

Cloud Computing - A Bird's Eye View

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Abstract: *Cloud computing is an internet computing model where data is stored on servers that are on the Internet and temporarily cached on the clients' computing devices such as: desktop computers, laptops, hand-held mobile devices, etc. In a cloud computing architecture, all the applications are not stored in a company's hard disk, rather it resides in a third party computer. Cloud computing involves the supply of on-demand IT computing functions and utilities that are delivered from third party platforms as a service. On-demand services and components include: software-as-a-service, platform-as-a-service, and storage-as-a-service. Cloud computing is scaling investment value with growing population and provides security for the stored information.*

Keywords: Cloud Computing, IaaS, PaaS, SaaS, Public Cloud, *Private Cloud*, Hybrid Cloud Community, investment, expert, security.

1. Introduction

Around 1999, internet as the mechanism to provide Application as Service got developed in the recent years and gaining importance in the networking. In 2005, the term cloud computing became popular and the sub classification of IaaS, PaaS & SaaS got formalized. The phrase "Cloud" originates from the 'cloud symbol' used by flow charts and diagrams to symbolize the Internet. While storing photos in online instead of home computer, we use webmail or a social networking site, using a "cloud computing" service.

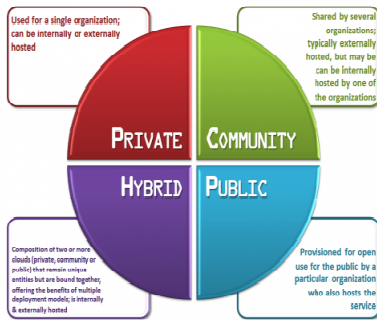
Cloud computing is the delivery of computing services over the Internet. Cloud services allow individuals and businesses to use software and hardware that are managed by third parties at remote locations. Examples of cloud services include online file storage, social networking sites, webmail, and online 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.

2. Cloud Architecture

In a cloud computing architecture, all the applications are not stored in a company's hard disk, rather it resides in a third party computer and when a company needs to use application software, and they access it via Internet. There three types:

a. **Public Cloud:** In this type of cloud form, data stored is in cloud server, which is located at a distant place elsewhere. It enables users to share and access data from anywhere and at any point of time. This means public cloud promotes shared environment. Although, a bit risky in terms of data security as business operations are done through Internet, but offers highly scalable environment.

- b. **Private Cloud:** A private cloud is beneficial for those organizations that do not want to share their confidential data with any third party. Data stored in a private cloud is secured in the firewall settings, which enable only the authorized parties to access data and do not invite any third party.
- c. As a matter of fact this type of cloud is secured than the public one because whatever data is stored on cloud is stored in in-house IT premise of an organization.
- d. **Hybrid Cloud:** A hybrid cloud is a mix of both and gives users or business entities the advantage of both the cloud environments. Suppose, a business enterprise wants to share its services and products with its clients across the globe, but at the same time wants to hide the confidential information from them, Hybrid cloud architecture would suit best for such types of businesses.
- e. **Community:** A community cloud is a multi-tenant cloud service model that is shared among several or organizations and that is governed, managed and secured commonly by all the participating organizations or a third party managed service provider. Community clouds are a hybrid form of private clouds built and operated specifically for a targeted group. These communities have similar cloud requirements and their ultimate goal is to work together to achieve their business objectives. The goal of community clouds is to have participating organizations realize the benefits of a public cloud with the added level of privacy, security, and policy compliance usually associated with a private cloud. Community clouds can be either on-premise or off-premise.



Source: JOSh Ames 2012, appcore

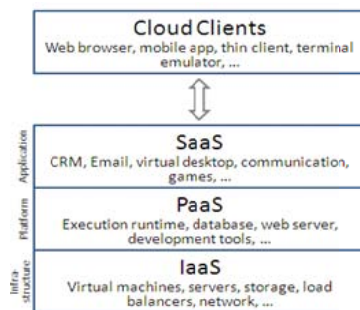
3. Cloud Computing Services

Cloud computing is a general term for anything that involves delivering hosted services over the Internet. These services are broadly divided into three categories: Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS) and Software-as-a-Service (SaaS). The following table implies that the companies that are using cloud computing services.

