

Cloud Computing: An Innovative Approach in IT

With every day innovations in IT world, the way IT corporations and business organizations benefitting from such innovations keeps growing. Cloud computing is a major shifting in the way IT organs in the organizations worldwide is going to look like and perform in the near future. It has already become a buzzword in major IT forums. The name cloud computing was inspired by the cloud symbol that is often used to represent the Internet in flow charts and diagrams.

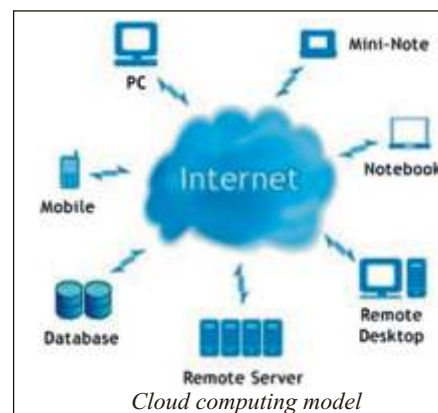


Sendil Kumar
District Informatics Officer
kumar.sendil@nic.in

Cloud computing can be defined as a paradigm shift in the use and consumption of computing and its resources over internet. With cloud computing, business organizations don't need to invest on expensive computing resources. A new breed of organization will emerge which will offer the computing infrastructure as a service over the web i.e organizations mostly small and medium enterprises no longer need to invest on procuring and maintaining computing resources such as high-end servers, storage servers, connectivity infrastructure etc. The service provider will set up and maintain the computing servers, SANs and other resources. The consumer organizations can simply connect to the service endpoints to perform their IT tasks. These organizations will need to pay per usage basis which is really going to be good news to small and growing business organizations.

Public Vs Private Clouds

A cloud can be made as private or public. A public cloud sells services to anyone on the Internet, (at present, Amazon Web Services is the largest public cloud provider). A private cloud is a proprietary network or a data center that supplies hosted services to a limited number of



people. When a service provider uses public cloud resources to create their private cloud, the result is called a virtual private cloud. Be it private or public, the goal of cloud computing is to provide easy, scalable access to computing resources and IT services.

Categorization of services in cloud computing:

Infrastructure as a Service (IaaS):

The Infrastructure service includes offering high end processing servers, database servers, and the connectivity backbone which are necessary to run software applications. Amazon Web Services provides virtual server instances with unique IP addresses and blocks of storage on demand. Customers use the provider's application program interface (API) to start, stop, access and configure their virtual servers and storage. In the enterprise, cloud computing allows a company to pay for only as much capacity as is needed, and bring more online as soon as required.

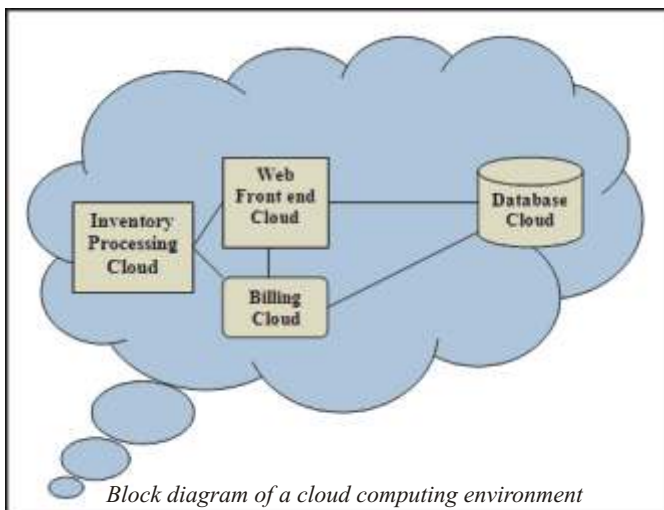
Software as a Service (SaaS): In the software-as-a-service cloud model, the vendor supplies the hardware infrastructure, the software product and interacts with the user through a front-end portal. SaaS is a very broad market. Services can be from Web-based email to inventory control and database processing. Because the service provider hosts both the application and the data, the end user is free to use the service from anywhere.

Platform as a Service (PaaS):

Platform-as-a-service in the cloud is defined as a set of software and product development tools hosted on the provider's infrastructure. Developers create applications on the

provider's platform over the Internet. PaaS providers may use APIs, website portals or gateway software installed on the customer's computer. Googleapps is a better example of a PaaS system.

A lot of new technologies in resource management such as VMware have made it possible to build a robust system with multiple operating systems and better optimize the usage of the computing power with maximum reliability of service. Thus, the service provider can build such multi-OS system with a variety of application development tools to cater to the needs of different types of application to be run on different OS platforms.



Key characteristics

- Agility improves with users able to rapidly and inexpensively upgrade/degrade technological infrastructure resources.
- Cost is claimed to be greatly reduced and capital expenditure is converted to operational expenditure. This significantly 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 fewer IT skills are required for implementation (in-house).
- Resource and location independence enable users to access computing systems using a web browser regardless of their locations. As infrastructure is off-site (typically provided by a third-party) and accessed via the Internet, users can connect from anywhere.
- 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 1020% utilized.
- Reliability improves through the use of multiple backup sites, which makes cloud computing suitable for business continuity and disaster recovery.
- Performance 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.
- 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, and the lack of security for stored kernels. Security is often 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. Furthermore, the complexity of security is greatly increased when data is distributed over a wider area and/ or number of devices.
- Sustainability comes about through improved resource utilization, more efficient systems, and carbon neutrality. Nonetheless, computers and associated infrastructure are major consumers of energy.

Cloud computing is going to be great boon for business houses worldwide. With the introduction of netbooks, anyone with an internet can perform tasks involving highly complex processing and data loads. Netbooks even though are smaller in processing power and storage compared to PCs, with the introduction of cloud computing, netbooks can take the place of personal computers and servers in the IT architecture diagrams. With the evolution of cloud computing, another concept called Remote Infrastructure management is evolving rapidly and has been adopted by some of the IT giants worldwide. **i**

For further information, contact

Sandil Kumar

District Informatics Officer
NIC District Informatics Centre,
Anuppur District, Madhya Pradesh