INSIGHTING CLOUD COMPUTING IN THE SIMPLEST WAY

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ABSTRACT:

The "World is moving Cloud" is the phrase where everybody (organization/business etc) are coming up with .The need of everybody in the present world is to have many costly resources, at low cost, use only those resources needed and don't want to pay on those which remain idle, dynamic usage of resources, anytime, anywhere access to the resources flexible scaling of resources, this all needs is being answered by one and only one Technology called Cloud Computing. In this paper I have discussed in detail about cloud computing Technology. What was before this Technology? It gives fullest knowledge of cloud computing. Everywhere we go around we see Internet; is growing beyond our imagination and when Internet comes in our mind the very next world comes is the Cloud. In this paper we discuss about the various models, cloud Architecture and the growing need in cloud. The primary benefit to Cloud Computing is the ability to store and obtain data from any location, at any time, on multiple types of devices.

KEYWORDS: Cloud Architecture, features, Services, Deployment models, Applications.

1. INTRODUCTION:

World before Cloud:-

Right from inception of understanding about cloud computing. There is a question in every mind is why cloud computing? Let us see the Evolution of Cloud Computing

When Main frame computers came into existence, several users accessed the central computer via dummy terminals. The task performed by dummy terminals enables the users to access the mainframe computer. As Mainframe computers were so costly it is not economically feasible for organization to buy them. So at that time the idea of provision of shared access to single computer occurred in the companies to save cost. So Cloud Computing has its root as far back in 1950's.

In 1970's, IBM came up with an operating system name Virtual Machine. This allowed for Simultaneous operation of using more than one Operating System. Guest operating System should be run on every Virtual Machine, with their own memory and other Infrastructure, so that sharing of resources are possible. So Virtualization came into existence and gained popularity.

In 1990's Virtualized private Network connection came into existence offered by Telecom operators and the quality of service was good as those of point-to-point (dedicated) services at lower cost. At that time it provided a way for more than one user to share single physical infrastructure.
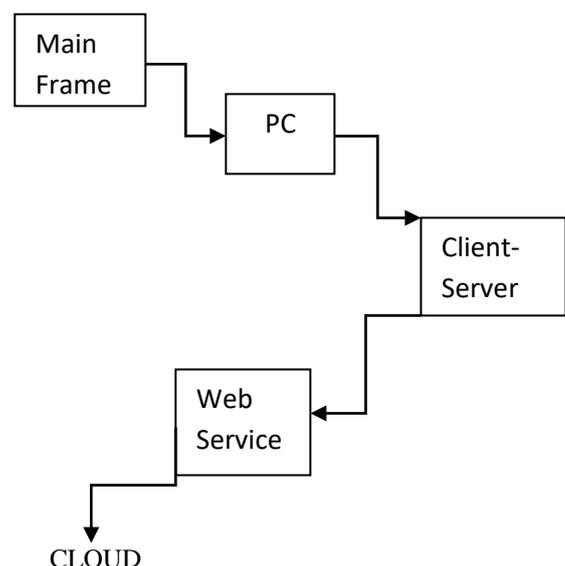
Fig 1: Evolution of Cloud Computing

Then comes catalyst caked grid computing, which allows major issue to be addressed via parallel computing .Utility computing allows computing resources to be offered as a metered service and SaaS allowed subscriptions which were network based to

Applications, by considering all this factors Cloud Computing came into existence.

Everyone in the present world moves towards the advancement in technology and in need of having carefree and indolent life so they are moving towards digitization. Digitization has helped people to the greater extent in terms of holding confidential information. The need of everyone (here everyone is referred to an industry/sectors/organization) is to have large memory, easy access, less maintenance, multi portability, scalable which was nothing happening in the traditional computing environment which conceived the idea is Cloud.

Cloud had helped business from the smaller business to larger enterprise.

(a) Life before Cloud:-

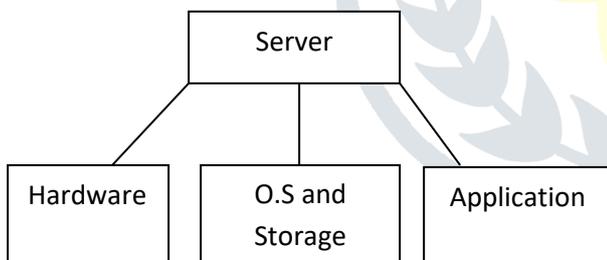The Server includes the components listed below:-

Fig 2: Components of Server

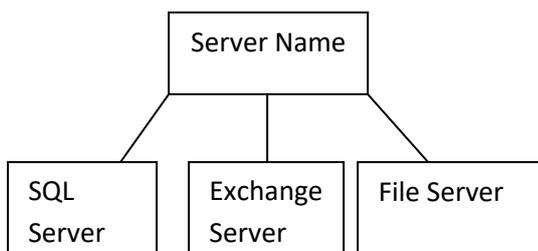Again server is being categorized by the functionality it provides.

