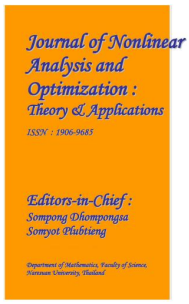
Journal of **N**onlinear **A**nalysis and **O**ptimization
Vol. 15, Issue. 1, No.15 : 2024
ISSN : **1906-9685**



Paper ID: ICRTEM24_114 **ICRTEM-2024 Conference Paper**

A TECHNIQUE OF ORGANIZING CHANGE MANAGEMENT THAT INTEGRATES CLOUD COMPUTING

#1**Dr. P. KISHOR,** *Associate Professor & HOD,*
Department of Computer Science & Engineering,
Sree Chaitanya Institute of Technological Science, Karimnagar, TS.

#2**Dr. KISHOR KUMAR GAJULA**, *Associate Professor,*
Department of Computer Science & Engineering,
School of Engineering,
MALLA REDDY UNIVERSITY, TELANGANA

ABSTRACT: These guiding ideas are integrated into each and every one of our technical endeavors. At every stage of the software development life cycle, it is abundantly clear that changing the standards is regarded in a positive light. This modification is much simpler to carry out in a system that is co-located as opposed to one that is dispersed and autonomous. As a consequence, coordination, communication, and organizational difficulties have become more difficult. Both change management and monitoring in the central repository are made more difficult as a result of this. According to the findings of this study, cloud computing may be able to assist customers with a variety of problems. An investigation into the methodology behind cloud computing was carried out with the help of a case study.

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

1. INTRODUCTION

The provision of services by users or customers is a technical need that is responsible for defining the requirements of a large number of stakeholders.

The criteria are derived from the activities of individuals who are involved in the particular application domain. The term RE refers to a multitude of procedures, some of which are elicitation of requirements, validation of requirements, generation of requirements, testing of requirements, and management of requirements. There is a necessity for a precondition. The primary objective of technology is to improve user experience while simultaneously lowering costs and labor requirements. Standardized design and administration are the two steps that make up the method known as Specification Engineering (RE). Administration of specifications refers to the process of monitoring and responding to shifting needs in a systematic manner. In order to make the transition as smooth as possible, it is essential to establish new laws, practice effective requirements management, and fix any existing software bugs. The capability to respond effectively to shifting circumstances and conditions is one of the most essential aspects of requirements

engineering. It is an essential step in the process of developing any kind of software. Revisions to the project plan, the discovery and elimination of counterfeit components, new customer expectations, compliance with disclosure standards, functional advancements, and changes to the management strategy are the primary drivers for adjusting software requirements. The approach to change management is quite straightforward and simple to grasp when it is used in an environment in which employees are co-located. However, when it is employed in a setting that involves multiple people and is scattered across multiple countries, it gives rise to new problems and complexity. Global Software Development, often known as GSD, is a process for developing software that makes use of a distributed team of software developers hailing from a variety of countries to create software in a variety of places. Because of its low cost and extensive pool of readily available resources, the GSD solution has generated a significant amount of attention in the business sector. Teams working on global software development (GSD) face a variety of issues as a result of this. The ability to effectively and efficiently manage change, as well as cultural variations, disparities in time zones, language barriers, the geographical dispersion of development teams, the absence of centralized repositories, and the inability to manage change are all factors that have an effect on requirement management in global software development (GSD). Computing in the cloud is useful in the resolution of a number of challenges that are hurting software development projects around the world. Cloud computing enables users to readily access and utilize shared resources such as data, software, and hardware components. This access and usage is made possible by internet connectivity. The cloud simplifies the process of allocating and managing available resources. The research will provide a solution to this issue that is based on cloud computing, and it will identify the risks that are related with requirements change management in globally distributed systems (GSD).

2. ENVIRONMENT REVIEW OF GSD

The research on global software development (GSD) suggests that geographically dispersed teams are more widespread than one might think. When teams are dispersed across multiple nations in a global context and numerous stakeholders have strong interests in the result of the process, it can be challenging to manage changes in the requirements of the project. In order for the development teams to successfully adapt to the shifting GSD environment, they will need to triumph over a number of obstacles. It is necessary to take into consideration the dangers that are associated with effective communication, collaboration, and management of change. The purpose of this study is to investigate the many ways of software change management that are already in use and to evaluate the difficulties associated with GSD specification change management. In addition to this, we will investigate many possible solutions to these problems. Concerns have been raised about the manner in which the GSD transition is currently being managed.

