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AUTOMATION PROCESS OF DEPLOYMENT OF WEBSITE

[1]Vaibhav Gupta , [2]Priyanshu Yadav , [3]Sanya Kasaudhan , [4]Trishla Saxena

[1,2,3,4]Students Department of Computer Science & Engineering , Raj Kumar Goel Institute of Technology

ABSTRACT

The title of the project is "AUTOMATION PROCESS OF DEPLOYMENT OF WEBSITE" .In this project we will first build the website and automate the process of its deployment ,as the developer will make changes in source code it will automatically get reflected in the production server .This project is based on CLOUD COMPUTING as cloud and for automation we will use various tools like docker Jenkins etc .Basically in this project we are going to use LINUX OPERATING SYSTEM.The Source Code Management will be Github . We are going to use AWS services like EC2 for the Jenkins Server. Cloud computing has received increasing interest from enterprises since its inception. With its innovative information technology (IT) services delivery model, cloud computing could add technical and strategic business value to enterprises. However, cloud computing poses highly concerning internal (e.g., Top management and experience) and external issues (e.g., regulations and standards). This paper presents a systematic literature review to explore the current key issues related to cloud computing adoption. This is achieved by reviewing 51 articles published about cloud computing adoption. Using the grounded theory approach, articles are classified into eight main categories: internal, external, evaluation, proof of concept, adoption decision, implementation and integration, IT governance, and confirmation. Then, the eight categories are divided into two abstract categories: cloud computing adoption factors and processes, where the former affects the latter. The results of this review indicate that enterprises face serious issues before they decide to adopt cloud computing. Based on the findings, the paper provides a future information systems (IS) re- search agenda to explore the previously under-investigated areas regarding cloud computing adoption factors and processes. This paper calls for further theoretical, methodological, and empirical contributions to the research area of cloud computing adoption by enterprises.

Keywords-: Docker , Security,Cloud Infrastructure,Continuous Integration ,Continuous Deployment , Containerization .

1. INTRODUCTION

In today's world the small as well as big organizations are using cloud computing technology to protect their data and to use the cloud resources as and when they need. CLOUD COMPUTING is a shared pool of

resources. The way we use computers and store our personal and business information can arise new data security challenges. It is based on a pay per use model.Over the past decade, there has been a heightened interest in the adoption of cloud computing by enterprises. Cloud computing promises the potential to reshape the way enterprises acquire and manage their needs for computing resources efficiently and cost-effectively. In line with the notion of shared services, cloud computing is considered an innovative model for IT service sourcing that generates value for the adopting enterprises. Cloud computing enables enterprises to focus on their core business activities, and, thus, productivity is increased . The adoption of cloud computing is growing rapidly due to the scalability, flexibility, agility, and simplicity it offers to enterprises. A recent cross- sectional survey on the adoption rates of cloud computing by enterprises reported that 77% of large enterprises are adopting the cloud, whereas 73% of small and medium-sized enterprises (SMEs) are adopting the cloud.

1.1 CONCEPT AND TECHNOLOGY

Cloud computing technology has been a new buzzword in the IT industry and expects a new horizon for the coming world. It is a style of computing which is having dynamically scalable virtualized resources provided as a service over the Internet. It reduces the time required to procure heavy resources and boot new server instances in minutes, allowing one to quickly scale capacity, both up and down, as one's requirement changes. With the rise of a ubiquitous provision of computing resources over the past years, cloud computing has been established as a prominent research topic. Many researchers, however, focus exclusively on the technical aspects of cloud computing, thereby neglecting the business opportunities and potentials cloud computing can offer. Enabled through this technology, new market players and business value networks arise and break up the traditional value chain of service provision. The focus of this paper lies on the real business aspects of cloud computing.

Cloud computing is not a new technology, but rather a natural evolution of efficient using and combining several modern technologies. Computing power, data storage and internetworking resources have all been put into a novel context and consequently, transformed into services (either separately or taken together). HR teams are often not all based in the same place. Additionally many people now work remotely, a perk often given by companies to appeal to those wishing to avoid a long commute, or who don’t want to place young children in daycare. Having employees work from home is also environmentally friendly, since it reduces the number of cars on the road; however, it can be very costly for businesses to set these employees up with their own hardware and software licenses and it can also be logistically difficult to service both hardware and software when an employee is not situated in an office,

with an inhouse IT support team available. This, of course, leads to one of the main benefits of using cloud computing applications. The paradigm in cloud computing is based on an old commercial approach – on-demand pay per use – in which you better rent a service for a specific period of time instead of buying the support infrastructure (utilities included), building a solution and administering it all by yourself. The cloud service providers (CSPs) promise reliable and configurable resources.

