prepared for validation testing.



T4-3.5 Update Design Documents – The IT PM and system development lead update the *Solution Architecture*, *Technical Design*, and the *Interface Control* documents to reflect changes necessary to clarify and refine the initial specifications. Note that these changes cannot result in a modification to the scope of the project or requirements specifications. Any such changes must be processed through the project’s change management procedures and protocols.



T4-4 Finalize Test Strategy

What Happens?

The initial test strategy developed during the Design Phase is reviewed and updated.

Who Does What?

The system development lead supports the IT PM in the finalization of the test strategy and updating of the *Test Plan*.

What Comes in?

- *Test Plan*
- *Requirement Traceability Matrix*

What Controls Need to Be Used?

The team uses the controls listed below to create the relevant artifacts or complete the task activities:

- *Test Plan* template, template instructions, and checklist
- *Requirements Traceability Matrix Instructions*

What Is Produced?

Work Product	Responsibilities		Must Create	Should Create	Should Update	Must Update	Must Complete
<i>Test Plan</i>	Responsible	IT PM					
	Accountable	Business PM					
	Consulted	System development lead Release manager Requirements lead Section 508 coordinator				X	
	Informed	TRC/CCC/EIB					
<i>Requirements Traceability Matrix</i>	Responsible	Requirements lead					
	Accountable	IT PM					
	Consulted	Business PM and other IPT members				X	
	Informed	TRC/CCC/EIB					

Detailed Tasks:

The following defines the detailed sub-tasks that take place within this task:

T4-4.1 Refine Test Strategy – The IT PM, with input from the system development lead and other IPT members, updates the test strategy developed in the Design Phase to reflect any revisions resulting from the development activities. For example, the developers’ coding and unit testing activities may identify new/modified resource requirements, constraints, risks, test scenarios,



pass/fail criteria, etc. The team also modifies the specifications for the test data as necessary to make sure sufficient data is available to support the enhanced strategy.

T4-4.2 Finalize the Test Plan – The IT PM, with input from the system development lead and other IPT members, updates the *Test Plan* to document the changes to the test strategy. The IPT uses the steps laid out in the *Test Plan* template, instructions, and checklist to update the *Test Plan*.

T4-4.3 Update the Requirement Traceability Matrix – The requirements lead works with the system development lead to ensure that all new/modified test scenarios in the *Test Plan* map to the requirements in the *Requirements Traceability Matrix*. The team uses the steps laid out in the *Requirements Traceability Matrix Instructions* to update the *Requirements Traceability Matrix*.



T4-5 Conduct Security Activities

What Happens?

The solution's security and privacy measures are updated, reviewed, and approved. The security assessments are conducted to ensure that the solution will be adequately protected from external and internal security threats.

Who Does What?

The business PM, IT PM, IT security specialist, privacy lead, and system development lead coordinate the security testing activities and update the security and privacy artifacts in the Cyber Security and Assessment Management System (CSAM) tool. Artifacts that the team may update include the *Security Plan*, *Privacy Impact Assessment (PIA)*, and *E-Authorization*.

The security specialist, along with the IT PM, assesses the threats and vulnerabilities and updates the security and risk assessment in CSAM following the Federal and HUD security and privacy standards and guidelines.

The IPT conducts security test and evaluation (ST&E) activities in accordance with HUD IT security and privacy standards and guidelines

If applicable, the IPT supports the HUD IT security group as it conducts the certification and accreditation (C&A) activities.

The IPT conducts a peer review of all artifacts following the Federal IT security and privacy standards and guidelines and HUD IT security and privacy policies, standards, and guidelines.

The Office of Information Security issues the *Approval to Operate Request*.

What Comes in?

- *Security Plan*
- *Privacy Impact Assessment*
- *E-Authorization*
- *Memoranda of Understanding*

What Controls Need to be Used?

The team uses the controls listed below to create the relevant artifacts or complete the task activities:

- HUD IT security and privacy standards and guidelines
- Federal IT security and privacy standards and guidelines
- CSAM guidelines and procedures
- *Privacy Impact Assessment Template*
- *Security Test and Evaluation Report Template Instructions*



What is Produced?

