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IN PREMISES OF CLOUD COMPUTING AND MODELS

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Abstract

Cloud computing that has become a relevant and virtualization technology that uses the internet and central remote servers to offer the sharing of resources that include software, frameworks, applications and business processes to the market environment to succeed the extensible demand. In the standard environment, the service vitality, elasticity, choices and flexibility suggest by this scalable technology are too attractive that makes the cloud computing to increasingly becoming a necessary part of the enterprise computing environment. This paper exhibits a survey of the current state of Cloud Computing. It involves in discussion of the evolution process of cloud computing, features of Cloud, current technologies adopted in cloud computing. This paper also exhibits a comparative study of cloud computing platforms (Amazon, Google and Microsoft and Cloudsim) and it stimulates the demands.

Keywords: Cloud computing, Deploy models, Service models.

Introduction

Cloud computing naturally accessing the resources and services needed to perform functions with dynamically changing needs. An application programmer or service developer demands to access from the cloud rather than specific resources. The cloud manages multiple infrastructures with multiple organizations furnish of one or more frameworks overlaid on top of the infrastructures binding them together.

Cloud computing is the delivery of computing services over the Internet. Cloud services allow and grant the individuals and businesses to used the software and hardware they managed by third parties at remote locations. Examples of cloud services involve online social networking sites, file storage, web mail, and online business applications [1] [14].The cloud computing model allows access to information and computer resources from anywhere that a network connection is available [13]. Cloud computing assists and shared pool into resources,

including data storage space, networks, computer processing and specialized corporate and user applications. Information about final paper submission is available from the conference website.

Our work describes the characteristics of cloud computing, cloud architecture, cloud deployment models, cloud service models and a comparative study of cloud computing systems.

Cloud Computing and its Services

Cloud computing is the delivery of computing as a service rather than a product, whereby shared resources, software and information are provided to computers and other devices as a utility over a network. Cloud computing is essentially infrastructure as a service. Using resources from distributed servers/computers, cloud computing frees you from the configuration of local servers. These services are broadly divided into three categories: Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS) and Software-as-a-Service (SaaS) [3] [4]. The name cloud computing was inspired by the cloud symbol that's often used to represent the Internet in flowcharts and diagrams.

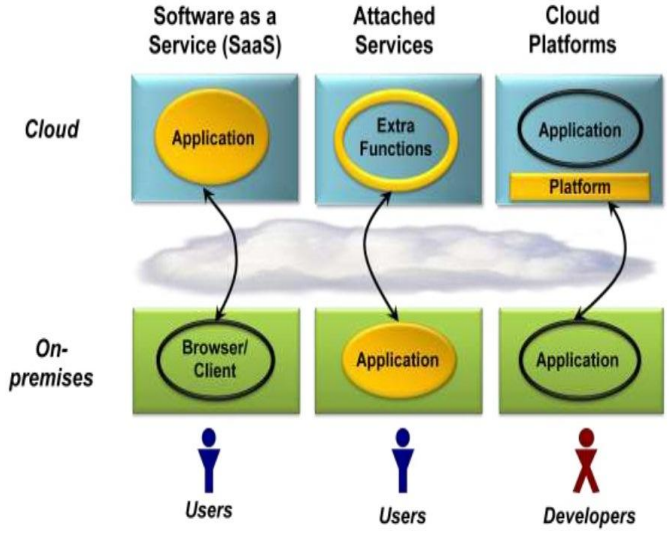

Figure1: On premises cloud systems.

For example: For a business in retail that might need to utilize a large number of servers during the holiday seasons, but not nearly as many after the holiday seasons, cloud computing is helpful by allowing the business to aggregate server usage based on their needs.

Cloud computing have been gaining momentum, particularly in the SaaS environment. Organizations are quickly realizing the value in cutting costs through monthly subscriptions to software, rather than outright purchasing it and having it become obsolete. When newer versions of software become available, companies need to repurchase and sometimes increase the amount of infrastructure needed to support the new software. With cloud-hosted services, it is possible to utilize enterprise-level software through subscription, without worrying about the cost of infrastructure or upgrading to the latest version of software.

Cloud computing providers deliver applications via the internet, which are accessed from a web browser, while the business software and data are stored on servers at a remote location. In some cases, legacy applications (line of business applications that until now have been prevalent in thin client Windows computing) are delivered via a screen-sharing technology, while the computing resources are consolidated at a remote data center location in other cases, entire business applications have been coded using web-based technologies.

