

CLOUD COMPUTING UP - Coming Era in IT

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Abstract- The Cloud computing is a term which is a set of technologies that allows computing applications and data to be visible as a set of services from a group of essential resources. The establishment of cloud computing comprises of data centres (servers, storage, networking), the business applications and middleware, virtualization software and for sure operating systems. The cloud computing infrastructure consists of services that are offered up and delivered through data centres that can be accessed from anywhere in the world. Cloud computing is very much beneficial for businesses now a days because of its valuable features. It is well suited for small organizations where there is budget or infrastructure limitation. The key idea behind this new information sharing technology is virtualization which reduces the need to install hardware on each and every machine. With this concept cloud computing saves a lot of energy and reduces the heat generation by various computers at the data centres.

Keywords: EC2: Elastic Compute Cloud, IaaS: Infrastructure as a Service, OCC: The Open Cloud Consortium, PaaS: Platform as a Service, SaaS: Software as a Service

I. INTRODUCTION

The concept of cloud computing originates on 1960s, when John McCarthy unwrapped that "computation may someday be organized as a public utility". Until the 1990s telecommunications companies who primarily offered dedicated point-to-point data circuits but with the advent of the term "cloud" which is actually taken from telephone system began offering Virtual Private Network (VPN) services with comparable quality of service but at a much lower cost. It's a fundamental swing from the traditional client/server architecture. There is an alternative of having multiple servers, and even clients, all over the place; they are all consolidated into limited number of powerful machines. With Cloud Computing users can access database resources through the Internet from wherever, and anytime for as long as they need, with no need of worrying about any maintenance or management of actual resources. Moreover, databases in cloud computing are very dynamic and expandable.

Cloud computing is information technology (IT) as a service, whereby instead of building your personal IT infrastructure to host databases and software, a third party hosts them for you in its huge server farms, and data and services are accessed through the Internet. In this set-up IT adds electricity and water as another utility.

Cloud computing is a term used to refer to Internet based development and services. A number of characteristics define cloud data, developing applications, services and infrastructure:

- Remotely hosted: Services or data are hosted on remote systems which mean someone else's infrastructure.
- Omnipresent: Services or data are available from anywhere.
- Commodified: The result is a utility computing model which is equivalent to traditional that of traditional utilities, like gas and electricity. You pay for what you would like.

II. CLOUD COMPUTING ISSUES:

a) Privacy

Privacy is the key issue that should be kept in mind while adopting cloud computing. In cloud computing the private data of a company that was stored in its data centres moves into a public cloud which is open for everyone. The Company doesn't know in which country or nation the data resides. The company has lost the control of privacy of its private data.

b) Open source

Open source software has provided the basis for many cloud computing implementations. In November 2007, the Free Software Foundation released the Affero General Public License, a version of GPLv3 proposed to close a supposed legal loophole associated with free software designed to be run over a network.

c) Open standards

Most cloud providers expose APIs which are normally well-documented (often under a Creative Commons license) but also exclusive to their implementation and thus not interoperable. Some vendors have adopted others' APIs and there are numerals of open standards under development, including the OGF's Open Cloud Computing Interface. The Open Cloud Consortium (OCC) is functioning to develop consensus on early cloud computing standards and practices.



Fig. 1

d) Security

The relative security of cloud computing services is a controversial issue which may be delaying its adoption. Issues barring the acceptance of cloud computing is due in large part to the private and public sectors discomfort surrounding the external management of security based services. It is the very nature of cloud computing based services, private or public, that promote external management of provided services.

e) Availability and performance

In addition to concerns about security, businesses are also anxious about acceptable levels of availability and performance of applications hosted in the cloud. There are also concerns about a cloud provider closing down for financial or legal reasons, which has happened in a number of cases.

f) Sustainability and sitting

Although cloud computing is often supposed to be a form of "green computing", there is as of yet no published study to substantiate this assumption. Sitting the servers affect the environmental effects of cloud computing. In areas where climate favours natural cooling and renewable electrical energy is readily available, the environmental effects will be more moderate.

g) Shared Infrastructure

Cloud computing uses a virtualized software model, which enables the sharing of physical services, storage, and networking capabilities.

h) Managed Metering

Cloud Computing uses metering for managing and optimizing the service and to provide reporting and billing information to the consumers. In this way, consumers are billed for services according to how much they have actually used during the billing period.

III. LEGAL ISSUES

In cloud computing there are also issues relating to policy and access.

Reliability and liability

As with any other telecommunications service, users will expect the cloud to be a trustworthy and reliable resource, mainly if a cloud provider takes over the mission of running "mission-critical" applications, and will expect clear description of liability if serious problems occur. Even though service disruptions will become increasingly exceptional, they cannot be barred. Data integrity and the correctness of results are other aspects of reliability.