Work Products	Responsibilities		Must Create	Should Create	Should Update	Must Update	Must Complete
<i>Security Risk Assessment</i>	Responsible	Security specialist					
	Accountable	Project sponsor			X		
	Consulted	IPT					
	Informed	TRC/CCC/EIB					
<i>Security Plan</i>	Responsible	Security specialist					
	Accountable	Project sponsor			X		
	Consulted	IPT					
	Informed	TRC/CCC/EIB					
<i>E- Authorization</i>	Responsible	Security specialist					
	Accountable	Project sponsor			X		
	Consulted	IPT					
	Informed	TRC/CCC/EIB					
<i>Privacy Impact Assessment</i>	Responsible	Privacy lead					
	Accountable	Project sponsor			X		
	Consulted	IPT					
	Informed	TRC/CCC/EIB					
<i>Security Test & Evaluation (ST&E) Plan</i>	Responsible	Security specialist					
	Accountable	Project sponsor	X				
	Consulted	IPT					
	Informed	TRC/CCC/EIB					
<i>Certification and Accreditation (C&A) Memos</i>	Responsible	Security specialist					
	Accountable	Project sponsor	X				
	Consulted	IPT					
	Informed	TRC/CCC/EIB					
<i>Security Test & Evaluation (ST&E) Report</i>	Responsible	Security specialist					
	Accountable	Project sponsor	X				
	Consulted	IPT					
	Informed	TRC/CCC/EIB					



Detailed Tasks:

The following defines the detailed sub-tasks that take place within this task:

- T4-5.1 Support ST&E activities** – The IPT completes the security test and evaluation activities as directed by HUD IT security guidelines. The IT security specialist and IT PM record the results in the *Security Test and Evaluation Report* in CSAM.
- T4-5.2 Support C&A activities** – The IPT supports the HUD IT security group in coordinating activities and documenting a review of all management, operational, and technical security controls consistent with the National Institute of Standards and Technology (NIST) *Special Publication 800-37, Guide for the Security Certification and Accreditation of Federal Information Systems*. The results of security certification help provide the factual basis for the authorizing management official to make an accreditation decision.
- T4-5.3 Update Security Risk Assessment** – The IT security specialist, business PM, and IT PM update the security risk assessment addressing the following components: assets, threats, vulnerabilities, likelihood, consequences, and safeguards. The risk assessment evaluates compliance with baseline security requirements, identifies threats and vulnerabilities, and assesses alternatives for mitigating or accepting residual risks. The team completes the assessment in CSAM following the Federal and HUD security and privacy standards and guidelines.
- T4-5.4 Update E-Authorization** – The IT security specialist and IT PM update the *E-Authorization* form in CSAM following the Federal and HUD security and privacy standards and guidelines.
- T4-5.5 Update Privacy Impact Assessment** – The privacy lead and IT PM update the project's *Privacy Impact Assessment* using the *Privacy Impact Assessment* Template and information in the *Solution Architecture*, *Technical Design*, and *Interface Control* documents, Federal IT security guidelines, and HUD IT security standards and guidelines.
- T4-5.6 Update MOUs** – The IT PM performs the actions required to update any *Memoranda of Understanding* (MOUs) with the interfacing systems.
- T4-5.7 Update System Security Plan** – The IT security specialist and IT PM update the *Security Plan* in CSAM based on the results of the ST&E and C&A activities and following the Federal and HUD security and privacy standards and guidelines.
- T4-5.8 Conduct Peer Review** – The IPT conducts a peer review following the Federal and HUD security and privacy templates, standards, and guidelines. If the security and privacy artifacts require corrections/alterations, they are sent back to the project team for revision/updating.
- T4-5.9 Issue the ATO** – For new systems, the IT security group provides the *Authorization to Operate* in order to deploy the software into production.



T4-6 Conduct User Acceptance Testing

What Happens?

The User Acceptance Testing (UAT) test sites and environments are configured. The acceptance testing is conducted in accordance with the *Test Plan* and by a group that does not include the team that developed the software.

Who Does What?

The IT PM coordinates test environment configuration activities. The configuration manager ensures that the correct version of the software components is deployed to the test environment and manages any changes to the environment during the test cycles. The system development lead, database administrator, and other IPT members verify that the environment is ready for user acceptance testing. The IT and business PMs coordinate with other IPT members to ensure that the UAT participants have the necessary access rights, guidelines, and resources (including test scripts) to complete the testing activities.

The project team supports the UAT participants, reviews the UAT results, addresses reported defects, and assesses the solution’s readiness for deployment to production.

What Comes in?

- *Configuration Management Plan*
- *Requirement Traceability Matrix*
- *Technical Design* document
- *Data Conversion Plan*
- *Interface Control* document
- *Test Plan*

What Controls Need to Be Used?

