Department of Veterans Affairs

**VistA Adaptive Maintenance (VAM)**

Software Configuration Management Plan



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# Overview

The implementation of a formal and structured Software Configuration Management (SCM) environment ensures that all Veterans Affairs (VA) software product artifacts are baselined and maintained in a stable environment. It provides the ability to apply state-of-the-art technology and environment enhancements to satisfy all project development and test objectives, in order to maintain the integrity of their products.

The complexities of the SCM process require the implementation of formal processes and procedures. These processes and procedures, along with detailed work instructions, provide objectives, requirements, and step-by-step instruction on the performance of activities within the SCM environment for software products. This document will provide discussion on the organization of personnel, and the division of tasks for teams working on software products. The processes and procedures are documented in the Configuration Management Procedures Manual and work instructions for each VA Product.

## Purpose

This document is intended to provide a uniform approach to SCM for the development of VA software products. It describes the processes and procedures for managing and controlling the development, delivery, and maintenance of all software and documentation products. This plan also outlines the SCM organization, responsibilities, activities, configuration change control flow, as well as the SCM requirements to be followed by teams producing or modifying software within the VA. The SCM Plan will aid both management and technical staff in the production of high-quality software products.

## Scope

These standards and procedures apply to all products under development or maintenance, and include management of embedded, purchased, or outsourced software, and third-party frameworks or packages. It also applies to all documentation, products, and other project or program initiative documentation management communicated now or in the future, as required to be controlled by configuration management processes.

SCM processes include configuration identification, configuration control, configuration status accounting, configuration audit, interface management, and baseline/build management.

## Audience

The primary audience for this document consists of all staff members who have a requirement, need, or desire to develop, change, fix, or enhance software artifacts for Vista Adaptive Maintenance (VAM) products.

## References

Reference documents are those documents that, although not a part of this document, serve to strengthen and clarify its contents. The following documents provide reference material for background information only. In case of conflict, the Office of Information and Technology (OI&T) documents are the guiding documents; otherwise, the Software Configuration Management Plan will take precedence. Contact the SCM team for instructions on how to obtain copies of the released version(s) of these documents.

* Office of Information and Technology VA Directive 6004 - Configuration, Change, and Release Management Programs
* Office of Information and Technology Configuration Management Process
* Office of Information and Technology Change Management Process
* Office of Information and Technology Release Management Process
* Enterprise Process Group (EPG) Pro-Path Process Maps
* Technical Reference Models
* 192-039 Interface Control Registration and Approval Document

# Roles and Responsibilities

This section defines the SCM tasks performed for VA Products. The following program and project team members participate in the delivery of artifacts (code, documents, etc.):

* Program Management
* Project Manager
* Development Team
* Scrum Master
* Development Lead
* Developers

## Software Configuration Management Team

VA Projects may be comprised of VA and contractor personnel, located at VA facilities and other offsite development locations, such as approved contractor/vendor sites.

Table 1 is a high-level list of personnel who may be members of the VA project and SCM teams, along with their assigned roles and responsibilities as they relate to SCM. The Roles defined herein can sometimes be overlapped with other roles and responsibilities depending on the environment. In addition, one person allocated for a specific role as listed below may often have the responsibility of other roles. Project specific roles and responsibilities are listed in the Project Management Plan. The project specific roles and responsibilities as they relate to SCM are listed in the project SCM Procedures Manual and work instructions.

Table 1: Software Configuration Management Team Roles and Responsibilities

| Role | Responsibility |
| --- | --- |
| Project Manager | * Develops and maintains artifacts, following version control procedures, using the SCM Procedures Manual and work instructions for each VA product worked within the program/project. * Ensures proper execution of the SCM Plan. * Oversees the software configuration management process. * Assesses and evaluates all other change requests/work items. * Identifies dependent projects. * Establishes/revises required artifacts. |
| Technical Writer | * Develops, edits, and delivers artifacts in support of subject software deliverables. * Develops and maintains artifacts following proper version control procedures, as per the SCM Procedures Manual and work instructions. |

## Change Control

Change Control is typically defined as the ability to coordinate, track, and manage change to the baseline of a product or other systems-configurable items. Change Control for a product should satisfy all change management criteria established by the OIT Change Management process. Criteria should satisfy all VA product plan development and test objectives, while maintaining the stability and integrity of the baseline within all products, regardless of which VA projects are conducting development activities on the artifacts.