Services	Companies
SaaS	Salesforce.com, Apple
PaaS	Microsoft, Rackspace, IBM
IaaS	Amazon, Google

KEY COMPANIES OFFERING CLOUD PLATFORMS / SERVICES

There are three basic services of cloud computing



3.1 Infrastructure as a service (IaaS)

Most basic cloud-service model, providers IaaS offer computers - physical or virtual machines - and other resources. IaaS clouds often offer additional resources such as images in a virtual-machine image-library, raw and file-based storage, firewalls, load balancers, IP addresses, virtual local area networks (VLANs), and software bundles. IaaS-cloud providers supply these resources on-demand from their large pools.

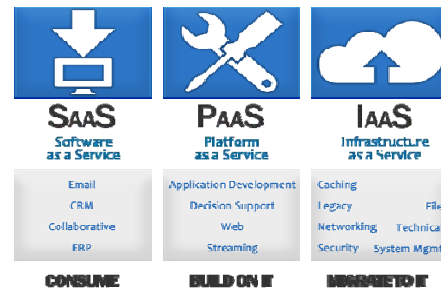
3.2 Platform as a service (PaaS)

In PaaS model, cloud providers deliver a computing platform typically including operating system, programming language execution environment, database, and web server.

Application developers can develop and run their software solutions on a cloud platform without the cost and complexity of buying and managing the underlying hardware and software layers. Some PaaS offers, storage resources automatically to match application demand such that cloud user do not have to allocate resources manually.

3.3 Software as a service (SaaS)

In the SaaS model, cloud providers install and operate application software in the cloud and cloud users access the software from cloud clients. Cloud users do not manage the cloud infrastructure and platform where the application runs. This eliminates the need to install and run the application on the cloud user's own computers, which simplifies maintenance and support. Cloud applications are different from other applications in their scalability—which can be achieved by cloning tasks onto multiple virtual machines at run-time to meet changing work demand. It is common to refer to special types of cloud based application software with a similar naming convention: desktop as service, business process as a service, test environment as a service, communication as a service.



Cloud Computing Equation: Cloud = Catalyst + Culture + Economics

3.4 Catalyst: Virtualization

It is the separation of software from hardware. Historically, deploying a given application required a server with dedicated storage. Today, that physical connection between software and hardware can be decoupled or virtualized.

Culture: IT landscape, when the network becomes as fast as the processor, the computer hollows out and spreads across the network

Economics: Demand for low cost, flexibility, scalability, reallocation.

4. Uses of Cloud Computing

a. Cloud Follows Pay

This means users will have to pay only for the amount of service used by them. Money spent on improving business through cloud doesn't prove to be expensive.

b. Cloud Technology believes in Optimization of Existing Resources

Suppose company is facing hard time in managing hardware and software stuff. Servers are running extremely low and there is not enough space left for any

new data to be stored. To overcome such a situation, cloud services are introduced so that existing servers get rest from the over loaded traffic and work environment of the company becomes more synchronized.

c. Disaster Recovery Plan Help to Restore Data Quickly on Cloud

For every cloud to be a successful one, pre-configured disaster recovery plan is must. cloud disaster recovery plan works automatically at the time a server or data crashes and help in restoring at the earliest. Incorporating such applications makes cloud an efficient platform for managing IaaS, PaaS and SaaS competitively.

d. Organizations Experience Device Independence

Cloud can reduce worry of keeping a track of hardware and software devices, we probably want to make your existing physical world into a virtual one. By managing cloud services have to bother about the IT premises.