The team uses the controls listed below to create the relevant artifacts or complete the task activities:

- *Test Report* template, template instructions, and checklist

What Is Produced?

Work Product	Responsibilities		Must Create	Should Create	Should Update	Must Update	Must Complete
UAT Test Report	Responsible	Business PM	X				
	Accountable	IT PM					
	Consulted	IPT					
	Informed	TRC/CCC/EIB					

Detailed Tasks?

The following defines the detailed sub-tasks that take place within this task:



- T4-6.1 Establish UAT Environment** – The configuration manager and other IPT members ensure that the required software components are installed in the UAT environment and that the environment is ready for UAT. This includes verifying the successful completion of any required data conversion. The team verifies the integrity of all configuration items and initiates UAT monitoring functions.
- T4-6.2 Facilitate UAT** – The IT and business PMs provides the UAT participants with the required access rights, test scripts, and other resources to execute the tests. The IT and business PMs provide the UAT participants with directions for recording test results, identifying defects, and obtaining assistance during the test cycles. The directions provided to the participants include detailed test case specifications that describe the purpose and manner of each specific test, the required inputs and expected results for the test, step-by-step procedures for executing the test, and the pass/fail criteria for determining acceptance. The IPT notifies affected personnel and organizations about the upcoming testing activities and schedules meetings to ensure that all affected personnel are aware of any procedural changes.
- T4-6.3 Monitor UAT Environment** – The IPT closely monitors all aspects of the system performance, including the effectiveness of security controls, for compliance with relevant system requirements and addresses any deviations.
- T4-6.4 Document Results and Make Recommendations** – The IPT documents the results of the UAT in the *Test Report*. The IPT uses the steps laid out in the *Test Report* template, template instructions, and checklist to create the *Test Report*. Additionally, the team captures any reported defects in the defect tracking repository (e.g., Quality Center) or the defect log. The business PM closely reviews the results to assess whether the system satisfies business needs and performance measures. The IPT ensures that all reported defects are correctly prioritized, and are mitigated and/or accepted as residual risk by the project sponsor or other appropriate authority. The team develops and documents any recommendations for improving system performance.



T4-7 Create User Training Documentation

What Happens?

The strategy for training the user community and all related system personnel (e.g., operations and support personnel) is finalized. The training material is developed as well.

Who Does What?

The IT PM monitors the training activities. The IPT creates the user training documentation.

What Comes in?

- Training Plan
- Requirements Traceability Matrix
- Technical Design document
- Test Report

What Controls Need to Be Used?

The team uses the controls listed below to create the relevant artifacts or complete the task activities:

- Training Materials Instructions

What Is Produced?

Work Product	Responsibilities		Must Create	Should Create	Should Update	Must Update	Must Complete
Training Material Instructions	Responsible	Business PM	x				
	Accountable	IT PM					
	Consulted	IPT					
	Informed	TRC/CCC/EIB					
Training Plan	Responsible	Business PM			x		
	Accountable	IT PM					
	Consulted	IPT					
	Informed	TRC/CCC/EIB					

Detailed Tasks:

The following defines the detailed sub-tasks that take place within this task:

T4-7.1 Finalize Training Approach – The business PM, with input from other IPT members, updates the training approach documented in the *Training Plan* to reflect any changes resulting from the development and testing activities. The IPT uses the steps laid out in the *Training Plan* template and checklist to update the *Training Plan*.

T4-7.2 Develop, Finalize, and Produce Training Materials – The business PM, with input from other IPT members, develops training materials comprising all artifacts used to provide instructions to end



users, operators, administrators, and support staff who will use, operate, and/or otherwise support the solution. These artifacts include instructor and student guides, audio and visual aids, computer-based and other media. The IPT uses the steps laid out in the *Training Materials Instructions* to create the training materials. The business PM, with input from other IPT members, completes all materials necessary to support the scheduled training including training booklets, online exercises, and presentation materials. The team reviews the training materials to ensure compliance with the completed solution. The team modifies training materials to reflect any corrections or changes to the solution that may have resulted from deficiencies found during unit, system, and user acceptance tests.



T4-8 Conduct User Training

What Happens?

Training sessions are conducted in accordance with the *Training Plan*. Training activities are monitored to determine if the training techniques and materials achieve the desired results.

Who Does What?