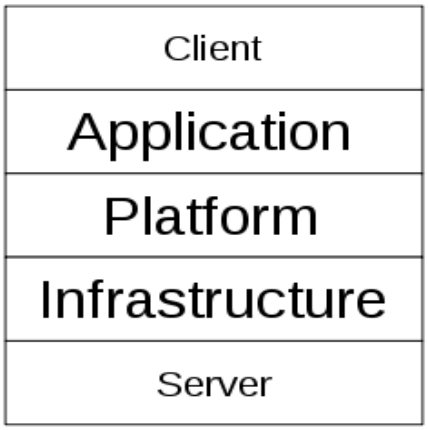

Figure 2: Kind of Layers.

A. Client:

A *cloud client* consists of computer hardware and/or computer software that relies on cloud computing for application delivery and that is in essence useless without it. Examples include some computers, phones and other devices, operating systems, and browsers.

B. Application:

Cloud application services or "Software as a Service (SaaS)" deliver software as a service over the Internet, eliminating the need to install and run the application on the customer's own computers and simplifying maintenance and support.

C. Platform:

Cloud platform services, also known as platform as a service (PaaS), deliver a computing platform and/or solution stack as a service, often consuming cloud infrastructure and sustaining cloud applications. It facilitates deployment of applications without the cost and complexity of buying and managing the underlying hardware and software layers.

D. Infrastructure:

Cloud infrastructure services, also known as "infrastructure as a service" (IaaS), deliver computer infrastructure – typically a platform virtualization environment – as a service, along with raw (block) storage and networking. Rather than purchasing servers, software, data-centre space or network equipment, clients instead buy those resources as a

fully outsourced service. Suppliers typically bill such services on a utility computing basis; the amount of resources consumed (and therefore the cost) will typically reflect the level of activity.

E. Server:

The server's layer consists of computer hardware and/or computer software products that are specifically designed for the delivery of cloud services, including multi-core processors, cloud-specific operating systems and combined offerings.

General Mode for Application Platforms

Most of the application platforms today come mostly from on-premises platforms. A useful way to think about cloud platforms is to see how the services an application developer relies on in the on-premises environment translates to the cloud.

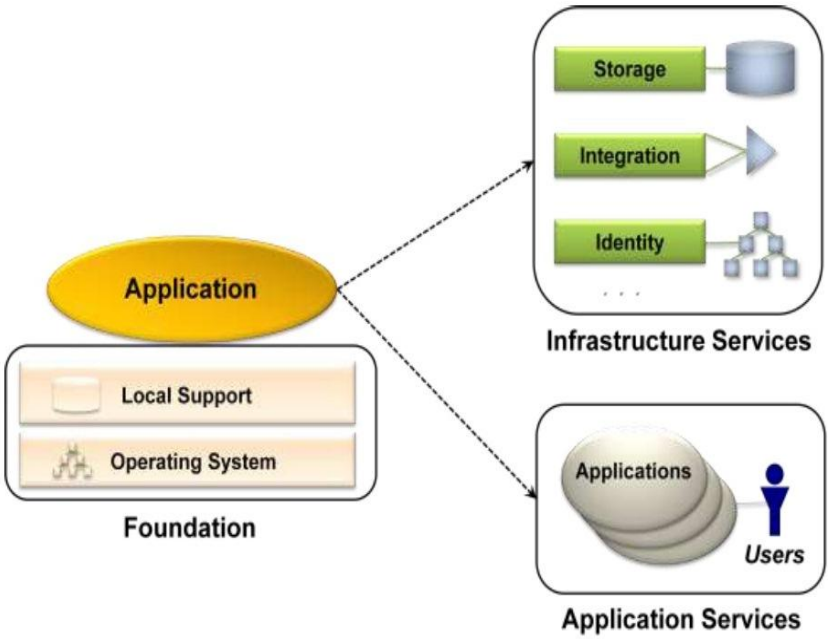

Figure 3: Cloud Application Services.

A. *A foundation:* Nearly every application uses some platform software on the machine it runs on. This typically includes various support functions, such as standard libraries and storage, and a base operating system.

B. *A group of infrastructure services:* In a modern distributed environment, applications frequently use basic services provided on other computers. It's common to provide remote storage, for example, integration services, an identity service, and more.

C. *A set of application services*: As more and more applications become service-oriented, the functions they offer become accessible to new applications. Even though these applications exist primarily to provide services to end users, this also makes them part of the application platform.