1.2 CHALLENGES

It is beyond any doubt that one of the latest developments of computer science, namely cloud computing has excellent prospects. On the one hand, it has great market potential, and on the other hand, it can usher in an era where abstraction and encapsulation principles can reach new heights. The constant worry of hardware and software development, their upgrade will become a matter of the past. The constant vigil and expenses incurred to safeguard against viruses and other forms of malware and spyware will fade away. The large staff and worries for the maintenance of hardware and software from physical and other sorts of wear and tear, the costs included will be largely minimized. And there will be an era wherein the developers will be concentrating on pure development work, leaving aside other trivial matters. Business houses and government concerns will no longer have to get very much involved in matters that directly do not relate to their business. The cloud will be providing them with both hardware and software solutions.

1.3 OPPORTUNITIES

With the disruptive wave of cloud computing entering the IT world, the scepticism of dark clouds over its adoption and implementation has also made its way .The cloud has taken a front seat, but the challenges and threats posed by its implementation cannot be ignored. The challenges are Security in with the database hosted on the vendor cloud security of critical data is uncertain. Privacy implies that the organizations today are trying to maintain a great deal of balance with its customers by protecting their data and maintaining a level of privacy. With the cloud implementation, the privacy of the data is not assured as the data lies with the third-party cloud service provider. Finally, the Compliance describes that every IT server and infrastructure have to follow certain compliance standards like PCI DSS, SOX, Web Trust, etc. With the shared resources, it becomes difficult for the cloud service.

2. LITERATURE SURVEY

2.1 A Literature Review on Cloud Computing Adoption Issues

Cloud computing is “an old idea whose time has finally come” . The term cloud is old since it was drawn in network diagrams as a metaphor representing the Internet . Cloud computing is generally referred to as providing “Internet-based computing

service". However, the technical meaning is richer, as cloud computing builds on already-existing computing technologies, such as grid computing and virtualization, which are forms of distributed computing technology.Virtualization involves masking the physical characteristics of computing resources to hide the complexity when systems, applications, or end users interact with them . Grid computing is "a model of distributed computing that uses geographically and administratively distant resources, and, thus, users can access computers and data transparently without concern about location, operating system, and account administration".

With the advent of cloud computing, the merits of virtualization and grid computing have been combined and further improved.Cloud computing shares some characteristics with virtualization and grid computing; however, it still has its own distinguishing characteristics as well as associated risks.Basically, definitions started with the notion of an application service provision (ASP) that is an IT sourcing model for renting business applications over the Internet. This definition became wider as Internet-based IT service offerings comprised storage, hosting infrastructure, and network; thus, it is given the name net sourcing, to fit the variety of IT service offerings. HP defines cloud computing as "Everything as a Service",while Microsoft perceives the value of cloud computing as "Cloud + Client," emphasizing the importance of the end user. T- Systems define cloud computing as "the renting of infrastructure and software, as well as bandwidths, under defined service conditions. These components should be able to be adjusted daily to the needs of the customer and offered with the utmost availability and security. Included in cloud computing are end-2-end service level agreements (SLAs) and use-dependent service invoices".

2.2 CHARACTERISTICS

Cloud computing service models share five common essential characteristics that distinguish cloud computing from other computing technologies :

1. On-demand self-service, where the consumer can unilaterally provision computing capabilities, such as server time and network storage, as needed automatically without requiring human interaction with each service provider.

2. Broad network access, where the capabilities are available over the network and accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms (e.g., mobile phones, tablets, laptops, and workstations).

3. Resource pooling, where the provider's computing resources are pooled to serve multiple consumers using a multitenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand.

4. Rapid elasticity, where capabilities can be elastically provisioned and released, in some cases automatically, to scale rapidly outward and inward commensurate with demand.

5. Measured service, where cloud systems automatically control and optimize resource use by leveraging a metering capability at some level of abstraction appropriate to the type of service (e.g., storage, processing, bandwidth, and active user accounts).