The business PM and training provider finalize training materials and schedule training sessions. The training provider (who may be a member of the IPT) conducts training sessions.

What Comes in?

- *Training Plan*
- *Training Materials*

What Controls Need to Be Used?

The team uses the controls listed below to create the relevant artifacts or complete the task activities:

- *Training Materials Instructions*

What Is Produced?

Work Product	Responsibilities		Must Create	Should Create	Should Update	Must Update	Must Complete
Training evaluations	Responsible	Business PM	X				
	Accountable	Project sponsor					
	Consulted	IPT					
	Informed	TRC/CCC/EIB					

Detailed Tasks?

The following defines the detailed sub-tasks that take place within this task:

- T4-8.1 Finalize Training Schedule** – The business PM completes scheduling of training sessions for all required personnel and develops the training rosters and attendance sheets for each session. The business PM notifies all training participants about the time and location of their respective sessions and ensures that the training facilities and equipment have been reserved in advance.
- T4-8.2 Conduct Training Sessions** – The training provider carries out the approved training sessions in accordance with the *Training Plan*. At the completion of each training session, the IPT and training provider request feedback from attendees to ensure that training objectives are being met.
- T4-8.3 Evaluate Effectiveness of Training** – The IPT analyzes all feedback received from personnel attending training sessions. Based on this analysis, the team makes recommendations for changes to training procedures or materials to ensure training objectives are met, as described in the *Training Plan*.



T4-8.4 Modify Training Materials as Necessary – The business PM responds to recommendations made as a result of analyzing feedback. The business PM, with input from other IPT members, updates or changes training materials and course procedures to ensure compliance with all approved recommendations received. Changes to the solution itself may also require updating the *Training Plan* and related courses and materials.



T4-9 Develop Operations and Maintenance Documentation

What Happens?

The Operations and Maintenance (O&M) documentation is completed.

Who Does What?

The IT PM, with input from the systems development lead and other IPT members, creates the *Operations and Maintenance Manual(s)* and the *User Manual*.

What Comes in?

- *Requirements Traceability Matrix*
- *Technical Design* document
- *Test Report*

What Controls Need to Be Used?

The team uses the controls listed below to create the relevant artifacts or complete the task activities:

- *Operations and Maintenance Manual* template, instructions, and checklist
- *User Manual* template, instructions, and checklist

What Is Produced?

Work Product	Responsibilities		Must Create	Should Create	Should Update	Must Update	Must Complete
<i>Operations and Maintenance Manual</i>	Responsible	IT PM	x				
	Accountable	Business PM					
	Consulted	IPT					
	Informed	TRC/CCC/EIB					
<i>User Manual</i>	Responsible	IT PM	x				
	Accountable	Business PM					
	Consulted	IPT					
	Informed	TRC/CCC/EIB					

Detailed Tasks

The following defines the detailed sub-tasks that take place within this task:

T4-9.1 Develop User Procedures – The IT PM, with input from other IPT members, develops a *User Manual* that clearly explains how a business user is to use the solution from a business function perspective. The manual includes the information necessary to allow user organizations to determine the solution’s applicability and when and how to use it.

T4-9.2 Develop O&M Procedures – The IT PM, with input from other IPT members, develops an *Operations and Maintenance Manual* that clearly describes the solution that will be operating in



the production environment and provides the operations and support staff with the information necessary to effectively handle routine production processing, ongoing maintenance, and identified problems, issues, and/or change requests.



T4-10 Update the Project Schedule and Other Project Artifacts

What Happens?

The *Project Schedule*, *Requirements Traceability Matrix*, and *Risk Log* are updated.

Who Does What?

The IPT uses the steps laid out in the *Project Schedule (WBS) Instructions* and *Earned Value Management Instructions* to update the *Project Schedule (WBS)*.

The IPT uses the steps laid out in the *Requirements Traceability Matrix Instructions* to update the *Requirements Traceability Matrix*.

The IPT uses the steps laid out in the *Risk Management Plan* template, checklist, and instructions, and *Risk Management Log Template Instructions* to update the *Risk Management Log*.

What Comes in?

- *Project Schedule (WBS)*
- *Requirement Traceability Matrix*
- *Risk Log*
- *Risk Management Plan*

What Controls Need to be Used?

The team uses the controls listed below to create the relevant artifacts or complete the task activities:

- *Risk Management Plan* template, template instructions, and checklist
- *Risk Management Log Template Instructions*
- *Project Schedule (WBS) Instructions*
- *Earned Value Management Instructions*
- *Requirements Traceability Matrix Instructions*

What is Produced?

