Cloud Computing: A Trend of Future

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ABSTRACT
With the increasing need of SaaS and cost cutting utilizations of the computer resources and anytime anywhere theory in IT industry, cloud computing is the revolution. It has been in the frame from the very beginning but its utilization is seen now on. With servers doing all the work for the user, client does not have to worry for anything, almost, from softwares to crashes, from resources to utilization. Cloud computing provide provisions to the IT industry to make its utilization, computation and learning fast and easy.

1. INTRODUCTION
Imagine the time when your computer is just a hardware device with space utilization at different level. Cloud computing provides that level. Cloud computing is the most advanced form of internet age where you don’t have to install, store or run your application on your computer but all happens at a different level, we call them “virtual servers or cloud”. Cloud provides user with low cost of resources with pay per service type, through dynamic scaling with the use of expertise of providers in organizing and provisioning computational resources. The application/data resides at another location on remote servers, which may be called data centers and are looked after maintained and provided with all the necessary resources by another company/organization.

Through cloud computing, users don’t have to think how to run, do I have the space for the software, what if my computer breaks down, all will be taken care by the cloud. Servers installed by the providers will provide all the services in an authenticated manner to the user as per request. Cloud computing is a way to increase capacity or add capabilities on the fly without investing in new infrastructure, training new personnel, or licensing new software.

Cloud computing is at an early age where only handful of providers but now with the evolving IT industry, more investment and transformation of the internet is taking place with the emerging cloud computing aggregators and integrators.

2. HISTORY
Cloud computing has gone through number of phases, from the few years when internet came into existence till now, transforming from grid and utility computing, Application service provider (ASP) and Software as a Service (SaaS).

[2]Cloud computing existence dates back to 1960 when John Mc McCarthy opined, “Computation may someday be organized as a public utility”. In 1961, he was the first to publicly suggest, in a speech at MIT, that time sharing technology might lead to a future in which computing power and even specific application could be sold through the utility business model.

One of the most remarkable and recognized milestone was Salesforce.com in 1999, established by Marc Benioff, Parker Harris and his fellows, which initiated the delivery of enterprise application through website. This epitomized for other software firms to use Internet for delivering enterprise application to others.

[1]The next was Amazon in 2002, which provided a trunk of cloud, based services including storage, computation and even human intelligence through Amazon Mechanical Turk by modernizing their data centers and resulted in significant improvements via Amazon web service in 2005.

[1]Later in 2006, Amazon launched Elastic Compute Cloud (EC2) that allowed small companies and enterprise to rent computers on which to run their own application. “Amazon EC2/S3 was the first widely accessible cloud computing infrastructure service,” said Jeremy Allaire, CEO of Bright Cove, which provides SaaS online video platform to UK TV and newspapers.

With the advent of Web 2.0, marked the emergence of Cloud Computing for companies like Google and others which started to provide browser based enterprise application through like Google apps etc.

Now with coming of Big giants like Google, Microsoft, IBM and Sun, the cloud computing saw an easy and a reliable landscape, which led to the wide acceptance of cloud in the IT industry.

In March 2010, Microsoft's CEO, Steve Ballmer, made his strongest statement of betting the company's future in the cloud by proclaiming, "For the cloud, we're all in" and further stating, "About 75 percent of our folks are doing entirely cloud based or entirely cloud inspired; a year from now that will be 90 percent.

3. ARCHITECTURE AND HOW IT WORKS
A cloud computing topology consists of three main components-the clients, the datacenter and the distributed servers, each of which plays an important role in the working of a cloud.

The clients are the devices that the end-users use to access the service (application/data) provided by the cloud. The clients can be Mobile, Thin or Thick clients depending upon their device of usage. The data center refers to the location, which consists of a collection of servers on which the application/data that the cloud is hosting is housed. It may be a small room or a
huge building in another part of the world that the client refers via Internet. The servers providing the service (data/application) are not housed at only one location, they may reside at geographically distinct locations and act as distributed servers, to the subscriber these distributed servers act as if they’re placed close to each other and working together with full and close interaction with one-another. To the service provider, the distributed servers provide a wider flexibility in options and security, if a server at one location fails the service would be continually provided by accessing the service (data/application) servers at the other location. There is no one-cloud infrastructure, the infrastructure may depend upon the application the choice of the service provider to implement its cloud.

Virtualization is an important concept that is related to Cloud computing, in which the service (data/applications) may be provided in a virtualized format. [2]There are two concepts to virtualization- full virtualization, par virtualization. Virtualization is a concept, which allows multiple instances of operating systems to run on a single computer within virtual machines by adding a virtualization layer between the operating system and the hardware. Full virtualization involves emulating the entire system (BIOS, drive etc.) in which an entire installation of one machine is run on another whereas [3]Para virtualization allows multiple operating systems to run on a single machine (h/w device) by efficiently using the system resources.