2.3 RESEARCH METHOD

Reviewing the literature is an essential process that creates a firm foundation for advancing knowledge; it facilitates uncovering areas where research is needed .This paper aims at systematically reviewing the literature to represent the current state of IS research regarding cloud computing adoption issues. This review process followed the fundamental guidelines for conducting an effective literature review by, and it is done within boundaries. The contextual boundary for this review is the enterprise users, not individuals, as there are significant issues that need to be addressed before enterprises start using clouds. The temporal boundary of this review covers the published articles in all previous years.

3. LITERATURE SEARCH PROCESS

The literature search process of this review involved querying seven quality scholarly literature databases (AISeL, IEEE Xplore, ScienceDirect, EBSCOhost, ProQuest, Wiley online library, and ACM digital library). These databases provide access to leading IS journals and high-quality peer-reviewed IS conference publications.

Further, online databases are appropriate and practical sources for reviewing the literature about a contemporary phenomenon such as cloud computing. The search criterion was limited to the article's title to ensure the relevance of the articles.

4.PROBLEM STATEMENT AND SOLUTION APPROACH

4.1 PROPOSED WORK

The motivation behind the proposed project is been stated as –

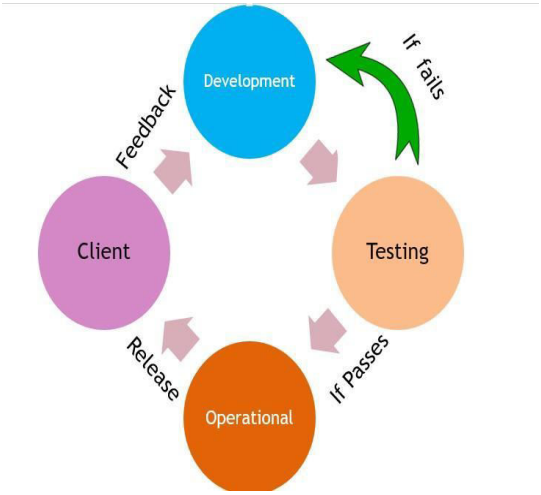

Fig. 4.1.

As mentioned in the above flow diagram the process of the software cycle is very slow and there are several conflicts and drawbacks by using this software release process.

Some of the major problems are –:

1. Lack of synchronization between development and operations.

2. Conflict between development and operation.

3. Delay in release.

4. Late delivery to clients.

So to avoid this late delivery of software/application deployment in this project we are using the process of Continuous Deployment.

4.1.1 Continuous Deployment

Continuous deployment can be thought of as an extension of continuous integration, aiming at minimizing lead time, the time elapsed between development writing one new line of code and this new code being used by live users in production.To achieve continuous deployment, the team relies on infrastructure that automates and instruments the various steps leading up to deployment, so that after each integration successfully meeting these release criteria, the live application is updated with new code.

Instrumentation is needed to ensure that any suggestion of lowered quality results in aborting the deployment process, or rolling back the new features, and triggers human intervention.

4.1.2 Expected Benefits

The main benefits claimed for continuous deployment arise as a result of reducing lead time, with two main effects:

1. Earlier return on investment for each feature after it is developed, which reduces the need for large capital investments.
2. Earlier feedback from users on each new feature as it is released to production, which affords techniques such as parallel (or A/B) testing to determine which of two possible implementations is preferred by users.

4.1.3 The flow for the Continuous Deployment is as followed -:

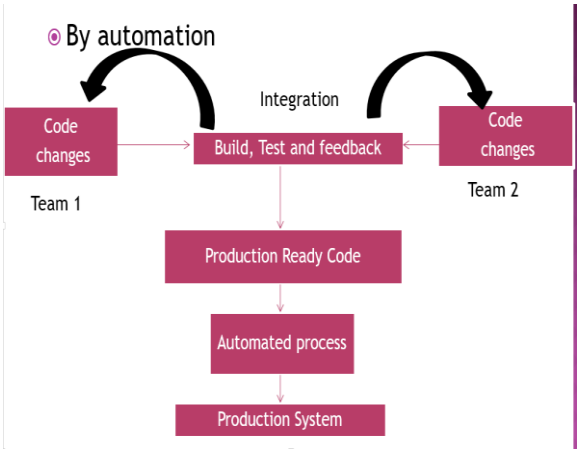

Fig.4.2.

