# *Cloud Computing*

***Prof. Gaikwad Ravi Pandurang***
***and***
***Prof. Gaikwad Anil Pandurang***
*Institute of Business Management & Rural Development ,*
*Ahmednagar 414111 (MS) (INDIA)*

## Abstract

Cloud computing refers to the use of networked infrastructure software and capacity to provide resources to users in an on-demand environment. In this paper we are taking a glance on this emerging technology and the various dimensions with respect to the different vendors and implementations. The overview and relevance with Service oriented architecture is considered.

## Keywords:

Grid, cloud, SAAS, PAAS, IAAS.

## Introduction

Grid computing is the application of several computers to a single problem at the same time — usually to a scientific or technical problem that requires a great number of computer processing cycles or access to large amounts of data.One of the main grid computing strategies is to use software to divide and apportion pieces of a program among several computers, sometimes up to many thousands. Grid computing can also be thought of as distributed and large-scale cluster computing, as well as a form of network-distributed parallel processing. It can be small — confined to a network of computer workstations within a corporation, for example — or it can be a large, public collaboration across many companies or networks. "The notion of a confined grid may also known as intra-nodes cooperation whilst the notion of a larger, wider grid may thus refer to inter-nodes cooperation. This inter-/intra-nodes cooperation "across cyber-based collaborative organizations are also known as Virtual Organizations.

It is a form of distributed computing whereby a "super and virtual computer" is composed of a cluster of networked, loosely coupled computers, acting in concert to perform very large tasks. This technology has been applied to computationally intensive scientific, mathematical, and academic problems through volunteer computing, and it is used in commercial enterprises for such diverse applications as drug discovery, economic forecasting, seismic

analysis, and back-office data processing in support of e-commerce and Web services

Cloud computing refers to the use of networked infrastructure software and capacity to provide resources to users in an on-demand environment. With cloud computing, information is permanently stored in centralized servers and cached temporarily on clients, which include desktop computers, notebooks, handhelds, and other devices.

Cloud infrastructure can reside within the company's datacenters (as internal clouds or on-premise solutions) or externally on the Internet (via external clouds or off-premise solutions). It encompasses any, per-unit-accountable, subscription-based or pay-per-use service that extends IT's existing capabilities.

Clouds utilize a set of typically virtualized computers that provide users with the ability to start and stop servers or use compute cycles only when needed, often paying only upon usage By design, cloud computing is scalable, flexible and elastic –offering IT staff a way to easily increase capacity or add additional capabilities on demand, without investing in new and expensive infrastructure, training new personnel, or licensing more software.

## II. Background

Cloud computing technology is a significant trend with implications for Intel IT. A rowing number of suppliers are starting to provide cloud computing offerings, and analysts project that some enterprises will purchase a significant percentage of their applications and infrastructure as cloud computing services within a few years.

This is an emerging and somewhat confusing area, we have created definitions that provide us with a common basis for discussion and developing our strategy. We define cloud computing as a computing paradigm where services and data reside in shared resources in scalable data centers, and those services and data are accessible by any authenticated device over the Internet.

We have also identified some key attributes that distinguish cloud computing from conventional computing. Cloud computing offerings are:

- Abstracted and offered as a service.
- Built on a massively scalable infrastructure.
- Easily purchased and billed by consumption.
- Shared and multi-tenant.
- Based on dynamic, elastic, flexibly configurable resources.
- Accessible over the Internet by any device.

Today, we have identified three main categories of external service that fall within our broad cloud computing definition.

**Software as a service (SaaS):** Software deployed as a hosted service and accessed over the Internet.

**Platform as a service (PaaS):** Platforms that can be used to deploy applications provided by customers or partners of the PaaS provider.

