



# Tool Integration Plan Table of Contents

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# Tool Integration Plan

## 1. Introduction

The Tool Integration Plan describes an approach to integration of the some of the Student Financial Assistance (SFA)-approved development support tools with the IPT process. The scope for the plan includes Project Management, Requirements Management, and Configuration Management tools. Tools to support testing are out of scope of this plan.

The plan first considers the degree of adoption and need for these tools. It then considers the capability and features of the tool(s), along with their associated products, to determine an effective method for using them within the IPT process. This document will clearly identify the steps necessary to integrate the tool(s) and process. It includes steps for training, deployment, and deliverable template replacement or incorporation, if applicable. It also identifies organizational responsibilities for each of these steps.

### 1.1 Background

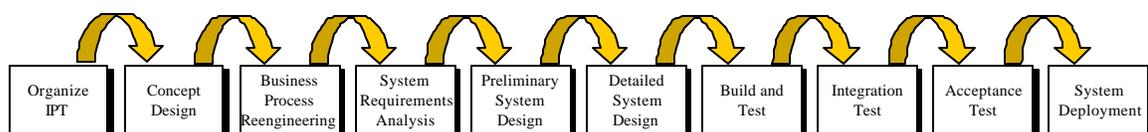
This section provides the background for the Plan. It includes the rationale behind developing the plan as well as a picture of how SFA arrived at this place in the overall Modernization Program.

### 1.2 IPT Process

This section introduces the IPT Process as defined for the SFA. It walkthroughs the high level waterfall process and explains the motivation behind developing standards for the System Development Life Cycle.

The Integrated Product Team (IPT) Process was defined by the SFA to standardize the system development life cycle (SDLC) utilized by the IPTs. It was defined to support the teams in the analysis, requirements gathering, design, and development of applications and/or systems through the use of process diagrams, defined subtasks, and associated templates that can be turned into deliverables. Templates are the actual shells the team will use to produce the deliverables outlined in each work plan. The templates are stored as separate documents so that each IPT can easily save the template for their own use. Like any framework, this suite of tools should be used at the discretion of the team lead to support the project. Certain tasks may be added or deleted according to the objectives of the overall project.

The high level “waterfall” process includes the following phases. A brief description of each phase follows the diagram.





*Organize IPT* – This phase kicks off the IPT team process. The major activities include setting up the team charter, defining project objectives and risks, identifying the baseline and measurements, establishing the team, and creating the project plan. This is the fundamental planning phase of the project. At this point, the project is still in inception.

*Concept Design* – During this phase, the team is formed, and they are thinking conceptually about how the project will proceed. The first task is to begin to document the high level requirements, including business, system, and software requirements, and diagrams. The outputs of this phase include the requirements definition and operational flow diagram (i.e., context diagram).

*Business Process Reengineering (BPR)* – BPR is part of certain system development projects where there has been an identified need to make radical process improvement. The team diagrams the “As-Is Process” in order to target these improvement areas and create “To-Be” representations. During this phase additional business requirements may surface. The outcome, in most cases, is a radically redesigned process that has been targeted for systems development.

*Systems Requirements Analysis* – During this phase, the IPT continues to document requirements at a greater level of detail. These include the requirements for deployment of the process or application. Specific attribute data is captured and requirements are categorized for more detailed analysis. Additionally, all these requirements (i.e., business, system, software, service level, etc.) are analyzed for consistency and completeness. The team members need to target the right business experts to ask the right questions in order to clearly understand the requirements from a business perspective so that they can be translated in the development phase.

*Detailed System Design* – The IPT creates some of the detailed design documentation, which includes the ERD diagram as well as program, screen, report, and procedures detailed designs during this phase of the IPT process. In addition, the team contributes to the plan for deployment and creates documentation for the learning design sub-task. At this point in the process, there is a transfer of knowledge and information between the analyst and the developers on the IPTs. Requirements are again revised (i.e., broken down) to include specific information that supports the next phase (Build and Test).

*Build and Test* – During this phase, the developer actually creates the application and/or system and tests to ensure that the original objectives and performance measures are achieved. The application/system build is based on the requirements that have been collected to date. The environment is also prepared for various tests that need to be accomplished (user, integration, acceptance, etc.).

*Integration Test* – The IPT conducts Integration testing. This phase was out of scope for this deliverable.