### Technical Reference Model

The Technical Reference Model (TRM) provides a technical framework which categorizes standards and technologies. The TRM leverages a common, standardized vocabulary, allowing inter/intra-agency collaboration and interoperability. It provides a foundation to advance the reuse of solutions and technologies. The TRM is allocated to the Technology Infrastructure level of the Federal Enterprise Architecture Framework pyramid. The recommendations of the TRM, once approved by the Architecture Review Board (ARB), constitute formal architectural policy.

### ****Process Management Service****

The Process Management Service is aligned under OIT. They are a dedicated team of process engineers who implement programs to improve processes so as to optimize product development.

### Testing Program

The testing program consists of quality assurance coordination and testing services. Their mission is to define and oversee the comprehensive testing program and software quality assurance.

### Tools Program

The Tools Division consists of design and development tools, portal and content management tools, scheduling and earned value management tools, risk management tools, and integrated collaborative environment. The mission of the Tools Program is to manage the procurement, implementation, training, and support of those tools which are chosen for standardization across software development. The Tools Division teams are responsible for the delivery of product and customer service to other areas of VA, via provision of licenses and/or systems support, in order to promote the One-VA objective to maximize efficiencies through partnership where there are similar resource needs. The Tools Division has an objective to consolidate standardized tool implementations within the components. In this role, the Tools Division champions and provides oversight for COTS product implementations, when those products are identified, for use across a significant segment of the organization, along with their VA and corporate business partners. The Tools Division is comprised of the following teams:

* The Design and Development Tools team is focused on procurement, design, implementation, and management of the **IBM Rational Software** Development Platform Suite of tools, and the current and future expanded implementations of software engineering suite tools.
* The Scheduling and Earned Value Management Tools team has a focus on procurement, design, implementation, and management of the **Primavera** portfolio management product, as the standard tool for project planning and management.
* The Portal and Content Management Tools team has a focus on procurement, design, implementation, and management of the Intranet and Internet **Microsoft SharePoint** web presence, as a standard content management method of communications with the organization, and the larger VA and business partner community.
* The Risk Management Tools team has a focus on procurement, design, implementation, and management of selected Risk Management tools.
* The Integrated Collaborative Environment team has a focus on creation of a web-centric environment, which will be used by the VA for sharing, collaborating, integrating, accessing, and controlling management information and product data, defining all of the products.

The primary functions of the Tools Division teams are to define standardized tool deployment architecture, identify technical tool solutions for meeting customer requirements, determine acquisition plans (e.g. make, buy, COTS) for new tools, manage design, development, configuration test, and deployment of tools and their updates, and manage end user support, formal training, and mentoring of provisioned tools.

# SCM Activities

The primary goal of SCM processes and procedures is detailed in this section, along with a discussion of the Software Development Life Cycle (SDLC), in alignment with Agile methodology. The section 3 details the following:

* Configuration Identification: includes, but is not limited to, documentation, product structures, and identification standards.
* Configuration Control: including interface and document management strategies, as well as change management.
* Status Accounting: includes various status reports on elements from an available tracking tool.
* Configuration Audits and Reviews: may include build audits, testing audits, and test readiness reviews.
* Release Management: includes the development side of release packaging concepts, electronic releases, and version description document production

## Configuration Identification

Configuration identification is the process of identifying, selecting, naming, and classifying the development items subject to change control. This involves defining the product structure and identification conventions to be used for baselines of products, documents, software builds, and releases packages. Items are normally placed under change control as soon as they are instantiated, as tracking the configuration, new contents, and implementation status of new requirements going into an initial release is equally as important as tracking later changes.

### Documentation Identification

All project-related documents will be managed and controlled in the designated documents repository for each specified document type. For the purposes of VAM, Rational is the VA-approved tool and repository for all software source code and electronic artifact configuration and version management. All project documentation must adhere to VA policy on protection of VA security and VA architecture content, desensitization of patient data content, FOIA content redaction restrictions, 508 accessibility standards, and documentation standards, where applicable.