To make this abstract model more concrete, think about how it fits with today's most popular on-premises platforms. The on-premises foundation looks like this:

A. *Operating system:* The dominant choices are Windows, Linux, and other versions of Unix.

B. *Local support*: Different technologies are used depending on the style of application. The .NET Framework and Java EE application servers provide general support for Web applications and more, for instance, while other technologies target specific kinds of applications.

For example, Microsoft's Dynamics CRM product includes a platform designed for creating a particular type of business application. Similarly, different kinds of storage are used for different purposes. Raw byte storage is provided by the file systems in Windows, Linux, and other operating systems, while more structured storage is provided by a range of database technologies, including the Oracle DBMS, MySQL, Microsoft SQL Server, and IBM DB2.

C. For on-premises infrastructure services, typical examples include the following:

 Storage: Like storage in the foundation, infrastructure storage comes in various styles. A remote file system might provide simple byte-oriented storage, while a Microsoft SharePoint document library provides a more structured remote storage service. Applications can also access a database system remotely, allowing access to another kind of structured storage.

 Integration: Connecting applications within an organization usually depends on a remote service provided by some integration product. A message queue is a simple example of this, while more complex scenarios use products such as IBM's Web Sphere Process Server, Microsoft's BizTalk Server, and others.

 Identity: Providing identity information is a fundamental requirement for most distributed applications. Common on-premises technologies that address this include Microsoft's Active Directory and other LDAP servers.

D. One way to think about these applications in the on-premises platform is to divide them into two broad categories:

 Packaged applications: This includes business software such as SAP, Oracle Applications, and Microsoft Dynamics, along with a myriad of other off-the-shelf products. While not all packaged applications expose services to other applications, more and more of them do.

 Custom applications: Many organizations have a large investment in custom software. As these applications increasingly expose their functionality through services, they become part of the on-premises application platform.

On-Premises Platforms to cloud Platforms

A cloud application can be built on a cloud foundation, just as an on-premises application is built on an on-premises foundation. Both kinds of applications can access infrastructure and application services provided on-premises and in the cloud. Just as on premises platforms support today's applications, cloud platforms provide services for the applications we're likely to build tomorrow.

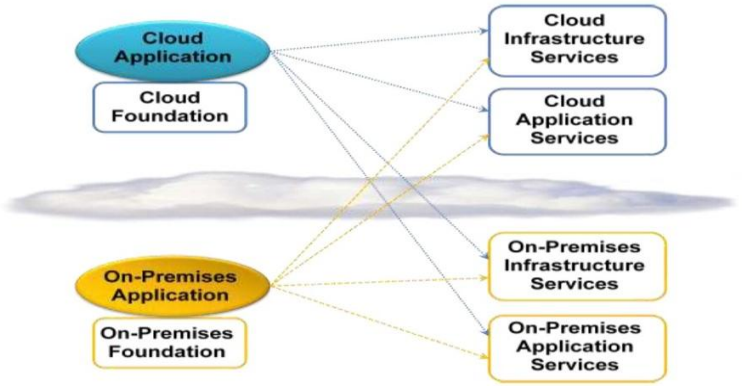

Figure 4: Infrastructure of Cloud services.

Cloud Service Models

Software as a Service (SaaS): The users simply make use of a web-browser to access software that others have developed and offer as a service over the web. At the SaaS level, users do not have control or access to the underlying infrastructure being used to host the software. Sales force's Customer Relationship Management software3 and Google Docs4 are popular examples that use the SaaS model of cloud computing.

Platform as a Service (PaaS): The applications are developed using a set of programming languages and tools that are supported by the PaaS provider. PaaS provides users with a high level of abstraction that allows them to focus on developing their applications and not worry about the underlying infrastructure. Just like the SaaS model, users do not have control or access to the underlying infrastructure being used to host their applications at the PaaS level. Google App Engine5 and Microsoft Azure6 are popular PaaS examples.