*Acceptance Test* – The IPT conducts Acceptance testing. This phase was out of scope for this deliverable.



*System Deployment* – The IPT deploys the developed system to the targeted user audience. As part of this phase, the team ensures that the right individuals and roles are matched up and targeted. The team will also create a lessons learned document to review the effectiveness of the project.

An additional task that was not detailed in the IPT process is system maintenance. It is worth mentioning in that there is a great deal of support that is required following the implementation of an application/system. These tasks need to be identified and responsibility needs to be assigned within the organization.

The customized processes for packaged software and web-based development build on the waterfall process to accommodate alternative development methods. The third type of customized development, rapid, follows the waterfall model. The variances occur in the level of focus on scope, resources, and timeframe. For a rapid development project, the scope is limited, the resources are dedicated and highly skilled, and the timeframe is clearly defined and fixed. The IPT process along with the customized models is described in more detail in previous deliverables.

### **1.3 Tool Support**

In order to support the IPT process, various tools have been identified for requirements management, configuration management, project management, testing, development, design, etc. For the purpose of this plan, the focus is primarily on the tool that has been selected to support requirements management. Additional detail available on configuration management and project management tools is provided. All other tools are currently out of scope.

#### **1.3.1 Requirements Management Tool**

SFA has selected Rational RequisitePro® to support the management of requirements. RequisitePro® is Rational's Web-enabled, enterprise-class requirements management tool. Typically, a requirements management tool supports the management of requirements data for the entire enterprise. Requirements drive what the system should do, and by providing access to vital requirements information throughout the project lifecycle, all cross-functional team members have the necessary details, context, and relationships for effective collaboration. Additional information on RequisitePro® and how it fits in with the IPT process is provided in Section 2 of this document. Section 3 addresses how the tool will be deployed to SFA.

#### **1.3.2 Other Tools**

This section contains information on relevant tools for Configuration Management and Project Management, and Testing that the SFA is currently reviewing for selection.

##### *Configuration Management Tools*

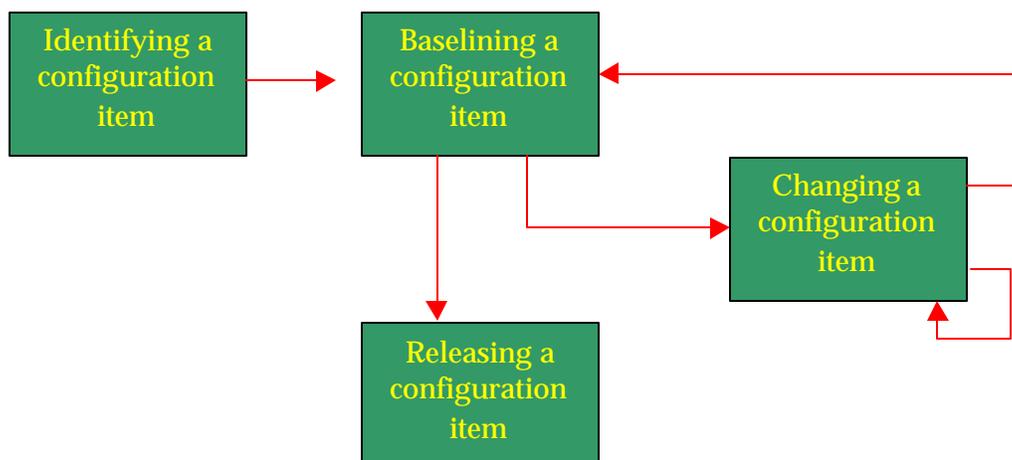
Configuration management is defined as the discipline of identifying, controlling, accounting for, and auditing configurations, i.e., aggregations of software (or any of its discrete portions), documents, or designs that are treated as a single entity. The tools to support configuration management are facilities that manage the status and relationships among repository entries,



source code components, run-time components and other application components as they evolve through the development life cycle. The tools should provide automated support for the configuration management approach. For example, the tools should automate the chosen techniques as much as possible. The Department is currently investigating some tool alternatives for configuration management.