### Documentation Categorization

Any documentation artifact should be categorized as either Product documentation or Project Management documentation. The criteria are relatively simple and should make it easy to determine in which category, and ultimately which repository, a new artifact should be placed.

#### Project Management Artifacts

Project Management artifacts are typically those that do not require migration through a series of life cycle stages, but rather, once generated, are static and relate to a specific state that the project is in at a certain time within its life cycle. For example, Meeting Agendas, Meeting Minutes, and Status Reports.

#### Development Artifacts

Product artifacts are those that change along with the developed product, most likely will experience changes over time, and will require baselining and Change Management. They typically represent specific configurations and criteria required by the developed release of the product to which they are associated and should be packaged and migrated through the same series of life cycle stages as all other baselined artifacts within the development environment architecture and utilities.

### Product Structures

A core part of Configuration Management is identifying and describing the attributes of a product or system’s hierarchy of component parts, referred to as product structure.

All products have the following attributes:

* A name, title, or similar nomenclature
* A unique identifier that is usually an acronym or abbreviation, and/or name space. This is often used in other identifiers, for example baseline, build, or release identifiers
* A version identifier, once the product is created, instantiated, and/or released nationally

### Identification Standards

Within the SCM repository, unique identifiers will be applied to products and their associated content. The following are the types of identifiers used in accordance with the formats defined in the applicable procedure documents:

1. File versions - Identifies the version or revision identifier of each software item that comprises the product at any specific baseline. It allows identification of unique items that make up the inventory of a baseline. Software identification provides the foundation for traceability of related artifacts. The software identification version number is assigned by the version control automated tool and controlled in the development repository. Each VDD lists all software, its version, and related change document numbers.
2. Change records– Identifies a set of work product versions created to resolve a specific Change Request. The identifier is created, controlled, and tracked by the Change Management System.
3. Baseline – Identifies a set of specifications or work products that has been formally reviewed and agreed upon, which serves as the basis for further development, and which can be changed only through change control procedures.
4. Build – Identifies a set of source code and other file versions used to build and assemble deployable packages.
5. Release Package – Identifies a set of deployable file versions and deliverable document versions that constitute a complete release package.
6. Release Candidate – Identifies the distribution of the baseline, or application modifications to the baseline, that is being staged for production before it becomes a product release.

## Configuration Control

Software development at the VA follows an iterative development process. All product assets are expected to be managed sufficiently to provide a stable, traceable, dependable and secured development, test and production environment within VA, and for VA information assets managed outside the VA, for the purposes of conducting business with or on behalf of the VA. Configuration Items (CIs) in the scope of this document are defined as any object (software, hardware, data, documentation, environment configurations) that may experience change over time.

### Interface Management

Interface management is required at the product level, system level, and enterprise level. This document does not attempt to detail the Interface Management process; however, it is required that all product development will use SOP 192-039 Interface Control Registration and Approval, which can be obtained by contacting the EPG.

### Document Management Strategy

Software development requires the implementation of Jazz/Rational to follow standards for documentation repositories. The implementation approach will leverage the Integration, Project Management, and Configuration Management support contracts, and VAM OIT team members and additional stakeholders.

Documentation Management includes the execution of a document’s lifecycle based on the nature of its content and purpose; its understanding of established federal and VA records retention policy; its understanding of federal and VA content management, web content, business need, privacy, security and FOIA applicability; and its need to be placed under configuration control, based on those established properties.

The following set of general principles and practices guide the VA product and project documentation management process:

* Ensure that all project software and non-software artifacts are versioned correctly according to VIP standards, and follow a build/release promotion versioning approach, which identifies all major, minor, and update changes to the components.
* Product and project documentation will be created with check-in/out and baselining activities in Jazz/Rational for versioning and change tracking activities.

A list of VA Project Management repositories and their use is documented in the VA Project Management repositories and can be obtained from EPG. Further information regarding the documentation management strategy, including implementation approach, directory names, and a description of the purpose of each directory, is available in the SCM Procedures Manual and work instructions.

