



INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

CLOUD COMPUTING AND IT'S RESEARCH CHALLENGES

¹Ms. Sonia Setia, ²Deepanshu Arora, ³Jatin Sharma, ⁴Sneha

¹Professor at M.R.I.I.R.S, ²Student, ³Student, ⁴Student

¹FCA,

¹M.R.I.I.R.S , Faridabad , Haryana

Abstract: Cloud Computing is a Set Of IT Services that are provided to the Customer over a network on a leased basis and with the ability to scale up or down according to the service requirements. The Cloud Technology, now-a-days is playing a Vital Role in saving the Organizations from incurring huge Capital Expenditure. If we talk about the earlier days, Companies relied on in-house models for data centers that required a huge Capital Expenditure investment as they purchased space, equipment, software and a workforce to run and maintain everything. Since, these companies had an in-house data center, they were satisfied about the data monitoring and network security, but this led to increased costs (Capital Expenditure). Today, companies still need the same tight security and oversight, but also more flexibility and more cost effective solutions, due to which they now have migrated to the Cloud Technology. However, with great power also comes great responsibility and challenges, the same is the thing for Cloud Computing Technology. Despite the Fact that Cloud Computing is Providing Large Opportunities to the Information and Technology Industry. We May say that Development of Cloud Technology is at its initial phase right now. There are a lot of issues that still need to be addressed.

In this Research Thesis, I will present a Survey Of Cloud Computing, highlighting it's key features and concepts as well as Some Challenges we can Face while Deploying the Cloud Technology in Use.

Index Terms – Cloud Computing, Virtualization, Data Centers

I. INTRODUCTION

Internet has been a major pillar of the Various Cloud Technologies that have been developed. Cloud Computing is the delivery of Hardware and Software services over the Internet, through a network of Remote Servers. Cloud is a shared pool of computer resources. It encapsulates all sorts of Computing Services over the Internet – be it Web Applications, Pre-Trained Artificial Intelligence Models, Big Data, Network, Storage etc.

The Advantages of Cloud Computing Model includes:

- 1). Reduced Hardware and Maintenance Cost
- 2). Accessibility around the Globe
- 3). Provides Flexibility to the Customer, where the Customer need not worry about mundane concerns like Software up-gradation.

II. CLOUD COMPUTING : OVERVIEW

According to the U.S National Institute Of Standards and Technology (NIST), "Cloud Computing is a model for enabling convenient on-demand network access to a shared pool of configurable computing resources (e.g. Network, Servers, Storage) that can be rapidly provisioned and released with minimal management effort or cloud provider interaction". In the Cloud Computing Environment, users do not need to own the infrastructure for accessing the various computing services. In fact, they can be accessed from any computer from any part of the world.

Cloud Computing is a general term for anything that involves delivering hosted services over the Internet. Instead of a static system architecture, Cloud Computing supports the ability to dynamically scale up and quickly scale down, offering cloud consumers high reliability, quick response times, and the flexibility to handle traffic fluctuations and demand.

III. CLOUD COMPUTING : BASIC FUNDAMENTALS

Here, By Cloud Deployment models we mean that how the cloud services are made available to the end users. The Various Types Of Deployment Models which are available to us are:

1).Public Cloud:

In Public Cloud Model, it supports all the users who want to make use of a computing resource , such as Hardware(Operating System , Storage, Memory) or Software(Application Server, Database) on a subscription basis(generally in months). Most common uses of public cloud are for application development and testing and for non-critical tasks such as file sharing and e-mail service.

2).Private Cloud:

As the name itself suggests, a private cloud setup is generally used by a single organization. Such infrastructure is either maintained by the organization itself or it is managed by a service provider that takes care of it either off-site or on-site. Private Clouds are generally expensive than the Public clouds , since they cater the needs of a single organization very well as well as they address the security and privacy concerns of organizations better than the public cloud.

3).Community Cloud:

This type of deployment model supports multiple organizations sharing computing resources that are part of a community examples include universities cooperating in certain areas of research, or police departments within a country or state sharing computing resources. Access to the community cloud is typically restricted to the members of the community.

IV. RESEARCH CHALLENGES OF CLOUD COMPUTING

1).Cloud Data Management

Cloud Data Management is a pivotal research topic in Cloud Computing. Cloud Data Management is the practice Of storing a company's data on an offsite server that is typically owned and supervised by a Vendor who specializes in Cloud Data Hosting . Managing Data in the Cloud provides an automated backup strategy, professional support ,and ease of access from Any Location. Since, Service Providers typically do not have access to the Physical Security System Of the Data Centres, they have to rely on the Infrastructure Provider to Achieve Data Security. Now, here comes the main problem, which in my words can also be referred to as a Problem Of Abstraction as the Service provider is solely depending on the Infrastructure Provider for the security, and we never know that whether the Infrastructure provider in turn is maintaining the Confidentiality of Data or Not.

