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An Overview of Cloud Computing

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Abstract
During the last several decades, dramatic advances in computing power, storage and networking technology have allowed the human race to generate process and share increasing amounts of information in dramatically new ways. As new applications of computing technology are developed and introduced, these applications are often used in ways that their designers never envisioned. New applications, in turn, lead to new demands for even more powerful computing infrastructure. Such a wonderful new technology is arrived called cloud computing. Cloud computing refers to the delivery of computing resources over the Internet. Instead of keeping data on your own hard drive or updating applications for your needs, you use a service over the Internet at another location, to store your information or use its applications. Doing so may give rise to certain privacy implications. This article reviews its definition, characteristics, advantages and disadvantages of cloud computing, types of cloud services, forms of service and players of the cloud and challenges & issues that are expected to be addressed.

Keywords: Cloud Computing, Internet, Network Connection, Software Infrastructure.

1. Introduction
The term "Cloud" in cloud computing is used synomously with "data center". Today the computing field is able to envision transitioning into the cloud computing era because of the breath-taking advances in computing and information technologies during the past three decades. The advances include the buildup of the Internet backbone, the widespread adoption of broadband access to the Internet, the powerful network of servers and storage in data centers, the advances in high performance and scalable software infrastructure for the data centers and the Web, etc.

When you store your photos online instead of on your home computer, or use webmail or a social networking site, you are using a "cloud computing" service. If you are an organization, and you want to use, for example, an online invoicing service instead of updating the in-house one you have been using for many years, that online invoicing service is a "cloud computing" service.

Cloud computing refers to the delivery of computing resources over the Internet. Instead of keeping data on your own hard drive or updating applications for your needs, you use a service over the Internet, at another location, to store your information or use its applications. Doing so may give rise to certain privacy implications.

Cloud computing is the delivery of computing services over the Internet. Cloud services allow individuals and businesses to use software and hardware that are managed by third parties at remote locations. Examples of cloud services include online file storage, social networking sites, webmail, and online business applications. The cloud computing model allows access to information and computer resources from anywhere that a network connection is available. Cloud computing provides a shared pool of resources, including data storage space, networks, computer processing power, and specialized corporate and user applications.

Cloud computing has been defined by the U.S. National Institute of Standards and Technology (NIST), "Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. This cloud model promotes availability

and is composed of five essential characteristics, three service models, and four deployment models".

Characteristics of Cloud services

- **On-demand self-service** means that customers (usually organizations) can request and manage their own computing resources.
- **Broad network access** allows services to be offered over the Internet or private networks.
- **Pooled resources** means that customers draw from a pool of computing resources, usually in remote data centers.
- **Rapid elasticity** services can be scaled larger or smaller.
- **Measured service** use of a service is measured and customers are billed accordingly.

Advantages of Cloud Computing

- **Pay-Per-Use Model / Only Pay for What You Utilize**

Unlike many computing programs where the package comes with unnecessary applications, the cloud allows users to literally get what they pay for. This scalability allows for you to simply purchase the applications and data storage you really need. "Pay-Per-Use" Billing Model Cloud usage policy defines that you will be billed for cloud resources as you use them. This pay-as-you-go model means usage is metered and you pay only for what you consume. Users have to pay only for the resources they use, ultimately helping them keep their costs down. Because this pay-for-what-you-use model resembles the way electricity, fuel and water are consumed; it's sometimes referred to as utility computing.

- **Mobility**

One of the main advantages of working in the cloud is that it allows users the mobility necessary in this day and age of global marketing. For example, a busy executive on a business trip in Japan may need to know what is going on at the company headquarters in Australia. Rather than having to make phone calls and rely on the reports of employees, they can simply check updated statistics online. The Internet is, for the most part, everywhere. Therefore, cloud computing allows the mobility necessary for success.

- **Versatile Compatibility**

It is an ongoing debate which is better, the Mac or PC? Despite which side of the fence you stand on this argument, it makes no difference when it comes to implementing cloud solutions into a business model. Users are often surprised to find that the various cloud apps available are accessible on both platforms.

- **Individuality**

One of the most convenient aspects of working in the cloud is that it is compatible with aspects specific to the company. For example, cloud IT services can be scaled to meet changing system demands within a single company.

Disadvantages of Cloud Computing

While the cloud benefits are numerous, this method of computation is not for all businesses. There are certain disadvantages that could persuade you that this system is not for your company, and it takes careful consideration and professional advice to determine if this is the case in any specific circumstance.

- **Less Control**

Utilizing the public cloud in business does have an obvious downside. By using this technology you risk losing a level of control over your company. While many IT managers are experimenting with various ways of implementing an in-house cloud system that runs on delivered metered services, this is not always the most lucrative business move.

- **Security and Confidentiality**

Since technology has started to expand in the exponential ways we are seeing in this day and age, cyber-crime has become a concerning issue. Cloud computing does pose the risk of increased security threats. While most companies have an up-to-date virus database, this does not make the files and information stored in the cloud immune to hackers.

