Role of Cloud Computing in Business-Concepts, Merits and Demerits

Pragati Maheshwari*

Abstract

Cloud Computing arose as one of the latest/hottest topic in the world of Information Technology. It is based on several research areas like Grid Computing, Virtualization, Distributed computing and Utility Computing. Cloud Computing is the next stage in the Internet's evolution. It provides the means through which everything — from computing power to computing infrastructure, applications, business processes to personal collaboration — can be delivered to you as a service wherever and whenever you need.

Keywords: *Cloud Computing, Information System, Security, Flexibility, Internet.*

1. Introduction:

1.1 Meaning: Cloud computing is the service model where the computing services such as hardware and software are delivered on demand over the networks, servers, storage, applications, etc. independent of device and location. Cloud computing provides computation, software, data access, and storage services that do not require end-user knowledge of the physical location and configuration of the system that delivers the services. In the traditional model of computing, both data and software are fully contained on the user's computer; in cloud computing, the user's computer may contain almost no software or data (perhaps a minimal operating system and web browser only), serving as little more than a display terminal for processes occurring on a network of computers far away. Common shorthand for a provided cloud computing service (or even an aggregation of all existing cloud services) is "The Cloud".

The name comes from the use of a cloud-shaped symbol as an abstraction for the complex infrastructure it contains in system diagrams.

1.2 Technological Concepts: While the expansion of cloud computing will take several years to fully expand, the three technologies that will enable it-

a) Virtualization

b) Multitenancy

c) Web Services

a) Virtualization: Virtualization is a technology that refers to the various techniques or methods of creating a virtual (rather than actual) version of something, such as a virtual hardware platform, operating system (OS), storage device, or network resources. It is the technology that hides the physical characteristics of a computing platform from the users. This allows servers and storage devices to be shared; applications can be easily migrated from one physical server to another.

• **Multitenancy:** It refers to a principle where a single instance of application software runs on a server, serving multiple clients or organizations. It is contrasted with a multi-instance architecture where separate software instances (or hardware systems) are set up for different client organizations. It enables sharing of resources and costs across a large pool of users thus allowing for:
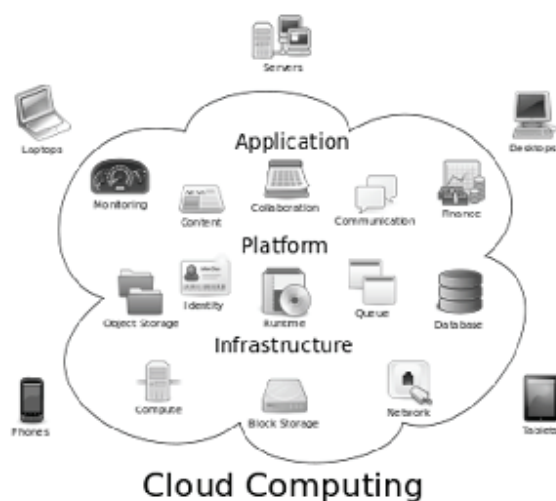
http://en.wikipedia.org/wiki/File:Cloud_computing.svg

*Academic Associate, Indian Institute of Management, Rau - Pithampur Road, Indore.

- **Centralization** of infrastructure in locations with lower costs (such as real estate, electricity, etc.)

- **Peak-load capacity** increases (users need not engineer for highest possible load-levels).

- **Utilization and efficiency** improvements for systems that are often only 10–20% utilized[1].

b) Web Service: A **Web service** is a method of communication between two electronic devices over the World Wide Web. A **Web service** is a software function provided at a network address over the web or the cloud, it is a service that is "always on" as in the concept of utility computing. The W3C defines a "Web service" as "a software system designed to support interoperable machine-to-machine interaction over a network". It has an interface described in a machine-processable format (specifically Web Services Description Language, known by the acronym WSDL).

1.3 Similar Systems: Cloud computing shares characteristics with:

- **Distributed Computing**: Distributed computing is a field of computer science that studies distributed systems. A distributed system consists of multiple computers that communicate through a computer network. The computers interact with each other in order to achieve a common goal. A computer program that runs in a distributed system is called a distributed program, and distributed programming is the process of writing such programs[2] Distributed computing also refers to the use of distributed systems to solve computational problems. In distributed computing, a problem is divided into many tasks, each of which is solved by one or more computers, which communicate with each other by message passing[3].

