Cloud Computing:

It is widely distributed, it is purely N/W based, it is kind of storage storage

It is the delivery of on-demand computing **service** over the **internet** on a pay-as-you-go basis

Cloud:

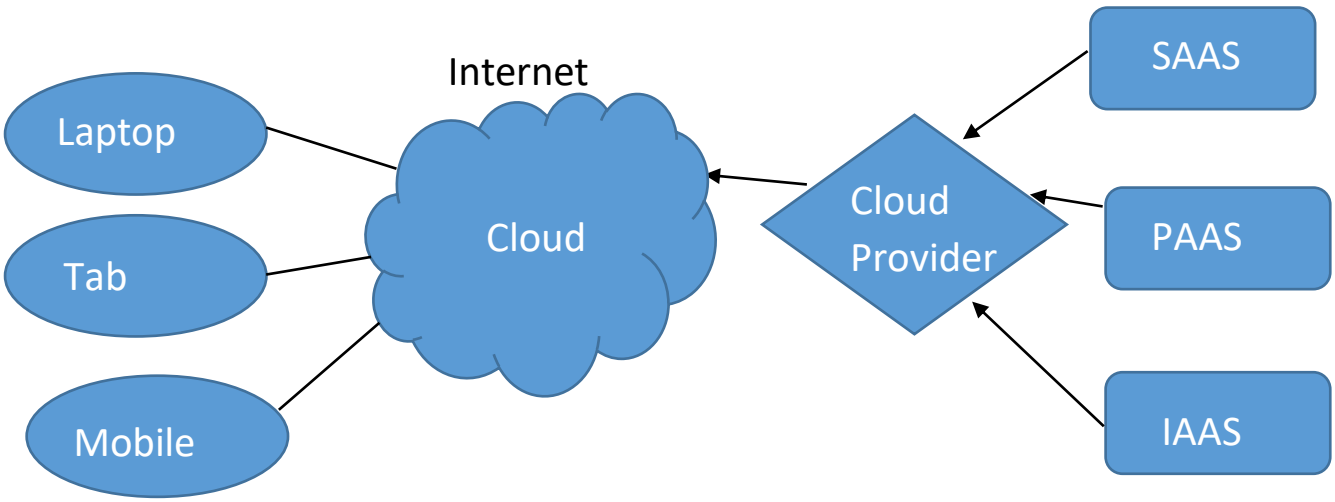
“you are using just some one’s server to host, process or to store the data”

Customer oriented definition:

- Any Time
- Any Where
- With any Device
- Accessing any Service (SAAS,PAAS,IAAS)

Business oriented definition:

- Universal Access
- Scalable Service
- New application service models (xAAS)
- Pay-as- you-go (eg-Gmail(15GB Free))



Evolution of Cloud Computing:

- Grid Computing
  - Solving large problems with parallel computing
  - Made main steams with Globus alliance
- Utility Computer
  - Offering computer services as a metered service
  - Introduce in late 1990's
- Software As A Services
  - Purely Network based subscription to applications
  - Gained momentum in 2001
- Cloud Computing
  - It is next generation **Internet Computing**
  - It is a next generation **Data Centre**

Why Cloud Computing:

Own Premises /Personal Sys/Single organi.	**Cloud Computing**
1) Higher pay, less scalability	Pay for what you use
2) Allot huge space for servers	No servers required
3) No automatic pupation	Automatic software updates
4) Appoint team for h/w and s/w maintenance	No Requirements
5) Lack of flexibility (can't exceeds storage)	High flexibility
6) Data can't access remotely	Data can be accessed & share anywhere over the internet
7) Takes longer implementation time	Rapid implementation
8) Poor data security	Better data security