- **Not Always Enough Room**

Many have been disappointed with cloud technology, because they find that once they have instituted a cloud system within their business, they run out of storage space. While it is possible to update the system, it can be a painstaking process.

Types of Cloud services

Cloud services are typically made available via a private cloud, community cloud, public cloud or hybrid cloud.

- **Public cloud** is offered over the Internet and are owned and operated by a cloud provider. Some examples include services aimed at the general public, such as online photo storage services, e-mail services, or social networking sites. However, services for enterprises can also be offered in a public cloud.
- **Private cloud**, the cloud infrastructure is operated solely for a specific organization, and is managed by the organization or a third party.
- **Community cloud**, the service is shared by several organizations and made available only to those groups. The infrastructure may be owned and operated by the organizations or by a cloud service provider.
- **Hybrid cloud** is a combination of different methods of resource pooling (for example, combining public and community clouds).

Forms of Service and Players

The forms of service that cloud computing provides today may be broken down into Managed Services, Software as a Service (SaaS), Web Services, Utility Computing and Platform as a Service (PaaS).The ideas behind these forms of service are not new. The fact that the users can tap into these services from Web browsers via the Internet makes them "cloud" services.

A managed service is aimed at delivering an application to an enterprise, rather than to end customers directly. This form of service has been available for a decade. There are many types of managed services provided via the Internet, including virus-scanning services for email, spam-filtering services (Google/Postini, etc.), security services (Secure Works, IBM, Verizon, etc.), desktop management services (Center Beam, Everdream, etc.).

There are numerous SaaS vendors (formerly known as application service providers). They run a single application in a data center and deliver the functionality via the Internet to the users. Enterprise SaaS vendors include salesforce.com (for sales force applications), Oracle/Siebel (CRM

applications), Workday (for ERP applications), Citrix (meeting applications) and numerous others. SaaS desktop applications for end users include Google Apps, Zoho Office, Microsoft Windows Live, etc. Google Apps include Gmail, Google Talk, Google Calendar, Google Docs (documents, spreadsheets, presentations and collaboration), etc. Microsoft Windows Live includes Hotmail, Messenger, and Photo Gallery. Internet portal sites, Internet search engines, and Internet social networking sites are essentially SaaS vendors for end customers.

Web services are similar to SaaS. Web service providers offer APIs that application developers can use in developing applications. Examples of Web services APIs include Google Maps, ADP payroll processing, the U.S. Postal Service, Bloomberg, credit-card processing services, etc.

Many players have recently started to offer computing resources, that is, virtual servers and storage as utility computing service. These include such heavyweights as Amazon, Sun Microsystems, IBM, and AT&T; and new vendors such as Nirvanix, Hatsize, Joyent, Cloudworks, etc.

Amazon offers Amazon Web Services (AWS), which today consists of Simple Storage Service (S3), Elastic Compute Cloud (EC2), Simple Queuing Service (which uses S3) and Simple DB. Amazon charges 15 cents a month per gigabyte of S3 storage, and 10 to 80 cents per hour for EC2 server. Amazon has 370,000 AWS customers. Amazon offers a 10% credit if S3 availability falls below 99.9% in any month. Many startup SaaS vendors provide their services on AWS. Some vendors offer entire virtual desktops with the look and feel of Microsoft Windows to those who cannot afford real desktops. Examples are Desktop Two, Zimdesk, GOPC and Sun Microsystems' Secure Global Desktop. These virtual desktops come with open source Web applications that run with Flash or Java.

PaaS also is a variation of SaaS. PaaS delivers an application development environment (platform) as a service, typically with computing resources for hosting the applications developed on the platform. Vendors include salesforce.com (Force.com), Coghead, Google (Google App Engine), Yahoo (Pipes) and Dapper.net. Google's application development platform, Google App Engine, lets application developers develop Python-based applications and hosts the application at no cost with up to 500 MB of storage.

Challenges & Issues

In this section we explain the challenges & issues cloud computing has to face. As a lot of economics is tied to this field it will be better that these issues are resolved as early as possible. Fig. 2 depicts the summary of the survey conducted by us on the basic issues of the cloud computing. The client's primary concern is taken in to account. Hence only the percentage of 4, 5 are being shown. The following are the issues that a cloud computing environment has to still resolve:

- **Security**

Can one assume that a cloud-based company will protect and secure ones data (Cloud computing presents specific challenges to privacy and security. back it up, check for data errors, defend against security breaches) if one is using their services at a very low cost? Or often for free? Once data is entrusted to a cloud based service, which third-parties do they share the information with? Cloud-sourcing involves the use of many services, and many cloud based services provide services to each other, and thus cloud-based products may have to share your information with third parties if they are involved in processing or transferring of your information. They may share your information with advertisers as well. Security presents a real threat to the cloud.

- **Performance**

Cloud computing suffers from severe performance issues. The cloud provider must ensure that the performance of the service being provided remains the same all through. There may be peak time break downs, internal flaws, and technical snags arising. Load balancer, data replicators, high end servers must be installed when needed.

