

☛☛ CLOUD COMPUTING

Cloud computing is the Internet based computing, whereby shared resources, software, and information are provided to computers and other devices on demand, like the electricity grid. A basic definition of cloud computing is the use of the Internet for the tasks you perform on your computer for storage, retrieval and access. The "cloud" represents the Internet. Cloud computing is a new name for an old concept: the delivery of computing services from a remote location. Cloud computing services are delivered through a network, usually the Internet.

Figure 4.3 shows you the overview of cloud computing system :

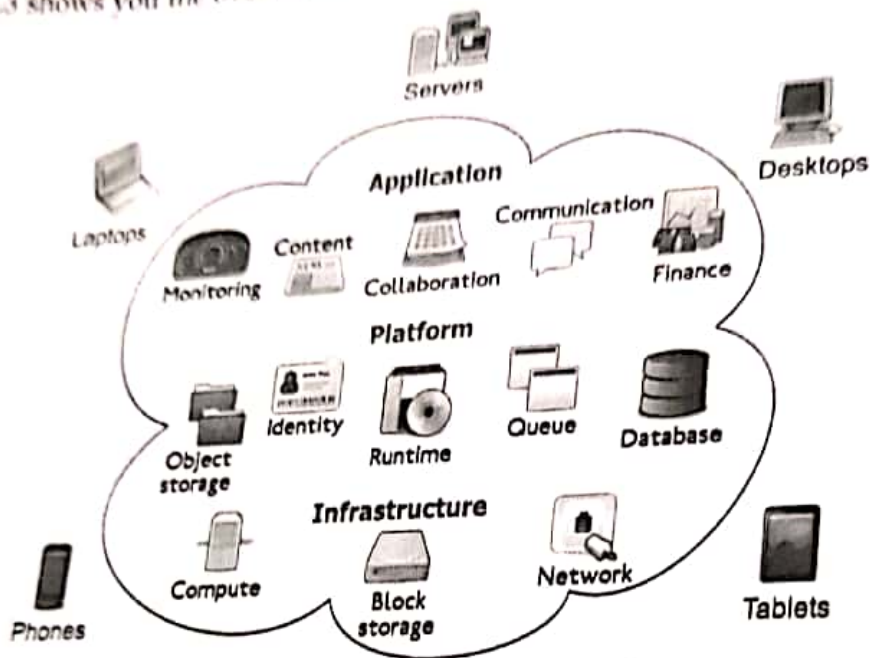


Figure 4.3 Cloud Computing¹

Characteristics

Cloud computing has following five essential characteristics :

1. **On-demand self-service.** Users are able to provision, monitor and manage computing resources as needed without the help of human administrators.
2. **Broad network access.** Computing services are delivered over standard networks and heterogeneous devices.
3. **Rapid elasticity.** IT resources are able to scale out and in quickly and on as needed basis.
4. **Resource pooling.** IT resources are shared across multiple applications and tenants in a non-dedicated manner.
5. **Measured service.** IT resource utilization is tracked for each application and tenant, typically for public cloud billing or private cloud chargeback.

Common cloud examples are : Google Drive, iCloud, Microsoft Azure, One Drive etc.

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The client consists of hardware and software that access cloud services. A client can be a **thick client** or a **thin client**. A **thick client** refers to a fully functional computer on each desk whereas a **thin client** machine provides just the functionality needed to accomplish the necessary tasks. Examples of *thin clients* include new age smartphones, tablets etc.

NOTE

Some freely available public clouds are **Google Drive, Amazon Web Services (AWS)** – Which comes free for trial, free starter plan of Red Hat Open Shift.

4.4.1 Cloud Services

Using clouds, many types of services are offered, accessible through clients. There are broadly *three* types of cloud services offered that allow the clients to use an application or a platform or an infrastructure.

Common types of cloud services are being discussed below.

(i) Software as a Service (SaaS)

In this type of service, a complete application is offered to the customer, as a service on demand, the on-demand service. With SaaS, you don't have to worry about the installation, setup and running of the application. Service provider will do that for you. You just have to pay and use it through some client. For example, to use office applications online, to use email services online, sending bulk emails using a software, web conferencing, customer relationship management, project management, invoicing and many more. The Sipo app available with this book also uses some type of SaaS. Today SaaS is offered by companies such as Google, Salesforce, Microsoft, Zoho, etc.

Examples of commonly available SaaS are : *Google Apps, Microsoft Office 365, Zoho One, Zoho CRM, Salesforce Customer 360 etc.*

(ii) Platform as a Service (PaaS)

In this type of service, a development environment is offered as a service, upon which other higher levels of service can be built. PaaS provides the computing platforms which typically include *operating system, programming language execution environment, database, web server* and so forth. For instance, PaaS can make you available a preconfigured Server and a front end to work on databases. The customer has the freedom to build his own applications, which run on the provider's platform. To meet manageability and scalability requirements of the applications, PaaS providers offer a predefined combination of OS and application servers, such as LAMP platform (Linux, Apache, MySQL and PHP), restricted J2EE, Ruby etc.

