

# Concept in software configuration system

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## **Abstract**

Software configuration management (SCM) should be able to change, manage and control the project of software. In addition, software configuration management process describes that how to manage, control the change and monitor the product. In this paper I want to focus on concept of software configuration management process, to explain the concept of configuration management process and adoption in the industry in terms of strategies and lessons learned, and to describe the proposed configuration management implementation.

Keywords: Software configuration; Software project; Implementation

## **Introduction**

First, we should understand the meaning of configuration, configuration management to make easy for understanding of concept in software configuration system. Configuration is the functional of software as set in forth technical documentation and realized in a production. Configuration management is an ordering to control the evolution of software systems. Actually, there is no general accepted definition for configuration management system because there is no integrated concept for configuration management system. For example , in Ideal speaking a configuration management is that which provide all functionality, like , identification , control , status bookkeeping , survey , prepare administration and group work but in essentially talking any framework that give a few portion of adaptation control ,setup distinguishing proof ,framework organizing ,framework modeling and has the expectation of giving setup administration and considered by the program designing community to be an arrangement administration framework[1].

Some time recently understanding the concept of program arrangement administration framework it is vital to turning on the concept of setup administration framework and arrangement administration tool.

Configuration administration framework can be considered portion of an environment where the arrangement administration bolster is an fundamentally portion of the environment and the setup administration framework is sold in that way as portion of a bundle.

Configuration instrument can be considered a stand-alone tool.

**Introducing of process and product in configuration management (CM)**

The configuration management consists of a product and process that we should distinguish each of them. Setup administration prepare illustrates the arrangement of assignments required to carry out arrangement administration (CM).

Basically, the method may be a arrange that characterizes what is essential to be done, who does it and how it is carried out. The method demonstrate takes into consideration arrangements and methods of the organization and it is computer program advancement lifecycle show (SDLC).

Setup administration item is the result of the method that's a building errand.

**Concept in computer program setup organization**

The concept is organized to demonstrate and evolution of configuration management support. Each concept is depicted because it exists in a specific arrangement administration framework. The usefulness ranges of intrigued for configuration management system concepts to be discussed are: components, repository, change request, team concepts, process concept, and combination of structure and construction features.

**1.1 Components concept:**

The components to identify and getting to components of computer program item is store and conveyed component.

**1.1.1 Repository:**

The repository as shown in figure 1.1 it captures configuration management data and stores forms of records as unchangeable objects. Or it may be a centralized library of records and provides form control for the record within the store and when a record is within the repository it ought to be beneath shape of setup administration also the records are not changed within the store since making alter to record implies to make unused adaptation of record. When client work on a record to check out the specific form of record in their working registry and perform any work on record check it back into the store and make an unused adaptation of record.

User cannot check out and alter the same record at the same time since when the record checked out, it bolted consequently till checked back in and an adaptation number is consequently related with modern form. In entirety, the store stores record history data that incorporates which include the reason for a alter, diverse form of the records, who and when supplanted the adaptation of record and the total code of deferent adaptation isn't put away fair the real concession between each adaptation is put away in general repository associated with directory that file exist in.