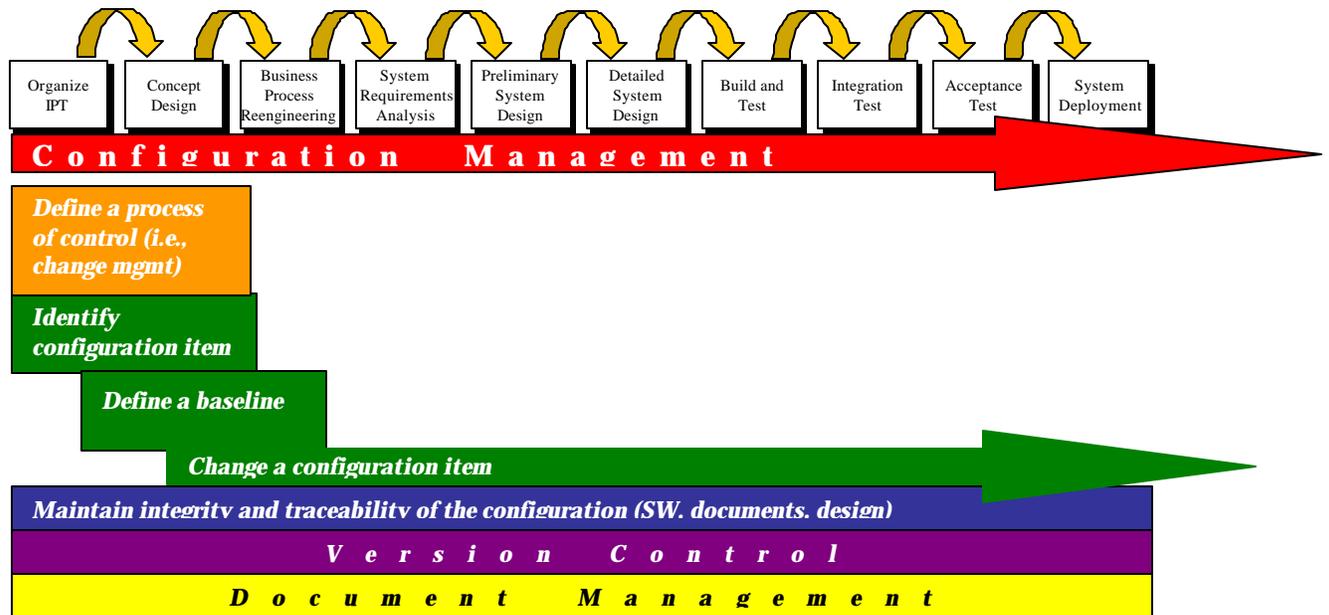
Currently, SFA has selected ClearCase® to support configuration management. ClearCase® is delivered as part of the Rational suite of applications. It supports software configuration management (SCM) – specifically version control, workspace management, process control and build management. Configuration management tools specific to software include: storage, audit tracking, version control, and documentation. Since configuration management is a combination of manual and automated procedures, keep in mind that there will be some tailoring required to make the configuration management tool amenable to the organization. Once the final selection has been made, a plan for integrating this tool into the current IPT process should be developed. This plan should include details on training, mapping, and tool deployment.

The configuration management process integrates the technical and administrative actions of identifying the functional, performance and physical characteristics of a configuration item (CI) and changes to those characteristics. CM provides information on project status and project control for each configuration items. The objective of configuration management during these phases is to establish and manage baselines, to produce the lowest overall project life cycle cost, optimal operating efficiency, and readiness of a configuration item. The process for configuration management includes the following key high level steps:





The following illustration describes how these high level configuration management tasks map to the IPT process:



Configuration management should be a part of the entire project life cycle. Certain key events like establishing baselines and defining control occur during the formative tasks while others occur throughout the project.

