

# An Approach of Stipulation Change Management Using Cloud Computing

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**Abstract:** Every technology project's successful implementation depends on the requirements. Changes in stipulations at any point of the software development life cycle are considered a healthy operation. Nevertheless, this transition is a little simpler in a co-located setting than in a decentralized system in which participants are spread over more than one area. This presents numerous challenges, such as coordination, communication & control, effective and efficient management of changes and the management of central repositories. Cloud computing can therefore be used to mitigate these stakeholder problems. We used a case study to test the system of cloud computing.

**Keywords:** Benefits of Cloud Computing, Role of Cloud Computing in GSD, Challenges of Requirement Change Management.

## I. INTRODUCTION

Services provided by users or consumers that represent stakeholders' needs are technology requirements. Requirements are

created based on how people actually work in the application area. Requirement Engineering (RE) consists of requirements generation, review, design, testing and management. Requirement Technology primarily aims to satisfy end users or consumers with minimum cost and time [1]. Specification Engineering (RE) processes consist of two phases: the design of stipulations and the management of requires. The modification of requirements is part of specification management. A change is described as work to be done: developing

new stipulations, filling out forms related to

requirements management and removing software bugs [2]. The management of requirements for change is an important phase in the engineering of requirements. In the creation of any software development, it plays an important role. The main reasons for the software requirement changes are the

improvement of functionality, changes in customer requirements, requirements for disclosure, plan changes, exclusion of requirements, imitation elimination and change in the management plan [3]. Change management in a co-located environment is easy and easy, but it becomes complex if someone develops in a GSD environment with a number of participants [2]. In Global Software Development (GSD), software has been globally developed from distributed sites where different people from many countries worldwide are connected [4]. Some factors that have increasingly brought GSD to the forefront are its benefit from lower costs and access to global capacity; most organizations regard GSD as a superior solution [4]. As a result, numerous problems arise in GSD teams geographically [5]. Coordination, communication, control, cultural and time zone difference, language barrier, development location, lack of central repositories, and management of change effectively and accurately are key factors affecting GSD requirements management [2]. There are various methodologies used to address the challenges of global software development; cloud computing is one of them. Cloud computing is a web-based computing standard where

resources such as software, hardware and information are shared on endusers' request. With less effort, resources can be easily shared and managed in the cloud [6]. The goal of this research is to identify the risks of requirements change management in GSD environments and to provide their solution through the use of cloud computing for application change management issues.

## II. ENVIRONMENT REVIEW OF GSD

Under GSD, project teams are geographically distributed. When teams are distributed in a global environment and several stakeholders are involved in the management of change, it is very difficult to manage change in requirements. The development teams have to deal with many problems in order to handle changes in the GSD climate. Communication risks, teamwork and change management are some of them effectively and reliably. The aim of this research is to identify issues in GSD specification change management and their possible solution by critically evaluating the existing software change management methodologies. The problems in the management of GSD transition are as follows:

### Communication, Coordination and Control

Under GSD, the improvements under application requirements and interaction are important [3]. Differences between cultures and time zones have an adverse effect on communication and coordination systems in different geographical areas because of development teams. It decreases the pace with which teams of production co-ordinate, collaborate and believe [3][4][7]. Teams share and exchange a broad range of information during interaction, which leads to several difficulties, which generate incomprehension between teams. GSD makes very little effort in relation to the interaction problem and RCM compared with the hierarchical software development system [3]. It is important that the solution of teamwork and communication problems be solved [8][9].

### Lack of Shared Repositories for Storing Requirements

The presence of economic, physical, cultural, linguistic and geographic gaps not only has an effect on the interaction process in GSD but also challenges development teams to set up and manage shared repositories. In these files, there is a common place for different development teams to document and exchange project information with other teams. While creating and maintaining these databases seems simple, due to various software development processes and standards, the data recorded by a team are often inconsistent with information documented by other teams and cannot thus be used timely for tracking requirements and other development processes [2]. It is critical that a common repository is made

available to all team members where teams are located in different locations [2].

### Lack of Managing Change Efficiently and Accurately

The coordination of stipulations is one of the main challenges and causes a lot of problems if teams are scattered and attempt to meet customer standards. If the development team does not accommodate customer requests, the design is useless for the customer. Most of the requirements management framework is used for co-located software projects, and is not capable of accurately meeting requirements for distributed software projects. It leads to high costs, schedule delays and most projects fail [2].

### Propose Work

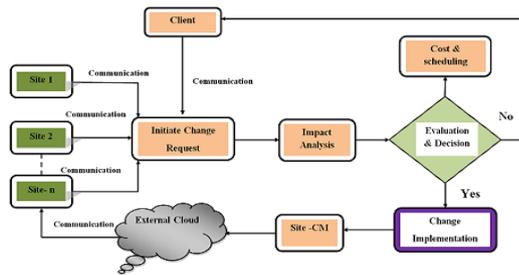
There are different methodologies used to tackle the problems of global software development. One of them is cloud computing. We suggest a system to address these various problems with cloud computing in the figure below.

## III. CLOUD COMPUTING

Cloud computing is an Internet computing model that shares resources such as hardware, code and data on customer request. With less effort, cloud computing services can be easily distributed and controlled [6]. Cloud computing provides many advantages: no investment [10][11], low demand self-service[12], high scalability[13], easy access and reducing market problems and maintenance costs[11]. Keeping in mind the advantages of cloud computing, we use it to manage requirement changes in GSD environments. We evaluate that cloud computing framework to address the above challenges of RCM:

- Cloud computing essentially provides effective cooperation among geographically distributed teams during software development cycles such as requirements, design, encoding, and testing. It solves the problem of communication and coordination.
- System models such as SaaS, PaaS, and IaaS are in use in cloud computing [14]. By using these database models data can be significantly and reliably collected, accessed, handled, analyzed and supplied among all citations.
- Cloud computing provides an external cloud repository. Public cloud includes all data related to evolving requirements management. The biggest advantage of the cloud computing platform is that any approved person can access the data from anywhere and anytime.