5. Opportunities and Characteristics

- a. **On demand self services:** computer services such as email, applications, network or server service can be provided without requiring human interaction with each service provider. Cloud service providers providing on demand self services include Amazon Web Services (AWS), Microsoft, Google, IBM and Salesforce.com. New York Times and NASDAQ are examples of companies using AWS (NIST). Gartner describes this characteristic as service based
- b. **Broad network access:** Cloud Capabilities are available over the network and accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms such as mobile phones, laptops and PDAs.
- c. **Resource pooling:** The provider's computing resources are pooled together to serve multiple consumers using multiple-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand. The resources include among others storage, processing, memory, network bandwidth, virtual machines and email services. The pooling together of the resource builds economies of scale (Gartner).
- d. **Rapid elasticity:** Cloud services can be rapidly and elastically provisioned, in some cases automatically, to quickly scale out and rapidly released to quickly scale in. To the consumer, the capabilities available for provisioning often appear to be unlimited and can be purchased in any quantity at any time.
- e. **Measured service:** Cloud computing resource usage can be measured, controlled, and reported providing transparency for both the provider and consumer of the utilized service. Cloud computing services use a metering capability which enables to control and optimize resource use. This implies that just like air time, electricity or municipality water IT services are charged per usage metrics – pay per use. The more you utilize the higher the bill. Just as utility companies sell power to subscribers, and telephone companies sell voice and data services, IT services such as network security management, data center hosting or even

departmental billing can now be easily delivered as a contractual service.

- f. **Multi Tenacity:** is the 6th characteristics of cloud computing advocated by the Cloud Security Alliance. It refers to the need for policy-driven enforcement, segmentation, isolation, governance, service levels, and chargeback/billing models for different consumer constituencies. Consumers might utilize a public cloud provider's service offerings or actually be from the same organization, such as different business units rather than distinct organizational entities, but would still share infrastructure.

Technology transformations started with mainframe computers than moved on to minicomputers, PCs and the web. The next wave of transformation in IT industry is cloud computing. Companies such as Facebook have grown over the last 5 years. The growth, revenue and the market valuation was only possible by using all three corner stone's of cloud computing i.e., technology innovation, delivery model innovation and business model innovation.

6. Cloud Computing Trends

- a. **Cloud computing is scaling investment value**
Cloud computing streamlines how software, business processes, and services are accessed. More than ever before, this is helping businesses scale operations and optimize their investments. This is not only through lower costs, efficient business models, or greater agility in operations. It has a lot to do with how businesses use it to optimize their investments. In the same breadth, businesses are scaling into more innovation with their IT capacity. This will certainly help them make more investments and draw corporate income.
- b. **The emergence hybrid cloud computing**
Hybrid cloud computing combines local and cloud computing. Businesses are using cloud computing (both private and public) to supplement their internal infrastructure and applications. Experts predict that these services will optimize business process performance. The adoption of cloud services is a new development in business functions. Under these circumstances, scaling down on the strengths of both worlds will become a common feature, if it's not already happening as it is.
- c. **Growing popularity for cloud-centric design**
More than ever before, organizational design is incorporating cloud computing migration elements. This simply means the need for optimal cloud experiences is on top of the list of the companies that are adopting this technology. This is a trend that is expected to grow more as cloud computing expands into different industries.
- d. **Cloud services optimized for mobile**
The future is firmly mobile, one way or another. The exceptional rise in the number of mobile devices— tablet computers, iPhones, and smartphones—comes into play here. Many of these devices are used to scale business processes, communications, and other functions. To make cloud computing useful to business owners and employees, the cloud is taking a 'mobile' approach. More cloud computing platforms and APIs will become accessible on mobile.

e. Security

Cloud computing security is one of the most documented cloud computing issues. People are worried about the security of the data they store in the cloud. Because of this, you should expect to see more secure security applications and techniques coming up. The number of new encryption, security protocols, and so much more will grow in the future.

7. Conclusion

Cloud computing is a technology infrastructure that can revolutionize education, business, and industry and also it offers benefits to various organizations and individuals. The hardware and software environment implements services based on the environment as a cloud-computing environment. They also provides privacy and security concerns. It provides a challenge to the new and changing needs of technological needs.

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