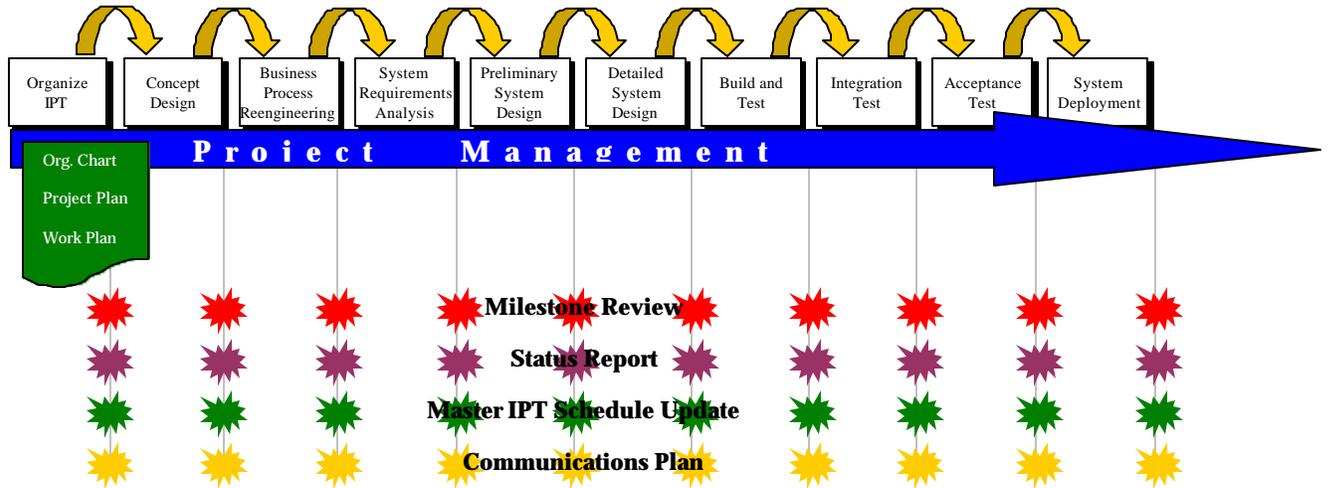
For additional information on the configuration management approach at SFA, please reference the following Modernization Program deliverable: [SFA Enterprise Configuration Management Approach](#).

### *Project Management*

Project management focuses on those activities that support the overall organization and management of the project tasks, resources, and timeframes. Typical project management activities include, developing a project plan, reporting status against that plan, managing the plan, and assembling resources based on skills and business need. The primary mechanism for project management is the work plan. Work plan development involves calculating a project's resources, costs, and schedule based on informed judgements regarding size and complexity. SFA is in the process of determining a standard tool to support Project Management.



Project Management tasks are identified throughout the systems lifecycle from Organize IPT through System Deployment. The following diagram represents the high level tasks that touch the IPT process. Each star represents a point in the process when each project management task should occur.





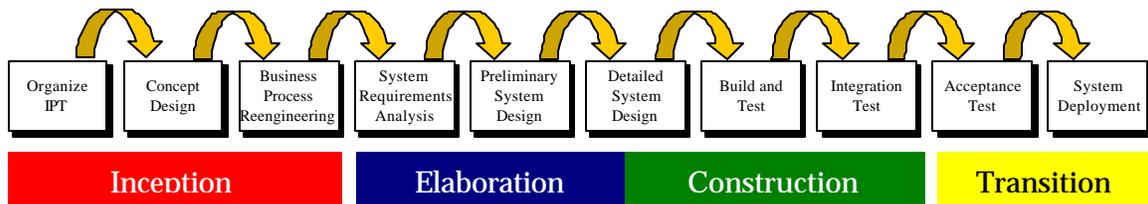
## 2. Process to Tool Mapping for RequisitePro®

This section begins to map the RequisitePro® Tool to the IPT process developed for the SFA. Included within this section is a process map that illustrates the overlap between the IPT process and the Rational Unified Process (RUP) and a tabular representation of the mapping.

### 2.1 Process Map

Embedded within the Rationale suite of tools is the Rational Unified Process (RUP). RUP has four phases that translate into the Systems Development Life Cycle (SDLC). In order to understand how this relates to the IPT process, the following mapping was done between the IPT process and the RUP:

*IPT Process*



*Rationale Unified Process*

### 2.2 Table

In addition to the RUP, the RequisitePro® Requirements Management Tool contains various templates that can be used to support the SDLC. The following tables represent the complete list of templates that support the IPT Process. These templates are paired up with the tool-provided templates that most closely map. However, a function of RequisitePro® allows the user to incorporate various documents and templates from which to create and capture requirements. Ideally, SFA could incorporate the complete set of templates to choose from when conducting an IPT. The tool is set up to manage all these documents.