- **Grid Computing**: Grid computing is the affiliation of computer resources from multiple locations to achieve a common goal. The grid can be thought of as a distributed system with non-interactive workloads that involve a large number of files. The grid computing differs from conventional high performance computing systems. E.g.: cluster computing is that grids tend to be more loosely coupled[4]. Although a single grid can be dedicated to a particular application, commonly a grid is used for a variety of purposes.

Grids are a form of distributed computing. A "super virtual computer" is composed of many networked loosely coupled computers acting together to perform large tasks.

- **Green Computing:** Green computing or green IT, refers to environmentally sustainable computing or IT. It is defined by *San Murugesan in the article Harnessing Green IT: Principles and Practices*, the field of green computing is "the study and practice of designing, manufacturing, using, and disposing of computers, servers, and associated subsystems—such as monitors, printers, storage devices, and networking and communications systems - efficiently and effectively with minimal or no impact on the environment.[5]" Green computing is similar to green chemistry; it reduces the use of hazardous materials, maximize energy efficiency during the product's lifetime, and promote the recyclability of expired products and factory waste. Many corporate IT departments have Green Computing initiatives to reduce the environmental impacts of their IT operations[6].

1.4 Different Models of Cloud Computing:

- **Software as a Service (SaaS):** It is the most commonly heard term in which the application runs on the cloud, avoiding the need to install and run the application on client computer. It differs from the other applications by its scalability. This process is transparent to the cloud user who sees only a single access point. It is common to refer to special types of cloud based application software with a similar naming convention: desktop as a service (DaaS), business process as a service (BaaS), test environment as a service (TEaaS), communication as a service (CaaS).The pricing model for SaaS applications is typically a monthly or yearly flat fee per user[7]. So price is scalable and adjustable.

Examples: Google Apps, Gmail, Facebook, Twitter.

- **Platform as a Service (PaaS):** In this model, the cloud providers provide a computing platform including operating system, programming language execution environment, database, and web server. It facilitates the development and deployment of applications without the cost and

complexity of buying and managing the underlying hardware and software layers.

Examples: Amazon's Relational Database Services, Google App Engine, Microsoft's Azure Services Platform.

- **Infrastructure as a Service (IaaS):** It is the most basic cloud service model in which storage and compute capabilities are offered as a service. IaaS clouds often offer additional resources such as images in a virtual-machine image-library, raw (block) and file-based storage, firewalls, load balancers, IP addresses, virtual local area networks (VLANs), and software bundles[7].

Examples: Amazon's S3 Storage Service, EC2 Computing Platform, Joyent, Terremark.
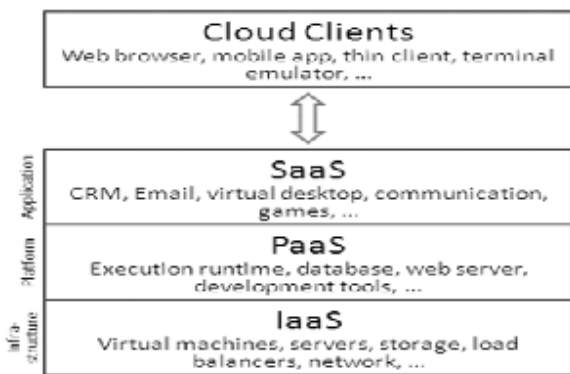
http://en.wikipedia.org/wiki/File:Cloud_computing_layers.png

2. Objectives:

- To determine the need of Cloud Computing in Business.

- To highlight and discuss the Advantages and Disadvantages of Cloud computing in the present scenario.

3. Methodology:

Data has been collected from different books, journals, and mainly from the internet sources for present analysis.

4. Discussion:

Here the advantages and disadvantages of cloud computing is discussed.

4.1 Advantages: Today, businesses face a tough challenge of meeting growing demands with limited resources. To overcome these challenges, business owners are looking at cloud based services. Cloud computing has something to offer every business.