Communication, Coordination and Control

The disparities in physical, linguistic, cultural, geographic, and economic factors might make it challenging for development teams to create and maintain shared repositories. These challenges can also make it difficult for teams to collaborate. These papers can be used by individuals affiliated with a variety of development groups to record information pertinent to a particular project, which can then be disseminated. Creating and administering databases may at first appear to be a simple task; but, ensuring consistency across teams quickly proves to be a challenging problem. When the data that is documented by one team is different from the data that is supplied by another team, it makes it more difficult to properly track standards and other development processes. When members of a team are geographically dispersed, it is imperative that they all have equitable access to a centralized information repository.

Lack of Shared Repositories for Storing Requirements

When trying to meet the demands of geographically spread teams and the expectations of customers, you could run into difficulties with coordination and communication. It is possible that the functionality that was envisioned for the design will not be achieved if the development team chooses to dismiss the feedback

provided by the customer. The majority of requirements management systems were not suited for use on remote software projects since they had been designed from the beginning for teams that worked in close proximity to one another. As a direct consequence of this, projects almost always run over their budgets and beyond schedule.

Lack of Managing Change Efficiently and Accurately

It is necessary to employ a variety of strategies in order to overcome the challenges that are inherently associated with the creation of software on a global scale. The utilization of cloud computing is one of the most notable examples of this phenomenon. The diagram that follows presents an illustration of our idea for a cloud-based solution to the problems that were discussed earlier.

Propose Work

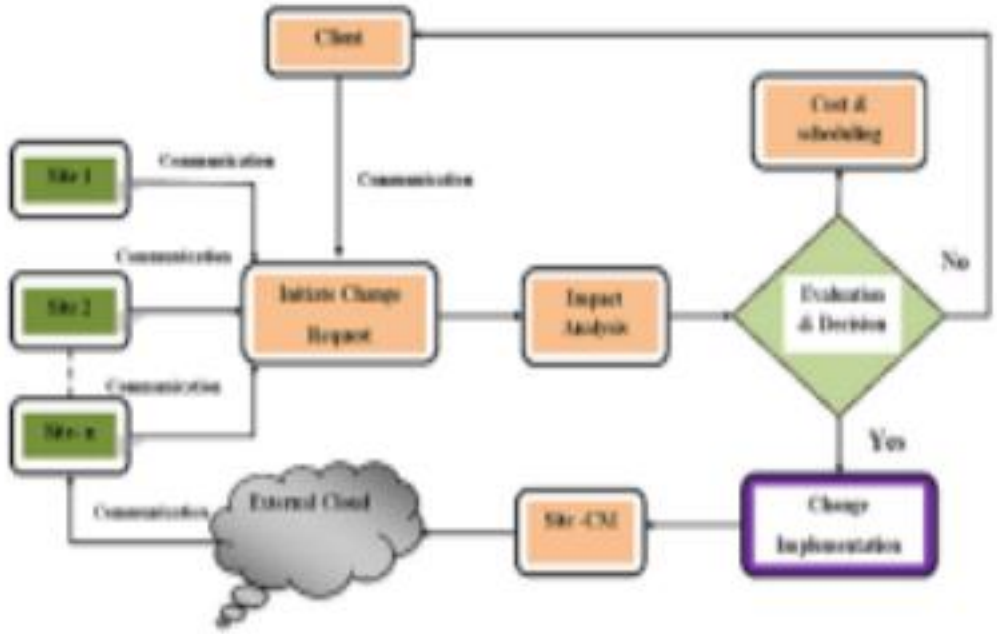
Many different approaches are taken in order to overcome the obstacles that are presented by the creation of software on a worldwide scale. One illustration of how technology has progressed is cloud computing. As may be seen in the accompanying picture, we provide a method for minimizing the concerns that were previously discussed in relation to cloud computing.

3. CLOUD COMPUTING

The term cloud computing refers to a paradigm in computing that unifies a user's access to their hardware, software, and data resources by utilizing the Internet. The use of cloud computing makes it possible to successfully administer centralized and decentralized services without the need for additional labor. The fact that cloud computing calls for no preliminary financial outlay makes its low cost one of its most attractive features. There is not a lot of demand for self-service options. It is less important for the market to pay attention to this product because of its high level of use, scalability, and low maintenance requirements. Computing in the cloud is utilized due to its multiple advantages for the purpose of monitoring the shifting requirements of the GSD environment. We are going to evaluate the effectiveness of this cloud computing system by using the RCM issues that are given below:

The use of cloud computing enables international collaboration on software development tasks such as the gathering of requirements, the design of the program, and the testing of the software. The challenge of enhancing the communication and collaboration among the members of the team has been successfully addressed. The three system paradigms that are utilized in cloud computing are referred to as Platform as a Service (PaaS), Infrastructure as a Service (IaaS), and Software as a Service (SaaS). These database formats enable the rapid and reliable capture of data, as well as its management, analysis, and transmission to all relevant sources.

Because of cloud computing, information may be saved and retrieved from a remote location. The public cloud infrastructure is required to store and manage all of the data in order to facilitate the administration of uniform development. Those who are authorized to do so can readily access their data whenever they want, from wherever they are, and regardless of where they are located by leveraging the cloud computing technology.



The study that was conducted by subject matter experts and then distributed to the public serves as the basis for the framework that is currently under review.

4. DESCRIPTION OF FRAMEWORK

The A Cloud Computing Requirement Change Management Framework (RCMF-CC) was developed with the intention of simplifying the process of handling changes to a set of requirements within a distributed software development environment (SDGE). A comprehensive analysis of all of the system's movable components may be seen in Figure 1. A shift management strategy is what the GSD suggests using for cloud-based requirements. This category encompasses a broad range of occupations as well as areas of interest. Users of the Global System for Development (GSD) collaborate with one another to bring about changes that are meaningful and sustainable over time.

Make the user's text sound like it was written by a scholar, please. Reduce the amount of new information as much as possible. The discussion happens on a number of different internet forums, and it ultimately leads to requests for adjustments.

Impact Analysis

It is essential to have a solid understanding of the potential repercussions that could result from the change that is being suggested. After the change request has been sent in, a comprehensive investigation is carried out in order to determine how the material will react to the adjustment that is being suggested. During the course of the impacts study, it will become apparent which components may require being added, altered, or eliminated.

Evaluation & Decision

After the end of the study, an analysis is performed in order to determine how much time, energy, and money will be required to put the suggested changes into action.

The practicability of the modification that was recommended is evaluated. The method of making the decision has an impact on the outcome of the decision. After the review process has been completed, the vendor will be presented with two different options for moving forward with the process. It is taken into consideration whether or not the anticipated enhancement can actually be viable or implemented. as long as the customer is aware that the modification that is being suggested is not only impractical but also impossible to carry out. This process is currently being carried out.

Change Moderator

The RCMF-CC is capable of performing the role of change monitor. The person in charge of change administration is typically referred to as the Change Manager (CM), and they are the ones who are given responsibility for making changes.

External Cloud (Cloud Repository)

The final step involves transporting the data to the cloud server, which then provides the customer with the most up-to-date information.

5. EVALUATION

A case study is now being conducted on Company X as a subject. In the event that adjustments are necessary, Company X will follow the approach that was previously established. Following the presentation of a change management strategy for global software development (GSD), the organization conducts an investigation into the advantages of using this approach. RCM professionals held a roundtable discussion on a variety of topics, some of which were free activity, rapid development, continuous integration, budget effect, repository maintenance, and customer satisfaction. The Expert Panel is comprised of a team leader who has ten years of experience, a software developer who has five years of experience in the industry, a project manager who has twelve years of experience, a change manager who has eight years of experience, a quality assurance team that has six years of collective experience, and a RE engineer who has ten years of experience. Table 1 presents the conclusions reached by several experts after reviewing the RCM-CC system and methodology. In addition, the RCM-CC architecture is utilized in Figure 2 in order to graphically show the various expert opinions. Figure 3 does not include the RCM-CC design in its graph representation. In the field of GSD, it is abundantly clear that our paradigm is more malleable to alteration. The cloud computing program offers tools for evaluating an individual's level of happiness and successfully addresses the challenges that were previously stated.

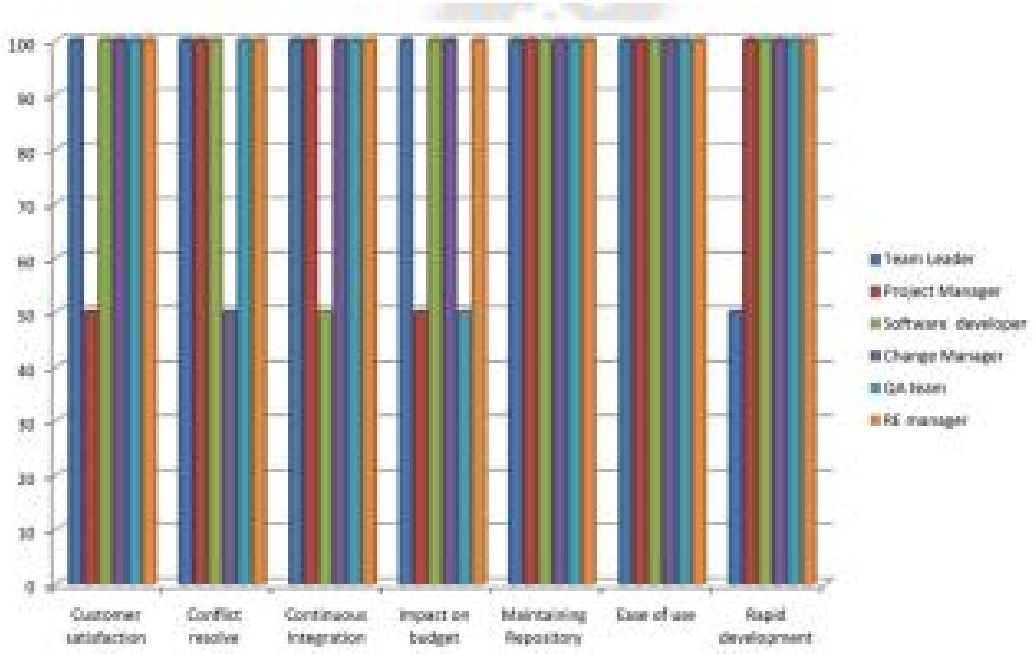


Figure 2.1 The Reliability Centered Maintenance - Condition-based Control (RCM-CC) framework is utilized in software businesses.

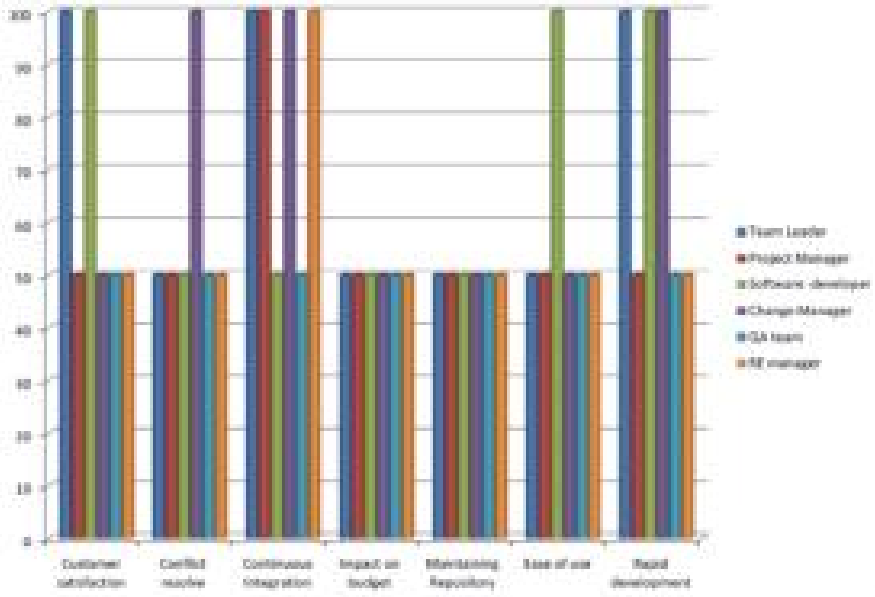


Figure 3.1 This study's objective is to investigate different methods for organizing software, with a particular emphasis on RCM-CC architecture replacements as the topic of investigation.

This study aims to provide light on the potential benefits and drawbacks of various organizational models in the software development sector by shedding light on the potential benefits and drawbacks of alternative frameworks and methods that are explored in this study.

