



A Survey of Current Trends in Cloud Computing

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ABSTRACT

Cloud computing is a virtualized image containing Internet based technology that has become an increasingly important trend, by offering the sharing resources that include infrastructures, software, applications and business processes to the market environment to match elastic demand and supply. In today's competitive environment, the service dynamism, elasticity, choices and flexibility offered by this scalable technology are too attractive that makes the cloud computing to steadily becoming an integral part of the enterprise computing environment. This paper presents a survey of the current state of Cloud Computing, This includes a discussion of the evolution process of cloud computing, characteristics of Cloud, Current technologies adopted in cloud computing, This paper also presents a Comparative study of cloud computing platforms (Amazon and Google), and its challenges...

Key words: Cloud computing, IAAS, PAAS, SAAS.

INTRODUCTION

In the last few years, a technology trend that has grown hastily, named cloud computing, being a promising business concept to one of the fastest growing segments of the IT field. Cloud computing has become progressively more important technology trend, and many vendors, business analyst and industry spectators predict a bright future in the marketplace. It provides resource sharing environments to enable sharing in terms of scalable and flexible infrastructures, middleware and application development platforms, and business enterprises. It describes a new enhancement, consumption, and delivery model for Information Technology services based on the Internet Protocols, of the ease-of-access to remote

computing sites provided by the Internet. The major goal of this system is to provide a highly scalable services to make a better use of computational resources to achieve higher throughput and be able to tackle large scale computation problems with a minimal cost.

The Cloud Computing is not actually the revolutionary recent development, but it is the outcome of the continuous advancement of the data management technology. On the century at the end of 80's, The term cloud computing comes from the use of a cloud image to represent the Internet or some large networked environment, This takes the concepts of grid computing and wraps it up in a service offered by data centre's. It overlaps some of the technology concepts of distributed, grid and

utility computing, however, this overlap is partly due to technology changes, usages and implementations over the years. The Cloud computing refers to both the applications delivered as services over the Internet and the servers and the system software in the data centers that provide those services.

Cloud adopts an on demand infrastructure services to provide the computing resources as an elastic services. The users of the cloud can apply for the resources based on their needs from Cloud and then return back to cope with their business needs . Cloud users only pay for the resources allocated to them. This can benefit Cloud users by shifting the risk of economic losses caused by over proportioning and under – provisioning to Cloud providers.

This paper is structured as follows : Section II describes the characteristics of cloud computing. Section III explains the cloud architecture, Section IV introduces the different types of Cloud models. Section V describes the comparative study of cloud computing service. Section VI summarizes and concludes the paper

Characteristics of cloud

Elasticity and Scalability

Cloud computing provides the capability to inflate and reduce the needed resources based on the user need . Cloud Computing facilitates organizations to rapidly scale their operations, by provisioning new computation resources and software applications to be delivered at a pace that does not seize back to the rest of the business.

Pay – per –use

Cloud computing makes infrastructure and services available “on-need” basis. The cloud users need to pay only as much for the computing infrastructure as they use. The billing model of cloud computing is similar to the electricity payment based on the usage.

On – demand

Cloud computing is based on ‘on-demand’ self services, which allows business units to get the computing resources when needed without having to go through IT for equipment.

Resiliency

The resiliency of a cloud service offering can completely isolate the failure of server and storage resources from cloud users. Work is migrated to a different physical resource in the cloud with or without user intervention .

Multitenancy

Public cloud service providers often can host the cloud services for multiple users within the same infrastructure. Server and storage isolation may be physical or virtual.

Work load movement

Cloud computing providers can migrate workloads across servers both inside the data center and across data centers.

Cloud computing architecture

Cloud computing Architectures are designs of software applications that use Internet accessible on-demand services (Figure 1). Applications built on Cloud Architectures are such that the underlying computing infrastructure is used only when it is needed, draw the necessary resources on- demand, perform a specific job, then relinquish the unneeded resources and often dispose them selves after the job is done. While in operation the application scales up or down elastically based on resource needs.