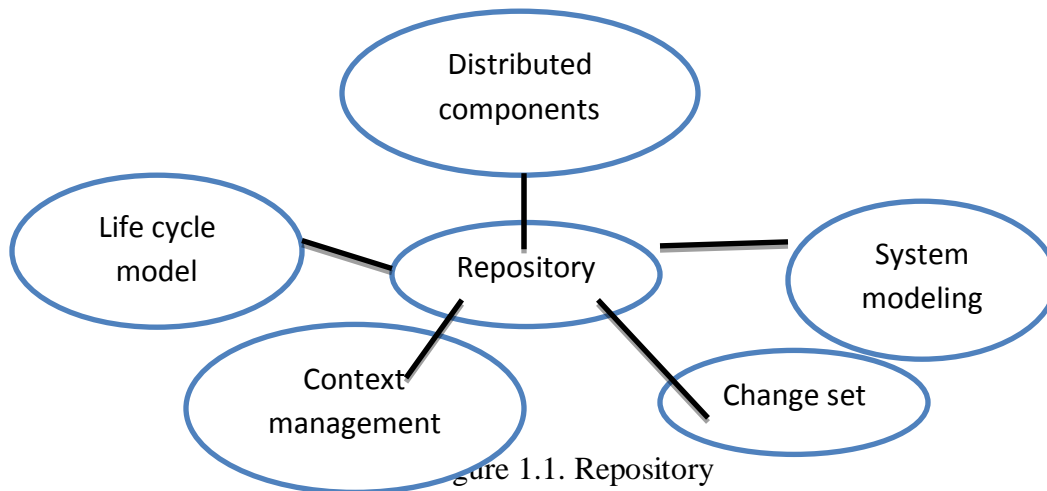


Figure 1.1. Repository

**1.1.2 Distributed components:**

The store is centralized coherently but the information from store ought to be physically disseminated and plan administration framework (PAF) gives a store for records conveyance in deferent equipment stages. For occurrence, giving a few blame resistance offices with the fundamental interpretations of record groups, the client carries out their work on the store as in spite of the fact that all the records were found on their claim workstations. Bunch of clients can work on the same arrangement records and different duplicates of records exist on distinctive workstation. So, DMS is mindful of the area of the foremost later form of a record when any alter bring to a record within the store gotten to be result to the neighborhood duplicate on conveyed work station and ended up overhauled since the framework knows where all the neighborhood duplicates are. [1]

**1.2 Process concept:**

Concepts that bargain with handle related usefulness are setting administration, alter ask, and life cycle show that I will explain them.

**1.2.1 Context management:**

Context management also called power frame and provides workflow management to direct group of users via their work process. For occurrence, a apparatus run that incorporate creation a circuit, approving it and reenacting for indicating it is execution highlights. Amid these operation control outline naturally determines the current setting connected to the devices and run the information sets command record that utilized in for conjuring instruments after that the client fair select the circuit plan and the instrument work for returning the work.

**1.2.2 Change request:**

Alter ask could be a report ask for a alter and related process model for change.[1] Client will send an internet program execution report (PSR) that indicates a blame or ask for expanding of adaptation components.After that the report is investigated by the implementers and designers

that can recognize the problem. The effect of change analysis, an online design change (DC) is proposed from (PSR) and know the details of what components are changed and how too investigations who will be influenced by the alter. At that point those individuals are within the alter control board, they are educated by the electronic mail almost DC to vote inside a certain time outline to endorse the alter. When the DC is concurred to at that point a modern improvement adaptation of alter code is made and plan alter ended up dynamic. So, the code that needs to be changed is bolted after completion the changes a modern adaptation is send for checking and endorsement to a individual with quality affirmation benefit.

### **1.2.3 Life cycle model:**

Alter arrangement control (AAC) gives concept for supporting a particular lifecycle show within the feeling of supporting the move between stages and individuals in lifecycle demonstrate and the assignment and information administration to be performed amid those phases.[1] This has been done by isolating out the stages into creating, testing, endorsing and discharging of an item. The partition permits diverse clients like computer program analyzers and engineers to exclusively do their work on the same code at the same time at that point the move and division between stages and independently work is gotten to by passing the code by means of to partitioned setup which appear each stage.

### **1.3 Structure and construction concepts**

Taking alter in component and it's structure clarifying the structure of an item , getting to the portion of that structure , building the item , and keeping the components of a structure steady are the alter set , framework modeling , subsystem , question pool, consistency upkeep that I will explain them one by one.

#### **1.3.1 Change set:**

Alter set appears a consistent alter to a item and implies of making any form of a arrangement that's not subordinate on the most recent form of that arrangement. The basic concept of taking in a store contrast between adaptations of components into a contrast association for making open to the client. The distinction association with the records to that they apply and the subtle elements around the alter make up the alter set. The alter set taking all changes to all records in setup with the reason for changes and the subtle elements of when and who made the changes. For case, a client needs to bring alter in a arrangement since of one bug the reason is the bug.

#### **1.3.2 System modeling:**

System modeling explains the software product according to the structure, components and how to build it. System modeling involves the concept of a family to take the history of the product and a family explains the success of versions in the components. Diverse client recognized adaptations of the item to form up a family. The attribution of each adaptation related with creation of date and creator. Development rules spares the number of components which

were created and long haul of components that ought to be built like sparing the compiler, it's adaptation.

### **1.3.3 Subsystem**

The environment that provides partitioning the large product in to parts the parts are called subsystems and subsystems show the way for clients to constrain the effect of changes and recompilation for environment to check the approve of to combine portion of an item.

Subsystems have interface specifications for good implementing bodies and show configuration items. Therefore, components in the subsystems are not obvious for other components within the subsystems unless they are outlined through the interface detail.