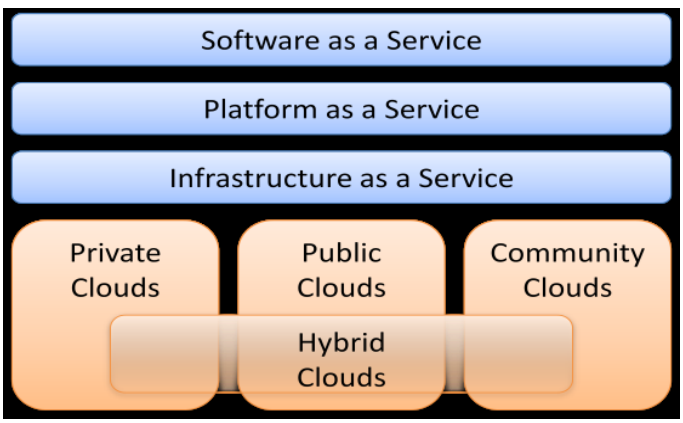

Figure 5: Cloud deploy models.

Infrastructure as a Service (IaaS): The users acquire computing resources such as processing power, memory and storage from an IaaS provider and use the resources to deploy and run their applications. In contrast to the PaaS model, the IaaS model is a low level of abstraction that allows users to access the underlying infrastructure through the use of virtual machines. IaaS gives users more flexibility than PaaS as it allows the user to deploy any software stack on top of the operating system. However, flexibility comes with a cost and users are responsible for updating and patching the operating system at the IaaS level. Amazon Web Services' EC2 and SLA (Service Level Agreement) [12] are popular IaaS examples. Some companies may tout themselves as cloud services but are more akin to online backup or file sharing services.

While there is certainly some overlap between each of these services, cloud services are unique because they allow you to view, edit and share files saved in the cloud. With some services, you can even sync your content across all your computers and devices. While no two cloud services are identical, each of the services we reviewed provides the same fundamental features and functionality.

Features:

The most important factor to consider in a cloud service is features, including the type of content you can store. The best cloud computing services are those that allow you to upload and save any type of file you would save on your local hard drive, from word documents to music files and everything in between. Some services even allow you to keep email, contacts and your calendar in the cloud. Any cloud service you consider should also allow you to view, edit and share your content regardless of what computer or device you are using. Other features to look for include automatic syncing of your files across all your devices, and password-protected sharing and file encryption to safeguard your content.

Mobile Access:

Arguably one of the biggest selling points of cloud computing services is their wide-ranging access. Whether you're on your work computer at the office or at home on your pad, cloud services allow you to access your content anywhere, anytime and on any one of your devices. Look for services that offer the greatest range of mobile access, including apps for popular smart phones and the ability to log into your account from any mobile browser. Ease of Use. Considering how often you'll likely be accessing your content in the cloud, it's important to select a cloud service that is intuitive and straightforward. The service's interface and tools should be easy to navigate and convenient to use.

Help and Support

Getting help when you need it is crucial when using any type of technology, including cloud services. Available support options should include technical assistance via telephone, email and live chat. The service should also provide a knowledgebase and user forums as resources.

Comparative Study of Cloud Systems

A comparative study of cloud computing systems is done which basically includes Amazon EC2, Google App Engine and Microsoft Azure based on the three parameters such as Technology benefits, business benefits and future trends. The following cloud system is:

A. Amazon EC2

One or more instances of a virtual machine can be created for processing and for storage. Payment is made based on time the instances are running. Hourly charge vary from $0.020 (US East-Virginia) to $3.200 (South America-Sao Paulo) [9].

It is possible to have a reserve instance for an initial payment and discounted rate of usage. Data storage can be both relational and non-relational. Virtual machine can be of different capacity –Standard (Small, Large, Extra Large), High- Memory (Double Extra Large, Quadruple Extra Large), High-CPU (Medium, Extra Large)[10]. Both Linux and Windows machine instances are supported.

To persistent data storage, we can have one of the 3 alternatives – Simple DB, Simple Storage Service (S3) or Relational Database Service (RDS). Simple DB and S3 storage mechanism is not RDBMS.[11]. RDS is an instance of MySQL – so we can use it like a normal RDBMS. `

B. Google App Engine

No need to instantiate any virtual machine. Application written in Python or Java can directly be deployed. We are charged on the actual normalized CPU cycles used. Storage is only non-relational. Charge is calculated on these parameters – bandwidth, CPU, storage, emails send. Bandwidth usage charges are $0.12 per GB, CPU cycles usage charges are from $0.08 to $0.64 per hour depending upon the capacity, storage charges are $0.13 to $0.64 per GB per month. $0.0001 is charged per email.

We have free quota for each of these parameters – it may be enough for development, testing and small deployment. There are limits imposed for peak usage on many different parameters –with daily limits & limits on usage in a burst.

