A Review Paper on Cloud Computing

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ABSTRACT: Cloud Computing provide a super-computing power. Cloud Computing is in lime light, because it has the ability to change the industry. Now Cloud computing is not a small, undeveloped branch of IT. The global cloud computing market is expected to grow from $37.8 bn (in 2010) to $121.1 bn (in 2015). According to a study, the retail cloud market is expected to grow more than three times from $4.2 bn (in 2011) to $15.1 bn (in 2015) [1]. It is developed as important technology for sharing resources, grid computing, distributed computing, parallel computing and visualization technology defined the shape of a new era. Entire operating systems could be run on the cloud. This review paper is for anybody who may have just heard the term "cloud computing" for the first time and needs to know what it is and how it helps them.
Keywords- Cloud Computing, Grid Computing, Distributed Computing, Parallel Computing, Visualization.

I.   Introduction

Cloud computing is so popular because it has the potential to bring a drastic change in the industry. It is very useful technology for sharing resources, grid computing, distributed computing, parallel computing and visualization technology. Cloud computing can act as an affordable alternative computing platform. It gives the ability of storing data online, instead of storing it on a physical hard drive. It also gives the flexibility to access that data from anywhere at any time unlike traditional storage systems, thereby reducing the extra cost spent on IT operations. In this style of computing provide power referenced with IT as a service [5]. It has proved to be a boon to small industries which cannot spend big bucks on data storage devices. In cloud computing, several systems are connected using a public and private network so that large number of files, applications and other data can be stored.

Fig1: Cloud Computing

Services of Cloud Computing

Cloud computing treats everything like a service viz. platform, software, data, security, computing, hardware and other infrastructure. But the things that are commonly studied are:

1. Software As A Service (SAAS)
2. Platform As A Service (PAAS)
3. Infrastructure As A Service (IAAS)

Software As A Service (SAAS): It consists of the software that are implemented or used over the internet like in emails, photo editing etc. Applications like Instagram are examples of SAAS. There are others that provide web hosting, gaming applications, media distribution, ecommerce applications, social media applications etc.

Features:

1. Easily accessible from anywhere using an internet connection
2. Commercial software can be accessed online
3. Options for 'pay as you go' or subscription based payment methods
4. Software is centrally managed
5. Reliable
6. No worries about upgrading software and applying patches
7. User-friendly APIs integrate different modules of software

Fig 2: Services of Cloud Computing

Platform As A Service (PAAS): It focus on software developers as it has all the facilities that are needed during the lifecycle of the development of web applications and services. For example, force.com provides mobile SDK and also provides a market to sell your applications [3].
Features:
1. Availability of tools and APIs
2. Integrated with other web services and databases
3. Easy subscription management

Infrastructure As A Service (IAAS): It is more useful for small companies as it reduces the infrastructure costs by providing servers, storage, networking and operating systems on demand. Examples are Amazon EC2, Amazon S3 [3].
Features:
1. Centralized
2. Scalable
3. Efficient and Affordable

II. The Advantages of Cloud Computing

Mobility: It gives the users mobility required to cope with the present scenario of global marketing where the user has to stay connected with his tools and data round the clock at any place he wants. The old tradition of making telephone calls to get regular reports is not feasible anymore in the current trend. Now that the internet is almost everywhere in the world, it is a very wise thing to use its worldwide connectivity to enhance mobility using cloud computing [6].

Versatile Compatibility: The ability of cloud computing to provide all the users same amount of services and flexibility irrespective of their operating system or software platform is mind blowing. It has saved the users from making a difficult choice from the available platforms as all the cloud applications are available on all kinds of systems [6][8].

Affordability: In cloud computing, the user only pays for the services and the amount of storage he needs unlike other computing techniques in which the whole package with unnecessary applications need to be bought [7].

Individuality: The most important feature of cloud computing is that it is compatible with the needs of any kind of company so that a company can maintain its individuality while using cloud computing services in its own desired ways.[7][8]

III. The Disadvantages of Cloud Computing

Less Control: As the data is stored and implemented on a public cloud, the level of control of the company over the technology gets reduced to a certain level. While several IT managers are experimenting with different ways of implementing an in-house cloud system that runs on delivered metered services, this might not always be the most lucrative business move [8].

Not Always Enough Room: Some users may be disappointed with cloud technology because they might find that once they have implemented a cloud system within their business, they may keep running out of storage space [8]. While it is possible to update the system, it can be a hectic process.

Security and Confidentiality: Since technology has begun to expand in the exponential ways we are seeing in this day and age, cyber-crime has become an issue of utmost concern. Cloud computing gives rise to the probability of security threats. While most companies have an updated virus database, this does not mean that the files and information stored in the cloud immune to hackers.

