A Survey Of Cloud Computing: Cloud Computing Concerns And Issues

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Abstract

Cloud Computing is the use of computing Resources (hardware and software) that are delivered as a service over a network (typically the Internet). The name comes from the use of a cloud-shaped symbol as an abstraction for the complex infrastructure it contains in system diagrams. Cloud computing entrusts remote services with a user's data, software and computation. A cloud computing platform dynamically provisions, configures, reconfigures, the servers as needed. Servers in the cloud can be physical machines or virtual machines. Advanced clouds typically include other computing resources such as storage area networks (SANs), network equipment, firewall and other security devices.

Key words: Public Cloud, Private Cloud, Hybrid Cloud

I. Introduction

Over the past few years, the concept of cloud computing and virtualization has gained much momentum and has become a more popular phrase in information technology. Many organizations have started implementing these new technologies to further reduce costs through improved machine utilization, reduced administration time and infrastructure costs. Cloud computing is the environment that enables customers to use applications on the Internet such as storing and protecting data while providing a service. In the section 2 architecture, In the section 3 the architecture layers of cloud computing are described. In section 4 advantages, in section 5 cloud deployment models, in section 6 related works is explained.

Figure1. Cloud Computing Model

II. Cloud Computing Architecture

Cloud computing Architectures are designs of software applications that use Internet accessible on-demand services (Figure 2). 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 themselves after the job is done.

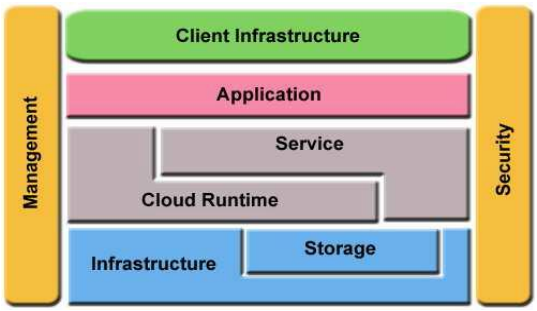

Figure2. Cloud Computing Architecture

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.

III.Architectural Layers of Cloud Computing

In general, cloud service providers tend to offer services that can be grouped mostly into following categories:

Infrastructure as a service (IaaS)
Platform as a service (PaaS)
Software as a service (SaaS)

Software as a Service (SaaS)

Software as a Service (SaaS) is a software distribution model in which applications are hosted by a vendor or service provider and made available to customers over a network, typically the Internet.

SaaS is becoming an increasingly prevalent delivery model as underlying technologies that support Web services and service-oriented architecture (SOA) mature and new developmental approaches, such as Ajax, become popular. Meanwhile, broadband service has become increasingly available to support user access from more areas around the world.

SaaS is closely related to the ASP (application service provider) and computing software delivery models. IDC identifies two slightly different delivery models for SaaS. The *hosted application management* (*hosted AM*) model is similar to ASP: a provider hosts commercially available software for customers and delivers it over the Web. In the *software on demand* model, the provider gives customers network-based access to a single copy of an application created specifically for SaaS distribution.

Benefits of the SaaS model include:

- Easier administration
- Automatic updates and patch management
- Compatibility: all users will have the same version of software.
- Easier collaboration, for the same reason
- Global accessibility.

The traditional model of software distribution, in which software is purchased for and installed on personal computers, is sometimes referred to as *software as a product*.

Infrastructure as a Service (IaaS)

Infrastructure as a Service is a provision model in which an organization outsources the equipment used to support operations, including storage, hardware, servers and networking components. The service provider owns the equipment and is responsible for housing, running and maintaining it. The client typically pays on a per-use basis.

Characteristics and components of IaaS include:

- Utility computing service and billing model.
- Automation of administrative tasks.
- Dynamic scaling.
- Desktop virtualization.
- Policy-based services.
- Internet connectivity.

IaaS is one of three main categories of cloud computing service. The other two are Software as a Service (SaaS) and Platform as a Service (PaaS).Infrastructure as a Service is sometimes referred to as Hardware as a Service (HaaS).