If Proper Security is not being maintained, then it can hamper the objectives of Cloud Technology like Confidentiality Confidentiality for secure data access and transfer, and auditability, for attesting whether security setting of Applications has been tampered or not.

2).Service Level Agreements(SLA'S)

A Service Level Agreement can be thought of as a bond for performance negotiated between the cloud services provider and the client. According to these SLA's, if a cloud service provider fails to meet the stated targets of minimums then the provider has to pay the penalty to the cloud service consumer as per the agreement. So, service level agreements are like insurance policies in which the corporation has to pay as per the agreements if any casualty occurs. A big challenge for the cloud customers is to evaluate these SLA's of Cloud Service Providers. Most providers/vendors create SLA's to protect themselves against legal action while duping the customer by offering minimal assurances to Customers. So there are some important issues like Data Protection, Outages, and Price Structures that need to be taken into account by the customers before signing a contract with the cloud provider. Some of the basic retrospective questions which the customer must ask before signing the contract with the cloud service provider is that, whether the cloud services are going to be up 99.9% of the time or not? And, how does that difference impact your ability to conduct business? Another major question to be asked is that If the service account becomes inactive then whether do they keep the User Data or Not? So, this becomes a pivotal research area in Cloud Computing.

3).Migration Of Virtual Machines :

When one physical host gets overloaded it may be required to dynamically transfer certain amount of its load to another machine with minimal interruption to the users. This process of moving one physical host to another is termed as Migration. The Transfer of a VM refers to the transfer of its state. This includes its memory, internal state of the devices and that of the virtual CPU. Among these, the most time consuming one is the memory transfer.

Two Parameters are considered while performing the Live VM Migration:

1). Downtime: Downtime refers to the time during which the service of the VM is not available.

2). Migration Time: Migration time refers to the total amount of time required to transfer a virtual machine at source to destination node without affecting its availability.

The major benefit of VM Migration is to avoid hotspots; however, this is not straightforward. Currently, detecting workload hotspots and initiating a migration lacks the ability to respond to sudden workload changes. So, this also poses an important research challenge in the cloud computing technology.

4).Data Encryption:

Cryptography in the cloud involves encryption techniques that can be used to secure data that will be used or stored in the cloud. This cryptographic security can range from simple (easy to manage, low cost and quite frankly not very secure) all the way to highly secure (very complex, expensive to manage and quite limiting in terms of access). You and the provider of, your cloud computing solution have so many decisions and options to consider. We should question all of our doubts to the Cloud Service Provider regarding these Security Concerns. For Example, Once the object arrives at the Cloud, it is decrypted and stored or Is there an option to encrypt it prior to storing ? Do you want to worry about the encryption before you upload the file for cloud computing or do you prefer that the Cloud Computing Service Provider should automatically do it for you.

These are the options you should consider and then make your decisions based on your desired levels of security.

5).Access Controls:

Authentication and identity management is a very important factor while accessing the cloud computing services. And, it is not really all that different. What level of enforcement of password strength and change frequency does the service provider invoke? In case, if the cloud consumer forgets his Account name and password, then what methodology will be followed in order to recover the Account name and password? This is not at all different from how you secure your own systems and data, and it works the same way in cloud by the way which you secure your own systems and data.

V. CONCLUSION

Cloud Computing, envisioned as the next generation architecture of IT enterprise has become the de-facto standard of the town these days. The way cloud has been dominating the IT market, a major shift towards the cloud can be expected in the coming years. Many more providers are moving into this area, and the competition is driving prices even lower. Attractive pricing, the ability to free up staff for other duties, and the ability to pay for “as needed” services will continue to drive more businesses to consider cloud computing.

In spite of the fact that Cloud Computing can be viewed as another marvel which is set to reform the way we use the Internet, but still there are some factors which we need to take into consideration. There are numerous new advances developing at a quick rate, each with the capability of making human's lives simpler. But, one must be mindful so as to comprehend the security dangers and difficulties presented in using these advancements. Cloud Computing is no exception.

This research thesis provides an Overview about cloud computing, fundamental building blocks of cloud computing, and overview of the cloud architecture. Furthermore, research challenges which are currently faced in the cloud computing technology are also highlighted.

REFERENCES

- [1] A Platform Computing Whitepaper “Enterprise Cloud Computing Transforming IT” Platform Computing, pp6, 2010
- [2] Cloud Computing , Wikipedia , URL : http://en.wikipedia.org/wiki/Cloud_computing
- [3] Prince Jain, “Security Issues and their Solution in Cloud Computing”, International Journal of Computing and Business Research
- [4] Problems Faced by Cloud Computing, Lord Crus Adr3
- [5] Sun Microsystems Whitepaper – Introduction to Cloud Computing
- [6] S. Arnold July (2009) – “Cloud Computing and the Issue of Privacy”
- [7] Hanqian Wu, Li Yao, “Network Security for Virtual Machines in Cloud Computing”