IPT Process Tasks and Templates	
IPT Process Sub-tasks	IPT Process Templates
Organize IPT	Team Charter
	Project Risks
	Project Objectives/Risks Checklist
	Value Proposition
	Business Performance Model
	Business Case
	Business Case Checklist
	Team Organization Chart
	Project Plan
	Project Plan Review Checklist

RequisitePro® RequisitePro® Templates
vision.doc



<b>IPT Process Tasks and Templates</b>	
<b>IPT Process Sub-tasks</b>	<b>IPT Process Templates</b>
	Project Status
	Communications Plan
	Communications Events
	Milestone Review Checklist
	Milestone Review Document
Concept Design	Requirements
	Requirements Checklist
	Operational (System)
	Quality Plan
	Concept Design Checklist
Business Process Reengineering	Business Process Design
	Business Process Flow
	Roles Description
System Requirements Analysis	System Performance Acceptance Criteria
	Deployment Requirements Def
	Requirements Traceability Matrix
Preliminary System Design	Deployment Approach
	Testing Approach
	Data Cleansing/Conversion Approach
Detailed System Design	ERD Diagram
	Program Detailed Design
	Screen Detailed Design
	Report Detailed Design
	Procedures Detailed Design
	Unit Test Plan
	Production Capacity Plan
	Deployment Plan
	Learning Design Plan
	Learning Design Checklist
Build and Test	Deployment Procedures
	Computer Operations Procedures
	Unit Test Status Report
	Unit Test Script
	Testing Checklist
Web-based Development	Physical Database Design

<b>RequisitePro®</b>
<b>RequisitePro® Templates</b>

Reqts.doc ReqtsTraces.doc ReqtsAttr.doc DocsReqts.doc requirementsgen.doc requirements.doc
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TestDocSummary.doc TestDocDetail.doc
---

RUP Business Entity Report.doc
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ScriptDetail.doc ScriptSummary.doc
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PhysicalViewSimple.doc PhysicalViewFull.doc PhysicalViewPublic.doc
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<b>IPT Process Tasks and Templates</b>	
<b>IPT Process Sub-tasks</b>	<b>IPT Process Templates</b>
	Logical Database Design

<b>RequisitePro®</b>
<b>RequisitePro® Templates</b>
LogicalViewFull.doc LogicalViewSimple.doc LogicalViewPublic.doc

A function of the RequisitePro® Tool allows the user to populate the tool with templates and documents that are created and customized to support the organization’s process. If necessary, the tool could support the inclusion of all the IPT process templates listed above. Additional mappings of RequisitePro® templates will occur as the organization matures through the systems development lifecycle.

The following are other templates provided by the RequisitePro®/RUP tools that have not been directly mapped to the current set of IPT templates:

- |                               |                                |                        |
|-------------------------------|--------------------------------|------------------------|
| Relnote.doc                   | RUP Business Use Case Model    | 498sdp.doc             |
| Region.doc                    | Survey.doc                     | RUP Package Report.doc |
| Version.doc                   | BuildSummary.doc               | RUP Class Report.doc   |
| Element.doc                   | ComputerDetail.doc             | RUP Business Use Case  |
| Activity.doc                  | BuildDetail.doc                | Realization Report.doc |
| Vob.doc                       | Design Guidelines.doc          | RoseJavaMapping.doc    |
| RUP Software Architecture     | RUP Business Worker Report.doc | o8mapping.doc          |
| Document.doc                  | PackagesClasses.doc            | RoseCorbaMapping.doc   |
| RUP Business Object Model     | Techsup.doc                    | Design.doc             |
| Survey.doc                    | ClassesAttrsOpsTable.doc       | ClassesAttrsOps.doc    |
| RUP Use Case Report.doc       | Classes.doc                    | ex2.doc                |
| RUP Use Case Realization      | manageorder.doc                | use case report.doc    |
| Report.doc                    | 498sss.doc                     | usecasedesigngen.doc   |
| RUP Use Case Model Survey.doc | 498sdd.doc                     | usecasedesign.doc      |
| RUP Actor Report.doc          | 498srs.doc                     | use case reportgen.doc |
| RUP Design Model Survey.doc   | 498ocd.doc                     | greenhsegen.doc        |
| ReqtsUseCases.doc             | 498irs.doc                     | greenhse.doc           |
| ComputerSummary.doc           | 498idd.doc                     | gettingstarted.doc     |



### 3. Deployment of Tool

This section addresses how the tool will be deployed to support the IPT process. The roll-out strategy should include the plan for validating the integration of the process and the tool, educating the IPTs on the process and the tool, and validating that the tool supports the process (i.e., identify a pilot IPT).

