

Experimental Cloud Computing as the 5th utility: Its Vision and Importance

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Abstract

With the meaningful improvements in Information Technology, it is envisioned that computing facilities will be considered as a 5th utility of the life after the four main utilities i.e. Water, gas, electricity and telephony. This computing utility, will contribute the fundamental stages of computing jobs that is necessary to fulfill all the demands of the public. Various computing prototypes have been introduced and cloud plays an important role. With the passage of time there is an elevation in the computer science field from the half century ago, experts have predicted that one day cloud computing will be used as one of the utility which will be very beneficial for all. With the growing hands in the field of virtualization, it is trusted that this approach has modified the whole IT industry. The cloud computing used as a utility is very important as other four utilities are because cloud provides computing services up to the high end services like virtual space, virtual servers, etc., which are highly essential for satisfying the needs of the user without physically purchasing all the infrastructure. To present this scenario, various computing prototypes have been proposed. After many of the milestones achieved in this field, we are now at a stage where we have almost complete computer ERA, which did not exist in reality, but is accomplishing its task and it is known to us as "Cloud computing". The author's aim for purposing this paper is to get the finer understanding about the cloud's overview and about its advantages and issues.

Key Words: Cloud computing, issues of cloud, the advantages of cloud, security issues.

1. INTRODUCTION

Presently cloud computing [1] is gaining its tremendous advancement in both education and IT sector. Computing models have been vastly modified to, just like a model which consists of services that are transported in an address to services such as water, electricity, gas, and telephone. Cloud computing may be formalized as the outsourcing of the computer services just similar to gas supply is outsourced. The customer simply uses it and need not to concern about from where since it is coming or how it is made or transported to us. Just every month he has to pay the bill for what he had used. The main purpose of cloud computing is same, user can directly make use of storage or any power or any environment without bothering from where is it coming or how he is getting and at the closure user simply have to reimburse for what he has used. In analogous model, users appeal for the needed services and approach those services without a glance to, from where these services are being bestowed or how they are conveyed to us. Several computing prototypes have been tracked for gaining the computing aspects and some of them are cluster computing, Grid computing, and many more cloud computing. "Cloud computing may be defined as the way in which we can store data or information permanently on servers and temporarily cache them on the client side through laptops, computers, sensor, etc." Figure 1 shows that the cloud computing act as a utility where users are able to access services from anywhere in the world. Cloud computing is briskly turning the tables towards flourishing

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the software for millions of customers to deplete it like a service, instead of run on their individual computers. Computing is being modified to a model that includes services delivered in a way equivalent to conventional utility such as water, electricity, gas and telephone. In October 2007, Google and IBM published collaboration with computing and it became more popular from then on. With the Amazon EC2, the web, email, Google App Engine and Sales force's CRM show an auspicious conceptual foundation of cloud services. In this model user can get resources according to their demand without noticing from where these services are managed and distributed. Several Computing paradigms include cluster computing, Grid computing and furthermore newly cloud computing. It is a paradigm that provides convenient, on-request access to the network to serve computer recourses such as networks, servers, storage, applications and services that can be quickly supplied and release with least management work and service provider interaction [1,2]. Resources can be accessed via the web and a pay-per-use concept is offered via vendors. Anyone can easily register to Cloud services, and deploy and configure servers for creating an application in hours, and paying only for the time these resources have been accessed [1]. Cloud computing provides the gathered common and infrastructure services. It is a paradigm that provides all IT services to the users via internet. In this the word cloud is a collection of all types of resources such as servers, applications, storage, etc. Cloud offers primarily three categories of services. First service given by the cloud is an infrastructure as a service (IaaS), which offers infrastructure to the users. Second category of service is Platform as a service (PaaS), which offers a platform for the users to make their application. The third type of service is Software as a service that offers software to the users to run their applications directly from the cloud. Cloud computing has many advantages that are making it very useful day by day: it is cost effective because installation of most of the resources is not required; less maintenance charges because services are controlled by cloud vendors. Flexibility and scalability, resources are provisioned and released, according to the user's requirements.