Work Products	Responsibilities		Must Create	Should Create	Should Update	Must Update	Must Complete
<i>Project Schedule (WBS)</i>	Responsible	Business and IT PMs					
	Accountable	Project sponsor			X		
	Consulted	IPT					
	Informed	TRC/CCC/EIB					
<i>Risk Management Plan and Log</i>	Responsible	Business and IT PMs					
	Accountable	Project sponsor			X		
	Consulted	IPT					
	Informed	TRC/CCC/EIB					
<i>Requirements</i>	Responsible	Business and IT PMs			X		



Work Products	Responsibilities		Must Create	Should Create	Should Update	Must Update	Must Complete
Traceability Matrix	Accountable	Project sponsor					
	Consulted	IPT					
	Informed	TRC/CCC/EIB					

Detailed Tasks

The following defines the detailed sub-tasks that take place within this task:

T3-1.2 Update Project Schedule – The IPT uses the steps laid out in the *Project Schedule (WBS) Instructions* and *Earned Value Management Instructions* to update the *Project Schedule (WBS)*. The *Project Schedule (WBS)* is updated to reflect the following:

- The status of coding activities
- The status of data conversion activities
- The status of test activities
- The status of implementation planning activities and the schedule of implementation activities in the Deployment Phase
- The status of training activities

T3-1.3 Update Risk Log – The IPT uses the steps laid out in the *Risk Management Plan* template, instructions, and checklist, and the *Risk Management Log Template Instructions* to update the *Risk Management Log*. The *Risk Management Log* is updated to reflect the following:

- The status of previously-identified risks
- New risks that were identified as the team conducted the Execution of Solution Phase activities

T3-1.4 Update the Requirements Traceability Matrix - The IPT uses the steps laid out in the *Requirements Traceability Matrix Instructions* to update the *Requirements Traceability Matrix*. The matrix is updated to ensure that all design elements covered in the *Technical Design* document and all test cases and scenarios covered in the *Test Plan* map back to system requirements.



T4-11 Conduct Deployment Go/No-Go Decision Meeting

What Happens?

The completed and reviewed project documents are compiled into the Execution of Solution Phase Package and are presented to the governance bodies for a Go/No Go control gate decision.

Who Does What?

The IPT compiles the Execution of Solution Phase Package. The package varies depending on the size and complexity of the project, and may include:

- *Test Report* (including defect log)
- *Operations and Maintenance Manual*
- *User Manual*
- Training materials
- *Test Plan*
- Security and privacy artifacts

Along with this package, the IPT submits a formal request to the IT governance bodies to review and approve the project.

After reviewing the project artifacts, the TRC approves the project to move into the Deployment Phase, allows the project to proceed into the Deployment Phase subject to certain conditions, or rejects the project. If the project is rejected the IPT follows the appeals process to re-submit the project for review.

If the project requires additional oversight from the CCC and/or the EIB, the TRC forwards the project artifacts to the relevant governance body along with a completed *Control Gate Review Decision* form containing the TRC's recommendation.

What Comes in?

- Execution of Solution Phase package

What Controls Need to be Used?

The team uses the controls listed below to create the relevant artifacts or complete the task activities:

- Project Execution of Solution Phase Go/No Go decision meeting guidelines

What is Produced?

- Approved Execution of Solution package
- Decision by TRC/CCC/EIB to proceed to Deployment Phase

Detailed Tasks:

The following defines the detailed sub-tasks that take place within this task:

T3-1.5 Assemble Execution of Solution Phase Package – The IPT compiles the Execution of Solution Phase documentation into an Execution of Solution Phase package and forwards it, along with a formal request for review and approval, to the TRC.



T4-1.1 Obtain Execution of Solution Phase Go/No-Go decision – The TRC reviews the Execution of Solution Phase package and:

- Approves the project to move into the Deployment Phase
- Approves the project to move into the Deployment Phase with conditions
- Rejects the project

If the project requires additional oversight from the CCC or EIB as identified in Tier 2 of the *Project Process Agreement*, the TRC communicates with the chair of the appropriate body and provides the necessary documentation for review.

T3-1.6 Resolve any Conditions for Project Approval – If the TRC, CCC, or EIB approves the project with conditions, the IPT adjudicates their comments and re-submits the changes for approval prior to moving into the Deployment Phase.