

The Software configuration Management

→ Software configuration Management — It is the ability to control and manage change in a software project. Change is inherent and ongoing in any software project. It is the ability to track & control such changes in a proper manner from the basis of a good Software project. SCM tries to bridge this gap by defining a process for change control.

Includes

Change Management processes, to prevent unauthorized changes, procedures to follow when making changes, required information, possibly uncertain management as well.

⇒ Why SCM required

The SCM is the process that defines how to control & manage change.

The need for an SCM process is actually felt when there are many developers and many versions of the software. Suffice to say that in a complex scenario where bug fixing should happen on multiple production systems and enhancements must be continued on the main code base, SCM acts as the backbone which can make this happen.

⇒ Elements of configuration Management system

- 1) Component elements — A set of tools used for configuration of software.
- 2) Process elements — Collection of procedures, and tasks that define an effective approach to change management.
- 3) Construction element — Include set of tools which automate the construction of s/w.
- 4) Human element — Include human resource of s/w team which

use set of tools and processes.

→ Scale of SCM

- 2) Configuration identification — Identifying configurations, configuration items and baselines.

3) Configuration control—Implementing a controlled change process. This is usually achieved by setting up a change control board, whose primary function is to approve or reject all changes requests that are sent against any baseline.

- 3) Configuration status accounting—Recording and reporting all the necessary information on the status of the development projects.

- 4) Configuration auditing—Ensuring that configurations contain all their intended parts and are sound with respect to their specifications. documents, including requirements, architectural specifications f user manuals.

- 5) Build Management — Managing the process and tools used for builds.
- c) Process Management — Ensuring adherence to the organization's development process.
 - d) Environment Management — Managing the software and hardware that host the system.
 - e) Framework — facilitate team integration related to the process.
 - f) Defect Tracking — Making sure every defect has tracking back to the source.

Software Configuration Items and tasks

⇒ Software configuration items — Configuration items refers to the fundamental structure unit of a configuration management system.

Example of configuration items include individual requirements documents, software, modules and plans.

The configuration management system oversees the life cycle of configuration items through a combination of processes and tools by implementing and enabling the fundamental elements of identification, change management, status accounting and audits.

Configuration item types are —

- Hardware
 - Software
 - Communications/Networks
 - Location
 - Documentation
 - People (Staff & Contractors)
- Product of software engineering is inclusive in configuration items.

⇒ Tasks in the SCM process

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which

SCM process includes following tasks

- configuration identification
- change control
- version control
- configuration auditing
- reporting

III

III. Configuration Identification (CI) It includes defining the basis for identifying software configuration items (SCIs), defining the method to depict the relationship between SCIs, defining the identification scheme for naming configuration identifications, identifying CI, identifying the baselines to be established and the corresponding software configuration identifications for defining the method for acquiring software configuration identifications in the project repository.....

IV

II Change control task — Change control defines process which is used to handle change requests from their initiation, until the time, the change is implemented and released to users. The change control process includes evaluating a change request, implementing the change and verifying & releasing the change.

III Version control task — Version control task of the SCM process is executed to manage multiple version of a configuration and the software configuration items that constitute it. Revisions of a software product and the principles of version control apply to revisions, variations and variants which are types of version of a software product.

IV Configuration auditing task — Configuration auditing of the SCM process is a software quality assurance (SQA) function. It is executed formally and impartially to ensure that

changes have been made correctly and quality has been maintained while implementing the changes.

There are 3 types of configurations audits — QA

- functional configuration audit
- physical configuration audit
- formal Qualification services

V

Reporting task — It provides timely information on the status of the changes requested and the software configuration items. It also affects to the people who may be affected by the changes. These could be the people requesting for changes, the developers, the project manager or the senior management.

Baseline

Baseline is a reference point in the software development life cycle marked by the completion and formal approval of a set of predefined work products.

The objective of a baseline is to produce a project's vulnerability to uncontrollable change by fixing and formally change controlling various configuration items at critical points in the development life cycle.