The framework proposed is based on literature data collected and started by industrial experts.



#### IV. DESCRIPTION OF FRAMEWORK

The design of the framework "A Cloud Computing Requirement Change Management Framework" (RCMF-CC) is undertaken within the context of a decentralized development environment for the Requirement Change Management. The system consists of the various activities shown in Figure 1. This model is proposed for GSD's Cloud Management of Requirement Shift. It includes various roles and behaviors. For the sake of implementing a transition, consumers in the GSD world interact.

Change Request The communication is conducted via various sites and leads to changes being requested.

##### Impact Analysis

It is necessary to understand correctly the consequences of the proposed change. When the application for change has been made, the adjustment is evaluated to see the impact of this change on the material. Components that may need to be formed, changed or discarded during impact analysis are defined.

##### Evaluation & Decision

After the study, the effort and cost associated with the introduction of the change are calculated.

The feasibility of the change initiated is verified. Decisions are taken on the basis of assessment. After the assessment stage, the vendor can have two possible choices. Whether the improvement demanded is practical and can be enforced or not. If the proposed change cannot be enforced as the consumer acknowledges the ineffectiveness of the adjustment. Such a move is being introduced.

##### Change Moderator

Moderator of change is a role of the RCMF-CC. Changes applied are transmitted to CM (Change Moderator).

##### External Cloud (Cloud Repository)

In the last step the data is transmitted to the cloud server and the customer is admitted to the update.

#### V. EVALUATION

We are doing a case study of a business X. Company X implements a standard system when modifications are required. In this company, we develop our system to handle transition in the GSD world and then analyze the experts. The feedback process was used by experts from RCM to provide opinions on the "customer satisfaction," "conflict resolution," "continuous integration," "budget effect," "repository maintenance," "rapid development" and "free activity." The Expert Panel includes a 10-year Team Leader, a 5-year Software Developer, a 12-year Project Manager, a Change Manager who has eight years of experience, a 6-year QA group and a 10-year experience RE engineer. Table 1 shows the results of the expert opinions for RCM-CC and the RCM-CC system. Figure 2 also shows a graph of expert opinions by using the RCM-CC framework and graph without using the RCM-CC framework in Figure 3. It is clear that the best way to manage change in the GSD world is by our proposed model. The cloud computing platform solves all the above problems and offers certain parameters of satisfaction.

#### VI. CONCLUSION

In this paper we have described the issues in the global software development environment during specification change management. There are many ways to solve this issue, but we have used cloud computing to mitigate the risks of changing requirements. We suggest a cloud computing platform. Then we use our framework to evaluate the results in an organization. The cloud computing system fixes all the above problems and satisfies those criteria. It is evaluated from the instance of the field.

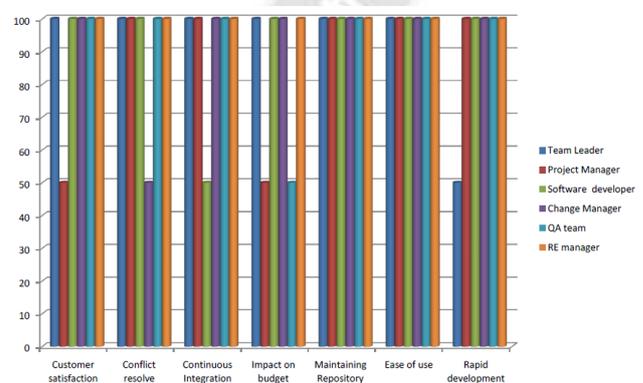


Figure 2.1 software organization using RCM-CC framework

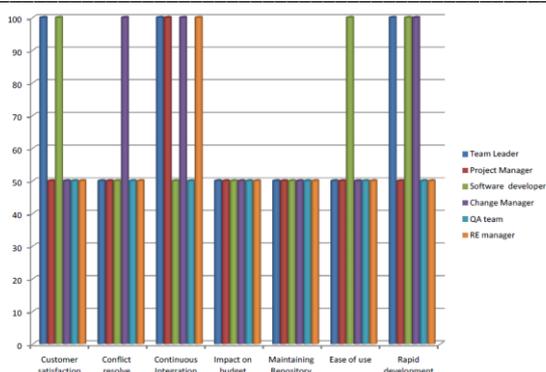


Figure 3.1 software organization without using RCM-CC framework

Table 1. Expert reviews.

Company using with RCM-CC framework						Company using without RCM-CC framework					
Apparent Benefits	Team leader	Project manager	Software Developer	Change Manager	QA team	Apparent Benefits	Team leader	Project manager	Software Developer	Change Manager	QA team
Customer satisfaction	✓	0	✓	✓	✓	Customer satisfaction	✓	0	✓	0	0
Conflict resolve	✓	✓	✓	0	✓	Conflict resolve	0	0	0	✓	0
Continuous Integration	✓	✓	0	✓	✓	Continuous Integration	✓	✓	0	✓	0
Impact on budget	✓	0	✓	✓	0	Impact on budget	0	0	0	0	0
Maintaining Repository	✓	✓	✓	✓	✓	Maintaining Repository	0	0	0	0	0
Ease of use	✓	✓	✓	✓	✓	Ease of use	0	0	✓	0	0
Rapid development	0	✓	✓	✓	✓	Rapid development	✓	0	✓	✓	0

✓ = Agree, 0 = Partially Agree, X = Not present.

Pert chart in software industry and it give better satisfactory results as compared to other traditional methods used in Global Software Development environment.

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