Examples of commonly available PaaS are : *AWS Elastic Beanstalk, Windows Azure, Heroku, Force.com, Google App Engine, Apache Stratos.*

(iii) Infrastructure as a Service (IaaS)

IaaS provides basic storage and computing capabilities as standardized services over the network. **IaaS** provides the *computing infrastructure, physical or virtual machines like servers,* and other resources like *virtual-machine disk image library, block and file-based storage,*

firewalls, load balancers, IP addresses, virtual local area networks and so forth. The customer would typically deploy his own software on the infrastructure.

Examples of commonly available IaaS are : Amazon EC2, Windows Azure, Rackspace, Google Compute Engine and many more.

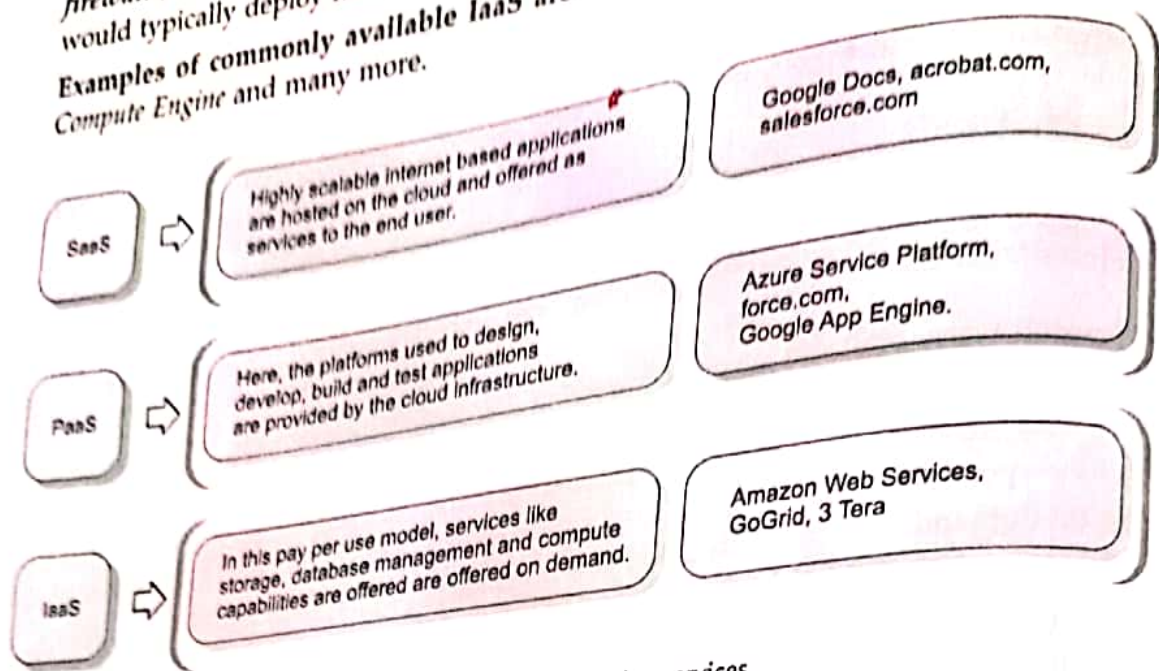


Figure 4.4 Types of Cloud computing services.

4.4.2 Types of Clouds

There are different types of clouds that you can subscribe to depending on your needs. As a home user or small business owner, you will most likely use public cloud services. Enterprises can choose to deploy applications on Public, Private or Hybrid clouds.

1. Private Clouds

A private cloud consists of computing resources used **exclusively owned by one business or organization**. In a private cloud, the services and infrastructure are always maintained on a private network and the hardware and software are dedicated solely to one organization.

Private clouds are often used by government agencies, financial institutions, any other mid- to large-size organizations with business-critical operations seeking enhanced control over their environment. A private cloud, also known as an internal or enterprise cloud, resides on company's intranet or hosted data center where all the data is protected behind a firewall.

2. Public Clouds

Public cloud refers to a **common cloud service** made available to multiple subscribers. The cloud resources (like servers and storage) are owned and operated by a third-party cloud service provider and delivered over the Internet. In a public cloud, you share the same hardware, storage, and network devices with other organizations that use the same cloud, called **cloud "tenants."**

Public cloud deployments are frequently used to provide web-based email, online office applications, storage, and testing and development environments.

Microsoft Azure, Google drive, Amazon Cloud Drive, iCloud etc. are examples of public cloud. The combination of public and private clouds is called the **hybrid cloud** and the clouds used by a group of related organizations is called the **community cloud**.