

Project ASSIST
Software Development Framework

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ASSIST Software Development Framework

Introduction

In May 1995, the ASSIST Board of Directors established and charged an intersegmental and ASSIST Coordination Site work group of technical representatives with the specification of a software development framework to help guide future software development activities at the ASSIST Coordination Site (ACS).

The following framework is based on a combination of standard software development practices used throughout the UC, CSU, and CCC systems and historical practices used at the ACS. This framework was formally adopted by the ASSIST Board of Directors at their November 6, 1995 meeting.

Terminology - “Software Maintenance” and “Software Development”

For the purposes of this framework and other ASSIST discussions related to ASSIST software development activities, the following working definitions are intended to help clarify two commonly used phrases.

- *Software Maintenance*

The term “Software Maintenance” refers to software modification activities (bug fixes, design changes, and enhancements) initiated by the Software Trouble Report (STR) process outlined later in this framework. These modifications apply to existing software products and often imply modification of existing definitions of functional requirements (as opposed to the creation of new functional requirements). Software maintenance activities may not use all of the steps outlined in this framework.

- *Software Development*

The term “Software Development” refers to the creation of new, distinct software products. Software development usually implies the creation of new functional requirements and these activities will generally include most of the steps outlined in this framework.

Some activities may involve both software development and software maintenance. For example, newly developed products may be integrated with an existing product as a maintenance activity initiated by an STR for the existing product.

Framework Objectives

This framework was developed to meet the following objectives.

1. Communicate Expectations

This framework establishes the means of communicating to ASSIST customers, and other constituents, the requirements, specifications, deliverables, and time lines of specific software development projects at required stages of the process.

2. Determining Review and Decision Points

This framework established the means of determining review and decision points of specific software development projects at required stages of the process.

3. Measure Progress

This framework establishes the means of measuring the progress and status of specific software development projects.

4. Measure Success

This framework established the means of measuring the success of specific software development projects.

Framework Scope

This framework has been developed as one tool to aid in the smooth operation, management, and oversight of Project ASSIST. It was developed to define policies and procedures specifically related to software development activities and is therefore limited in its scope.

Customers

ASSIST customers include:

1. Community College, CSU, and UC campuses who use any ASSIST end-user software.
2. Community College, CSU, and UC campuses and other agencies (i.e. UCOP) who use any ASSIST database maintenance software.
3. MIS staff at Community College, CSU, and UC campuses who are interested in integrating local systems with ASSIST data and processes.
4. The system-wide offices of the three segments sponsoring ASSIST; the California Community Colleges Chancellor's Office, the California State University Chancellor's Office, and the University of California Office of the President.
5. Prospective users from campuses not currently participating in the Project.

Roles of Key Project ASSIST Organizations

The following describes the roles of key organizational entities of Project ASSIST in relation to software development framework activities.

1. The ASSIST Users Group

The ASSIST Users Group is coordinated by the ACS and consists of representatives for all ASSIST customers identified above. Users Group subcommittees focusing on general topic areas are formed on an as needed basis and serve a primary role of discussing requirements, design, and prioritization issues related to ASSIST software development. Subcommittees are the primary forum for the ACS to understand the changing needs of many ASSIST customers. Participation in subcommittees is voluntary and meetings are generally open to any interested customers. Subcommittees will also review project proposals and functional requirements as needed.

2. The ASSIST Coordination Site

The ACS is responsible for coordinating and implementing all ASSIST software development activities. This includes primary responsibility for the development of specific software development project proposals and plans, estimating resource requirements, analyzing systems requirements, coordinating the review of plans, managing the implementation of plans, providing status reports to the TAC and Board as specified in project plans, and responsibility for all analysis, programming and testing of software.

3. The ASSIST Technical Advisory Committee

The ASSIST Technical Advisory Committee (TAC) is responsible for working with the ACS to help ensure the success of ASSIST software development activities by reviewing project proposals, definitions of functional requirements, project plans, and product evaluations at specified points during the software development process and recommending changes as needed. The TAC is also responsible for making recommendations to the Board regarding the validity of plans and resource estimates for software development activities.

4. The ASSIST Board of Directors

The Board is responsible for the final approval of all software development activities. This includes 1) determining the scope of specific software development activities based on ACS proposals and plans, resource availability, and TAC recommendations, and 2) approving additional resources as required. The Board is also responsible for monitoring the status of specific projects based on information to be provided by the ACS as outlined in the project plans of individual projects.

Software Development Framework Methodology

ASSIST software projects will follow the basic methodology outlined below. This methodology was developed to help ensure successful software development activities, set and communicate expectations for products (functionality, development and delivery schedule, resource requirements, etc.), and provide quality control points at which the projected deliverables, resources, and schedules can be reviewed. Activities and work products associated with this process will vary in relation to the size and complexity of the particular project. Larger, more complex project, may require more detailed analysis and plans for development, testing, and deployment. This methodology includes the following seven phases.

1. Project Proposal
2. Systems Analysis and Definition of Functional Requirements
3. Project Plan
4. Programming Implementation
5. Product Testing and Verification
6. Product Deployment
7. Product Evaluation

Summary of Reviews

At key points during the software development process, the ACS will coordinate reviews of various information to help ensure that projects are on track and headed for success. The following is a brief chart which summarizes these review points.