- **Availability**

Even though cloud promises to be a 24X7X365 service, cloud outages occur frequently. Outages can be scheduled or unscheduled. Table 1 provides details about the downtime in hours and the economic impact of cloud outages of various cloud providers from 2007 to 2012.

Table 1: Economy Impact Table Due To Cloud Outages

	Total (Hour)	Average (Hour)	Availability	Cost (USD)
Amadeus	1	0.167	99.998	89,000
Facebook	3	0.500	99.994	600,000
ServerBeach	4	0.667	99.992	400,000
Paypal	5	0.833	99.990	1,125,000
Google	5	0.833	99.990	1,000,000
Yahoo!	6	1.000	99.989	1,200,000
Twitter	7	1.167	99.987	1,400,000
Amazon	24	4.000	99.954	4,320,000
Microsoft	31	5.167	99.941	6,200,000
Hostway	72	12.000	99.863	7,200,000
BlackBerry	72	12.000	99.863	14,400,000
Navisite	168	28.000	99.680	16,800,000
OVH	170	28.333	99.667	17,000,000
Total	568	94.667	99.917	71,734,000

- **Cost**

Cloud computing can have high costs due to its requirements for both an "always on" connection, as well as using large amounts of data back in-house.

- **Regulatory requirements**

What legislative, judicial, regulatory and policy environments are cloud-based information subject to? This question is hard to ascertain due to the decentralized and global structure of the internet, as well as of cloud computing. The information stored by cloud services is subject to the legal, regulatory and policy environments of the country of domicile of the cloud service, as well as the country in which the server infrastructure is based. This is complicated by the fact that some data in transit may also be regulated.

- **Bandwidth, quality of service and data limits**

Cloud computing requires "broadband of considerable speed" Whilst many websites are usable on non-broadband connections or slow broadband connections; cloud-based applications are often not usable. Connection speed in Kilobyte per second (or MB/s and GB/s) is important for use of cloud computing services. Also important are Quality of Service (QoS); indicators for which include the amount of time the connections are dropped, response time (ping), and the extent of the delays in the processing of network data (latency) and loss of data (packet loss).

- **Major suppliers**

Only handful providers are available in the market which is still holding back many SME's to join a cloud.

Technical Issues

To help cloud computing take root, it will be necessary to adapt various mature technologies to the cloud computing paradigm. There are some technical issues are:

- **Cloud computing software platform**

As cloud computing software platform is the heart of a cloud computing system, it will require considerable further research. Hadoop is an open source cloud computing software platform, as an alternative to the platforms developed by Google and others. It appears to be a good vehicle as a launching point for research. Yahoo is a major sponsor of the Hadoop project. IBM has adopted Hadoop for its Blue Cloud solution. Facebook uses Hadoop in its data analysis.

- **Collaboration applications**

Such means of collaboration as chat, instant messaging, and internet phone calling, etc. will be added to various popular applications. Google Docs spreadsheets already make it possible for multiple users to chat while editing a spreadsheet together.

- **Application and data integration across clouds**

The research on these subjects can leverage the available EAI, EII, and ESB technologies.

- **Continuing work on multimedia transmission and data mining**

Transmitting the bulky multimedia data across the network will continue to be a challenge, and it needs further research to speed up cloud computing. Further, as more data gets pushed to the clouds, including user-created data, the need to analyze (mine) such data to derive business-useful knowledge will increase. The data mining and machine learning communities will need to address this need.

- **Service management**

As the clouds proliferate and the users start plugging into multiple clouds, the problems of discovering and composing services that have been subjects of research in the service-oriented architecture context will need to be revisited in the cloud computing context.

Conclusion

Cloud architecture propagates too many diverse areas. Governments, municipal administrations and universities may benefit from it when employees are scattered in multiple locations. However, cloud providers have to assure compliance with legislation and requirements of the end-users.

It is also a field of intense scientific and commercial interest: algorithms dealing with load balancing, data replication and redundancy, parallel processing, virtualization, memory management, networking as well as security, authentication, large-scale data encryption and information retrieval are presented and benchmarked; flexible pricing models introduced; novel cloud-enabled applications integrated with existing platforms and devices (entertainment, applications for mobile access); and fields of research augmented via use of such affordable provisioning paradigm.

Future of the cloud is ever-changing as it came into prominence relatively recently. Research, testing, and academic—industry cooperation may shape it to best serve the needs of modern society and science.

References

1. Aoun R, Doumith EA, Gagnaire M. Resource provisioning for enriched services in Cloud environment, in Proc. IEEE Cloud Com Conf., 2010, 296-303.
2. Buyya R, Yeo CS, Venugopal S. Market oriented Cloud computing: Vision, hype, and reality for delivering IT services as computing utilities, in Proc. IEEE/ACM Grid Conf., 2008, 50-57.
3. Libor Sarga, Cloud Computing: An Overview, Journal of systems Integration, 2012, 3-14.
4. Won Kim. Cloud Computing: Today and Tomorrow, Journal of Object Technology, 2009; 8(1):65-72.