### Change Management

Formal change control should be instituted for work products when an initial functional baseline is created, i.e., there are a set of approved requirements. From a management standpoint, implementing the initial set of requirements is no different from those requirements defined later, or changes to baselined requirements. Some form of Change Request should be used for tracking and status accounting of all development activities. Although the development team is responsible, they are still expected to follow change control process, which will facilitate the transition to formal change control that is managed by the SCM team.

#### Software Change Management

A key principle in the change control process is to push the change authority to the lowest possible level, while still maintaining sufficient control. Change authority depends upon the phase of development the project is in, and the state of the configuration item. Each role in the change process has a set of guidelines to determine authority for either approving change or escalating the change authority to the next level. This results in a compromise between a stringent, centralized change authority and the flexibility of rapid change required by an iterative process.

All changes are subject to the following, and must comply with the change request review cycle:

* Development Managers and/or delegates, such as team leads, have the authority to approve programming or documentation change requests, but must defer architecture change requests to the project architects that are within scope, schedule, and budget, and do not coincide or conflict with the promotion of deliverables from developer’s environment.
* The appropriate product owner is the approval authority for changes that impact budget, schedule, overall product functionality, and quality.

### Change Control Process

Issues, Risk and Change Request management, and tracking activities facilitate the ability to perform the change control processes with consistency and effectiveness. These processes ensure that the product’s artifacts are introduced into the product baseline and are eventually delivered to customers with a high degree of confidence of known contents.

#### Issue Management

Issue management is responsible for managing identified items that, if not resolved, may affect a product in regard to cost, schedule, or scope. Resolving an issue may result in unforeseen activities that impact the triple constraint, necessitating a Change Request. The rule is that actions to manage an issue cannot change an artifact that has been introduced into the SCM repository. If unforeseen/unplanned activities necessary to manage an issue require an artifact to be changed, then a Change Request must be created.

Any individual associated with the development of a VA product or executing its resulting functionality may identify issues. Issues may or may not result in a requirement for modification of the executing products or environment.

Issues that do result in such a requirement, will, by process, generate an associated Change Request, (either a Defect or Enhancement), in the Development Environment Change Tracking facility.

Issues that are solely related to the management of the product, such as scheduling or resource management concerns, will follow the established Agile VIP methodology for risk management and issue resolution. The details for managing issues are documented in the Project Issue Management Plan for each VA product.

#### Risk Management

Risk management is responsible for managing uncertain future events or conditions that, if they occur, have a positive or negative effect on a product. Risks have three components: a possible future event, the probability of its occurrence, and the impact of its occurrence.

#### Change Requests

Within software development, a Change Request is a general term for any request from a stakeholder to change an artifact or process. All SCM artifacts established in the repositories for a product, or changes to those artifacts, must be tracked. This will ensure that the baseline of the product has documented contents from the initial baseline, and throughout the life of the product.

## Status Accounting

Configuration status accounting addresses the recording, tracking, and reporting of information needed to effectively manage the development of VA products. Data and logs that identify the configuration status, configuration item identification, and change status of all change requests must be maintained to enable reporting.

Change requests provide the foundation for software configuration management status accounting but are not standalone. Additional status reporting should be conducted, where appropriate, to include tool and resource usage progress, and the overall product SCM environment condition.

### Status Reporting on Change Request Activity

Status reporting on Change Request activity should be reported either on a weekly basis, or on an as-needed basis. Reports that are generated for these purposes should contain data pertaining to each CR as deemed necessary in order to provide detailed information for the entire audience.

### General Status Reports

Based on the status accounting tool, other reports can be produced as required. Other reports can include tool and resource usage, progress, and the overall application’s SCM environment condition. The frequency, format, and detail included in these reports are all determined by the needs of the project. For detailed information on which reports are required, refer to the SCM Procedures Manual and work instructions document for each product.

## Configuration Audits and Reviews

Audits and reviews are actions performed to verify that the product matches the configuration items as described in specification and other documents, and to report the known state of the deliverable. Audits and reviews vary in complexity and formality. Generally, all products released will have gone through the following, at the very minimum:

* A review by product management, or a designee, for verification of functionality completeness. This would be accomplished by the Development Manager reviewing the VDD to ensure the contents are correct.
* An audit by SCM for accuracy of the VDD. This is accomplished by auditing the actual objects and versions included in the release listed in the VDD against the SCM maintained environment for Change Control and Change Tracking.