Deployment of the tool introduces it into the target operating environment. Typically, this involves a large number of interrelated activities. The tool needs to be made available to users, and these users need to embrace and adapt to the new ways of working, learn new skills related to the tools, and strive for new levels of learning and collaboration. Integral to the deployment is the continuous process improvements aimed at sustaining the use of the process and tools throughout the organization. Deployment includes customization, communication, training, piloting, and installation.

SFA has procured the Rational Suite Enterprise Edition to support the IPT process from analysis through maintenance. Each application will be deployed to support the target component of the IPT process. The following describe the functionality of each of the applications in this suite:

- *RequisitePro*® - creates and manages requirements through out the software development cycle.
- *Rose Modeler*® - graphically communicates architectural requirements using industry standard UML.
- *SoDA for Word*® - provides documentation automation and helps prepare use case reports.
- *Rational Unified Process*® - defines roles and provides direction in the software engineering process (iterative concept).
- *ClearQuest*® - tracks, manages, and reports on product defects and change requests.
- *Rose Enterprise Edition*® - provides visual modeling and code generation (forward and reverse engineering).
- *Robot*® - automates GUI functional testing.
- *Test Factory*® - helps the user learn about an application automatically, builds regression tests, and identifies software failure.
- *Load Test*® - simulates a stress test of up to 2,500 virtual users and administrators using the system.
- *ClearCase*® - provides a configuration management tool that can be used by both analysts and developers.



This tool integration plan focuses primarily on the RequisitePro® tool to support requirements management. Section 5 identifies next steps to include a more detailed look at how the tools listed above can be integrated into the IPT process.

### **3.1 Tool Customization Requirements**

The RequisitePro® tool requires very little customization out of the box to support the requirements management function of the IPT process. The tool has been designed to work with documents created in the MicroSoft office environment. The user identifies requirements within these documents and highlights the associated text. The tool recognizes this flagged text as a requirement and populates the database with requirement data. Once the requirement has been added to the database, the user can create attributes that are associated with the requirement. Additionally, users can enter requirements and their attributes directly into the tool as they are identified.

In terms of customization or adaptation to the SFA environment, the following actions need to occur:

- RequisitePro® is identified as the tool to support requirements management within SFA; however, it needs to be made available to the user community to support the IPTs.
- An approach for capturing and tracking requirements needs to be defined and communicated. Once this is done, the organization can begin to track these requirements across the IPTs and establish measures of accountability for applying requirements to business solutions. The approach for requirements management needs to be developed in conjunction with the system developers to ensure that the correct information is gathered and provided to the right person or group.
- Documents need to be identified as the standard templates for the IPTs. These documents can be a combination of RequisitePro® -provided templates and IPT process templates.
- SFA needs to specify mandatory minimum templates. (The added value of this needs to be determined.)
- SFA needs to provide access to the documents/templates so that the IPTs can begin to follow these standards.
- SFA needs to establish a library to manage documentation as well as objects that are created throughout the life cycle.

### **3.2 Communication**

Communication is the cornerstone to any successful deployment. IPT team members will be eager for information on the benefits of an organized and methodical approach to software development



and the tools to support that process. These communication efforts need to be carried out by lead IPT figures and key sponsors within the SFA organization in order for a successful outcome to be achieved.

### **3.3 Training**

Another important component of the deployment strategy is training. In order for the organization to successfully and actively accept the process and support tools, there needs to be a certain level of education that is made available to them. IPTs need to be educated on the details behind the IPT process diagram and tables, become familiar with the templates that support the process, and understand how to utilize the tool in conjunction with the process tasks and subtasks. Section 5 includes recommended approaches for addressing training across the SFA. Specific training should include:

- IPT Process and Templates
- Rational Tool Set, including Object Oriented UML
- Software Development/Project Management
- Requirements Development and Management
- Training on additional tools as they become available

### **3.4 Pilot Roll-out**

As part of the deployment strategy, SFA should select one IPT to pilot the use of the process and tools to support the project. This provides a mechanism for the organization to judge the appropriateness of both elements.

SFA has selected the School's Portal project as the pilot project for the IPT process and tools roll-out. Included in this pilot will be the communication of pilot objectives, the preparation of IPT members (i.e., process and tool training), monitoring of progress, and evaluation of the successful application of the process supported by RequisitePro® as the requirements management tool.