### **1.3.4 Object pool:**

The question inferred pool comprise of a collection doubles and other objects delivered by interpretation devices and each inferred question has all data around its framework modeling including form of source and interpreter apparatuses that utilized with interpreter alternative, client comment for determination, date, time, included individual and area for determination and this data is called bound configuration thread (BCT). When domain software engineering environment (DSEE) wants to build the system and computes the desired bound configuration thread (BCT) for every component in system model after that the DSEE see the pool on the off chance that a inferred question coordinating the specified one exists. In case it does, it is utilized on the off chance that not, it is build.

### **1.3.5 Consistency maintenance**

The configuration management assistant (CMA) explains the validation and construction based on summary explanation of the product about the successful or unsuccessful usage of components that forming the configuration. Configuration management assistant (CMA) can characterize that a arrangement is usable when to be usable a setup ought to be total, unambiguous, steady and need adaptation skews. It implies a setup ought to comprise of all occurrence of components required and shouldn't include different occasions of a component. The classes of properties appear the highlights of client characterized like imperatives, sorts and adaptations. When a modern setup is developed the CMA utilizes the data that fills the database through the past utilize of the components shaping the setup. So, CMA predicts that the setup is usable.

## **1.4 Team concepts**

The team concept or the synchronization of computer program designing groups working on a item that are in workspace, straightforward see and exchange that I want explain by details each of them.

### **1.4.1 Workspace**

The workspace gives segregation of work and propose for discourse between worldwide long-term store for unchangeable objects and private brief term store for changeable objects. The

concept of workspace to hampers the client from interferometer with one another's work and workspace give the concept that work can continue on changeable objects that's beneath arrangement administration. The workspace is accomplished through the adaptation status demonstrate it implies that the state property is associated with form of component and state is depending on components like, active or solidified. The state ought to be either a private workspace or within the open store and a active component is usable by others and it is changeable but frozen component is not changeable and it is available for public to use that.

#### **1.4.2 Transparent view:**

The straightforward see gives a seeing component with assurance against unauthorized get to a setup. [1] Fair the form of records that client interested will be seen within the workspace the all-other adaptations are covered up from see in any case they are exist physically. For occasion, the alter that made the most recent version of open it isn't fundamental to be seen within the workspace and the client is separated from the open changes at that point workspace deliver the appearance of a specialized store for the client.

#### **1.4.3 Transaction:**

The transaction synchronizes and coordinates team changing the same or diverse parts of the item or exchange incorporate of an environment and set of commands. In here the environment is like a workspace and a straightforward see that appears the structure of registry which utilized to store source and determined objects. The command is like a resolve that provide the interactions across environments. The command and environment are used to synchronize the action between users and the communication of actual changes.

#### **1.5 Summary**

As conclusion, each concept is described as it exists in a particular configuration management system. The configuration management consists of a product and process. Setup administration prepare illustrates the arrangement of errands required to carry out setup administration (CM) and the method could be a arrange that characterizes what is vital to be done, who does it and how it is carried out. The method demonstrate takes into consideration approaches and strategies of the organization and it is software development lifecycle model (SDLC). Arrangement administration item is the result of the method that's a building assignment.

### **Adoption of configuration management in the industry: strategies and lessons learned**

#### **Introduction**

The configuration management is used with software development to control and modify by different stakeholders. This paper aims to explain the implementation of configuration management process based on practices and this implantation was applied at Brazilian Electrical Energy Research Center (CEPEL) and I organized this paper in three sections. Section 1 explains

the configuration management process implementation;section 2 explains the case study product at CEPEL,section 3 provides lesson learned.

## **Section 1**

### **Process for configuration management implementation**

We should define good plan to help the standard activity and produce the software development organizations. For configuration management implement process we should follow some steps as follow:

- Prepare the environment: This is the first step process activity and in this activity we should select the technology of configuration management and its extension in the organization.
- Create mindfulness within the interested parties: In this action the partner is educated of the changes which ought to perform.
- Diagnose the project: This is the third process of configuration management implementation this activity gets a meeting with project group and consultants to present the project and let them to understand the project structure and history of the development. In addition, this activity let the team to know about those features that are relative to the application of configuration management in the background of the project.
- Diagnose document: This activity shows comprehend of the project and this activity involve the primary suggestion for the structure of version repository for good implementation.
- Train project team: This is the activity that team project direct to be the best configuration management practices and know the tools which used in project.
- Configuration management plan: This step defines the plan for the project and directs the operation of configuration management that is applied with project life cycle.
- Prepare for migration: This step tests those that are related to the migration of project to new configuration systems. In sum, when the project trained, configuration management plan approved, migration step completed after that the migration step executed after that the mentoring step performed where the project team clear the issues that are used in their scenario.