Fig 3: Server types

If the file server is filled up and exhausted then the duty of System Administrator is to add new server. If there are

multiple server and the hardware failure occurs, then the service is down. The only one solution that the system Administrators can do is to make a cluster of servers to make them more faults tolerant. But with the clusters of servers there are also some disadvantages such as Scalability (it is the capability of a system, network, and

Process to handle a growing amount of work) and there are many applications which cannot work in the clustered environment. The main issue which is being raised is Server maintenance; however the duty of System Administrator has to look upon all the issues related to hardware, operating system storage into consideration and managing the storage as per need. Thus raised an issue on server maintenance and thus the concept of virtual server came into existence.

(b) Virtual Server:-

Virtual Server's concept separates the server software from hardware.

A virtual Server can be serviced by one host or more than one host and also one host can manage more than one Virtual Server. Virtual Server are nothing but an email server, database server etc. Virtual server mainly focuses on the environment on which it works, if the environment is good it will not be affected by the loss of host.
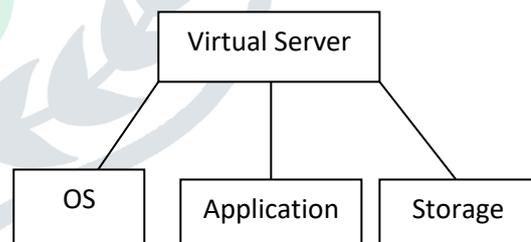
Fig 4: Components of Virtual Server

The main problem of traditional server is its scalability the problem of scalability is solved by virtual server. If the system administrator finds out that the resources supporting the virtual server were overburdened, they can adjust the amount of resources allocated to that virtual server. By creating server templates in an virtual environment which is used to create multiple virtual servers by which virtual servers based on its own will migrates from host to host whenever needs.

1.1 Why Cloud Computing?

Suppose I have hussaini.com, in this Hussaini server's operation hours are from 9AM till 4PM

in a day. Then why we spend resources on the server during nights. When it is just idle? I am hosting by server but why leaving it idle during its non working hours. I came up with a solution.

I decided to host the website in Amazon's EC2 Elastic Compute cloud procuring during the day and dispraising every night. Pay just Rs 150/- anything per server per hour or more for higher capacity servers. I will not be

concerned about the Updating, Hardware, and many more. Let Amazon worry about Hardware.

1.2 Features of Cloud Computing:-

- You don't have to buy the hardware.
- You "lease" it as needed from a cloud.
- There are Public Clouds.
  E.g.:-Amazon EC2, and many others (Microsoft, IBM)
- A private Cloud can also be created but the focus must be on security.
- You can create Virtual Server ("Virtualization")
- At any point of time we can choose the operating system and software.
- It will run on the server located at somewhere that is we are unaware of it.
- You can start more on a few minutes' notice.
- You can shutdown instance in a minute or so
- They will send you a bill for what you use.

1.3 Definition:-

The term "Cloud" can be linked to the Internet because Cloud works on Internet or it is a symbol for the Internet Cloud Computing refers to computation and storage. "Cloud COMPUTING is about changing computing from the single desktop PC/ data centers to the Internet." The term "Cloud Computing" is defined by different author differently.

Cloud computing is a technology which use the internet and central remote servers to maintain data and application. It is a group of computers and servers linked together over the Internet. It refers to manipulating, designing and accessing the application online. It allows consumers and businesses to use applications without installation and access their personal file from any computer with the help of Internet [1][2] due to the centralization of data.

- Maintenance:-

  It is easy to maintain since there is no need to install on each user's computer.

- Metering:-

  It means the resources are measured as per the usage and it should be measured/metered per client and application on a daily, weekly, monthly and yearly basis [3].

- Flexibility:-

It is quite flexible and is quite impressive. Whenever the text version of any given software is released we need to adopt that platform then what need to do is that simply by contacting your cloud service provider and authorizing the change.