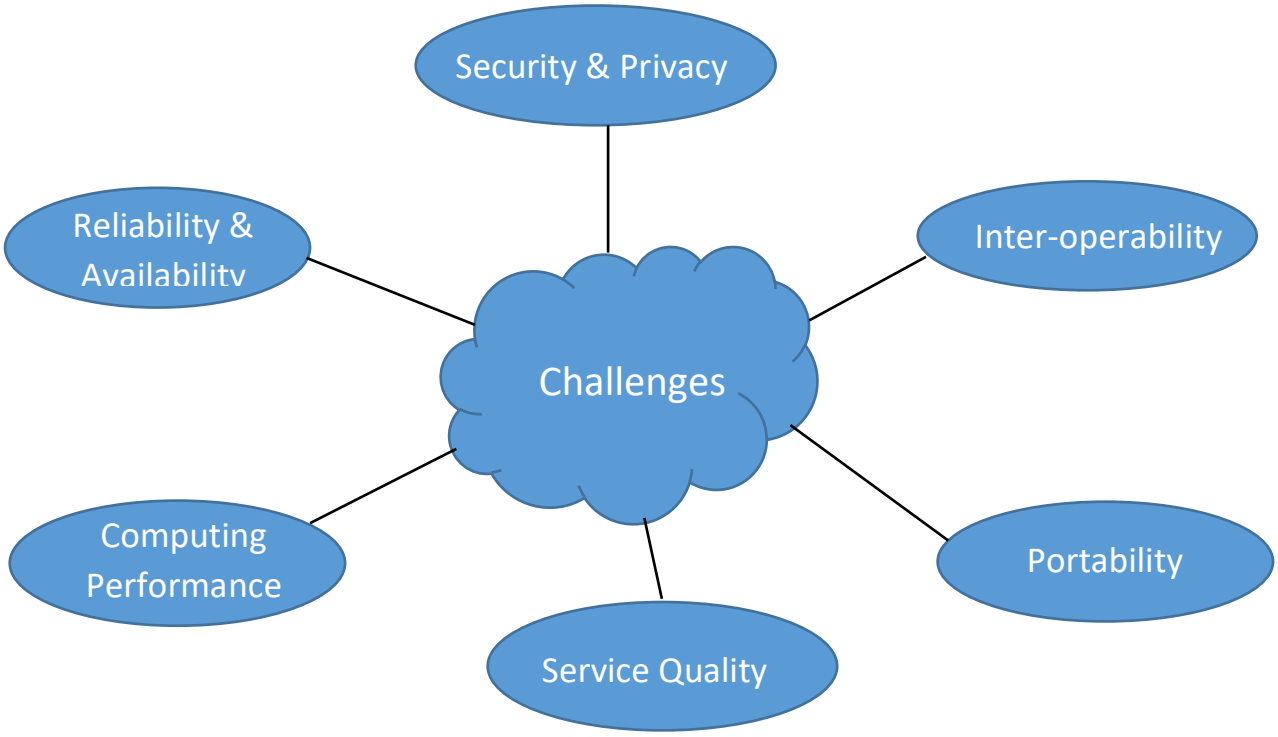
Cloud Computing Applications :

Cloud computing is applied in almost all the fields like –

- Business (Mailchimp , chatter , google apps , Quick books)
- Entertainment (Audiobox.fm)
- Data Storage & Backup Services (Box.net, Mozy, Joukuu)
- Social Networking (Facebook, twitter)

- Art (Moo)
- Management (Toggle , Evernote, Outright)

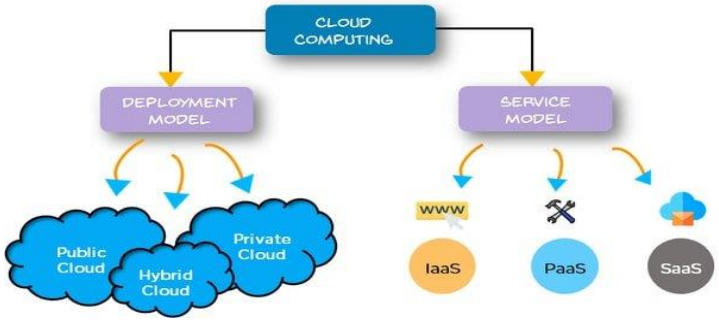
Challenges in Cloud Computing:



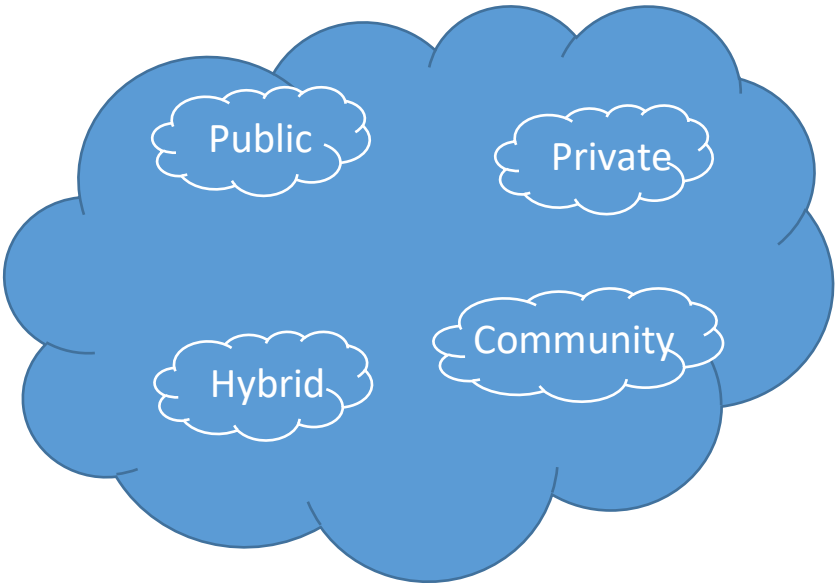
Basic Concept of Cloud computing Architecture:

There are certain **services** and **models** working behind the scene making the cloud computing **feasible** & **accessible** to end users. Following are the working models for Cloud Computing –

1. Deployment Models
2. Service Models



1) Deployment Models -

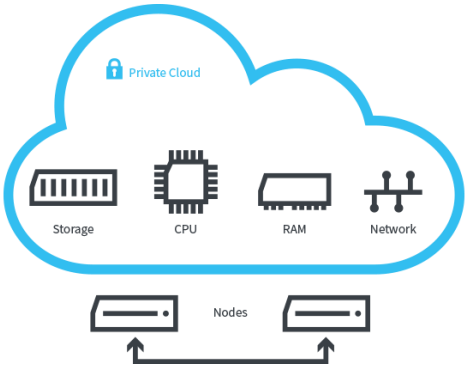


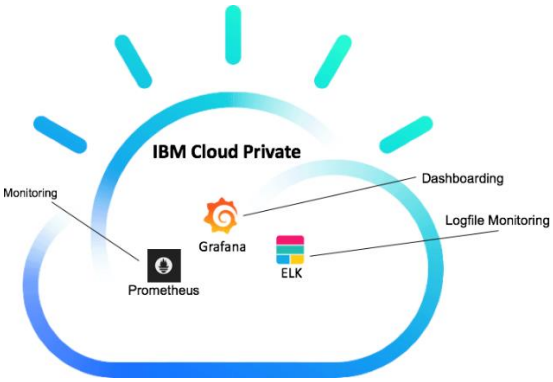
a) Public Cloud –

- It allows system or services to be easily accessible to the general public
- Like:- **Google** , **Amazon** , **Microsoft** offers cloud services via internet to the public

b) Private Cloud –

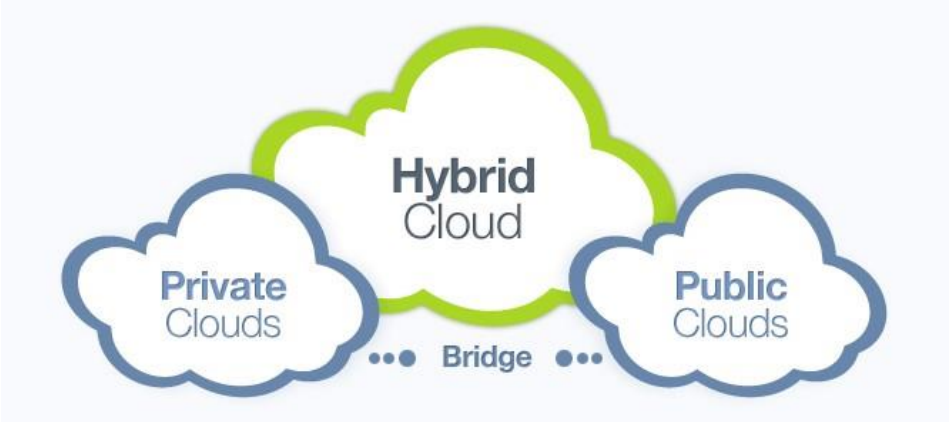
- It allows system & services to be accessible within organization
- It can be managed internally by organization itself & by third party