## **Section 2**

### **Configuration Management Implementation at CEPEL**

I want to discuss about the usage implementation of version control at an institute that is called CEPEL. CEPELL has many program ventures beneath advancement that a few of the extend wasn't beneath adaptation control. The engineer organizes the adaptation control and reinforcement in media like CDs. For form control a few ventures utilized the Visual Source Safe (VSS) tool and the other projects used the Concurrent Version System (CVS) also one of the projects used Subversion.

For analyzing the use of subversion (SVN) repository with CM best practices we should answer these questions as follows:

- Is the repository being used by the developers?
- When did the most recent commit happen?
- How long is the period between commits (length of time)?

Focusing on the scope of VSC the consultancy group received two dimensional examinations .1 employing a device for gathering and creating store concurring the extend advancement.2. Apply a survey for receiving qualitative data to support the summary. For analyzing to produce report first should check the number of committers in each project I want to show this information in table 1.1.

Projects	Committers number	Migration date	Report time
Project_01	3	December 2007	2007-12-16 to 2008-10-09
Project_02	6 #	January 2008	2008-01-15 to 2010-07-09
Project_03	5	March 2008	2006-03-10 to 2010-05-19
Project_04	10#	August 2008	2000-09-08 to 2010-07-08
Project_05	8	October 2008	2008-10-07 to 2010-07-08
Project_06	37#	October 2008	1997-08-21 to 2010-06-14
Project_07	1	December 2008	2008-12-15 to 2009-09-08
Project_8	2#	July 2009	2009-07-21 to 2010-07-08
Project_09	1#	August 2009	2009-08-18 to 2009-08-18
Project_10	2#	October 2009	2009-10-02 to 2010-02-03
Project_11	1#	November 2009	2009-11-11 to 2009-11-11
Project_12	2#	November 2009	2009-11-12 to 2010-06-30
Project_13	13	December 2009	2005-04-27 to 2010-07-08
Project_14	13	January 2010	1997-10-17 to 2010-06-14
Project_15	Not verified	Not verified	Not verified
Project_16	Not verified	Not verified	Not verified

The table has shown the number of committers to each project according to the migration date. Some committer numbers are included the ash key (#) those mean that they are subversion (SVN) login which was made for consultancy group to moment information of extend in to store. The project\_15 and project\_16 have not been verified yet because the tools used on them for gathering data couldn't produce the report and project\_15 is large. So, the script that used for producing the report maybe crashed during the execution and the repository that created for the project\_16 seemed to be removed. The project\_6 has the most committers and it has taken long time from 1997 to 2010. The most active committers were project\_4 compared to the others in term of lines code. Project\_09 and project\_11 have not been active the migration was done for backup purposes and the teams members has mentioned that they are will be re-activated at some point. Project\_07 is undergoing of re-structuring. In sum, for answering the first question according to the table 1.1 the repository that created for projects do not seem to be used by the project team and the repository is used by the developers all con not used the repository.



For showing the question one, answering the question two according to commit happen and question three according for long periods with no commits may show the vacation time on the project development I want show this summarization in table 1.2 as follow:

Table 1.2 shows the usage of repository, recent commit date and time between commits.

Projects	Is repository used	Recent commit date	Period between commits
Project_01	No	October 2008	Long
Project_02	Yes	July 2010 #	Short
Project_03	Yes	May 2010	Short
Project_04	Yes	July 2010#	Short
Project_05	Yes	July 2010#	Short
Project_06	Yes	June 2010	Short
Project_07	No#	September 2009	Long
Project_08	Yes	July 2010	Medium
Project_09	No#	August 2009	Long
Project_10	Yes	February 2010	Medium
Project_11	No #	November 2009	Long
Project_12	Yes	June 2010	Medium
Project_13	Yes	July 2010#	Short
Project_14	Yes	June 2010	Short
Project_15	Not verified	Not verified	Not verified
Project_16	Not verified	Not verified	Not verified

Table 1.2 has shown that project\_1, project\_07, project\_09 , project\_11 didn't use repository also the recent commit were happen on them have mentioned in table and the period of them were long period. However in project\_02 to project\_06 were used repository the recent commit date that were happen has mentioned in table and the period of between commit of them were short. In addition, project\_15 and project\_16 have not been verified yet maybe the project\_15 was crashed during the execution of script for producing the report and project\_16 was deleted or removed.