**Infrastructure as a service (IaaS):** Computing infrastructure, such as servers, storage, and network, delivered as a cloud service, typically through virtualization.[1][2]

## III. Technology

## Cloud Computing Architecture

Cloud architecture the systems architecture of the software systems involved in the delivery of cloud computing, comprises hardware and software designed by a cloud architect who typically works for a cloud integrator. It typically involves multiple cloud components communicating with each other over application programming interfaces, usually web services.

This closely resembles the Unix philosophy of having multiple programs doing one thing well and working together over universal interfaces. Complexity is controlled and the resulting systems are more manageable than their monolithic counterparts. Cloud architecture extends to the client, where web browsers and/or software applications access cloud applications. Cloud storage architecture is loosely coupled, where metadata operations are centralized enabling the data nodes to scale into the hundreds, each independently delivering data to applications or users.[2][6]

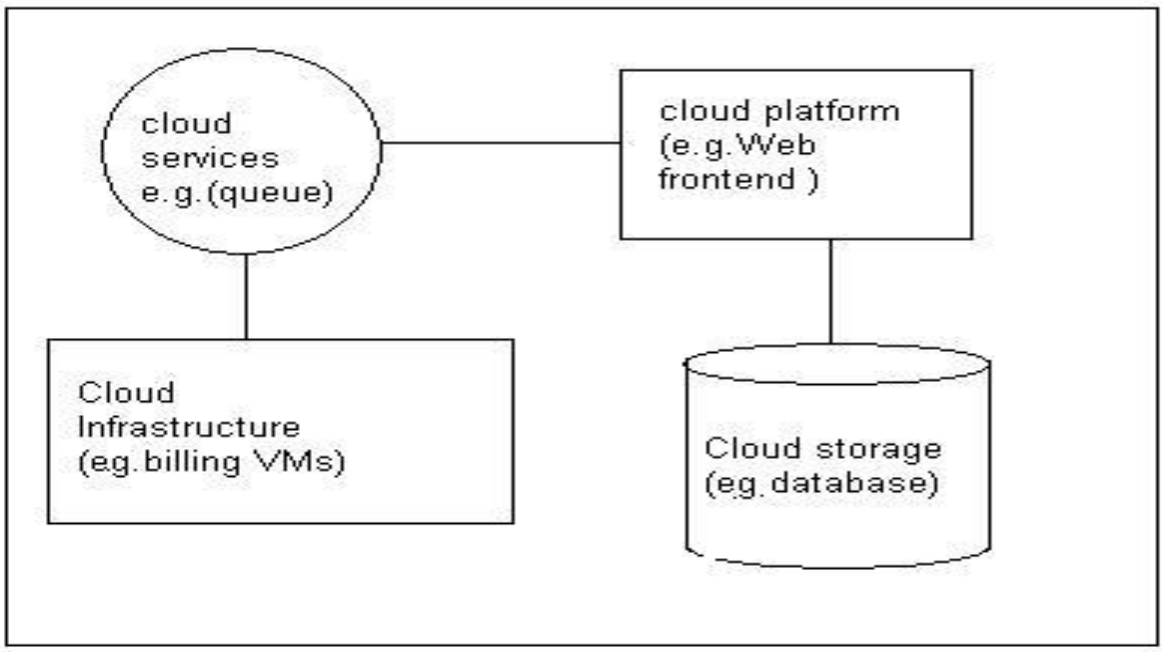


**Fig.1: Cloud Computing sample architecture**

## IV. Types

It can be helpful to look at what the customer actually purchases. There are three different use cases for cloud computing solutions:

1. **Application and Information Clouds –** Sometimes referred to as software-as-a-service, this type of cloud provides a wide range of business-level services and information to end users. Applications in this space include salesforce.com, Expedia.com and Google Apps.[1]
2. **Development Clouds –** Sometimes referred to as platform's a-service, cloud development platforms enable application authoring and provide runtime environments. Examples of software development clouds include Engine Yard, CohesiveFT, Amazon EC2 and Google App Engine.[1]
3. **Infrastructure Clouds –** Also referred to as elastic compute

clouds or infrastructure-as-a-service, this type of cloud provides virtual hardware capacity to organizations on an elastic basis. Examples of cloud infrastructure providers include Terremark Infinistructure, Amazon Web Services, Hosting.com and Savvies.[1]

All three types of cloud computing solutions can be deployed in either public or private environments.

