9.7 SOFTWARE CONFIGURATION MANAGEMENT

Software Configuration Management is the ability to control and manage change in a software project.

Change is inherent and ongoing in any software project. The ability to track control such changes in a proper manner form the basis of a good software project. Software Configuration Management tries to bridge this gap by defining a process for change control.

Change Management defines processes to prevent unauthorized changes, procedures to follow when making changes, required information, possibly workflow management as well. Change management is orders of magnitude more complex than version control of software.

Why is Software Configuration Management required?

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

The need for an SCM process is acutely 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.

9.7.1 Traditional Software Configuration Management Process

Traditional SCM process is looked upon as the best fit solution to handling changes in software projects. Traditional SCM process identifies the functional and physical attributes of software at various points in time and performs systematic control of changes to the identified attributes for the purpose of maintaining software integrity and traceability throughout the software development life cycle.

The SCM process further defines the need to trace the changes and the ability to verify that the final delivered software has all the planned enhancements that are supposed to be part of the release.

The traditional SCM identifies four procedures that must be defined for each software project to ensure a good SCM process is implemented. They are :

- Configuration Identification
- Configuration Control
- Configuration Status Accounting
- Configuration Authentication
- Configuration Identification

Software is usually made up of several programs. Each program, its related documentation and data can be called as a "configurable item"(CI). The number of CI in any software project and the grouping of artifacts that make up a CI is a decision made of the project. The end product is made up of a bunch of CIs.

The status of the CIs at a given point in time is called as a *baseline*. The baseline serves as a reference point in the software development life cycle. Each new baseline is the sum total of an older baseline plus a series of approved changes made on the CI.

A baseline is considered to have the following attributes :

(1) Functionally complete

A baseline will have a defined functionality. The features and functions of this particular baseline will be documented and available for reference. Thus the capability of the software at a particular baseline is well known.

(2) Known Quality

The quality of a baseline will be well defined *i.e.,* all known bugs will be documented and the software will have undergone a complete round of testing before being put define as the baseline.

(3) Immutable and completely recreatable

A baseline, once defined, cannot be changed. The list of the CIs and their versions are set in stone. Also, all the CIs will be under version control so the baseline can be recreated at any point in time.

✔ Configuration Control

The process of deciding, co-ordinating the approved changes for the proposed CIs and implementing the changes on the appropriate baseline are called configuration control.

It should be kept in mind that configuration control only addresses the process after changes are approved. The act of evaluating and approving changes to software comes under the purview of an entirely different process called change control.

✔ Configuration Status Accounting

Configuration status accounting is the bookkeeping process of each release. This procedure involves tracking what is in each version of software and the changes that lead to this version.

Configuration status accounting keeps a record of all the changes made to the previous baseline to reach the new baseline.

✔ Configuration Authentication

Configuration authentication (CA) is the process of assuring that the new baseline has all the planned and approved changes incorporated. The process involves verifying that all the functional aspects of the software is complete and also the completeness of the delivery in terms of the right programs, documentation and data are being delivered.