Evolution of Cloud Computing, Comparing Cloud with Grid Computing

Shashank Krishna

P E S University & Microsoft Student Partner, Bangalore, Karnataka, INDIA

Abstract

Cloud computing is one of the most emerging and important concept among IT field in current era. Cloud computing a heavy word, it's a service of computing accomplished by the internet which is powerful in the field of architecture. Cloud provides enormous services to users, which are universal in nature in comparison with the grid computing. Cloud is independent of location, service and software to systems and devices is accomplished through shared servers. In this paper, given a review on cloud computing evolution, it is comparison with grid computing and various approaches to cloud.

Keywords

SaaS, PaaS, IaaS, Cloud Computing, Grid Computing, Cloud Services.

I. Introduction

Cloud term means a network providing resources through Internet. The information or what we usually call as user can acquire "resource" available in cloud, whenever and wherever needed. Users of cloud usually prefer the introduction of an third party to supply the Internet service instead of their own physical setup. Users use the information and resource available in cloud and will pay only for the part of the information and resource used by them. By using cloud workload of user can be reduced. Using cloud the load on the local computer for running application is reduced. Here the load is reduced as due to the load is taken by the computers in network, which forms a cloud. The software and hardware requirements at the user end are reduced to a greatest extent. User has to equip with only a simple piece of software, i.e., the browser to access the Internet. Cloud features include wider network area, elasticity, shared infrastructure, etc..

Cloud services are categorised into three major sectors; (1) SaaS (Software as a Service), (2) PaaS (Platform as a Service, and (3) IaaS (Infrastructure as a Service). Nowadays public in general have been involved in cloud in form of services like YouTube, OneDrive, etc., by this management duties are reduced to much extent whose major concern is innovation and production. Cloud is majorly used in business, which aims to meet the need of the changing environment in technology.

II. Evolution of Cloud Computing

Cloud is a combination of some new and all old concepts in a lot research fields like Service-Oriented, grid and distributed computing and also virtualization. As per "Yousedd et al", cloud can be considered a as a new era computing paradigm that allows user to utilize temporarily the infrastructure of computing over a network, as a service by the service provider at possible levels of abstraction (Youseff et al. 2008).

As per "Armbrust et al; Computing in cloud refers to both the applications delivered as service over the internet and the hardware and system software in the datacenter that makes these services possible. The services themselves have long been referred to as SaaS (Software as a Service). Datacenter software and hardware totally compute a cloud service. Whenever a cloud is made available in pay as you use manner to public in general, we term it as public cloud; service being sold is utility computing. The term private cloud is referred to internal datacenters of a business or other any organization, which is not made available to general public. Thus, computing is the sum of SaaS and utility computing, but does not include private cloud. (Armbrust et al. 2009).

A centralized computing which doesn't include computing on a local system, the central computing is handled by any other organization and storage utilities but this is not done in grid computing.
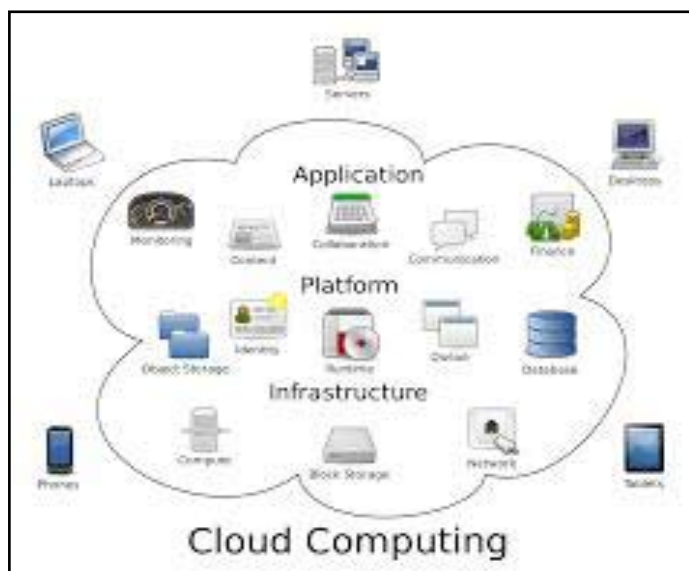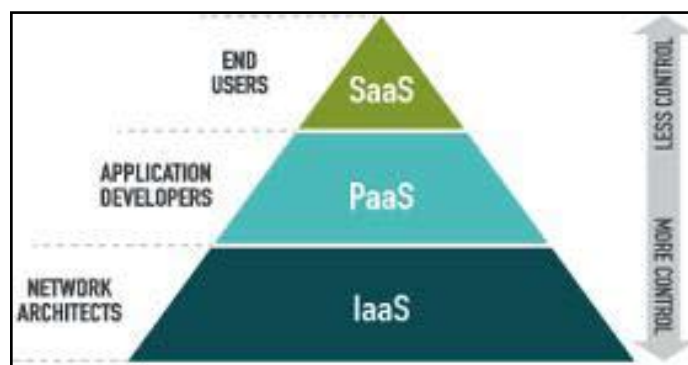

Fig. 1: Cloud services

Fig .2: Major Categories of Cloud Services

A. SaaS (Software as a Service)

Users can access SaaS through the Internet and local system web browser. SaaS means to build the functionally independent, vertically and universal available applications prior implication. For illustration we can have DB system processes, HR System, and many other applications; users use this as a service.