2. ARCHITECTURE:-

The architecture of Cloud Computing includes all those components, sub components and elements that are used for computing [4].
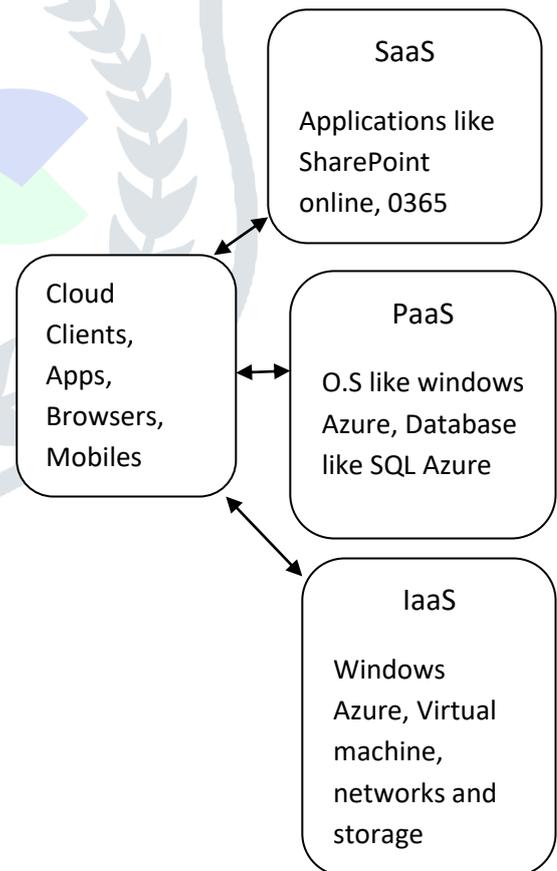
Fig 5: Cloud Computing Architecture

But if you think practically, The Architecture of cloud is divided into two section called Front End and Back End.
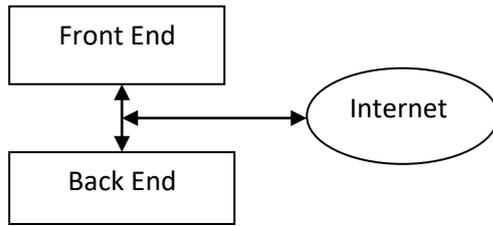
Fig 6 Practical Cloud Architecture

1.4.1 Front End:-

The front end is the areas which the computers is used by the customer/client/consumers with some applications need to access cloud computing systems.

1.4.2 Back End:-

In Cloud Computing back end section is nothing but Cloud itself which may comprise of various computer machines, data storage, servers etc. Here there may be one Cloud and set of these cloud forms a whole Cloud Computing System. Here Cloud can be anything such as Video games to data processing or software development to entertainment.

Example of Cloud Computing:-

Every commonly examples of cloud computing are Facebook, email etc. Let us discuss about the example of email. Email uses cloud computing if you send or receive mail, all that you need is Internet Connection.

They are few things which we can consider here such as the cost to operate cloud computing is very much cheaper as this provides one of the biggest advantage as anybody needs on the other side all the files, mails and database are hosted in the servers of service provider, privacy is one of the concern and security is the biggest concern.

In the architecture above if we look at the services the cloud architecture provides three different types of services. Let us see what those services actually do.

Software-as-a-Service:-

SaaS can be explained as a process by which Application Service Provider (ASP) provide different software application over the Internet.

It enables the customer to eliminate the headache of installing and operating the application on his own computer and also get rid of the immense load of

software maintenance [2].With SaaS a provider licenses an application to the customer as a service on demand through subscription [6].

In software as a service model, provider provide both hardware and software infrastructure and the users interact with the system through the front end portal .It is the duty of Microsoft outlook to send and receive mails.

The main theme behind SaaS is that the service provider will provide customer the service of using their application software.

Ex:-Google, Salesfoce.com (CRM)

In SaaS Company buy access to an application but have no responsibility for its implementation. The most applications the client gets via SaaS are Customer

Relationship Management (as with salesforce.com) to the tasks such as Medical Billing Management, Classroom Scheduling.

Platform-as-a-Service:-

It provides a platform oriented service. In this customer has responsibility for application deployment and to provide securing access to the application itself [2]. PaaS is mainly useful when multiple developers all together working on a development project. Here the consumers don't control the underlying Cloud Infrastructure which includes network, servers, operating system, or storage but it has control over the deployed application.

Example:-Google App Engine, load storm are the instances of PaaS for executing web applications over Internet [7].

The service provider only provides platform or a stack of Solution for your users. It helps users saving investment on hardware and software. The Users execute the application in the platform which is provided by cloud provider. PaaS provides platform on which a customer can run its own applications.

Ex:-A company might have .NET application to which due to some problems or holiday peak loads it has trouble in providing enough resources. The only solution that the company does is to go platform provider such as Akamai, to run its system on its .Net application server framework.