C. Microsoft Azure

Offering has 3 main parts – Windows Azure, SQL Azure and App Fabric. It uses Hyper-V for virtualization – it works more like Amazon than like Google. There is an introductory offer where the service can be avail for free Payment is made for the resources used. One instance of Virtual Machine usage charges vary from $15.00 per month (Extra Small Instance) to $720.00 per month (Extra Large Instance). Data storage charges are $4.995 per month up to 100MB and $9.99 per month for greater than 100MB up to 1GB. Additional charges are applicable for additional usage more than 1GB. Bandwidth usage charges are $0.12 per GB for North America and Europe regions and $0.19 per GB for Asia Pacific Region. The development environment is Visual Studio through an SDK.

D. Cloudsim

The Cloudsim is implemented at the next level by programmatically extending the core functionalities exposed by the Gridsim layer. Cloudsim provides novel support for modeling and simulation of virtualized Cloud-based data center environments such as dedicated management interfaces for virtual machines (VMs), memory, storage, and bandwidth. Cloudsim layer manages the instantiation and execution of core entities (VMs, hosts, data centers, application) during the simulation period. This layer is capable of concurrently instantiating and transparently managing a large scale Cloud infrastructure consisting of thousands of system components. The fundamental issues such as provisioning of hosts to VMs based on user requests, managing application execution, and dynamic monitoring are handled by this layer. A Cloud provider, who wants to study the efficacy of different policies in allocating its hosts, would need to implement his strategies at this layer by programmatically extending the core VM provisioning functionality. There is a clear distinction at this layer on how a host is allocated to different competing VMs in the Cloud.

Finding perfect of Cloud System

Amazon has been one of the first service providers that provide sharing of resources ie: storage capacity to create a very scalable and flexible platform and resizable compute capacity in the cloud. Each instance type is configured with a specific amount of memory, CPUs, and local storage. Rather than experimenting with all the various instance types, for this paper only the c1.xlarge instance type is used. This type is equipped with two quad core 2.33-2.66 GHz Xeon processors (8 cores total), 7 GB RAM, and 1690 GB local disk storage. In our previous work we found that the c1.xlarge type delivers the best overall performance for the applications considered here [11]. A different choice for worker nodes would result in different performance and cost metrics. 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 .The following comparison gives the clear result [9].

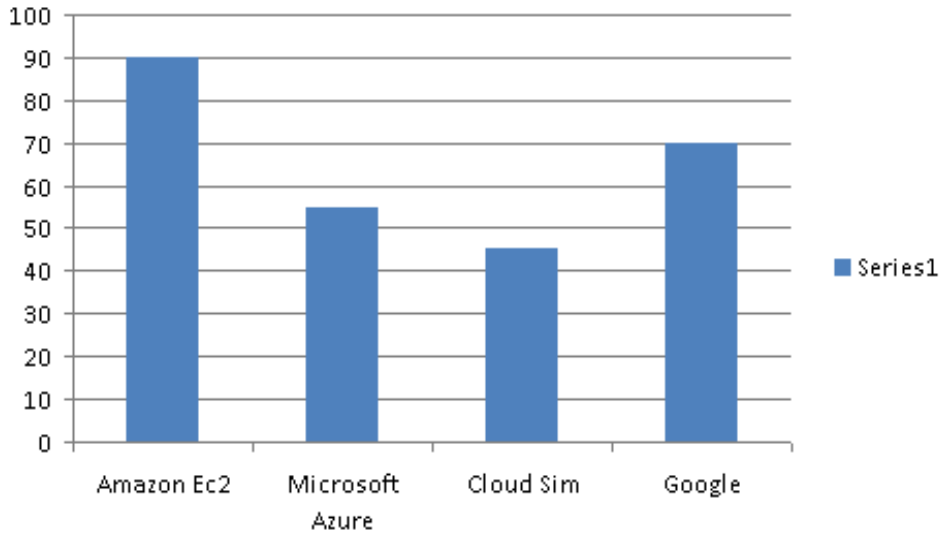

Figure 6: comparison of cloud system.

Conclusions

The effort to transform existing comparison the cloud system and find out the Amazon EC2.However, after find out the speed and flexibility of cloud computing environments provides a substantial boost with manageable cost. The cloud-ready application is readily adaptable to similar comparative the problems. In the Future work we can find out more and more comparison between the cloud systems and provide must interesting things.

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