Fig-1: What the cloud is?

1.1 Types of cloud computing

IaaS: Stands for Infrastructure as a Service. It offers virtualized resources like computation, storage, and communication. A cloud infrastructure provides provisioning of on demand servers which are running on different operating systems and software. Infrastructure services

are considered as the basics of computing model. Flexi scale, Go Grid and Amazon EC2 mainly offer IaaS services [21].

PaaS: Stands for Platform as a Service. These provide a higher level of abstraction to make a cloud comfortably programmable. The PaaS provides an ambiance in which developers create, extend their applications and do not feel the urge to know how many processors or what a heap of memory is used [20]. Force.com, Microsoft Windows Azure and Google App Engine are some example of Platform as a Service.

SaaS: Stands for Software as a Service. Applications reside on the prime of the cloud stack. Services which are equipped for users by this layer can be attained by users through Web portals [7]. So these days large numbers of consumers are migrating from manually installing computer programs to on-line software services which provide same functionality. Desktop applications like spread sheet and word processing can now available on the web in the form of services. Thus SaaS provides the capturing of applications and makes the customer experience less because of dilemma in software maintenance and simplifies development and testing for providers. Salesforce.com, Rack space are example of SaaS.

1.2 Deployment models

Private cloud [21]: This cloud authority is cultivated for the use of only single organization which is being composed of multiple consumers e.g. business units. It may be governed, managed by the single organization for their own use.

Community cloud [20]: This cloud authority is maintained for defining communities of consumers from organizations that have to experience the same data within each other. It is organized by single or more of the organizations in the community.

Public cloud [21]: This cloud authority is maintained for generic public. It may be managed or owned by academic, business or statecraft organization or some blending of them. It is maintained and managed by 3rd parties (cloud provider) itself.

Hybrid cloud [8]: This cloud authority is aggregation of more than two cloud authorities (private, public or community) which is solitary entities, but combined with technology that approves both data and application mobility like cloud bursting for load balancing between clouds.

Table-1. Deployment model

| Model | Cost issues | Security issues | Control issues |
|-----------|-----------------------|-----------------|----------------|
| Public | Setup: highest | Least secure | Least control |
| Private | Setup: high | Most secure | Most control |
| Community | Setup: relatively low | Less secure | Less control |
| Hybrid | Moderate | Moderate | Moderate |

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2. WORKING OF CLOUD COMPUTING

Let's explain its working with an example [7]. Let's imagine we are heading a large company or organization. Our prior responsibility is to ensure that all the employees in the company have the proper software and hardware for their work. But only buying computer for each employee is not sufficient they will also require a software license where they get the tools for execution of their work. Moreover, there is new hiring's that time also we require computers and software license so that each employee can work. With respect to cost it is very stressful. We will only load one application instead of installing software to each computer. The application would allow employees to login into a web based server, which consist of all the programs they needed for their work. It is the concept on which cloud computing works and it have shuffled the entire IT industry. Due to the unfolding of this concept, local computers have, not to run heavy applications on their systems [13,14]. The cloud providers handle them by their own. The only thing what user needs is to connect him from the internet connection to run cloud computing systems which is simple as any web browser works. Best examples of it are an e-mail account with a Web-based e-mail service like Hotmail, Yahoo! Mail or Gmail. You have not to run your email program on your computer, you simply log in to a Web e-mail account through internet. The software and storage for our account doesn't occur on our computer, it's on the server side. This is the working of cloud computing. Template sample paragraph .Define abbreviations and acronyms the first time they are used in the text, even after they have been defined in the abstract. Abbreviations such as IEEE, SI, MKS, CGS, sc, dc, and rms do not have to be defined. Do not use abbreviations in the title or heads unless they are unavoidable.

2.1 Advantages

Cost efficiency: Cloud computing [9] provides us with ultimate cost efficient approaches to adopt, boost and maintain. Previously, companies make lot in finance and put on license fee for their software and all which was very expensive. Additionally, cloud is achievable at moderate rates and lowers the company's IT consumption. Nearby, there are numerous extended scalable opportunities that cloud provides for us that are pay-as-you-go and much else which construct cloud as a very reasonable to cost. Almost Unlimited Storage: Heaps of data are stored on a cloud which gives us approximately the boundless storage space.