## V. Characteristics

1. Agility improves with users able to rapidly and inexpensively re-provision technological infrastructure resources.
2. Cost is greatly reduced and capital expenditure is converted to operational expenditure. This lowers barriers to entry, as infrastructure is typically provided by a third-party and does not need to be purchased for one-time or infrequent intensive computing tasks. Pricing on a utility computing basis is fine-grained with usage-based options and minimal or no IT skills are required for implementation.[2]
3. Device and location independence enable users to access systems using a web browser regardless of their location or what device they are using (e.g., PC, mobile). As infrastructure is off-site (typically provided by a third-party) and accessed via the Internet, users can connect from anywhere.
4. Multi-tenancy enables sharing of resources and costs across a large pool of users thus allowing for:

   **Centralization** of infrastructure in locations with lower costs (such as real estate, electricity, etc.)

   **Peak-load capacity increases** (users need not engineer for highest possible load-levels)

   **Utilization and efficiency** improvements for systems that are often only 10–20% utilized.[2]
5. **Reliability** improves through the use of multiple redundant sites, which makes cloud computing suitable for business continuity and disaster recovery. Nonetheless, many major cloud computing services have suffered outages, and IT and business managers can at times do little when they are affected.[2]
6. **Scalability** via dynamic ("on-demand") provisioning of resources on a fine-grained, self-service basis near real-time, without users having to engineer for peak loads. Performance is monitored, and consistent and loosely-coupled architectures are constructed using web services as the system interface.
7. **Security** typically improves due to centralization of data, increased security-focused resources, etc., but concerns can persist about loss of control over certain sensitive data. Security is often as good as or better than under traditional systems, in part because providers are able to devote resources to solving security issues that many customers cannot afford. Providers typically log accesses, but accessing the audit logs themselves can be difficult or impossible.
8. **Sustainability** comes about through improved resource utilization, more efficient systems, and carbon neutrality Nonetheless, computers and associated infrastructure are major consumers of energy.[2]

Another area of research is promising towards the internationalization and legal rights and political issues of the relationships between the two countries. The boundaries of the two continuants or countries are not restricting the infrastructural facilities required for the implementation of the cloud architecture. This is similar to the electronic money transfer and e-Banking between to different banks.

## VI. Components

Following are the components of cloud computing:

1. Clients
2. Services
3. Application
4. Platform
5. Storage
6. Infrastructure

## VII. Applications

### 1. QuickSchools.com

QuickSchools.com is an online school management system that runs on the Application Service Provider model. It was released in mid-2008 by Maestro Planning Solutions founded in Kuala Lumpur, Malaysia in 2002. Typical features such as admissions, student information management, scheduling and grading functionalities are made available over the internet using the software as a service model.[8]

### 2. Google Docs

Google Docs is a free, Web-based word processor, spreadsheet, presentation, and form application offered by Google. It allows users to create and edit documents online while collaborating in real-time with other users. Google Docs combines the features of two services, Writely and Spreadsheets, which were merged into a single product on October 10, 2006. A third product for presentations, incorporating technology designed by Tonic Systems, was released on September 17, 2007.[8]

### 3. Google apps

Google Apps is a service from Google for using custom domain names with several Google products. It features several Web applications with similar functionality to traditional office suites, including: Gmail, Google Calendar, Talk, Docs and Sites. The Standard Edition is free and offers the same amount of storage as regular Gmail accounts. The Premier Edition, which offers 25 GB of e-mail storage, is 50 USD, 40 EUR, or 33 GBP, per year, per account. The Education Edition, which is free, combines features from the Standard and Premier editions. [8]