Right from application delivery to mobility solutions, cloud computing offers an intuitive methodology to leverage resources and improve business performance. In simpler words, cloud computing is a methodology that offers network services over the Internet[8].

- **Backups**: We are currently using a cloud service provider to back-up our data periodically throughout the day and for our disaster recovery needs.

  - Backing up in "the cloud" and recovering data from "the cloud" is considered easier than it is on physical, on-site devices.

  - Backing up data used to be a time consuming and expensive process.

  - With the cloud back-up, we can automatically back-up our data daily to our disaster recovery service provider's servers, and have the ability to restore the   data cheaply, efficiently.

  - We can even test the restored data in a lab type environment to ensure that the restore is successful before users are given access to it[9].

- **Flexibility:** There is a high rate of flexibility when using cloud computing.

  - Employees are now more able to access data from servers outside the office and not hard-wired in-house servers.

  - Cloud computing not only provides flexibility for the workers but also in in implementing changes and new technologies without high risk and cost.

  - Cloud Computing is creating a more flexible and mobile work lifestyle for organizations.

  - It is easy to access the information all over the world using internet connection.

- **Cost Effective:**

  - Cloud Computing is the best cost efficient method to maintain, use and also to upgrade.

  - There is no need to buy, upgrade and maintain servers and related hardware.

  - There is no need for users to invest their time and money into using stand-alone servers which would be a bit complicating to use.

  - It reduces IT maintenance costs, as the cloud computing supplier becomes responsible for

systems maintenance, upgrades and security.

- The low barrier of entry and the pay-per-use model offered by cloud computing makes it very versatile.

- It is scalable for large corporations and affordable for small ones.

- Since a massive amount of resources is not needed for everyone, they can be leased to other clients, and the cost can be divided among those clients.

- There is no need for replacing capital expenditures on a regular basis.

• **Data Security:**

- The level of security offered by a reputable cloud provider usually exceeds the level businesses, particularly smaller businesses, can provide themselves.

- A number of cloud computing vendors now offer multi-factor authentication as part of their service. Multi-factor authentication is much more secure than the more traditional user name and password authentication convention.

- Many cloud computing vendors often have much stronger physical security controls with meaningful certifications that many small-to-midsize companies cannot provide on their own.

- Private Cloud allows customers to control who is in the cloud, where data is stored, who has access, etc.

- Internet banking is an interesting comparison for the current cloud computing cryptography[10.]

• **Easily Accessible:**

- When connected to the internet, data and software can be accessed anytime, anywhere in the world. This can assist with expansion to other premises, whether locally or internationally, and make it easier for employees to work from home.

- This flexibility positively affects knowledge workers' work-life balance and productivity.

- Real time collaboration and sharing becomes a reality which can be leveraged for the enterprise productivity and efficiency.

• **Storage Capacity:**

- When internet is used with the cloud services

then the organization will have lots more room to store the files and data that they need to store.

- With the Cloud Computing you need not to worry about the running out of the disk storage or to increase your current storage.

• **Customization:** Last but not least, it is the fact that cloud computing allows customizing the business applications. This is a great benefit because the world of online business is very competitive.

4.2 Disadvantages: While cloud computing and storage is a great innovation in the field of computing, However, there are certain things that you need to be cautious about too. Some may say that there are no down sides to cloud computing, but users should not depend too heavily on these services. Although you may find all you need with a particular service, you have to consider the security and portability it offers and also make contingencies should the service be terminated abruptly. Some of the disadvantages are:

• **Security:** The biggest concerns about cloud computing are security and privacy.

- No control over the business data. The main information in every company is its data files with valuable customer information.

- A proper security model for cloud computing is not yet developed. Security, privacy and compliancy are still difficult for cloud solutions. Especially for public cloud services.

- Physical location of hardware and software is unknown.

- Cloud Computing is the computing which is done with Internet. So, one should not be using cloud computing applications that involve storing data with which one is not comfortable having on the internet.

- Storing data in the cloud may make your files exposed to the possibility of being attacked or harmed even after updating your virus database. So be careful while choosing your Cloud Service Provider.

• **Cost:**

- Many cloud computer vendors present themselves as utility-based providers, claiming that you're only charged for what you use.