Access and usage restrictions: Over and above privacy concerns, the possibility of storing and sharing data in clouds raises issues about copyright, licenses, and intellectual property. Clouds database can be accessed at any instance of time, by any user with an Internet connection, from any place. Licensing, usage agreements and intellectual property rights may vary in different involved countries, but the cloud hides these gaps, which can cause problems. Governments will need to carefully consider the suitable polices and levels of regulation or legislation to provide sufficient safeguards for distributed computing. These may include:

1. Essential thresholds for reliability;
2. Assignment of liability for damage or other abuse of data;
3. Opportunity for data security;
4. Privacy security;
5. Potential for anonymity;
6. Access and usage privileges. (Adolp, 2009)

IV. DEPLOYMENT MODELS

Deploying cloud computing can be at variance depending on requirements, and the following four deployment models have been identified, each with specific characteristics that support the requirements of the services and users of the clouds in particular ways

Private Cloud

The cloud infrastructure has been deployed, and is maintained and operated for a specific organization. The operation may be in-house or with a third party on the premises.

Public Cloud

The cloud infrastructure is available to the public on a commercial basis by a cloud service provider. This enables a consumer to develop and deploy a service in the cloud with very little financial outlay compared to the capital expenditure requirements normally associated with other deployment options.

Community Cloud

The cloud infrastructure is shared among a number of organizations with similar interests and requirements. This may help to reduce the capital expenditure costs for its establishment because the costs are shared among the organizations. The operation may be in-house or with a third party on the premises.

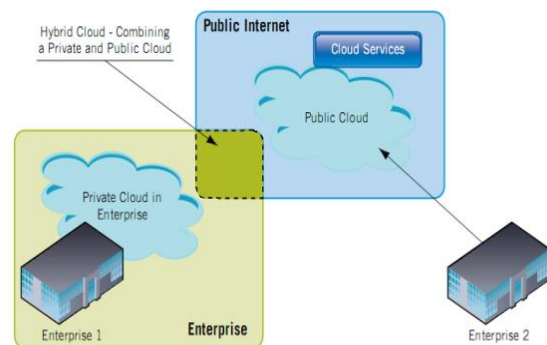


Fig. 2: Public, Private, and Hybrid Cloud Deployment Example

VI. ARCHITECTURAL LAYERS OF CLOUD COMPUTING

IT people speak about three diverse kinds of cloud computing, where different services are being provided for you. Note that there's a certain amount of ambiguity about how these things are defined and some overlap between them

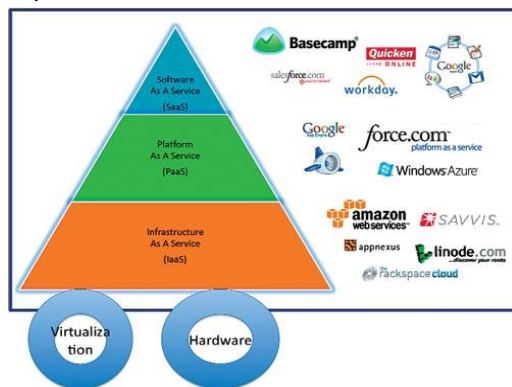


Fig. 3

Infrastructure as a Service (IaaS)

IaaS is a service delivery model in which a company is given control over different resources and applications. These resources consist of storage, hardware, servers, networking components, etc. On demand principle is used in this case as the infrastructure is provided to the user as per his requests. Ordinary web hosting is a simple example of IaaS you pay a monthly payment or a per-megabyte/gigabyte fee to have a hosting company serves up files for your website from their servers.

Software as a Service (SaaS)

As the name suggests, it provides several software application as a service through the cloud. It means you use a full application running on someone else's system. By removing the need to install and run an application on a user's own computer it gives the way for businesses to get the similar benefits as commercial software with less cost. SaaS also alleviates the burden of software maintenance and support but users give up control over software versions and requirements. Web-based email and Google Documents are possibly the best-known examples.

Platform as a Service (PaaS)

PaaS means you develop applications using Web-based tools so they run on systems software and hardware develop by another company. Consumers purchase access to the platforms, enabling them to install their own software and applications in the cloud. The operating systems and network access are not managed by the consumer, and there might be restriction as to which applications can be deployed.

VII. APPLICATIONS OF CLOUD COMPUTING

The applications of cloud computing are countless. As a right middleware, a cloud computing system could implement all the programs a normal computer could run. Potentially, everything from basic word processing software to customized computer programs intended for a specific company could work on a cloud computing system.

Here are just a few reasons that why everyone want to rely on another computer system to run programs and store data want to rely on another computer system to run programs and store data:

1. Consumers would be able to access their applications and data from anywhere at any time.
2. It could cut down the hardware costs. On client side the requirement for advanced hardware reduces due to cloud computing systems.
3. AS servers and digital storage devices take up space, some companies lease physical space to store servers and databases because they don't have it available on site.
4. Companies might save huge funds on IT support. Streamlined hardware would, in theory, have less trouble than a network of heterogeneous machines and operating systems.
5. The client could take benefit of the whole network's processing power, if the cloud computing system's back end is a grid computing system.

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