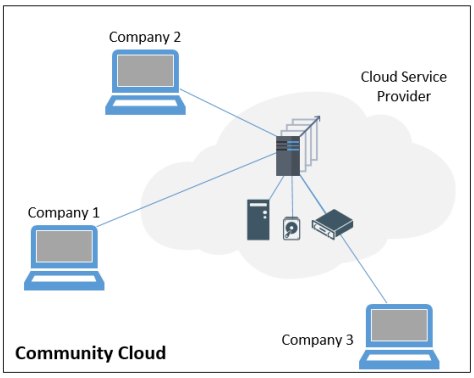
C) Private Cloud –

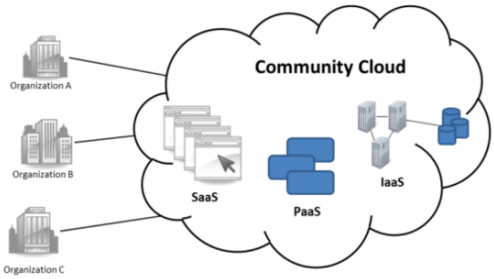
- It is a mixture of Public & Private cloud
- Non critical activities are performed by the **Public Cloud**
- Critical activities are performed by the **Private Cloud**

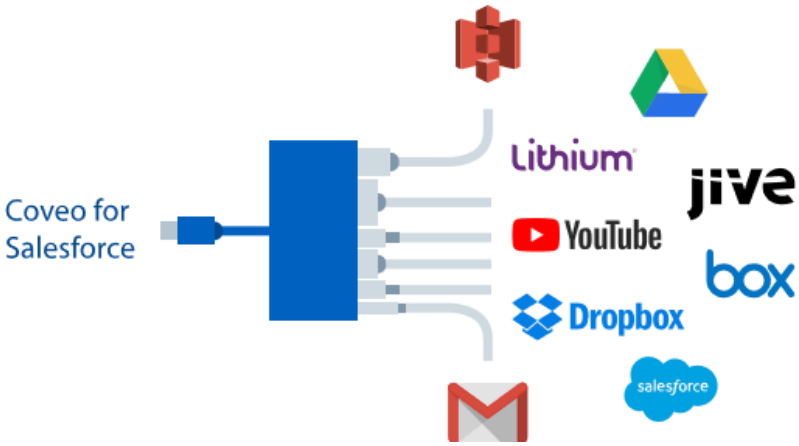


D) Community Cloud –

- It allows System & Services to be accessible by group of organization
- It meets the shared concerns
- It shares infrastructure between several organization from a specific community
- It may be manged internally by organization or third party