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This can be further classified in two types; (1) Software on Demand and (2) Hosted application management.

1. Advantages of SaaS:

1. SaaS is a fast developing and upcoming technique for supplying technology.
2. Used for interfaces of some programming tools like API, which provide integration between various software tools.
3. Already some services of SaaS are well known for instance Microsoft Office 365 Online.
4. Used in applications in which the main role is in – between the world and the enterprise.
5. Used in applications that have a short implication, for instance software collaboration for a product/tool project.
6. SaaS is a application which can be enhanced in a wider manner by offering services like real – time booking services, social networking applications, any mail applications and so on.

B. PaaS (Platform as a Service)

In this scenario users develop the software and the enterprise provides a platform in the cloud to implicate it. It points to the development tools and software's. For instance the servers of application in Java or .Net platform and DB Server is MySQL or Oracle; which the users will use to build their own software/ application to meet their specific needs. Web applications can be quickly and easily created on computing platform and reduces complexness, maintenance and expenditure. We can classify this into three types; (1) Proprietary PaaS, (2) Specific stack PaaS and (3) Comprehensive PaaS.

1. Advantages of PaaS;

1. By using PaaS, there is no need for user to download or install the software's online.
2. The users have to pay only for what they use.
3. This has the shared network architecture means concurrent users access the application.
4. User activities can be deeply and properly understood.
5. Provides security, scalability and reliability, which are built – in.
6. Reduces maintenance and development cost; when user develop, deploy and test any software on same integrated environment this can be achieved.

C. IaaS (Infrastructure as a Service)

IaaS is a combination of both private and public infrastructure as a whole or can be obtained individually. Iaas provides the delivery of computing resources required in the form of storage, OS, network and hardware as demanded. For IT resource Iaas provides a new comparison to SaaS and PaaS, the IaaS is growing rapidly.

1. Advantages of IaaS;

1. Has full scalability.
2. Administration role is not required.
3. Numerous users can access on the same hardware.
4. Distributes the services as a network.
5. Cost varies based on the type of service requested and offered.

IV. Comparing Cloud with Grid Computing

Grid computing had some disadvantages, which was not able to fulfill all class of users needs. The new era of computing which concentrates on all classes of users, which is known as Cloud Computing. Cloud overcomes the disadvantages of grid and has become on of the most prominent among users and IT enterprise. The below mentioned table will provide the key differences between the parameters of grid and cloud.

Table 1: Comparison between Cloud and Grid Computing

Cloud Computing	Grid Computing
Single Ownership	Multiple owners can take ownership
Multitasking feature is available	Multitasking feature is available but the capacity of providing the necessary result is slow compared to cloud computing
High Transparency	Low Transparency
Virtualization mechanism used in cloud computing provides higher security	Grid certification service mechanism is used hence security of data is at risk in grid computing
Degree of scalability is high	Degree of scalability is low
Number of users computing at the same time is high	Number of users computing at the same time is low
Abstraction level is high	Abstraction level is low
Multiple Operating Systems (OS) can run at a time for computational process	Only a single standard Operating Systems (OS) runs for computational process
Sharing of resource depends on the use of service	Sharing of resources is achieved in collaboration manner
Example: OneDrive, Azure, Google, Amazon, etc..	Example: SETI, GIMPS
Future scope is Next generation of computing	Future was cloud computing

V. Future scope of cloud computing

Cloud has now developed as an important part of daily life of users. By the invention of cloud computing, conventional view of computing has changed drastically. With the positive response from the users and user-friendly approach to its configuration, the future of cloud computing is very bright. According to organizational survey, more the 70% in coming decade of Americans will use it's various application for personal and official use.

Now general public is aware of it, as majority of them have started utilizing mail services, social networking and many e-commerce services. Due to the high speed Internet, the future of cloud computing is bright. Because of this globalization due to Internet through satellite we are getting closer to the world. The Internet has become the cheapest, easiest and faster mode of communication with various cloud based applications like Skype, Hike, WhatsApp, etc. Nowadays with the use of satellite, users can access Internet and get connection while flying. A centralized trust will validate cloud-computing systems in future.

VI. Cloud Computing role in India

India is a country with many small and medium scale companies, which cannot afford high technology solutions. Accessing different web services of e-commerce using sophisticated systems are beyond the reach for a large group of users in India. As per a survey 70% of Indians earn less than $2 per day and cannot

afford these costly systems to facilitate e-commerce. A Microsoft-IDC study analyzes that cloud computing will generate over two million jobs in India by 2015. A study by Nasscom and Deloitte estimates that cloud-computing market in India will reach USD 16 million by 2020.

VII. Conclusion

In this paper we have described about cloud computing, characteristics of cloud computing, evolution of cloud computing and comparison between cloud computing and grid computing. We have also described about various approaches of cloud computing and advantages related to it. We have got to know that analysis of this field in various ranges of applications will increase continuously. By this study we understand that cloud computing will impact on major part of society and commercial business.

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Author's Profile

Shashank Krishna, perusing Post – Graduation at P E S University, 100 feet ring – road, BSK III Stage, Bangalore – 560085, Karnataka, INDIA & Microsoft Student Partner (MSP 2014) [ID: MSA 2014/1255] E-Mail: krishna_r59@ rediffmail.com