Baseline are also used to identify the aggregate of software and hardware components that make up a specific release of a system.

→ Baseline purpose — The purpose of a baseline is to provide:

- Measurable process points within the system development lifecycles.

- A basis for change control in subsequent project phases.
- A stable reference for future work.
- Intermediate and final points for reading the plan.
- For purpose of project check procedure.
 - Efficient baseline → efficient baseline means the following characteristics:
 - 1) A baseline must be associated with the "specification" and a formal approval of a physical characteristic such as document or hardware component.
 - 2) All items associated with a baseline must be placed under formal change control.
 - Specifying a baseline = baseline are defined by:
 - The name of the physical items which constitute the baseline.

- The point in the project where the baseline is expected to be complete.

• The method to be accepted to approve baseline items.

• The individual responsible for approving baseline items.

Change Request Management

Change Request Management defines the process required to initiate change, analyse impact, authorize change request, change and release change into project progression.

Change Request Management

Initiate Change

Log Request

Analyze Impact

Authorize Change Request Management

Develop Change

RELEASE MANAGEMENT PROCESS

II

Initiate change — Should initiate the change through the submission of a change requests. It should be requested by any stakeholder and submitted by one of the project team members who submits requests for changes relating to its area of responsibility.

III Log Request — Should assign a change number to the change request, record request date, requested by, request name, & change manager name.

Assign priority to requests. e.g., the change initiator should assign a priority as emergency, high, medium or low.

Enter the change request of change log to the

Project documentation change request folder

- III Analyze Impact — Determine impact on existing documentation and configuration items by requesting documents architecture documents and for software configuration items.

Request service by development and for production support teams to determine impact upon each area, also identify configuration items that are impacted by the change request. Assign the change category to change document whether that change is major, significant, minor or standard.

- IV Authorized change request Management — Request for change must be standard request, standard changes do not require change management team approval since they are automatically approved and more directly to change deployment.

All major and minor change request is must approved.

by change Management Team. Change Manager send the request to change Management Team

III

Develop change — In this schedule the changes according to business priorities, change pipeline, category and priority. A change Owner is appointed according to the requirements of the change in terms of technology, size, priority & category.

Change Development process follows a sequential development life cycle, and change must have to meets the acceptance criteria before it is passed to the release Management process.

IV

Release Management process — In this process, a effective release packages are build for the deployment of one or many changes into production. Preparation for release is given to ensure maximum successful deployments.

V

Software configuration Management repository

Software configuration items are maintained in a project database or repository. The repository is a database that acts as the center for both accumulation and storage of software engineering information.

Repository is needed because —

- 1) Finding a configuration item when it was needed.
- 2) Determining which items were changed, when & by whom was often challenging, is it done by repository.
- 3) Constructing a new version of an existing program is very easy.
- 4) It describes the relationships between configuration items.

⇒ Role of the Repository

- 1 Data integrity — Data integrity means it provides

constraints to data which is going to enter.

Data according to constraints input enters in repository

6 Resource

2 Information sharing — Information sharing provides mechanism for sharing information among selected objects of developer / tool manager / SCM

3 Tool integration — Tool integration establishes a data model that can be accessed by many software engineering tools, control access to the data of performs appropriate configuration management functions.

4 Data interpretation — Data interpretation provides function 2 that allows SCM tasks to be performed on one or more sets of software configuration items

5 Methology enforcement — It defines an entity relationship model stored in the repository that implies a specific process model for S/w engineering.

3 Rig

6 Document standardization — It is the standard approach for the creation of the engineering document.

Document standardization is the definition of object in the database.

SCM (Software configuration management) features.

1 Versioning — when a project is in process, many versions of project are prepare and save in repository, so that management of product increase will go effectively and developers may go back for testing and debugging.

2 Dependency tracking and change management —

Configuration objects (items) are store in repository. Repository Manager the relationship between these configuration objects (items). And the new product is develop from these relation ships.