- According to *Gartner,* in most cases, a company

must commit to a predetermined contract independent of actual use. To be sure you're saving money; you have to look closely at the pricing plans and details for each application.

- Cloud hosting is a lot cheaper than traditional technologies; the fact that it's currently new and has to be researched and improved actually makes it more expensive.

- **Incompliance:**

- Since the cloud is fairly new, cloud solutions are not as flexible as they will be someday. As an example, upgrades can often result in a loss of data. Since the environment you are working within may be incompatible with others.

- Be careful when you're choosing a cloud computing vendor that you're not locking your business into using their proprietary applications or formats.

- If you want to share numbers through a Google Drive spreadsheet, you might not be able to get that information from the cloud into the Drive. You also want to make sure that you can easily increase or decrease your number of users who have access to your cloud account.

- Also make sure that you can add and subtract cloud computing users as necessary as your business grows or contracts.

- **Interruption of Service:**

- With the Cloud Computing the data can be accessed by anyone and at any time. But sometimes this cloud system can have some serious disturbance so you cannot access your files from cloud.

- It happens at the most inconvenient times that one is unable to access his/her email due to provider being down.

- Uploading and downloading of large documents may take a long time.

5. *Conclusion:* This paper explains, in the present scenarios, what cloud computing means for information security, data protection and privacy. We look at the security advantages of cloud computing and its risks. With its offering of backups, information security, cost, flexibility, internet based information techniques; the cloud can satisfy the computing needs of users.

6. *References:*

1. Wikipedia, "Utilization and Efficiency", "Jeff Bezos' Risky Bet". Business Week.

2. Wikipedia, "Distributed Computing", Andrews (2000). Dolev (2000). Ghosh (2007), p. 10.

3. Wikipedia, "Message Passing", -Andrews (2000), p. 291292. Dolev (2000), p. 5.

4. Wikipedia, "Grid Computing", http://www.e-sciencecity.org/EN/gridcafe/what-is-the-grid.html

5. Wikipedia, "Green Computing", San Murugesan, "Harnessing Green IT: Principles and Practices," IEEE IT Professional, January–February 2008, pp. 24-33.

6. Wikipedia, "Green Computing", http://en.wiki pedia.org/wiki/Green_computing#cite_note-2

7. Wikipedia, "Infrastructure as a Service", Chou, Timothy. Introduction to Cloud Computing: Business & Technology

8. http://www.2x.com, "Advantages of Cloud Computing", http://www.2x.com/blog/2013/02/news/advantages-of-cloud-computing/

9. http://technorati.com, "Risks and Benefits of Cloud", http://technorati.com/technology/ cloud-computing/article/the-risks-and-benefits-of-cloud/

10. http://www.moderndcbusiness.com, "Security advantages of Cloud Computing", http://www.moderndcbusiness.com/security-advantages-of-cloud-computing.html

11. @BM-Support.ORG, "Disadvantages of Cloud Computing", http://www.slideshare.net/maikelm/disadvantages-of-cloud-computing

12. http://www.crunchyhub.com, "Advantages and Disadvantages of Cloud Computing", http://www.crunchyhub.com/advantages-and-disadvantages-of-cloud-computing

13. http://www.superb.net, "top-9-disadvantages-of-cloud-computing", http://www.superb.net/ blog/2013/03/04/top-9-disadvantages-of-cloud-computing/

14. http://www.cloudcomputingtechie.com, "top -5 disadvantages", http://www.cloudcomputingtechie.com/top-5-disadvantages/

15. http://sbinfocanada.about.com, "Cloud- Computing-Disadvantages" http://sbinfo canada.about.com/od/itmanagement/a/Cloud-Computing-Disadvantages.htm

16. http://www.examiner.com, "five-advantages-and-disadvantages-of-cloud-computing", http://www.examiner.com/article/five-advantages-and-disadvantages-of-cloud-computing

17. http://www.dummies.com, "Cloud Computing", http://www.dummies.com/how-to/content/what-is-cloud-computing.html

18. Marston, S., Li, Z., Bandyopadhyay, S., Zhang, J., & Ghalsasi, A. (2011). Cloud computing - The business perspective. Decision Support Systems, 51(1), 176-189.