**Survey with stakeholders**

According to the method of sixteen target ventures a few of components relate to the designers and venture director. So, we ought to accumulate the information by devices and input ought to be given by the partners. For instance, how are the method and apparatuses being utilized after the setup administration usage prepare? What are the advancements and troubles? So an explore study was performed with partners that are included within the ventures concurring to accumulate understanding, analyzing point of see and clarify a feeling approximately the proposed handle.

**Survey phases**

When we want to adopted the approach we should follow four phases as follows:

- In first phase we should define, evaluate and validating the survey.
- In second phase it is necessary to choose and provide connection to an expert model.

- In third phase need to send the survey invitation and gather the data.
- At the end the data should be analyzed in semi quantitative way.

For example, convenience was selected eighty stakeholders form sixteen projects according the information extricated from the subversion store. After that from these partners the models ended up decrease to seventy-five based on invalid or non-available association. The subject is mindful to analyze and appears there's no noteworthy biases are present within the ponder. In any case, when there's no respect critical was watched based their validity the subjects were similarly weighted amid the information conglomeration. From this demonstrate perhaps 25 partners replied the examiner in July 2010. So, the rate is relate to 28% of viable subjects, 85% of the designers subject, 15% is extend chief, 10% work in expansive ventures, 45 % work in medium ventures, 45% work in little ventures and the successful subjects are included in 81% of the sixteen ventures.

In result of survey, when the three phases of survey have been completed the elements of feedback were analyzed in a semi quantitative way in fourth stage. Be that as it may, a few results of the study appeared within the figure 2.1 and 2.2 to inquire approximately utilization of subversion and arrange of adaptation control after expansion of handle. We ought to know that more subjects are utilizing subversion foundation and take after the development arrange when the method is beneath execution. For this reason we should modify and report which are related to the creation of external repository for supporting third party developers, involving the version of non-intermediary for the repository which is every commit want to release, using of no branches when the development is under execution, we should use subversion in new projects, using of VSS for treating the subversion like periodical repository. In addition, as showed in figure 2.1 90% of subjects use the SVN after the extension of process and figure 2.2 has showed the usage of version control plan.

- 60% create and keeping the branches in project repository.
- 60% creating and keeping the tags in project repository.
- 65% is checking the logs in the project repository.
- 75 % utilize commit within the extend repository.
- 10% utilize subversion control fair for backup.

Figure 2.1

Shows the usage of SVN after process and figure 2.2 shows the usage of version control plan

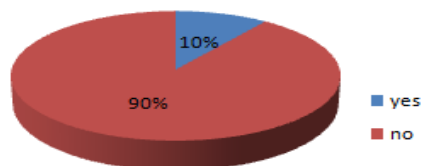


figure 2.1

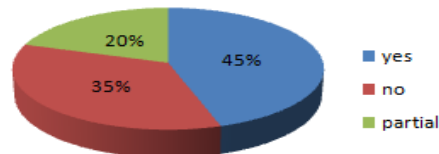


figure 2.2

### Section 3

#### Lessons learned

As thinking to the keeping of activity is very important in software industry because it needs greeter attempt among software engineering activities based from high financial costs, configuration management help to overcome on some of the race that link in activity. For example, need of item information and the carelessness in conducting changes to the program.  
(2)

This paper appeared the method of usage on arrangement administration based on the standardization of the utilize of apparatuses with culture of organizational found in software development. In process I have learned usage of implementation in configuration management include adaptation control in an organization that have numerous computer program ventures.

In movement pointed at to know the concept and objective of arrangement administration in computer program advancement and partners that ought to know the significance of usage of VCS for ventures. The gather extend ought to capable for little measure ventures that are physically controlled the form which didn't consider the need of back instrument as a issue and estimate of the team.

The duration for migration varied based the size of the history in store it means in other folder or cd and the number of project versions also kind of VCS used. Those projects that are used the VSS are more difficult in migration especially in the debasement within the store base.

The length of each venture prepare was three month and some time the duration was varied more or less based some factors included complexity of restructuring in repository and availability of team project for getting meeting and migration step.

The very important things that we should remember is the covering of training step in practical of configuration management area in the concepts and numerous times dissolvable resistances and questions on the usage. So, we ought to know that the victory of this sort work depends on the capability, educate of those included in work and the arranging of unused setup administration structure based on adjust usage. To get it for end of the of work ought to know the plausibility of utilizing the proposed handle within the CEPEL ventures. In whole, we ought to get it to utilize the method, issue following, construct the instruments for applying in other organization and work with other configuration management systems.

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