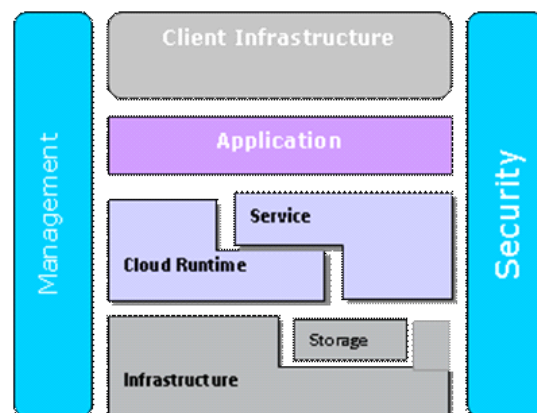


Fig. 1: Cloud computing architecture

The rapid growth of cloud computing is largely based on the effective implementation of its architecture. In cloud computing, architecture is not just based on how the application will work with the

intended users. Cloud computing requires an intricate interaction with the hardware which is very essential to ensure uptime of the application. Applications build on Cloud Architectures run in the cloud where the physical location of the infrastructure is determined by the provider. They take advantage of simple API's of Internet accessible services that scale on-demand, that are industrial strength, where the complex reliability and scalability logic of the underlying services remains implemented and hidden inside-the –cloud. The usage of resources in Cloud Architecture is as needed, thereby providing the highest utilization with optimum cost.

Types of cloud model

In provisioning a secure cloud computing solutions, a major decision is to be made to choose the type of cloud deployment model. Cloud computing can be classified into four types on the basis of the location where the cloud is hosted.

Private cloud

A Private cloud is a term that is set up within an organization's internal enterprise datacenter that emulate cloud computing on dedicated networks. This types of cloud is a marketing term for a proprietary computing network which offers hosted services and platforms to a limited number of people behind a firewall. It is also known as internal cloud or corporate cloud. This type of cloud is easier to align with security, conformity , and regulatory requirements , that represents a amalgamation of technology trends holding great promise for the enterprise computing. Private clouds are well managed and built on virtualization and automation. It will take shape over the next few years, only in large enterprises.

Public cloud

Public cloud or external cloud is a model which describes the cloud computing in the traditional mainstream sense, where the needed resources are dynamically provisioned on the basis of ' pay – per –use ' , self service over the Internet. Public Cloud computing Infrastructure is a multi-tenant , which provides resources, such as applications, and storage , available to the general public or to a large industry group over the Internet. Public cloud provides the ability to easily connect

servers and share information and use resources through the interaction of several virtual resources. As it is built on the shared infrastructures, services may introduce security problems and are less secure than the other cloud models . The trust and privacy concerns are endemic with public clouds. Cloud infrastructure is hosted at the vendor's premises. The computing infrastructure is shared between organizations .

Hybrid cloud

A hybrid cloud is the private cloud which is linked to one or more public cloud services, which are centrally managed and provisioned as a unit. The hybrid cloud provides services as a mix of both public and private clouds as virtualized services. It is a cloud computing environment in which an organization provides and manages some resources in – house and has others provided externally. This model is more prevalent for large enterprises which often already have substantial investments in the infrastructure required to provide resources in –house. Hybrid Cloud provides applications and data in a secure manner so that many organizations prefer to keep sensitive data under their own control to ensure security.

Community cloud

The Infrastructure which is shared among the organizations of the same community in Cloud is Community Cloud. The Community cloud computing provides an alternative architecture, which combines the Cloud with the technologies like Grid Computing, Digital Ecosystems, and Green Computing

Cloud services

Cloud computing is a Internet based technology trend which derives the characteristics from the client server model, Main frame systems, Grid



Fig. 2: Cloud Services

Computing, peer – peer architecture where resources are shared. There are different categories of the cloud computing services such as platform, infrastructure, hardware and applications (figure 2). These services are provided in real time over the Internet.

