Comparative Analysis of Cloud Computing

***Mr. Atish Aitawade**
****Mr. Srinivas R**

*** & ****Assistant Professor, Computer Science Department, Reva First Grade College, Sanjaynagar, Bengaluru-560094

Abstract:

Cloud Computing is metamorphoses in commercial infrastructure which is becoming an increasingly popular enterprise model in which the entrepreneurs are provided with computing resources based on their demands. It is reforming the IT industry. The applications are provided through internet and have taken over the business world. Cloud applications allow companies to eliminate the need to install, run and maintain an application in house by outsourcing it to an application supplier in the cloud. Since the Cloud is a broad collection of services, the entrepreneurs can choose when, where, and how they can use Cloud Computing services. Distributed computing suppliers have setup a few server farms at various geological areas over the web, keeping in mind to serve the entrepreneurs requirements of the business visionaries around the world.

This paper contains a brief report on cloud computing, different types of Cloud Computing services and differentiates between them based on the services offered and also have done few case studies on services of cloud computing.

The practice of using a network of remote servers hosted on the Internet helps to store, manage, retrieve data for processing, rather than on a local server or a personal computer. It works on the principle of Shared processing resources on demand i.e., the data that are stored on Cloud can be accessed by other users or from other systems on demand by the users. Cloud computing helps in improved manageability and less maintenance cost. Data that are stored on Cloud are easily accessible. There are several benefits of using Cloud Computing for the end users and for organisation. They are:

Self Service Provisioning: Also known as Cloud self service, is a system that allows the entrepreneurs or the organisation to set up and launch applications and services in a cloud computing environment. There is no need of direct intervention of an IT organization or a service provider to set up and launch the application on the cloud.

Elasticity: The companies can scale up or scale down the computing as per the company demands.

Pay per use: Cloud computing allows the end users to pay only for the resource and work load they use.

Types of Cloud Computing:

Classification of Cloud computing is based on:

1. Location of the cloud computing.
2. Type of services offered.

1. Location of the cloud Computing:

Private Cloud: Also known as internal cloud or corporate cloud: It is dedicated to single organisation. It includes self service and scalability. The data that are stored on private cloud are accessible by an organisation or by members who are given permissions. They are more secure and offers hosted services to a limited number of people behind a firewall, so it minimizes the security concerns. Usually Private Cloud services are Pay per use. They are more expensive. Private Cloud are of two types:

a. On-premise Private Cloud – The hosting for cloud computing is within the premises.

b. External hosted Private Cloud - hosted by a third party specializing in cloud infrastructure. They are less expensive then On-premise Private Cloud.

Public Cloud: The data or the applications stored on public cloud are made available to the general public over the web. eg. Elastic Compute Cloud (EC2) of Amazon, Blue Cloud of IBM, Sun Cloud, Google AppEngine and Windows Azure Services Platform. The users have no visibility and control over where the computing infrastructure is hosted. Public cloud services may be free or pay per use. The benefits of using Public Cloud services are: a. Public cloud services are Easy and in-expensive because the public

service providers offer hardware, application and bandwidth cost. b. Scalability to meet the public demands. c. Pay for what the user uses, so no wasted resources.

Hybrid Cloud: It is the combination of both private and public cloud services. The goal of hybrid cloud is to create a unified, automated, scalable environment which takes advantage of a public cloud infrastructure, while still maintaining control over mission-critical data.

Community Cloud: Sharing of computing infrastructure in between the organisation of the same community. eg. All Government Organisation within a state may share computing infrastructure on the cloud to oversee information related to citizens residing of that particular state.

2. Classification based upon service provided

Type of services offered

a. **Software as a Service (SaaS).** In Software as a Service the cloud clients install, operates and maintains the application program from the clients cloud devices and the cloud users access the application from the cloud clients. The cloud users do not manage the cloud infrastructure and platform where the application runs. The users access the application from various client devices such as using either a client interface or a program interface. The entrepreneurs does not oversee or control the fundamental cloud base including system, servers, working frameworks, storage, or even individual application abilities, with the possible exception of restricted user-specific application configuration settings. It is also referred to as “on demand software”.

Most SaaS applications can be run on a web program with no downloads or installations required, but some require plug-ins.

Characteristics of SaaS:

1. Commercial Software can be accessed over the internet.
2. It is centralised distributed system (i.e., the software is managed in a central location).
3. Works on the principle of “one to many”. The software that is installed on a clients cloud can be accessed by many users.
4. Clients do not require handling of programming redesigns and fixes.
5. Different pieces of software can be integrated with the help of Application Programming Interfaces (APIs).

SaaS Examples: Google Apps, Salesforce, Workday, Concur, Citrix GoToMeeting, Cisco WebEx, etc.