### 4. My phone

My Phone is an online service provided by Microsoft to synchronize specific data on Windows Mobile phones with the company's dedicated servers over the internet. The service was deployed as a beta version on February 16, 2009, when Microsoft officially announced the service at the Mobile World Congress. It enables users to backup data on their phones such as SMS messages, contacts, photos, email and tasks.[8]

## ViII. venders & providers

### Venders:

1. Data as a service(DaaS) :

   Data direct (technology)

   Strike iron (data as service)

2. Software as a service(SaaS):

   Sales force(on demand application)

   Live meeting(ms office)

   Workday

3. Platform as a services(PaaS):

   Force.com (platform as services)

   Google code.[3]

## Provider:

**1. Amezon.com**

The Amazon Web Services (AWS) are a collection of remote computing services (also called web services) offered over the Internet by Amazon.com.

- Launched in July 2002, Amazon Web Services provide online services for other web sites or client-side applications. Most of these services are not exposed directly to end users, but instead offer functionality that other developers can use. In June 2007, Amazon claimed that more than 330,000 developers had signed up to use Amazon Web Services.[6]
- Amazon Elastic Compute Cloud (EC2), providing scalable virtual private servers using Xen.
- Amazon Elastic Block Store (EBS), providing persistent block level storage volumes for EC2.
- Amazon Simple Storage Service (S3), providing Web Service based storage for applications.
- Amazon Simple Queue Service (SQS), providing a hosted message queue for web applications.
- Amazon Mechanical Turk (Mturk), managing small units of work distributed amongst many people.
- Alexa Web Services, providing traffic data, thumbnails, and other information about web sites.
- Amazon Associates Web Service (A2S, formerly Amazon E-Commerce Service or ECS), providing access to Amazon's product data and electronic commerce functionality. [9]

**2. IBM**:

IBM, one of the first major IT products and services firms to commit to cloud computing, has more than 200 cloud computing partners, many of which are startups or small firms moving into the cloud computing services market.

IBM does not offer cloud computing services directly to businesses, but it has staked out a role as a hardware and middleware supplier and a facilitator of the cloud computing market. [7]

**3. Sun Microsystems :**

Sun's approach to cloud computing blends our expertise in developing open source software and communities with unique design innovation. Sun's Open Cloud platform is the first step in delivering on our vision of a world that has many clouds that are both open and interoperable. Sun' cloud architecture empowers developers with the expanded interoperability and freedom of choice they need to easily take advantage of the agility, efficiency and cost benefits of cloud computing.

At the core of the Sun Cloud will be the first two services - Sun Cloud Storage Service and Sun Cloud Compute Service - which will be available this summer.

The data center clouds allows the online development azure Services Platform is an application platform in the cloud that allows applications to be hosted and run efficiently.

## IX. Conclusion

At the end of the whole discussion we are at the point that the cloud computing is very useful and emerging technology for resource sharing such as storage, service etc. the future. It is useful for small, medium as well as large organization. The security in the cloud computing is emerging area of research at the various boundaries of the layered architecture. The optimization issues are important issues in the future work.

## References

1. "Eight key ingredients building internal cloud from". VMWare Ltd.
2. http://en.wikipedia.org/wiki/Cloud_computing#Key_characteristics [Accessed on date 29th June 2009].
3. http://en.wikipedia.org/wiki/Cloud_computing#Vendor
4. [access on date 25th June 2009]
5. http://en.wikipedia.org/wiki/Category:Cloud_computing_providers [Accessed on date July 4, 2009]
6. Building GrepTheWeb in the Cloud, Part 1: Cloud Architectures
7. (www.amazon.com)http://phx.corporateir.net/phoenix.zhtml?c=176060&p=irol-newsArticle&ID=1012590&highlight
8. http://www.redherring.com/home/25558
9. http://en.wikipedia.org/wiki/Category:Cloud_applications
10. http://en.wikipedia.org/wiki/Amazon.com