Backup and Recovery: Subsequently, all the data is which is gathered in the cloud is backed up and restoring it is much uncomplicated than storing the data on a physical device. Abundant working is done by several cloud service providers to grab recovery of information [12]. This makes the absolute mechanism of recovery and backup much effortless than the other traditional approach of data storage.

Automatic Software Integration: Software integration in cloud is frequently something that manifest significantly. This closely relates that cloud users ought not to take the additional trouble to integrate their applications as per own choices.

Easy Access to Information: The time users roll itself into the cloud, they can approach the information from everywhere by using internet.

Quick Deployment: Cloud computing allows the assistance of quick deployment. Once we opt for this approach of functioning, the full system can be fully functional in few minutes.

Easier to scale of services: It makes pleasant for companies to scale their services corresponding to the appeal of clients.

2.2 Issues

In spite of the innumerable asset as discussed over, Cloud computing also has countless issues. Businesses, exclusively smaller ones, need to be attentive for such perspectives before going in for this technology. The main flyers involved in it are: Technical Issues: It is

legitimate that information and data conserved on the Cloud can be achieved any time and from everywhere, but there are occasions when the system can have few humorous affairs. The end user should be conscious that this technology is always prone to drain of their data and some other technical issues. Even the best providers of cloud have to undergo this kind of distress [17].

Security: Another dominant argument on a cloud is illustrated as security [24]. Before using this technology, the user ought to know that they will hand over all their company's sensitive information to a third-party i.e to the providers of cloud. This could enforce a great danger to the company. Hence, businesses ought to be sure that they are appointing the faithful service providers, who will retain their information securely. Prone to attack: In the cloud, accumulation of our data and information causes companies exposed to intrusion and threats. So there are maximum chances of robbing of our sensitive data.

Cost: In the beginning utilization of cloud computing may resemble much more moderate than a distinct software solution installed. The companies have to certify that the cloud operations have all the attributes that are needed by software and if not, it has to analyze which of them are missing features essential to them.

Inflexibility: Making a choice about which cloud dealer frequently means locking the business into using their applications or formats. For instance, possibility to insert a document created in another format into a Google Docs spreadsheet is not possible. The company must be adequate in adding and/or subtracting cloud users as significantly as its business amplify or compact.

Load balancing: In cloud computing [10] another main issue these days is load balancing. It is an execution that allots the workload constantly to all the nodes in the cloud to divert a stage like some nodes are densely loaded with work and others are jobless or doing little work. It helps achieving high resource utilization ratio and user satisfaction, therefore improving the overall performance and resource utilization of the system.

Security: According to Wikipedia [23] Security in cloud computing may be defined as "Security in cloud may be termed as "cloud security" is an evolving domain of computer security, network security and information security. Security may introduce wide set of policies and technologies provided to protect our applications, data and infrastructure of cloud computing." IaaS: Stands for Infrastructure as a Service. It offers virtualized resources like computation, storage, and communication.

3. CONCLUSIONS

Demands for cloud computing is a rapidly evolving. If properly used and integrated it can be very beneficial for businesses and academics. More and more companies offer PaaS, SaaS, IaaS and many more to create business values and to attract more and customers. In the paper, working on cloud computing has been discussed by the author with a very small example of our day to day life i.e. working of g-mail and have focused on the various advantages of the cloud computing. Today Technology has reached to such an extent that if we look back we can't even imagine our today's world with that speed or technology. It is spoken that everything has two sides. So, despite the advantages of its cloud computing we have seen, there are also issues which are quite serious and risky to deal with. In cloud security is the dominant affair these days. The Future scope of my paper would be working on the security issues and will work on how to search in encrypted data because these days huge amounts of data is encrypted for security purposes. So finding the data without decrypting it is the main task to do.

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