Cloud Computing

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Abstract: *The term "Cloud Computing" is recent but the idea of centralizing computation and storage in distributed data centers maintained by third party companies is not new but it came in way back in 1990s along with distributed computing approaches like grid computing. It is providing IT as a service to the cloud users on-demand basis with greater flexibility, availability, reliability and scalability with utility computing model. The third-party computing capability over the network is a good way to cut costs, increase scale, and improve agility. The concept of cloud computing involves a data center somewhere in the world, or even multiple data centers scattered around the world. This is a paradigm shift from the historical client server architecture where the network users owned, maintained, and operated their own network infrastructure, server rooms, data servers, and applications*

I.   Introduction:

Cloud computing is a computing paradigm, where a large pool of systems are connected in private or public networks, to provide dynamically scalable infrastructure for application, data and file storage. With the advent of this technology, the cost of computation, application hosting, content storage and delivery is reduced significantly. Cloud computing is a practical approach to experience direct cost benefits and it has the potential to transform a data center from a capital-intensive set up to a variable priced environment. The idea of cloud computing is based on a very fundamental principal of „reusability of IT capabilities'. The difference that cloud computing brings compared to traditional concepts of "grid computing", "distributed computing", "utility computing", or "autonomic computing" is to broaden horizons across organizational boundaries. Forrester defines cloud computing as: "A pool of abstracted, highly scalable, and managed compute infrastructure capable of hosting end customer applications and billed by consumption."

Definition & Trends:
Cloud computing is an umbrella term used to refer to Internet based development and services. The cloud is a metaphor for the Internet. A number of characteristics define cloud data, applications services and infrastructure:

*   Remotely hosted: Services or data are hosted on someone else's infrastructure.
*   Ubiquitous: Services or data are available from anywhere.
*   Commoditized: The result is a utility computing model similar to traditional that of traditional utilities, like gas and electricity. You pay for what you would like.

A number of computing researchers and practitioners have attempted to define Clouds in various ways .

*   "A Cloud is a type of parallel and distributed system consisting of a collection of interconnected and virtualized computers that are dynamically provisioned and presented as one or more unified computing resources based on service-level agreements Stablished through negotiation between the service provider and consumers."
*   "The people can access the information that they need from any device with an Internet connection—including mobile and handheld phones—rather than being chained to the desktop. It also means lower costs, since there is no need to install software or hardware."

Today's cloud computing implementations promise lowcost, efficient, highly-scalable, utility-grade computing, Cloud computing is really the next logical step to the various virtualization solutions and technologies we have seen become more prominent lately.

II. Cloud computing types:

1. **Private Cloud:** The cloud infrastructure is operated solely for an organisation. In simple words we can say that such cloud models are dedicated to a third party who wish to use. It may be managed by the Cloud Computing provider or any other third party.

2. **Public Cloud:** The cloud infrastructure is made available to the general public or a large industry group and is owned by the Cloud providers.
3. **Hybrid Cloud:** It's a combination of two or more clouds (private, community or public).
4. **Community Cloud:** This cloud infrastructure is shared by several organisations.

Market-Oriented Cloud Architecture:
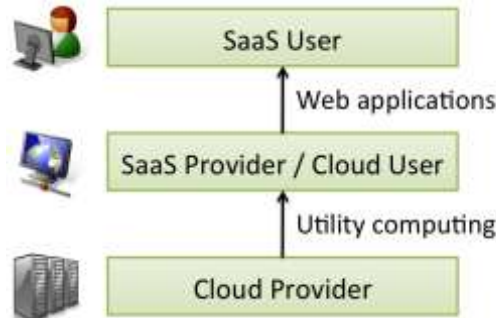
1. **Infrastructure as a Service (IaaS):** The IaaS layer offers storage and infrastructure resources that is needed to deliver the Cloud services. It only comprises of the infrastructure or physical resource. Top IaaS Cloud Computing Companies: Amazon (EC2), Rackspace, GoGrid, Microsoft, Terremark and Google.
2. **Platform as a Service (PaaS):** PaaS provides the combination of both, infrastructure and application. Hence, organisations using PaaS don't have to worry for infrastructure nor for services. Top PaaS Cloud Computing Companies: Salesforce.com, Google, Concur Technologies, Ariba, Unisys and Cisco.
3. **Software as a Service (SaaS):** In the SaaS layer, the Cloud service provider hosts the software upon their servers. It can be defined as a in model in which applications and softwares are hosted upon the server and made available to customers over a network. Top SaaS Cloud Computing Companies: Amazon Web Services, AppScale, CA Technologies, Engine Yard, Sales force and Windows Azure.

Popular Cloud Computing Platforms

AbiCloud: Abicloud is a cloud computing platform, It can be used to build, integrate and manage public as well as private cloud in the standardized environments. Using Abicloud, user can easily and automatically install and manage the server, storage system, network, virtual devices and applications and so on.

Eucalyptus: Eucalyptus (Elastic Utility Computing Architecture for Linking Your Programs to Useful Systems) mainly was used to build open-source private cloud platform.

Nimbus: Nimbus is an open tool set and also a cloud computing solution providing IaaS. It permits users lease remote resources and build the required computing environment through the consumption of virtual machines.

OpenNebula: It is also an open source cloud service framework. It allows user deploy and manage virtual machines on physical resources and it can set user's data centers or clusters to flexible virtual infrastructure that can automatically adapt to the change of the service load.

III. Summary and Conclusion:

Cloud computing is a new and promising paradigm delivering IT services as computing utilities. As Clouds are designed to provide services to external users, providers need to be compensated for sharing their resources and capabilities. In this paper, we have proposed architecture for market-oriented allocation of resources within Clouds. We have discussed some representative platforms for Cloud computing covering the state-of-the-art. finally, we need to address regulatory and legal issues, which go beyond technical issues.

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