Infrastructure-as-a-Service:-

IaaS can be utilized by enterprise customers to create cost effective and easily scalable IT solution where he complexity and expenses of managing the underlying hardware are outsourced to the Cloud Provider [2]. Here the customer can buy the infrastructure that might not be used for months. Here service provider owns the equipment and is responsible for housing running and maintaining it. It basically follows "pay as use basis". Here service provider bears all cost of hardware, servers, network equipment. In order to take the computing service the customer has to pay for the services and build their own application software.

IaaS allows an organization to run entire data center application stack, from operating system to the application on Service Provider's Infrastructure.

Ex:-Amazon's Elastic Compute Cloud

3. TYPES OF CLOUD COMPUTING:-

Considering network infrastructure and its installation. Cloud Environment is broadly divided into three categories.

- Public
- Private and
- Hybrid

3.1 Public Cloud:-

A public cloud is where the service is provided on demand for any clients. Many Cloud experts consider Public Cloud as he main stream cloud system. It is the duty of third party service provider to provider both storage space and computing capability for all the application software in Public Cloud

Examples are Amazon web and Google.

Services of Public

Free   Pay per usage model
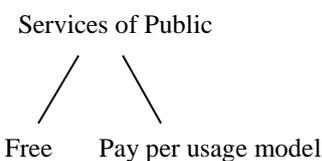
It is the duty of service provider to make resources such as application and storage available to the general public over the Internet.

Pons and Cons:-

- Easy and inexpensive set up because everything will be provided by provider.
- No wasted resources because you need to pay for what you use.
- One major con is security as everything available in public environment so

there is more chances of data to be corrupted.

3.2 Private Cloud:-

Every individual organization maintains private cloud. It is quite different from public cloud here you

need to set up your own data center and bear all the expenses which occur due to installation and maintenance but advantage is you have complete control on your data.

It is mainly useful for the company which wants its full control on its data than they get by using a third party hosted service.

Pons and cons:-

It gives full security and privacy but quite expensive.

3.3 Hybrid Cloud:-

It is a combination of both public and private cloud. If you consider the main responsibility of IT department of an organization is to provide all kinds of services to all kinds of business.

This system all helps I maintaining backup and archive, in return the data is replicated on a Public Cloud. For Example any organization needs a secure cloud and large cloud so they are keeping more critical data/important data to the private cloud while less critical data can be placed to public cloud.

In the recent research finding it has been seen that many organizations are moving from private to hybrid cloud Architecture. Utilization if private only was significantly reduced from 51% last year to just 24% this year. Public-only architectures also reduced 30% to just 19% [8].

4. APPLICATIONS:

4.1 Email:-

Email communication plays a very important role in many of our lives. This is one of the most important and useful application of cloud.

Online email has been offered by all the big names such as Microsoft, yahoo and of course Google for a number of years.

Everyone today is becoming slave to the Internet connection. The first thing you do when you find yourself in new or unfamiliar location is try to find internet café to launch your secure portable web browser and check your emails.

4.2 Need for local data storage is not required:-

Storing data such as video, Mp3, photos and documents online instead of at home gives you an added advantage and freedom to access them wherever and whatever time you find the means to get online.

Examples of online storage area Zoom Drive, Microsoft's, Sky drive, Humyo, S3 from Amazon, and many other. Many offer both free and paid for storage and backup solutions.

4.3 Online Collaborator:-

Sometimes it happens that you need the opinion of others in any of your need. Few years ago Google launched a service that allowed groups of people to work on the same document. Using Google wave you can create a document and then invite others to comment, emend, opinion or otherwise join in with the creation of final draft .Google is not alone in producing online collaborations other examples include spice bird, sticky and view.

Earlier any projects to complete tasks takes weeks or even months to complete by using other advance methods by using this technology it takes mere minutes or hours to complete.

4.4 Working in virtual office:-

Having a system and space hogging suite of application like word processor, a spread sheet creator and a presentation sitting on your computer and working, you could opt to work online instead.

It provides all the benefits of accessibility, storage, potential for collaboration, working in online than office suite.

Examples of online suites are Ajax 13, Think free and Microsoft's office live.

A part from the above application it is mainly used everywhere in the present world such as Hospitals, Small business, Higher Education, colleges etc.

CONCLUSION:-

Cloud technologies are just beginning to develop, "the technology is just taking its first baby steps towards the future". As per the reports today the volume of Cloud Computing market exceeded $45 billion, and by 2020 this figure will increase to 150 billion. Cloud Computing will change the future world and Cloud Computing has received increasing interest from various industry professionals and enterprises. Many organizations save the most important data in the cloud,

thereby abandoning the costly servers and backup's system. However, in a few years the Cloud will bring the world much more usefulness than you might think right now. With this I conclude saying that Cloud is like "electric light" which we use it without necessarily understanding how it works.

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