Summary of Project Review Points

Project Phase	ACS Review	Customer Review	TAC Review	Board Review
Project Proposal	Yes	Yes	Yes	Yes
Systems Analysis and Definition of Functional Requirements	Yes	Yes	Yes	
Project Plan	Yes		Yes	Yes
Programming Implementation	Yes			
Product Testing and Verification	Yes	Yes		
Product Deployment	Yes			
Product Evaluation	Yes	Yes	Yes	Yes

Each of these phases and the related review points are described in more detail as follows:

1. Project Proposal

A project proposal will be developed by the ACS to communicate the need for software maintenance or new software development. The ACS will work directly with customers to understand needs, possible end-products, and potential benefits during the development of proposals. Individual software maintenance project proposals may include multiple items initiated by the STR process. Proposals will describe the needs, customers affected, initial indication of end-products, and the anticipated value to customers. The format and level of detail required for proposals will vary depending on the nature of the proposed project. Proposals will include sufficient detail to enable the ASSIST Board to understand and judge the costs and benefits of the proposed project.

Project Proposal Reviews

Project proposals will be reviewed, in order, by the corresponding customer group(s), the TAC, and the ASSIST Board. Based on recommendations of the TAC, the Board will determine whether the proposal will move to the next phase, be modified and resubmitted by the ACS, or be dropped from consideration.

2. Systems Analysis and Definition of Functional Requirements

After Board approval of a project proposal, the ACS will develop the functional requirements for the project. This will involve various systems analysis activities to be conducted by ACS staff with additional input from customers and the TAC as needed. Early in this analysis phase, the ACS will develop an estimate of when the definition of functional requirements is expected to be completed and ready for review.

The definition of functional requirements will include detail of the capabilities to be implemented including new/modified data elements, new/modified process logic, and new/modified end-products.

Functional Requirements Reviews

The functional requirements for a project will be reviewed by the appropriate customer(s) and the TAC. Customer review will verify that the proposed end-products are on track to meet customer needs and expectations based on the project proposal. TAC review will verify that the functional requirements and proposed solutions are clearly defined and in-line with established ASSIST technical directions. Based on recommendations of the TAC, the project will either move to the next phase or be modified and resubmitted by the ACS.

3. Project Plan

After Board approval of the definition of functional requirements for a project, the ACS will perform required analysis to develop an initial project plan. This plan will present the detailed steps to carry out the remainder of the project, a schedule with anticipated begin and end dates for key steps, and a resource estimate for completing the project.

Project Plan Reviews

The initial project plan will be reviewed, in order, by the TAC and the ASSIST Board. The TAC review will verify that the initial plan is sufficient to produce expected results and verify that the initial schedule and resource estimates are reasonable. Based on TAC recommendations, the Board will determine whether the project will move into the “Programming Implementation” phase, be modified and resubmitted by the ACS, or be dropped from consideration. The ACS will modify project plans as required based on TAC and Board reviews.

The nature of some projects may require that the initial schedule and resource estimates are quite rough and will be refined as further analysis and design steps are completed in the programming implementation phase. If this is the case, the plan will note this and include additional review points as appropriate. At these review points, there will be an opportunity to determine if the project is headed for failure and should therefore be modified or canceled. At any time during the Project Plan where the ACS determines that project schedules or resources will vary to any significant degree, the TAC will be notified.

4. Programming Implementation

After Board approval of the initial project plan for a project, the ACS will follow the project plan to develop the related end-products. As will be described in actual plans, the ACS may elect to use a variety of approaches during this stage.

During further analysis and design activities in this phase, ACS staff may find it necessary or desirable to deviate from original specifications for planned end-products. Any significant deviation from the functional requirements, along with any related changes in schedules or resources, will be noted in the revised project plan.

Programming Implementation Reviews

If the project is of such a nature that the plan includes steps where schedule and resource estimates are to be refined, or if substantial deviations from original plans are required, there will be corresponding TAC and Board reviews as defined in the plan. As indicated in the previous phase, these reviews will provide an opportunity to determine whether the project is headed for failure and should be either modified or canceled.

5. Product Testing and Verification

After completion of the programming implementation phase, the ACS will coordinate external beta testing and verification of end-products. A test plan will be developed which will involve customer representatives in testing end-products. Initial customer installation and configuration instructions will be developed and provided to test sites. Any errors, problems, or anomalies uncovered during testing will be documented on an issues list and reviewed by ACS staff and users to determine appropriate resolution. All known issues will be either resolved or documented as known issues.

Product Testing and Verification Reviews

The review of test plans for projects will not be required.

6. Product Deployment

After completion of the product testing and verification phase, the ACS will develop a deployment strategy and begin deploying end-products to customers. Information collected during the testing and verification phase related to installation and configuration will be used to develop the deployment strategy to help ensure successful deployment. This phase will include database conversion activities if required and the development of required customer installation and configuration instructions.

Product Deployment Reviews

The review of deployment strategies for projects will not be required.

7. Product Evaluation

After the end-products from a project have been deployed, the ACS will determine an appropriate method and solicit feedback from customers. The information collected during this phase should address issues appropriate to the end-products such as how well end-products function and perform compared to customer expectations. The ACS will also summarize other pertinent information about the development process such as actual time and costs compared to estimated time and costs, actual system capabilities compared to functional requirements, etc..

Product Evaluation Review

Customers may be provided with appropriate summary information to inform them of the level of success of the project. The TAC and Board will be provided with this and other information to better understand actual versus projected outcomes as a possible aid in planning future software development projects.

ACS Software Trouble Report Process

In order to keep track of issues related to ASSIST software products, the ACS has developed a Software Trouble Report (STR) process. The STR process is used to report and track software bugs and bug fixes, software maintenance requests from customers, and software enhancement requests from customers. The data collected with this process is helpful in communicating lists of current software issues and assessing the status of past issues.

The ACS may be called on to coordinate with customer groups and collect additional requests for design changes and enhancements based on evolving customer needs. The information collected during these activities are captured using the STR process. The STR process can then be used to help generate project proposals for software maintenance activities.