### Build Audits

Build audits consist of an “as-designed” against an “as-built” verification, which is the comparison of the designed development of elements (technical documentation) versus the completed, or built, product. The SCM staff will maintain audit trails of the builds that validate traceability of baseline changes, verify incorporation of approved changes, and provide integrity to baselines.

Audits are performed incrementally during development to validate the progress toward schedules and reduce efforts to successful testing. Unless otherwise directed, the SCM team will assume responsibility for the verification of performance of build audits.

### Testing Audits

Testing audits will be performed to ensure quality, and to assess the correctness, reliability, performance, robustness, and usability of the application by executing the application in a test environment, with test data. Audits will confirm that release contents, including change requests and defects, are mapped to test cases to be executed.

To have adequate configuration control of the testing environment, a formal test plan with all test cases to be run must be documented, along with the expected configuration, before any testing begins. When testing is complete, an as-run test plan, along with all testing material, is then archived in the SCM environment.

### Test Readiness Review

An informal test readiness review will take place directly before each phase of testing, and will be used to discuss any known deficiencies, impacting internal CRs, or test environment issues. The lead, architects, developers, testers, SCM Manager and the SQA Manager will attend the test readiness review, along with any other employees who may benefit from the resulting information.

## Release Management

Release Management within SCM maps to Development Build Promotion Management, not be confused with OIT Release Management. A release is defined as the grouping of physical or electronic objects, along with all supporting media (documentation) necessary to satisfy a given set of requirements.

### Release Packaging Concepts

A release that contains a software deliverable is made up of controlled artifacts that must be baselined, built, tested, packaged, and staged for distribution as a single entity. The product’s release packages will provide the ability to identify the exact contents that comprise a product, which trace to the exact version of artifacts at specific point in time. A single version of an artifact may be included in several releases. A new release cannot be identified until the release candidates that have been staged for production have been deployed and verified by OIT Release Management.

### Electronic Release Package

The electronic release package contains executable(s), installation scripts, a user guide, installation documentation, and any required supporting software on electronic media. The executable is generated from a baseline. The electronic production release package media will be labeled with an identification number, descriptive name, and release date. A soft copy of the VDD will be generated and sent with the electronic product as part of the release package.

### Version Description Document

The VAM VDD describes the documentation, media used in producing the deliverable, and the contents of the release package, both physical and functional. The VDD should be produced when the first build is promoted to the first testing environment outside of the developer’s integration test environment and modified with each promotion to other environments. The VDD contains the following:

* Description of release media containing the electronic product identification, description of deliverable, and location of the release package
* Intent of version being described
* Identification of all the artifacts used to make or generate the executable image. The identification will include the name of the version control tool, the artifact storage location, item name, and version
* Identification of all artifacts used to generate the executable image that have changed from the previous VDD
* Identification and location of the functional and physical configuration audit reports and explanation or notes pertaining to the audit findings
* Change descriptions containing one or both of the following:
* Defect report listing all defects that have been resolved since the last release of the product, and all open defects against this release of the product
* Change Requests addressed by this release of the product, along with a description of all changes made

## The SDLC

The SDLC is used to identify and display all the stages that a product goes through during its evolution. The SDLC is not designed or engineered; it is simply the result of documenting what has been established by other activities during the development of a product. The main purpose for documenting the SDLC is to map the required stages and states to the terminology and configuration of Jazz/Rational implemented to support them.

# SCM Environment

This section contains a description of the SCM environment for software products in development. Software development project teams develop and deliver software systems for use and deployment to multiple environments. Each product can have multiple test phases that are conducted across multiple locations. There are many products being developed by a workforce that follows a distributed staff model. These considerations, in conjunction with merging all development staff to institute standardization, are the basis for following sub sections.

As previously stated, change control provides an integrated method for change initiation, processing, approval, and updating of a product baseline and/or release package. SCM is responsible for ensuring the accuracy and integrity of the baseline in the repository.