Case Study: Hamilton Housewares Pvt. Ltd. is an Indian based company, which is one of the main makers, wholesale suppliers, merchants and exporters of house product items over the globe. Since its commencement in 1972, it has cut a corner for itself amongst its clients as a pioneer of the house product industry. Today, the organization is pushing ahead with various brands under the Hamilton group and has turned into a pride of each home crosswise over India and other worldwide destinations. Hamilton House tries to offer only quality items and services, to be straight forward and direct with clients, and give remarkable client services

As the number of users has increased, it was difficult for the Hamilton Housewares Pvt. Ltd. to handle the customers. For these to handle customers request more manpower was hired, but still the problem raised. To overcome the problem, Hamilton Housewares Pvt. Ltd. intuitive Saas Cloud Computing. Later, the Managing Director added to his conversation that, "It appeared to be more capable and strong than other online support solutions, and it had been appraised very much in surveys we'd perused. Besides, we realized that since it was web-based solution, it could without much of a stretch scale to support our expanding volume." As a result, the company could easily handle their customers and raise the tickets for them.

b. **Platform as a Service (PaaS).** In Platform as a Service, allows the creation or customisation of web applications using programming languages, services, libraries and tools supported by the provider, rapidly and effortlessly and without the complexity of purchasing and maintaining the software and infrastructure underneath it.

The entrepreneurs / consumer has the control over the deployed applications and configuration settings for hosting of the application, but does not have control or manage the cloud infrastructure

including the network, server, virtualisation, operating systems or storage. PaaS is like SaaS with the exception of that, instead of being programming conveyed over the web, it is a stage for the making of programming, conveyed over the web.

Characteristics of PaaS:

1. Services to develop, deploy, host, test, and maintain applications in the same integrated environment.

2. Online user interface creation tools help to create, modify, test and deploy different user interface.

3. A single instance of software runs on a server and serves multiple users.

4. Built in adaptability of deployed software including load adjusting and failover.

5. Integration with web services and databases through regular benchmarks.

6. Supports development team collaboration.

PaaS Examples: Apprenda

Case Study:

c. **Infrastructure as a Service (IaaS).** In Infrastructure as a Service (IaaS) the cloud clients deliver Cloud Computing infrastructure such as servers, storage, network and operating systems to the cloud users as an on-demand service. Rather than obtaining servers, software, server farm space or system hardware, the users purchase those assets/resources as a completely outsourced service on demand. The users do not manage or control the cloud infrastructure instead has control over the operating systems, storage and deployed application and conceivably restricted control of selected networking components. By and large IaaS can be acquired as open or private infrastructure or a blend of the two. Iaas is making sound in Cloud computing world.

Characteristics of IaaS:

1. Resources such as servers, storage, network and operating systems are distributed to the users as an on-demand service.
2. Dynamic scaling is allowed. The users can scale their requirements based on their demands.
3. The cost varies, utility evaluating model.
4. Generally incorporates different clients on a single piece of hardware.

IaaS Examples: Amazon Web Services (AWS), Cisco Metapod, Microsoft Azure, Google Compute Engine (GCE), Joyent.

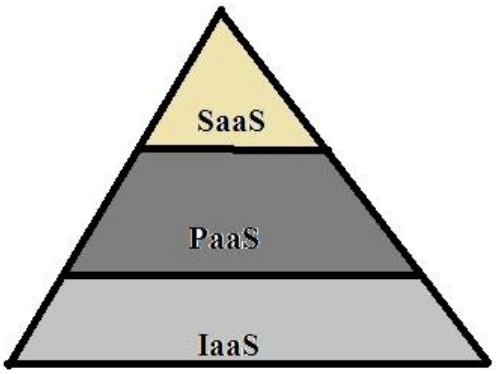

Fig 1.1: Representation of Cloud Computing Stack

In this report we look at all three categories in detail however a very simplified way of differentiating these flavours of Cloud Computing is as follows:

• SaaS applications are designed for end-users, delivered over the web.
• PaaS is the set of tools and services designed to make coding and deploying those applications quick and efficient.

• IaaS is the hardware and software that powers it all – servers, storage, networks, operating systems.

Conclusion

Distributed computing is a term that doesn't portray a solitary thing instead it is a general term that sits over a variety of administrations and services from Infrastructure as a Service at the base, through Platform as a Service as an advancement development tool and through to Software as a Service supplanting on-premise applications.

For entrepreneurs hoping to move to Cloud Computing, it is imperative to comprehend the different aspects of Cloud Computing and to survey their own circumstance and choose which sorts of arrangements are proper for their needs.

Cloud computing is a quickly accelerating transformation inside IT and will turn into the default strategy for IT conveyance moving into the future – entrepreneurs should consider their methodology towards starting a move to the cloud computing sooner.

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