There are four modules as proposed work in our project –

1. Development of website
2. SCM (Source Control Management)
3. Containerization
4. Continuous Integration of website

4.2 METHODOLOGY

According to the proposed modules there are different phases, tools , platforms are required in this project. Let us discuss each of the modules in detail.

Development of website

Fig.4.3.

In this module the website is being developed in which there will be frequent changes committed. To store the code we'll use the concept of the centralization of code which is done by the help of SCM (Source code management). In the next module the SCM is discussed.

4.2.1 SCM (Source Control Management)

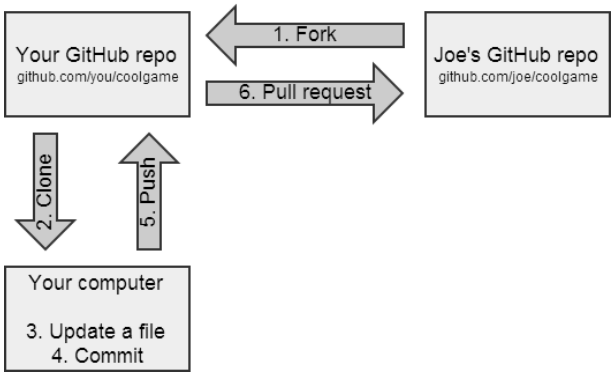

Fig.4.4.

A source code manager (SCM) is a software tool used by teams of programmers to manage source code.

SCMs are used to track revisions in software. Each revision is given a timestamp and includes the name of the person who is responsible for the change. Various revisions may be compared, stored, and merged with other revisions.

Using revision control software, a programmer or team of programmers may use several approaches for software development. Locally, developers must all use the same computer system, which may be the revision control system. In a distributed model, developers work directly with a local repository, where their individual source code revisions are collected. The developers then update the central repository with their local revisions so that revisions can be shared among developers**.**

4.2.2 Advantages

1. It allows multiple developers to access and change different areas of code, without interfering with each other's work.
2. Backup of code
3. Version history.
4. Centralization of code

4.2.3 Containerization

Containerization is a lightweight alternative to a virtual machine that involves encapsulating an application in a container with its own operating system. A container takes its meaning from the logistics term, packaging container. When we refer to an application container, we mean packaging software.

Containerization has recently gained hypes with an open source tool Docker. Docker

containers are designed to run on every environment from physical computers to virtual machines, from bare-metal, Clouds, etc.

Containerization vs Virtualization

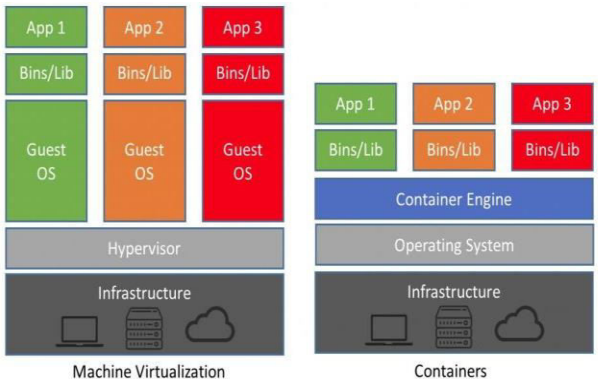

Fig.4.5.

What Are the Advantages of Using containers?

- The average container size is within the range of tens of MB while VMs can take up several gigabytes. Therefore a server can host significantly more containers than virtual machines.
- Running containers is less resource intensive then running VMs so you can add more computing workload onto the same server.
- Provisioning containers only take a few seconds or less, therefore, the data center can react quickly to a spike in user activity.
- Containers can enable you to easily allocate resources to processes and to run your application in various environments.
- Using containers can decrease the time needed for development, testing, and deployment of applications and services.
- Testing and bug tracking also become less complicated since there is no difference between running your application locally, on a test server, or in production.
- Containers are a very cost effective solution. They can potentially help you to decrease your operating cost (less servers, less staff) and your development cost (develop for one consistent runtime environment).
- Container-based virtualization is a great option for microservices, DevOps, and continuous deployment.

In this project we will use Docker as a container.