### **3.5 Installation**

Development of a plan for installation and system administration of the Rational Suite of products in a true multi-user environment to be undertaken by SFA OCIO staff, Rational Software Corporation support staff, and CSC -- SFA's virtual data center (VDC) contractor. Part of this task will be to develop a plan that lays out the specifics and requirements for installing the tools on SFA's VDC.



## **4. Risks**

The following risks have been identified for the roll-out of the IPT process and associated tools. These risks have an impact on the success of the tool integration as well as the overall acceptance by the SFA organization.

### *Senior Staff Support*

It will be difficult to sustain the IPT process and tool use without the support of senior staff. In order to combat this challenge, a process owner needs to be identified at the appropriate level within the organization. The IPT process impacts multiple offices within SFA.

### *Continuous Process Improvement*

The roll-out of the IPT process needs to be supported by a continuous process improvement team in order to be successful. This plan should contain an explicit approach for monitoring process performance against targets, identifying opportunities for improvement, and changing the process. The IPTs need to have a method for providing feedback on the process and the tools. If this is not included, the effectiveness of the tool integration and process application will diminish over time.

### *Project Management Tool*

A standard tool to support project management needs to be identified and rolled-out to the organization. SFA will not be able to begin to operate in the new paradigm until this decision is made, the tool is made available, and individuals are trained in its use.



## 5. Next Steps

The purpose of this Tool Integration Plan is to identify the strategy for implementing the IPT process and integrating the tools for requirements management, configuration management, and project management into the organization. The following high level tasks need to be completed by the SFA organization in conjunction with the Modernization Partner:

- *Communication* - The process owner (high level) needs to communicate the purpose behind creating and standardizing on a IPT process. A communication plan needs to be developed that targets who and when. Essentially, SFA needs to "sell" this process to those individuals in the organization who will be working on IPTs in the future.
- *Tool and Process Availability* - In order for the teams to adopt the process as a tool for systems development, the documents, diagrams, and templates need to be readily accessible. There has been talk about including the templates on the SFA Intranet for the IPT teams to download. The details on this have not been finalized. Additionally, the tools that support the process need to be made readily available to the users in a multi-user environment with full system support, to include deployment, maintenance, and backup. For example, the RequisitePro® tool for requirements management has been selected and roll-out has begun. However, there is no strategy for a coordinated roll-out. Currently, the application is being randomly installed on individual workstations.
- *Education* - Once the communication plan is in place and kicked off, the IPT team members need to be educated on both the process and the tool. The organization would be remiss in assuming that because information and tools are available that individuals have the know-how to begin to actively embrace and use them. SFA needs to work with a training vendor to ensure that training documentation, a training schedule, and classes are developed and roll-out to the organization.
- *Pilot IPT* - An IPT needs to be selected (see Section 3.4) as a pilot to ensure that the process and tools are actually supporting the development efforts. This pilot needs to be targeted and feedback needs to be gathered and applied.
- *Collect Feedback* – Not only during the pilot, but throughout the full implementation of the life cycle, feedback needs to be gathered and improvements must be made to both the process and the tools.
- *Process Improvement Group/Individual Identification* - An individual or group needs to be identified as the process owner within the SFA. The process owner is responsible for achieving the outcomes of a process, driving process improvement, and acting as an advocate for the process within the organization. This entity will have responsibility for developing the communications plan, supporting the development of training, briefing IPT teams and senior management, participating as an advisor on the Pilot IPT, collecting feedback, and making updates to the process.



In addition to the high level tasks identified above the organization should undertake the following tasks with support from the Modernization Partner:

- Pilot the IPT Process and Tools to the selected IPT (i.e., School Portals).
- Support the development of IPT process and tools training for the SFA organization. Responsibility for the actual development and delivery of this training should rest with the SFA University.
- Update the IPT process to include an Object Oriented focus.
- Support the development of in the Rational tool set, software development and project management, and requirements development and management.
- Provide a mechanism for IPT process maintenance (process and templates) and continuous process improvement.
- Complete the tool integration (i.e., design tool – Visual Age – testing).
- Develop a solution for model maintenance (i.e., library/object repository).
- Identify an SFA individual to champion the IPT process throughout the organization.
- Identify an SFA individual to become the tool expert.
- Expand on the current process to include system development using UML and provide training, facilitation, tool integration, and model maintenance in this area.
- SFA needs to identify and adopt a standard tool for project management.