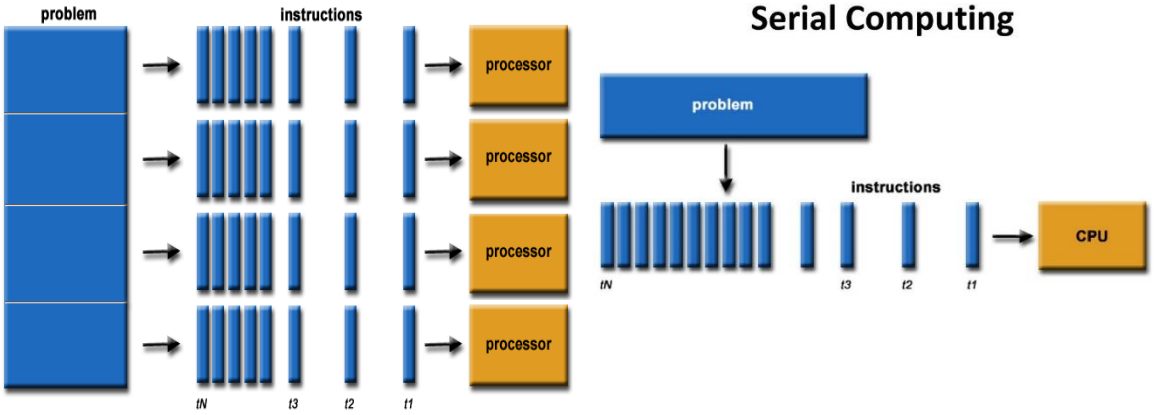






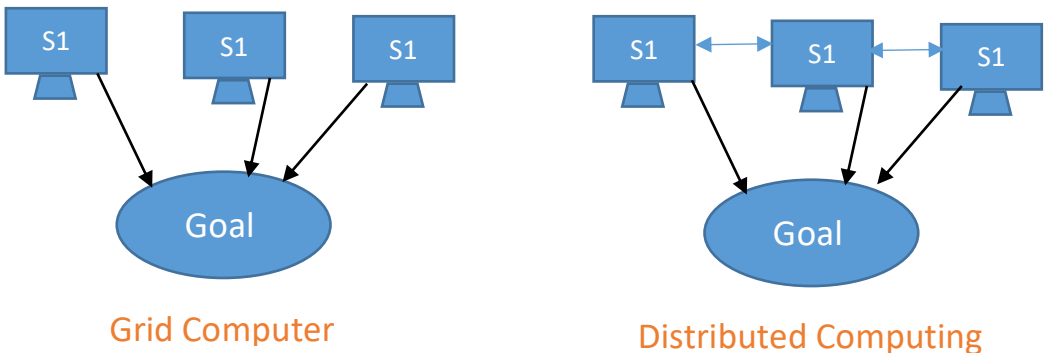
Parallel Computing:

- It is a form of computation in which many calculations are carried out simultaneously.
- To be run using multiple CPU's
- A problem is broken into discrete parts that can be solve concurrently.
- Each part is further broken down to a series of instructions.
- Finally instruction from each part execute simultaneously on different CPU's



Grid Computing:

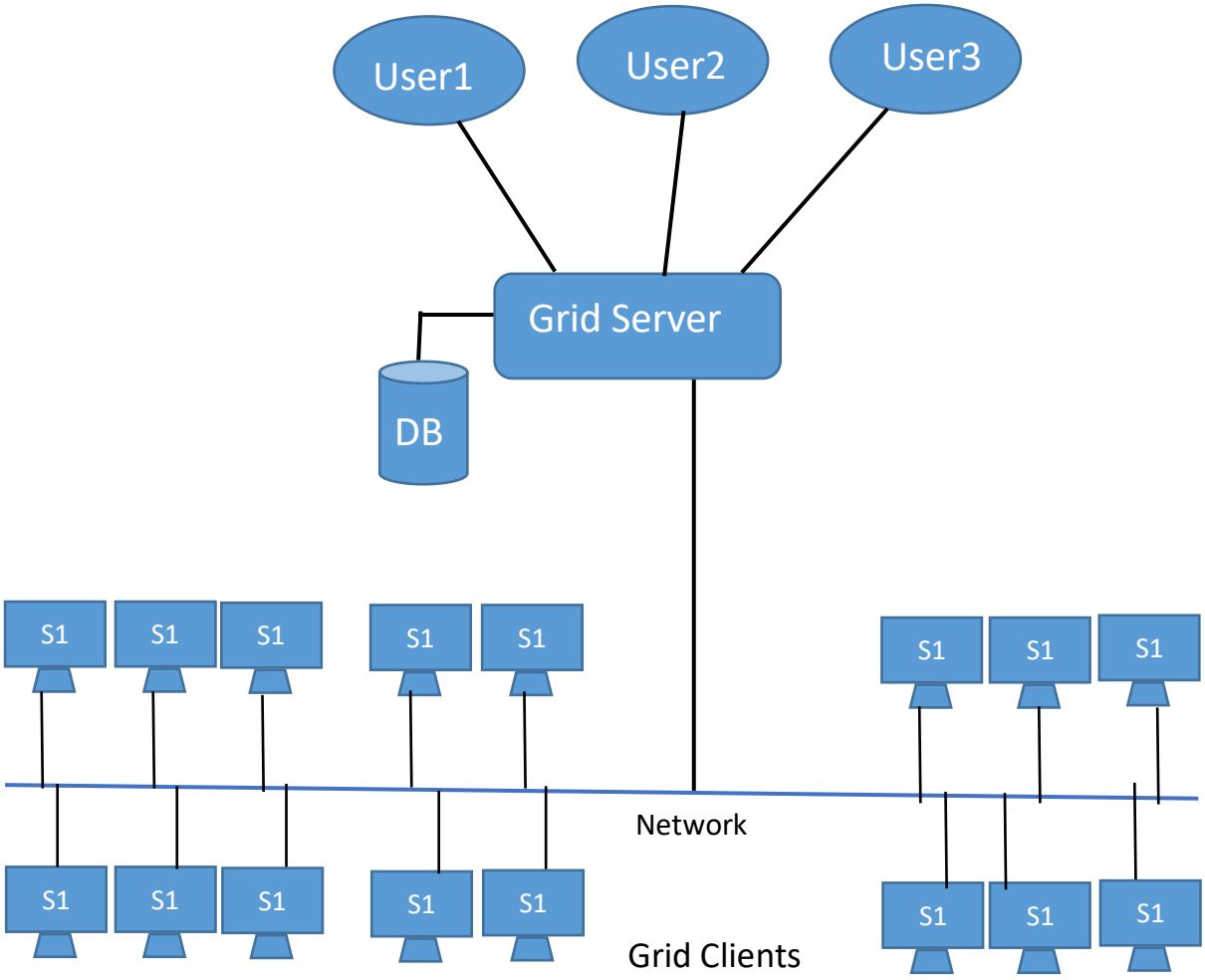
- It is a collection of computer resources from multiple location to reach a common goal.
- Grid can be thought as distributed system with **non-interactive workload** that involve a large number of files