4.2.5 Docker

A Docker container is an open source software development platform. Its main benefit is to package applications in containers, allowing them to be portable to any system running a Linux or Windows operating system (OS). A Windows machine can run Linux containers by using a virtual machine (VM). Container technology has been around for a while, but momentum and hype around Dockers approach to containers have pushed this approach to the forefront. While it is a major player in the container field, Docker is only

one form of container technology.

4.2.6 Continuous Integration

Continuous integration is a DevOps software development practice where developers regularly merge their code changes into a central repository, after which automated builds and tests are run. Continuous integration most often refers to the build or integration stage of the software release process and entails both an automation component (e.g. a CI or build service) and a cultural component (e.g. learning to integrate frequently). The key goals of continuous integration are to find and address bugs quicker, improve software quality, and reduce the time it takes to validate and release new software updates.

Why is Continuous Integration Needed?

In the past, developers on a team might work in isolation for an extended period of time and only merge their changes to the master branch once their work was completed. This made merging code changes difficult and time-consuming, and also resulted in bugs accumulating for a long time without correction. These factors made it harder to deliver updates to customers quickly.

How does Continuous Integration Work?

With continuous integration, developers frequently commit to a shared repository using a version control system such as Git. Prior to each commit developers may choose to run local unit tests on their code as an extra verification layer before integrating. A continuous integration service automatically builds and runs unit tests on the new code changes to immediately surface any errors.

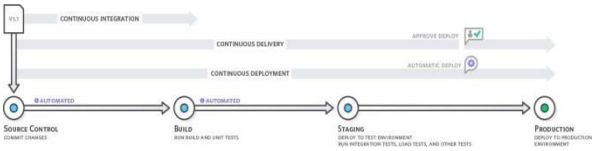

Fig.4.6.

Continuous integration refers to the build and unit testing stages of the software release process. Every revision that is committed triggers an automated build and test.For Continuous Integration the tool which will be used is Jenkins for this project.

4.2.7 Jenkins

Jenkins is an open source Continuous Integration server capable of orchestrating a chain of actions that help to achieve the Continuous Integration process (and not only) in an automated fashion. Jenkins is free and is entirely written in Java. Jenkins is a widely used application around the world that has around 300k installations and growing day by day.It is a server-based application and requires a web server like Apache Tomcat. The reason Jenkins became so popular is that of its monitoring of repeated tasks which arise during the development of a project. For example, if your team is developing a project, Jenkins will continuously test your project builds and show you the errors in early stages of your development. By using Jenkins, software companies can accelerate their software development process, as Jenkins can automate build and test at a rapid rate. Jenkins

supports the complete development lifecycle of software from building, testing,documenting the software,deploying and other stages of a software development lifecycle.

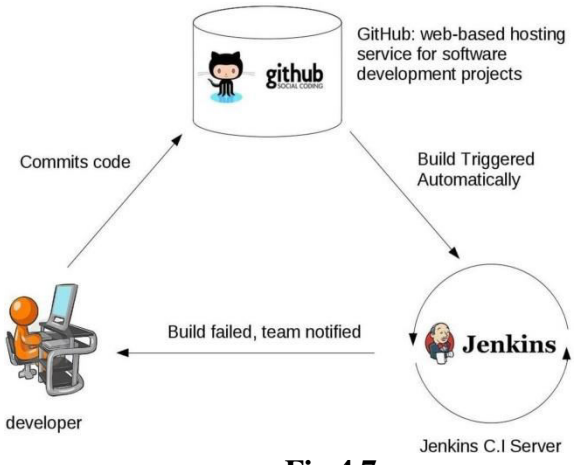

Fig.4.7.

5. REFERENCES

1. https://www.backblaze.com/blog/vm-vs-containers/
2. https://github.blog/
3. https://en.wikipedia.org/wiki/Jenkins_(software)
4. https://searchcloudcomputing.techtarget.com/definition/cloud-computing
5. https://www.infoworld.com/article/3271126/ci-cd/What-is-cicd-continuous-integration-and-continuo us-delivery-explained.html

6. "Docker security best practices," https://blog.sqreen.io/docker-security/,Article,accessed January, 2019.

7. R. Moreno-Vozmediano, R. S. Montero, and I. M. Llorente,"Iaas cloud architecture: From virtualized datacenters to federated cloud infrastructures," Computer, vol. 45, no. 12, pp.65–72, Dec 2012.