3 Requirements tracing — This special function provides

the ability to track all the design and construction components and deliverables that results from a specific requirements specification.

4 Configuration Management — A configuration management facility keeps track of a series of configurations representing specific project milestones or production releases.

5 Audit Trail — It establishes additional information about when, why and by whom changes are made. Information about the source of changes can be stored as attributes of specific objects in the repository.

6 Version control in Software Configuration Management

Version control process of SCM combines procedures of tools to manage different versions of the configuration objects that are created during the software process.

Version controlled system implements or is directly integrated with four major capabilities —

- 1) A Project database (repository) that stores all relevant configuration objects.
- 2) A Version Management capability that stores all versions of a configuration object.

3) A trace facility that enables the software engineer to collect all relevant configuration objects and construct a specific version of the software.

4) A Issue tracking capability that enables the team to record & track the status of all issues.

Management

Change control is software configuration management

Change control is defined process which is use to handle the request of change from their initiation, until the time, the change is implemented.

And released to the user. The change control process includes evaluating a change request, implementing the change and verifying and releasing the changes.

Change control combines human procedures and automated tools. A change request is submitted and evaluated to assess technical merit, potential side effects, overall impact on other configuration objects, future functions and the projected cost of the change.

A result of assessment is present in a change report which is used by a change control authority (i.e. These are person or groups who makes final decision on the status of priority of the change).

Need for change
↓
Change request from user
↓
Developer evaluates

Need for change is recognized

Change request from user

Developer evaluates

Change report is generated

Change control authority decides

Request is queued for action, ECO generated

Assign individuals to configuration objects

"Checkout" configuration objects (items)

Make the change

Review (audit) the change

"Checkin" the configuration items that have been changed

Establish a baseline for testing

Perform quality assurance of testing activities

"Promote" changes for inclusion in next release (revision)

Rebuild appropriate version of software

Review (audit) the change to all configuration items

Include changes in new version

Distribute the new version

Change request is denied

↓

User is informed

The Plan for change in software configuration management

There is proper plan for change process. The purpose of this plan is to provide basic guidelines for how source code of software builds will be managed.

This document will cover source code administrator, build environment standards and define the process by which new components will be added to builds and a common understanding of how to manage bucken builds.

The Objective of software configuration Management plan is to ensure consistent software quality across projects by ensuring that:

- a) All components are managed in a source control tools
- b) All components are compiled on an independent

and controlled build Machine

c) Build Machine specifications are controlled and documented.

SCM Plan Requirements

- will define set of configuration items to be managed
- Assign roles and responsibilities.
- Define software configuration standards and procedures
- Document the SCM tools and their use.
- Define the required metrics to support the plan.

plan → SCM plan Template include following objects.

SECTION 1 (Introduction)

- 1.1 Purpose → The purpose of the SCM plan is to provide basic guidelines for how builds will be managed.

repeated

1.02 Scope → Describes the scope of module, project

and team involved

1.03 Reference and → Includes all the references and links that pertain to the scr plan.

1.04 Acronyms and → Includes configuration items,
Glossary
Software configuration management
Configuration Management engineer
Subscription engine constants

1.05 Outstanding → Includes all outstanding to do
Tasks
and tasks.

SECTION 2 (Responsibilities)

2.01 Role → Includes all the responsibilities for each role.

SECTION 3 (list out all the union tools being used and their versions)

3.01 Current version → Version number

Section 4 (Describe the process)

4.1 Production → Describe production code procedures

4.2 Development → Describe development code procedures

Section 5 (Describe the guidelines)

5.1 Build Servers → Describe the build environment

5.2 Security and → Describe the security and permission
permission surrounding the Build environment

Section 6 (Describe the process)

6.1 Build process → Describe the build process

6.2 Build Versioning → Describe the build identification of
version strategy

6.3 Build Schedule → Describe the build schedule and
rules around building.

6.4 Build Logs of → Describe the build logging and
tracking requirements and reporting

6.5 Build Scripts → Describe the build scripts and
configuration files including how

the responsibility is broken out