**Cloud Computing:** Is where software applications, data storage and processing capacity are accessed on internet.

[Cloud refers to Abstraction and Virtualization concepts]

**Three ways to cloud computing:**

* SAAS – Software as a Service
* PAAS – Product as a Service
* IAAS – Infrastructure as a Service.

**SAAS**: Allows users to run existing online application.

Is a easiest way cloud compute where off=the-shelf applications are accessed over the internet.

Free or paid, accessible from any computer, facilities collaborative working.

Example:

google docs, salesforce, pixlr, CRM, ERP, etc. (paid or subscription based).

**PAAS**: Allows users to create their own cloud applications using supplier-specific tools and languages.

Provides an environment and tools for creating their new online applications.

Example:

google app engine is product where anyone create, run and maintain their own web application.

Microsoft has Azure allows user to develop and run windows application Microsoft region of its cloud.

Salesforce’s force.com web application built and run.

**IAAS**: Allows users to run any applications they please on cloud hardware of their own choice.

Allows a business to run existing applications on a cloud supplier’s hardware.

It means existing company’s applications can be migrated from company data center.

The **fundamental unit** in **cloud infrastructure** is a **server**.

* Servers can be physical or virtual.
* Physical Server is individual computers.

Virtual Server instances or software control spices of real physical server but shared among the users by a process called Virtualization. [Virtualization allows many users to share one physical server].

Depending on types of servers involved, IAAS comes in 4 categories.

**Private cloud**: where specific number of physical servers are dedicated to one customer.

**Dedicated Hosting**: where customer rents physical servers on-demand with cost matching their demand.

**Hybrid Hosting**: mix of physical servers and virtual Server instances are rented on demand in effort reduce cost and further increase flexibility.

**Cloud Hosting**: where a customer rents virtual server instances on-demand and often on an hourly basis.

Several companies are offering IAAS marketplace

For example, Amazon offers a number of cloud hosting products.

Rockspace, GoGrid

Cloud computing costs:

Unit cost is usually defined as the cost of a machine instance per hour or another resource.

A platform is a cloud computing service that is both hardware and software.

VOIP: Voice Over IP: is a set of communication protocols for delivering voice over the internet.

IMS: IP Multimedia Subsystem.

MGCP: Media Gateway Control Protocol ( light weight protocol).

SKYPe Protocol: peer to peer model (closed service) protocol.

Google – uses VOIP protocol for streaming services, googleTalk is google voice.

IAAS: providers rely on virtual machine technology to deliver services.

[Most large infrastructure as service providers rely on the virtual machine technology that can run applications]

The virtual machines are containers that are assigned specific resources, means software that runs in the virtual machine is what defines the utility of the cloud computing system.

VMM Component is called Hypervisor.

The application such as Web Server or Database Server that can run on a Virtual Machine Image are referred to as Virtual application ( Image of Machine that serves a narrow purpose).

VMM manages i/o for the virtual machines.

VMM allows different operating systems to run in their own memory space.

Amazon Machine Images are virtual appliance that have been packaged to run on the grid of Xen nodes.

Hypervisor (or) Virtual Machine Monitor (CMM) : Is a piece of computer software, firmware or hardware that creates and runs virtual machine.

A computer on which Hypervisor runs one or more Virtual machine are called as Host Machines and each virtual machine is called as Guest Machines.

The Hypervisor presents the guest operating system with virtual operating platform and manage execution of guest operating system.

Multiple instance of variety of operating systems may share Virtualized Hardware resources.

Multiple instances share a single Kernel.

Types of Hypervisors: Type 1 Hypervisor and Type 2 Hypervisor.