The services provided by cloud computing can provide three types of resources as service which are- software as a service, hardware as a service and platform as a service. In providing software as service, the cloud computing architecture involves hosting the software, which would be used by subscribers (customers) via Internet. The software would be maintained by the service providers with all the upgrades and patching. The customers would be billed/charged every time they use the software rather than just paying once for the software development if the software would have been developed internally in the subscriber’s organization. This service reduces the costs for companies who do not want to employ staff for the whole development and maintenance of the software but at the same time this service may not be beneficial for organizations with very specific requirements for software’s as the subscriber may be providing a generic version of the software to all its subscribers. The platform as a service provides the subscriber with all the resources required to build the application or the software via the Internet without the need for downloading or installing the same. The major issue with using platform as a service is of interoperability and portability i.e. if is using the services of one service provider and decides to move to another service provider, it may not be able to do so or would have to spend huge amounts to do so.[2] Using platform as a service a subscriber has the advantages of using geographically isolated development teams and to use web services from various sources. In providing hardware as a service a service provider provides the hardware (resources) to a subscriber and the subscriber can put anything it wants onto it. The service provider in other words rents the Data center i.e. all the hardware resources from its data center that the subscriber requires.

4. APPLICATIONS
Cloud computing is the most recent and emerging technology in the field of IT. Slowly and gradually industry people have started to realize the potential benefits of Cloud Computing and one can see that IT people are all over the spectrum when it comes to cloud computing.

The most important and basic use of cloud computing, and undoubtedly the best use of cloud computing for the user is that one does not have to worry about the infrastructure when it comes to cloud. The client only needs to have the basic hardware capability of Monitor, Keyboard, Mouse and just enough processing power to run the middleware necessary to connect to the cloud system. You don’t need to have the most high speed RAM and hard drive, so saves a lot for the client.

The best of the thing for the corporate is anytime and anywhere use of information. Once the information is loaded on the cloud, client can use the data whenever they need. There is no need of corporation’s internal or central network storage or large computer hard drive.

In addition to this, client or user doesn’t have to worry about the recovery or the crashes of the system or memory; all is taken care by the cloud. So duplication of data is avoided largely.

It is not possible for all the companies to have all the required softwares, especially the small firms, for all the employees. Cloud computing provide them with the option of choosing the right software whenever needed and pay the metered fee to the computing company. Thus, helps the firms to save lot of money.

If the backend of the cloud computing is grid computing, then the client could take advantage of the entire network's processing power. [3]Many a times scientist and engineers do complex calculations which may take year long to process on individual computers. With cloud computing, client can send the calculation to cloud; cloud can tap the information and send the same to grid for multiple processing, thus hastening the calculation.

5. ISSUES
There may be many situations in which cloud computing may not be the best solution for an implementation. Cloud computing has various limitations or concerns associated with it.

The most important concern is the security of data. The main reason being the fact that once the data has gone out of the hands of the subscriber to the lap of the service provider, the subscriber has lost the layer of control over the data. If there’s another party housing your data how do you know that your data is safe and secure, the worst case being that all your data on the cloud is accessible to everyone else.
There can be some solutions to these security threats. One may be to encrypt your data and then send it, in this way the data is fully encrypted and no one else is able to access it once it leaves your organization. Another solution maybe to have a strong agreement/contract with the service provider, which restricts the service provider from sharing the data with anyone else outside the subscriber’s organization or with anyone outside the contract.

There may be a lot of threats from hackers who may access a subscriber’s important data and encrypt or destroy it or blackmail the subscriber to share it with competitor until the subscriber pays them off.

Sometimes it is essential for the cloud service providers to share data with the law enforcement agencies or with the government organizations in case of some criminal cases in which the information may be essential for the verdict of the case of to catch the culprits.

There are a number of regulatory issues concerning cloud computing. Currently, there is no regulation and it would be rather strange to ask the government to step in and regulate our data and the cloud but there does not seem any other solution. The government will have to step in and decide who actually owns the data in case of cloud computing implementation and whether the law enforcement agencies or the government organizations be allowed to access the data on the cloud.

CONCLUSION

With changing modern world, Cloud computing is a kind of a network service and is a trend for future computing. With separation of infrastructure maintenance duties from application development, separation of application code from physical resources, ability to use external assets to handle peak loads, ability to scale with user demands, cloud computing is the next BIG thing in the field of IT sector.

REFERENCES

[1]. Amazon_Elastic_Compute_Cloud