

SOFTWARE CONFIGURATION MANAGEMENT

Configuration Management

The process of software development and maintenance is controlled is called configuration management. the configuration management is different in development and maintenance phases of life cycle due to different environments.

- Goal: The goal of CM is to maximize productivity by minimising mistakes
- CM is the process of
 - Managing changes to the software system
 - Identifying, organising and controlling changes to the software product during development and operation.
- CM is an umbrella activity which operates throughout the life cycle of a software product.
- Effectiveness of CM is just by the number of defects reported due to incorrect or inappropriate configuration control.

Configuration management activities

- SCM activities are planned.
- Selected software work products are identified, controlled and made available.
- Changes to the identified software work products are controlled.
- Effective jobs and individuals are informed of the status and content of the software baselines.

Activities/Functions of CM

- Configuration identification
 - Identification of items / components which make a configuration.
 - Define baselines.
- Configuration Control
 - Monitors integrity and traceability.
 - Exercises access-control.
 - Controls changes: receive, approve, monitor ,control change request and defect reports
 - Control releases
- Status accounting
 - Record product status
 - Report product status
- Configuration Audit
- Organise for configuration management

Concept of Baselines

Baseline refers to a set of configuration items which together depict (something to describe) a product milestone. Only approved items are accepted into baseline.

Configuration Identification

Goals:

- To create the ability to identify system components.
- To provide traceability between configuration identifications.

Definition:

Elements of configuration management consists of selecting the configuration items for a system and recording the functional and physical characteristics in a technical documentation standards

Purpose:

Ability to identify and reconstruct any item / configuration when required.

The following documents are required for above activities-

- Project plan
- Software requirement specification document.
- Software design description document.
- Source code listing.
- Test plans/procedures / test cases.
- User Manuals.

Documentation

Software documentation is the written record of the facts about a software system recorded with the intent to convey purpose, content and clarity.

User Documentation

S.No.	Document	Function
1.	System Overview	Provides general description of system's functions.
2.	Installation Guide	Describes how to set up the system, customize it to local hardware needs and configure it to particular hardware and other software systems.
3.	Beginner's Guide	Provides simple explanations of how to start using the system.
4.	Reference Guide	Provides in depth description of each system facility and how it can be used.
5.	Enhancement	Booklet Contains a summary of new features.
6.	Quick reference card	Serves as a factual lookup.
7.	System administration	Provides information on services such as networking, security and upgrading.

Fig- User Documentation

System Documentation

It refers to those documentation containing all facets of system, including analysis, specification, design, implementation, testing, security, error diagnosis and recovery.

System Documentation

S.No.	Document	Function
1.	System Rationale	Describes the objectives of the entire system.
2.	SRS	Provides information on exact requirements of system as agreed between user and developers.
3.	Specification/ Design	Provides description of: (i) How system requirements are implemented. (ii) How the system is decomposed into a set of interacting program units. (iii) The function of each program unit.
4.	Implementation	Provides description of: (i) How the detailed system design is expressed in some formal programming language. (ii) Program actions in the form of intra program comments.

S.No.	Document	Function
5.	System Test Plan	Provides description of how program units are tested individually and how the whole system is tested after integration.
6.	Acceptance Test Plan	Describes the tests that the system must pass before users accept it.
7.	Data Dictionaries	Contains description of all terms that relate to the software system in question.

■ Software Versions

Two types of versions namely revisions (replace) and variations (variety).

Version Control :

A version control tool is the first stage towards being able to manage multiple versions. Once it is in place, a detailed record of every version of the software must be kept. This comprises the

- ✓ Name of each source code component, including the variations and revisions
- ✓ The versions of the various compilers and linkers used
- ✓ The name of the software staff who constructed the component
- ✓ The date and the time at which it was constructed

Software Version Control is a system or tool that captures the changes to a source code elements: files, folders, images or binaries.

Version Control Tools track these changes and allows manipulation of versions and baselines.

Many tools do very similar tasks

Types of Version Control Software

Source Control Tools

Software Configuration Management Tools

Configuration Management Tools

Document Management Systems

Product Life Cycle Management Systems, PLM

Content Management Systems, CMS

Version Control Functionality However, Version Control, or Software Configuration Management Tools do this specific job superbly.

Think of it this way, software developers who use these tools day-in and day-out, write these tools.

So of course, they do a really good job of providing these functions:

Check Out, Edit, Check In

Conflict Resolution

File Merging

Conflict Resolution

File Revision History

Source Code Branching

. Version Control Software is an overview of the features and concepts of a few of the more commonly used Open Source SCM Tools, Subversion, Bazaar and Git.

- **Change Control Process**

Change control process comes into effect when the software and associated documentation are delivered to configuration management change request form (as shown in fig), which should record the recommendations regarding the change.

Change control is manual step in software lifecycle. It combines human procedures and automated tools.

Change control process is illustrated in below figure

Change request submitted and evaluated to assess technical merit, potential side effects, overall impact on other configuration object and system function, and project cost of change.

The result of the evaluation are presented as a change report, which is used by the change control authority(CCA) – A person or group who make final decision on the status and priority of the change.

Different factors of Change Control process

Change request initiation and Control

Impact Assessment

Control and Documentation of Changes

Documentation and Procedures

Authorized Maintenance

Version Control etc

Change control process Flow



CHANGE REQUEST FORM

Project ID:

Change Requester with date:

Requested change with date:

Change analyzer:

Components affected:

Associated components:

Estimated change costs:

Change priority:

Change assessment:

Change implementation:

 Date submitted to CCA:

 Date of CCA decision:

 CCA decision:

Change implementer:

Date submitted to QA:

 Date of implementation:

Date submitted to CM:

 QA decision: