

Latest Innovations in Software Engineering using Cloud Computing, Mobile Computing, BIG Data and Network Protection

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Abstract: Presently, software engineering is the dynamic branch and growing continuously to design more reliable and efficient systems. Past history of software engineering developments show that software engineers are working hard to enhance quality, reducing project completion time, testing time and development cost during complete software development life cycle. Latest innovations show that use of new techniques like big data, cloud computing, distributed computing, mobile computing and network protection etc. are used to enhance the efficiency of software engineering project. Now a day, many research areas in software engineering require intense research to enhance the productivity in the different domains. This paper focuses in these areas and provides a short insight related to software engineering and new techniques.

Keywords: Model, Methodology, Techniques, Big Data, Cloud Computing, Mobile computing, Network Protection or Network Safety

I. CLOUD COMPUTING

Bianchi et al. ^[1] explained that cloud computing is latest and hot topic for research in software engineering. In cloud computing, many new models and techniques are introducing daily to benefits the industry. The cloud computing concepts are also used to enhance the working conditions in software industry by reducing the cost and time.

Past research shows that identification of services quality and improvement attributes in cloud computing are very difficult to identify. The benefits of cloud computing techniques are not finding useful in all service sector but software industry users can take the benefit of this methodology in a variety of services. Rana et al. ^[2] focused on different cloud computing approaches for improvement in software development life cycle. The classification of different approaches in cloud computing is shown in Figure 1.

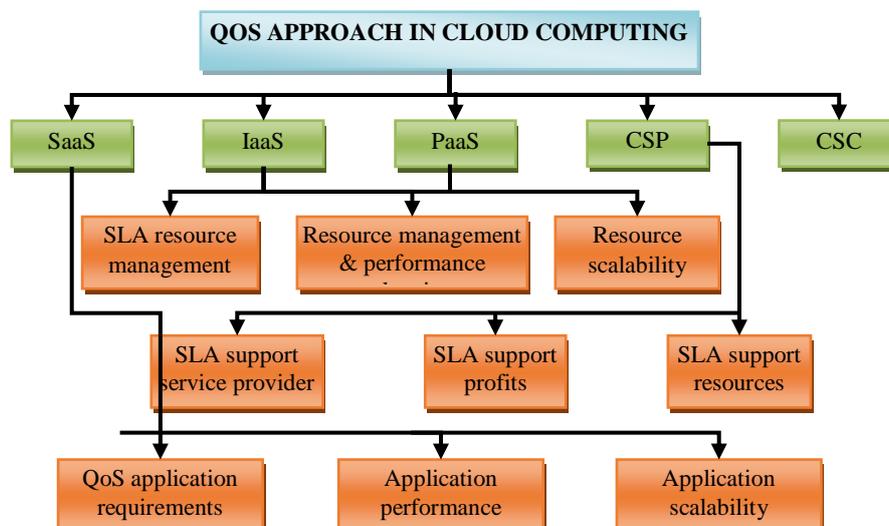


Figure 1: Classification of different approaches in cloud computing

The SaaS (software as a service) approach focus on different applications provided through systems and act as a service for consumers. The PaaS (platform as a service) approach focus on different platform resource applications

development for system services utilization. The IaaS (infrastructure as a service) approach focus on different data centers and virtualization resources provided by the organizations. The CSP (cloud service provider) approach focus on the different services provides by cloud computing such as software, hardware and infrastructure services etc. as per user demand. Finally, the CSC (common service center) approach manages all process between the service provider and the services consumer to utilize the software, platforms and many other supported facilities.

The authors of the same research paper explained that cloud computing is the adoption of cloud services in software engineering learning environment. The main issues in the model are concerned with the resource availability, accessibility, compatibility, scalability, maintenance of tools and services used during software development life cycle.

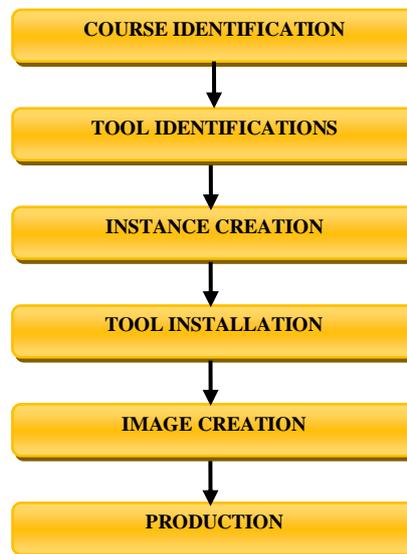


Figure 2: Guidelines to extend the use of software engineering tools in cloud computing

In the same paper, another highlighted issue was the absence of adaption method. The collective result of three different American universities showed that software engineering students face difficulty due to availability, compatibility, software licensing and higher cost. In cloud computing, some guideline to extend the use of software engineering tool is shown in Figure 2.

The benefits of cloud computing can be visualized by multiple computers with different operating systems regardless of their location. In addition, the beneficiary objective is to optimize the resources outcome efficiently. To conclude, cloud computing have indulge in many real areas like education and industry. The cloud computing benefit users by improving the service quality and provide right guidelines to work with different tools those cause benefit to the society directly or indirectly.

II. BIG DATA

Mockus et al. [3] explained that most of the fields are using big data concept broadly so they suggest applying the same for every phases of software engineering like analysis, design, testing and maintenance phase. In cloud computing, both type (structured and unstructured) operational data can be support by all the software development techniques in software engineering. In software engineering, they purposed most popular research approach i.e. operational database systems approach in big data. They also explained the emerging needs of cloud computing for operational data system. It is very necessary to develop and implement the basic cloud computing principles data operation system more effectively in software engineering. This grabs the best practices systematically with past databases research experience.

Thayer et al. [4] proposed many different techniques to build complete operational data from incomplete, incorrect, tempered and filtered data in software engineering. They describe that development of basic library mechanism features are necessary to describe the relationships between software engineering domain entities. These mechanisms are designed to find the missing input values from different context segment models. The particular care should be taken for operational data at the time of method application. There may be more assumptions to apply the different techniques in software engineering.

Jawawi et al. [5] explained about the future of big data in their research to identify and implement robust methods during collecting, storing, cleaning, segmenting, augmenting and analyzing data problems. In another research paper on big data, authors proposed four different analytic models to implement cloud computing as (i) data management (ii) data development (iii) data visualization and (iv) data business. At present, industries are using different big data models for data analyzation like customers demand, revenue generation, operation and cost decision. Hence, there are many big

challenges for big data implementation concepts in software engineering. Every technology has its pros and cons as cloud computing help to elevate cost proportional demand while big data requires expensive software, large infrastructures time consuming.

III. MOBILE COMPUTING

Mobile computing proliferations application demands are increasing exponentially in software development and life cycle. The primary focus of previous researches was based on unit testing, integration testing, system testing and acceptance testing in mobile computing or applications.

Mahmood et al. [6] proposed an evolutionary approach in mobile computing to overcome the shortcoming of integration and system testing by combining the above techniques. This approach searched mobile computing related program independently to identify evolutionary code segments and algorithm segments information. Although this technique became highly successful in automation testing due to mobile computing (hand held device tools) but performance of the system degrades because of input disability conditions. In future, the existing model or framework may extend the utilization of search base algorithm.

Tramontana et al. [7] explained that mobile computing is an event driven technique. The main issue with mobile application testing is to access the traditional event driven system (graphical user interface, internet device, embedded software etc.) testing approaches used with cloud based mobile computing. Google platform suggests rapid regression and stress testing for automatic mobile computing. The mobile computing testing technique is proposed to find run time crashes and non-visible faults due to application versions modification. Hence, it is concluded that the research in mobile computing is growing exponentially to identify and test the right model in software engineering.

IV. NETWORK PROTECTION

Network protection measure and compare the securities of different models. Singhal et al. [8] described that earlier research measures the rank during weak network but now it has to be measure the rank at fixing time. They defined kZero day network safety security metrics to measure and compare the different risk during network assessment. kZero day network safety is calculated during network hardening. The kZero networks hardening increased with isolation, diversity, disabling services and firewall attacks. The sub-metrics model patching services are used to choose different network hardening solutions and vulnerability. They further explained that there is a heavy need to improve known inputs services application for kZero rank evaluation. However, network protection and safety research is growing daily because of existing networks security issues during local or distributed network broadcasting.

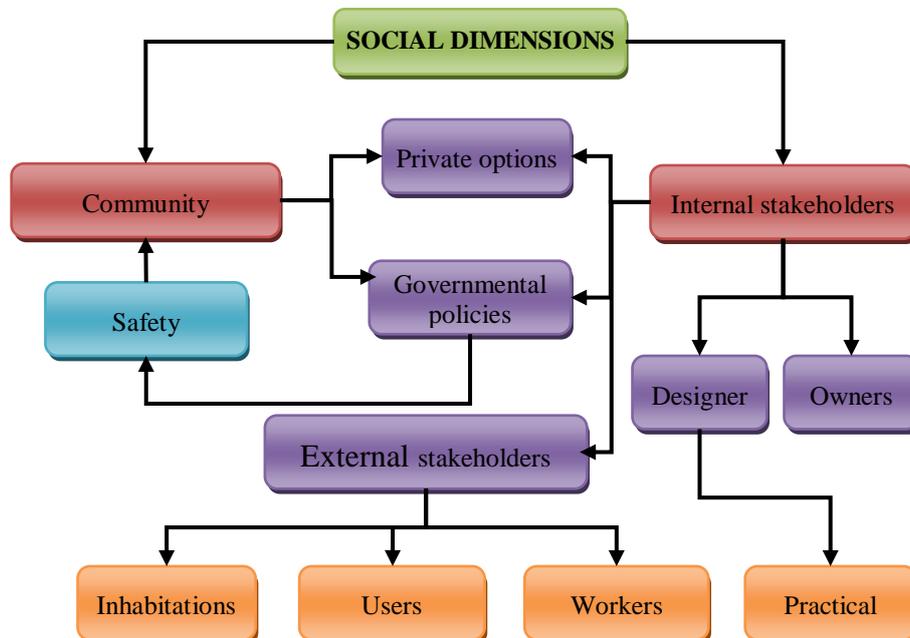


Figure 3: Policies for implementing software application tools on cloud

Mukherjee et al. [9] proposed a hierarchical and multi-dimensional model to detect different intrusions in network safety and protection. This hierarchical and multi-dimensional model works in three phases (i) preparation phase (ii) attack phase and (iii) post phase. In first phase i.e. preparation phase, attacker try to find the basic network information. In attack phase, attacker try to login remotely from another network machine. In final phase i.e. post phase,

attacker try to collect or change the system information through network hacking. This hierarchical and multi-dimensional model is more beneficial in open environment for real time systems. To conclude, the research in network protection with safety and security measurement is growing exponentially from basic to advance level framework.

V. APPLICATION MANAGEMENT

The main purpose of software application management is to keep track of all major activities during software development life cycle like requirement, analysis, designing, testing and maintenance along with development cost. Due to pre-defined criteria, it is very difficult to find best software development life cycle strategy from different application management techniques.

Howard^[10] described that it is really very difficult for researchers to find the strength and weakness of software application management during planning. The first motto of software application management is to find objectives or outcome clearly. The second objective is the selection of best available strategies for the maximum efficiency in specific time duration. The policies for implementing software application tool on cloud are shown in Figure 3.

In addition, it is concluded that assigning of right project as per overall project team capabilities like qualification, technical skills and experience also enhance outcome of software application.

VI. CONCLUSION

This paper reviews the latest trends of software engineering for research purpose. This paper helps research students to choose the best technology for their career. The presented study conclude that every strategy have some pros and cons as cloud computing reduce the cost while big data requires expensive software and huge infrastructures. The mobile computing research is growing exponentially to choose the best model. Finally, network protection is more beneficial for improving the kZero network safety and security in a real open network.

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