Platform as a Service (PaaS)

Platform as a Service (PaaS) is a way to rent hardware, operating systems, storage and network capacity over the Internet. The service delivery model allows the customer to rent virtualized servers and associated services for running existing applications or developing and testing new ones.

Platform as a Service (PaaS) is an outgrowth of Software as a Service(SaaS), a software distribution model in which hosted software applications are made available to customers over the Internet.. Geographically distributed development teams can work together on software development projects. Services can be obtained from diverse sources that cross international boundaries. Initial and ongoing costs can be reduced by the use of infrastructure services from a single vendor rather than maintaining multiple hardware facilities that often perform duplicate functions or suffer from incompatibility problems. Overall expenses can also be minimized by unification of programming development efforts.

Benefits of the PaaS model include:

- OS features can be changed and upgraded frequently
- Rapid construction of Business applications.
- PaaS reduces Total Cost of Ownership

On the downside, PaaS involves some risk of "lock-in" if offerings require proprietary service interfaces or development languages. Another potential pitfall is that the flexibility of offerings may not meet the needs of some users whose requirements rapidly evolve.

XaaS (Anything as a Service)

XaaS is a collective term said to stand for a number of things including "X as a service," "anything as a service" or "everything as a service." The acronym refers to an increasing number of services that are delivered over the Internet rather than provided locally or on-site. XaaS is the essence of cloud computing.

The most common examples of XaaS are Software as a Service (SaaS),Infrastructure as a Service (IaaS) and Platform as a Service (PaaS). The combined use of these three is sometimes referred to as the SPI model(SaaS, PaaS, IaaS). Other examples of XaaS include storage as a service (STaaS), communications as a service (CaaS), network as a service (NaaS) and monitoring as a service (MaaS). Following the convention of pronouncing "SaaS" as "sass," "XaaS" is sometimes pronounced as "zass."

IV. Cloud Deployment Models

Cloud computing architects need to make some considerations about infrastructure models when moving from a standard enterprise application deployment model to one based on cloud computing. There are three basic service models to consider in a cloud computing, such as Public, Private and Hybrid clouds.

1. Public Clouds:

Public computing clouds are open to anyone who wants to sign up and use them. Public clouds are run by vendors, and applications from different customers are likely to be mixed together on the cloud's servers, storage systems, and networks. One of the benefits of public clouds is that they can be much larger than a company's private cloud and can offer the ability to scale up and down on demand, shifting infrastructure risks from the enterprise to the cloud provider.IBM operates a cloud data center for its customers. Multiple customers share the same infrastructure, but each others' cloud is secure and separated as though behind its own firewall.

2. Private clouds

The intention of designing the private cloud is basically an organization that needs more control over their data than they can get by using a vendor hosted service. Private clouds are built for the exclusive use of one organization, providing the utmost control over data, security, and quality of service. Private clouds typically sit behind the firewall of an organization (enterprise or university), and only people within that organization have permission to access the cloud and its resources.

3. Hybrid clouds

A hybrid cloud is a composition of at least one private cloud and at least one public cloud. A hybrid cloud is typically offered in one of two ways: a vendor has a private cloud and forms a partnership with a public cloud provider, or a public cloud provider forms a partnership with a vendor that provides private cloud platforms.

A hybrid cloud is a cloud computing environment in which an organization provides and manages some

resources in-house and has others provided externally. For example, an organization might use a public cloud service, such as Amazon Simple Storage Service (Amazon S3) for archived data but continue to maintain in-house storage for operational customer data. Ideally, the hybrid approach allows a business to take advantage of the scalability and cost-effectiveness that a public cloud computing environment offers without exposing mission-critical applications and data to third-party vulnerabilities. This type of hybrid cloud is also referred to as hybrid IT.

V. Advantages

When it's comes to a service that is deliverable with minimum needs of resources, everybody knows that its cloud computing. It is the kind of service that has got the maximum feasibility and openness which is hard to find in any other service. There is actually no competition when you take it features as the base of comparison. With the cloud computing services, you just have it all. No matter where you are, or what is the time, you get to do things, a facility that is long awaited in other kinds of services of the level of cloud computing. Speaking of its ability, listing all of them would require the breaking of any writing rules; still I would like to manage most of them within the boundary.