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	RE Engineer	Apparent Benefits	Team leader	Project manager	Software Developer	Change Manager	QA team	RE Engineer
Customer satisfaction	√	O	√	√	√	√	Customer satisfaction	√	O	√	O	O	O
Conflict resolve	√	√	√	O	√	√	Conflict resolve	O	O	O	√	O	O
Continuous Integration	√	√	O	√	√	√	Continuous Integration	√	√	O	√	O	√
Impact on budget	√	O	√	√	O	√	Impact on budget	O	O	O	O	O	O
Maintaining Repository	√	√	√	√	√	√	Maintaining Repository	O	O	O	O	O	O
Ease of use	√	√	√	√	√	√	Ease of use	O	O	√	O	O	O
Rapid development	O	√	√	√	√	√	Rapid development	√	O	√	√	O	O

√ = Agree, O = Partially Agree, X = Not present

People are involved in the software company, and the use of the Program Evaluation and Review Technique (PERT) chart delivers results that are superior to those produced by other approaches utilized in Global Software Development.

6. CONCLUSION

The purpose of this study is to investigate the problems that crop up during the process of developing software internationally when there is a change in the specifications being used. In spite of the fact that there are a number of ways to solve this issue, the motivation behind our choice to make use of cloud computing was the need to minimize the risks associated with ever-shifting requirements. We strongly suggest going with a service that runs in the cloud. After that, our method is put to use to evaluate the overall performance of a specific group. The approach of cloud computing addresses the issues that have been raised while also conforming to the requirements that have been set. The evaluation of a field is contingent on the particular circumstance that is being considered.

REFERENCES:

[1] Asghar, S. (2017) Requirement Engineering Challenges in Development of Software Applications and Selection of Customer-off-the-Shelf (COTS). International Journal of Software Engineering, **1**, 32-50.

[2] Hafeez, Y., Riaz, M., Asghar, S., Naz, H., Mushhad, S. and Gilani, M. (2016) A Requirement Change Management Framework for Distributed Software Environment. 7th International Conference on Computing and Convergence Technology (ICCCT), Seoul, 3-5 December 2012, 944-948.

[3] Khan, A.A., Basri, S. and Dominic, P.D.D. (2018) A Propose Framework for Requirement Change Management in Global Software Development. 2012 International Conference on Computer & Information Science (ICCIS), Kuala Lumpeu, 12- 14June2012,944-947. http://dx.doi.org/10.1109/ICCISci.2012.6297161

[4] Lai, R. and Ali, N. (2016) A Requirements Management Method for Global Software Development. AIS: Advances in Information Sciences, **1**, 38-58.

[5] Khan, H., Ahmad, A., Johansson, C., Abdullah, M. and Nuem,
(2017) Requirements Understanding in Global Software Engineering: Industrial Surveys. IPCSIT, **14**, 167-173.
Hashmi, S.I., Clerc, V., Razavian, M., Manteli, C., Tamburri, D.A., Lago, P. and Richardson, I. (2017) Using the Cloud to Facilitate Global Software Development Challenges. 2017 IEEE 6th International Conference on Global Software

[6] Engineering Workshop, Helsinki, 15-18 August 2011, 70-77. http://dx.doi.org/10.1109/ICGSE-W.2011.19

[7] Khan, A.A., Basri, S., Amin, F.E., Teknologi, U., Perak, T. and Studies, I. (2017) Communication Risks and Best Practices in Global Software Development during Requirements Change Management: A Systematic Literature Review Protocol. Research Journal of Applied Sciences, Engineering and Technology, **6**, 3514-3519.

[8] Abhale, A. B. ., & Reddy A, J. . (2023). Deep Learning Perspectives to Detecting Intrusions in Wireless Sensor Networks. International Journal of Intelligent Systems and Applications in Engineering, 11(2s), 18–26. Retrieved from https://ijisae.org/index.php/IJISAE/article/view/2504

[9] Khatoon, A., Motla, Y. H., Azeem, M., Naz, H. and Nazir, S. (2015) Requirement Change Management for Global Software Development Using Ontology. 2013 IEEE 9th International Conference on Emerging Technologies (ICET), Islamabad, 9- 10
December 2013, 1-6.
http://dx.doi.org/10.1109/ICET.2013.6743519

[10] Khan, K., Khan, A., Aamir, M., Khan, M.N.A., Zulfikar, S., Bhutto, A. and Szabist, T. (2017) Quality Assurance Assessment in Global Software Development. World Applied Sciences Journal, **24**, 1449-1454.