IV. Applications of Cloud Computing

File Storage and Sharing: If someone have suffered the frustration of trying to send or receive a very large file via email then this technology is for them. Services like SendFile, Dropbox are available to facilitate sending of large files via email. It provides a secure file sharing system for workgroups and team collaboration. With the availability of a wide range of services from Cloud Drive to hosted SharePoint, there is no reason to send large attachments anymore. Virtual team, including partners and customers, can have a place within the cloud where they share information and documents.

Cloud Database: Almost every web application needs a database. In the past, web developers used to set up and maintain the databases of their own like MySQL, SQL Server, etc. Management and tuning of a database needs a very specific set of skills in order to perform complex tasks. This is most appropriately done by the database administrator. Cloud databases provide developers a powerful and scalable database that works sufficiently. From infrastructure to database software to tuning and monitoring – almost everything is done as a service.

Customer Relationship Management (CRM): CRM systems deal with two of the most sensitive parts of the data: customer information and revenue. The advantages of cloud-based CRM systems are precise for Sales teams and IT and the risks have been taken care of. CRM can act as a blueprint for moving more lines of business applications to the cloud.

Email: Email is another useful application that is fairly mature by now. At a personal level, everyone uses cloud-based consumer email services like Outlook and Gmail and enjoy the benefits of access from anywhere and not having to worry about capacity and/or server uptime. There is a specific cloud email solution for almost every business, be it low-cost hosted email, hosted exchange for small businesses or even managed dedicated exchange environments for large number of customers.

Platform as a Service (PAAS) for Web Applications: Platform as a Service (PAAS) allows developers to host their apps without having to worry about servers at all; they just upload their application and it runs. This makes a PAAS ideal for web developers, microsites and standalone applications that do not require interacting with other line of business applications.

File Backup: Everyone wants to back up all important documents and files, but few of us actually do it consistently and efficiently. A good and reliable backup stores a copy of your files at some remote location. Until recently, that used to mean making a backup to a tape or disk and relocating those to some storage facility which was complex logistically, time consuming and very expensive. Cloud-based backup could be a powerful solution in which backups can be scheduled to run automatically and the information is stored in a secure remote location where it will always be available when needed and moreover, capacity is never a problem.

Web Site Hosting: Websites can prove to be a huge drain on the IT resources, especially if the websites are visited very frequently. Hosting a website in the cloud along with managed services allow web teams to focus on creating the best possible web content. Cloud-based web hosting has the ability to provide scalability and high availability if designed properly.

E-Commerce: Scalability and availability are critical concerns for online stores. Every minute of downtime can result in lost sales. A slow website can result in losing a customer for life. E-Commerce is also known for seasonal high peaks, like in the holiday season. When a particular range of products at an E-Commerce website is highly in demand, it could easily slow down traditional servers, preventing customers from being able to make a purchase. However, the cloud allows that same website to quickly get hold of additional resources and handle the load. When the rush subsides, those resources are turned back off.

V. Types of Data Storage in Cloud Computing

The architecture of a cloud storage is completely based on its conception and proposed hierarchical and certain key technologies involving Data Duplication, data organization, security, virtual storage etc.[4]

Personal Cloud Storage: It is also called mobile cloud storage and is a part of public cloud storage which stores data in the cloud and provides the users with data access from anywhere using internet. It also provides ability of data syncing and sharing across different devices. Windows OneDrive is an example of personal cloud storage.

Public Cloud Storage: In public cloud storage, the enterprise and the storage service provider are separated from each other and there are no cloud resources stored within the enterprise's data center. The enterprise's public cloud storage is fully managed by cloud storage provider. [3][9].

Private Cloud Storage: It is a kind of cloud storage in which the enterprise and cloud storage provider are integrated within the data center of the enterprise. In private cloud storage, the storage provider's infrastructure is in the enterprise's data center that is actually managed by the storage provider. Private cloud storage is helpful in resolving the potential performance and security concerns while offering the advantages of cloud storage [2][3].

Hybrid Cloud Storage: Hybrid cloud storage is the combination of public and private cloud storage where some important critical data stays within the private cloud of the enterprise while other data is stored and can be accessed from the public cloud storage.

VI.   Conclusion

Cloud computing is the latest technology that is widely studied and used in different aspects of all kinds of businesses. There is an availability of many cloud platforms for users as well as enterprises. However, the understanding and use of these platforms is a different story altogether. In this paper, the definitions, types, features, advantages, disadvantages and uses of cloud computing and its services are reviewed. Though each cloud computing platform has its strengths and weaknesses, one thing that needs to be kept in mind is that with every platform, there are always several unresolved issues. Here, for example, the issues like continuous availability, performance, confidentiality, auditability and security of data, synchronization of data in different clusters in a cloud platform, interoperation and standardization, security of a cloud platform shall remain a matter of wide research in coming years. But there is no doubt that cloud computing has a bright future waiting for it.

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