Scalability- this one is the king in the features section and is what attracts most of the attention. Just start with a low configuration and increase them in the future whenever you desire.

Openness- you can access the cloud from your living room, while jogging in the morning or during a journey. Cloud computing services bring things closer to you with their un-believable applications.

Carefree- the user just orders for the things he needed and he is accordingly served by his provider. The best part about cloud computing services is that it is maintenance-free, update-free, and free of every other job that is done by a user in other computing services. Everything out here is taken care of by the service provider.

Security- tire-based security system, a major breakthrough in security mechanisms is used in here. Multiple levels of firewalls make it impossible for hackers to get not areas other than theirs.

Just-in-time- a unique support system that operates round the clock to fix the problem makes it possible for users to résumé their work without wasting any time. Even the server installation and implementation process as is superbly fast.

VI. Challenges of Cloud Computing

Cloud computing is vulnerable to various security and privacy threats

1. Security and Privacy

The fact that the valuable enterprise data will reside outside the corporate firewall raises serious concerns. Hacking and various attacks to cloud infrastructure would affect multiple clients even if only one site is attacked. These risks can be mitigated by using security applications, encrypted file systems, data loss software, and buying security hardware to track unusual behaviour across servers.

2. Service Delivery and Billing

It is difficult to assess the costs involved due to the on-demand nature of the services. Budgeting and assessment of the cost will be very difficult unless the provider has some good and comparable benchmarks to offer. The service-level agreements (SLAs) of the provider are not adequate to guarantee the availability and scalability.

3. Reliability and Availability

Cloud providers still lack round-the-clock service; this results in frequent outages. It is important to monitor the service being provided using internal or third-party tools. It is vital to have plans to supervise usage, SLAs, performance, robustness, and business dependency of these services.

4. Performance and Bandwidth Cost

Businesses can save money on hardware but they have to spend more for the bandwidth. This can be a low cost for smaller applications but can be significantly high for the data-intensive applications. Delivering intensive and complex data over the network requires sufficient bandwidth. Because of this, many businesses are waiting for a reduced cost before switching to the cloud

VII. Findings

Amazon has been one of the first cloud service providers that provide a very scalable and flexible platform and resizable compute capacity in the cloud. Amazon EC2 changes the economics of computing by allowing paying only for capacity that is actually used. The survey findings articulate that Amazon bested Google and Microsoft, and Amazon is recognized as the leader of the cloud computing, twice as many as Google and much more than Microsoft. According to cisco global index, traffic on the cloud data centers increases drastically from year to year.

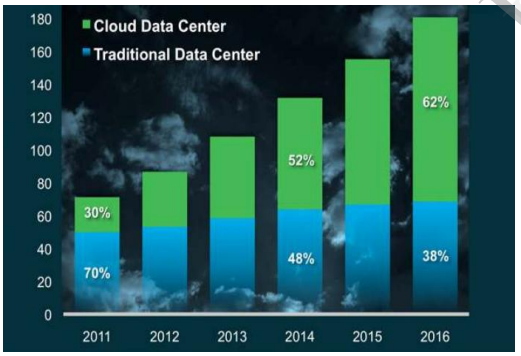

Figure3. Access of Data centers.

VIII. Conclusion

Cloud computing has started to obtain mass appeal in corporate data centres as it enables the data centre to operate like the Internet through the process of enabling computing resources to be accessed and shared as virtual resources in a secure and scalable manner. This proposed survey will provide an idea on the current trends in the cloud systems and comparison of Amazon EC2, Google App Engine and Microsoft Azure is made based on technology benefits, business benefits and increasing of data centers usage and future trends. In this paper, advantages of the cloud computing are highlighted, and summarized the dominance of the Cloud Computing. The future work is finding efficient security methods for managing the data in the cloud.

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