The methods by which all activity within a SCM Environment is conducted are determined by the functionality and configuration of the tools used for and within that environment. Figure 1 provides an overview of the tools typical of a software development environment, and how they relate to SCM tools.

Figure 1 Software Development Environment Related to SCM



The tools implemented for the SCM Environment will provide the functionality depicted above. This section provides information needed for actual product SCM environment configurations and the naming conventions to be used.

## SCM Tools

Formal SCM tools have been identified and approved for performing SCM tasks within the development environment. Only approved tools, such as Jazz/Rational, will be used in the SCM environment, and all SCM environments that are using un-approved tools must go through the wavier process. The SCM tools that have been selected for version/change control, baseline management, build/package management, issue/risk/change tracking, have standardized implementation. All team members are to follow instructions for using these tools in order to maintain consistency throughout the SDLC in alignment with Agile VIP methodology. The SCM Procedures Manual and work instructions provide details, and can be obtained through the SCM team for each VA product.

The implementation of approved SCM tools will form standard software and document repositories, and associated change history artifacts to allow development and service delivery teams to develop, store, and manage promotion of all work products through configuration and change management processes. The approved list of SCM tool can be obtained within the TRM.

## Security

Access to work areas, change records, and artifacts within the repositories for VA products is based upon staff member status and need. All SCM environments will have a standard implementation and security model that is to be followed in order to meet security requirements. Each SCM environment must be documented describing the security model and be referenced in the SCM Procedures Manual and work instructions.

## Training

Access to the SCM toolset may require training. Training requirements for tools such as Jazz/Rational can be obtained through the SCM team for each VA product. Any subsequent training will be conducted or facilitated by the Project Manager, Development Manager, and/or the SCM team for each VA product.

Training courses for Jazz/Rational can be found in the Talent Management System (TMS), and must be completed in a timely fashion. All team members and stakeholders who are to obtain access to Jazz/Rational must complete the following courses in order to gain access to the tool:

* TMS ID 3878248 - IBM Rational Team Concert - Agile Sprint, Configuration/Change Management Level 1
* TMS ID 3878249 - IBM Rational Team Concert - Agile Sprint, Configuration /Change Management Level 2
* TMS ID 3878250 - IBM Rational DOORS Next Generation - Requirements Management Level 1
* TMS ID 3897036 - IBM Rational DOORS Next Generation - Requirements Management Level 2
* TMS ID 3897034 - IBM Rational Quality Manager - Quality Management Level 1
* TMS ID 3897035 - IBM Rational Quality Manager - Quality Management Level 2

# Acronyms, Abbreviations, and Terms

The following acronyms have been used throughout this document.

Table 2: Acronym List

| Acronym | Definition |
| --- | --- |
| ARB | Architecture Review Board |
| CCB | Change Control Board |
| CI | Configuration Item |
| COTS | Commercial-off-the-shelf products |
| CMP | Configuration Management Plan |
| CR | Change Request |
| EPS | Enterprise Product Support |
| EPG | Enterprise Process Group |
| EVS | Enterprise VistA Support |
| FOIA | Freedom of Information Act |
| GOTS | Government-off-the-shelf products |
| IDE | Integrated Development Environment |
| IDL | Iterative Development Lifecycle |
| NDI | Non-developmental Items |
| PD | Office of Enterprise Development |
| OIT | Office of Information and Technology |
| PAL | Project Artifact Library |
| POC | Point of Contact |
| RUP | Rational Unified Process |
| SCM | Software Configuration Management |
| SDLC | Software Development Life Cycle |
| SOP | Standard Operating Procedure |
| SQA | Software Quality Assurance |
| TRM | Technical Reference Model |
| TSPR | Technical Services Project Repository |
| UCM | Unified Change Management |
| UML | Unified Modeling Language |
| VDD | Version Description Document |
| VIP | Veterans focused Integration Process |
| VHA | Veterans Health Administration |
| VistA | Veterans Health Information System and Technology Architecture |

## Terms

The glossary supporting the terms used within this document is contained within the Master Glossary and is available from the following location:

<http://vaww.oed.wss.va.gov/process_asset_library/Lists/glossary/default.aspx>