Software as a Service (SaaS)

Software as a Service, is a multi-tenant software application delivery model that provides both hardware and software infrastructure which is effective and sustainable to the users to interact with the system through the front end portal. SaaS is commonly referred to as the Application Service provider model. Software and business professional relate the term SaaS with business software, based on 'pay per use' and as a possibly minimal cost for businesses to use the software based on their needs rather than getting license for every applications and devices. The software has limited functionality and can be expanded and contracted based on the user need. SaaS is becoming an increasingly prevalent.

Infrastructure as a Service (IaaS)

IaaS is the delivery model which provides computer Infrastructure as a service. It is a single tenant cloud computing layer where the dedicated resources of Cloud Computing vendors are shared only with the contract based clients at a pay-per-use fee. This greatly reduces the need for huge initial investments in computing hardware such as networking devices, computing servers, and processing unit. It is the base layer of the Cloud computing Virtualized stack. It serves as a base foundation for their execution, for the other two layers. Amazon EC2 is an example of an IaaS.

Platform as a Service (PaaS)

Platform in the cloud computing is a set of software or applications which runs on platform which is hosted in the cloud. It provides all the needed infrastructure to run specific applications on the Internet. The users execute the applications in the platforms hosted by the cloud provider through the platform or application programming interface. Google apps is an example of platform services. PaaS makes the deployment of user applications as well as it makes a way to rent hardware, operating systems storage and network capacity possible over the network.

Comparison between cloud systems

Although the cloud computing can be seen as a new technology phenomenon that can handle such massive data on basis of on-demand service. The services provided by the cloud ranges from single and simple business functions to highly complex computing for complex 3-D modelling.

This paper discusses the comparative study of cloud computing systems such as Amazon EC2 and Google App Engine based on the three parameters such as Technology benefits, business benefits and future trends (Figure 3).

Amazon EC2

Amazon Ec2 provides a resizable virtual computing environment, which allows the users to use web service as a interface to formulate web scale computing simple for the developers. It allows the user to configure capacity with a minimal hostility. Amazon provides the services of computing by allowing only to pay for the capacity that is used. Amazon EC2 provides the feature that enables the users to increase or decrease the capacity within few minutes.

The user can choose the configuration of the system such as memory needed, CPU, storage and system booting partition size. Amazon EC2 provides the overall solutions for computing environment. It offers a very highly scalable, reliable and Inexpensive virtual environment, where the service runs within Amazon's datacenters and network infrastructure. Amazon EC2 provides copious mechanisms for securing the computational resources.

Google App Engine

GAE provides the user to run web applications on the Google's Infrastructure. The App Engine applications includes automatic scaling, and dynamic load balancing. It Provides a platform for the developers to host the applications in Google data centers . It supports the application written in several programming languages, such as Java and python.

The billing rates depend on how much storage and bandwidth the application uses, and are measured in terms of gigabyte. The Google App

Engine provides more flexible infrastructure to write applications, and can run only some limited range of applications.

Findings

Amazon has been one of the first service provider to provide storage space and computing resources to create a very scalable and flexible platform following the model of cloud. The survey findings articulate that Amazon bested Google, and Amazon is recognized as the leader of the cloud computing, twice as many as Google (Figure 3).

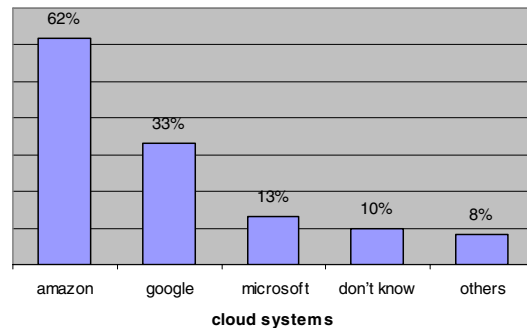


Fig. 3: Comparison of cloud systems

CONCLUSION

Cloud Computing provides computing services in today's competitive environment in a highly scalable way, the environments provided by the cloud strives to be dynamic, elastic, reliable, customizable, and robust with a guaranteed Quality of Service. This proposed survey will provide an

idea on the current trends in the cloud systems and comparison of Amazon EC2 and Google App Engine is made based on three parameters. In this paper the hype and challenges which are currently faced in the cloud computing industry are highlighted, And summarized the Superiority of the Cloud Computing.

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