Grid Computer

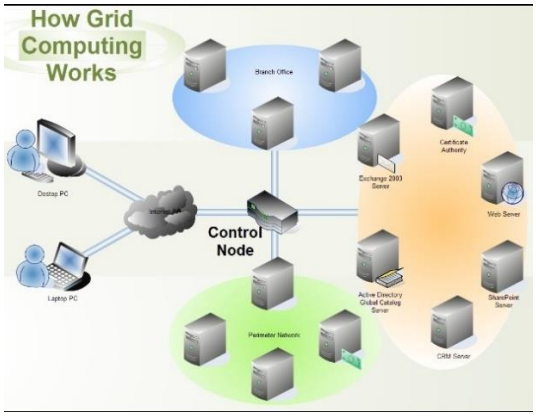
Distributed Computing

- It is a h/w & s/w infrastructure that provides dependable , consistent & inexpensive access to high and computational capabilities.
- It links together computing resources (PC's, Workstations, servers, storage elements et.) and provides a mechanism to access them.



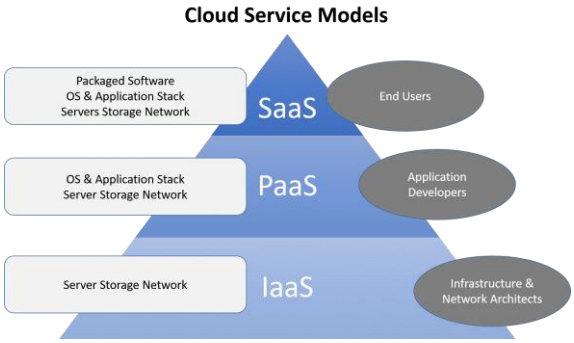
In general a Grid System requires:

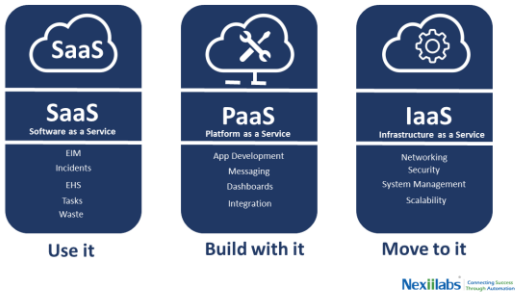
- At least one computer, usually a server which handles all the administrative duties
- A network of computers running special grid computing network software
- A collection of computers software called middleware



2) Service Models:

- The Service models are the reference model on cloud computing is based
- These categorized in three basic service models –
    1. **Infrastructure as a Service (IAAS)**
    2. **Platform as a Service (PAAS)**
    3. **Software as a Service (SAAS)**



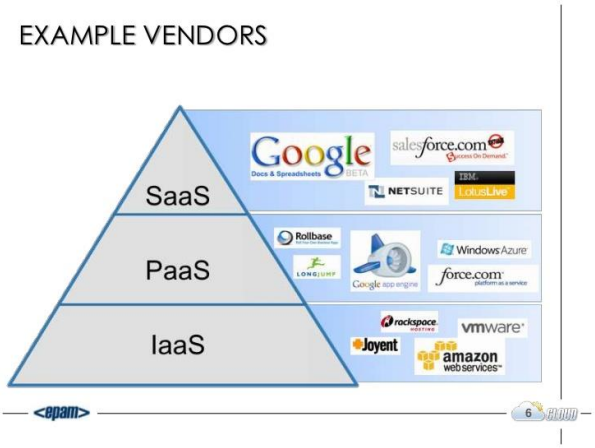


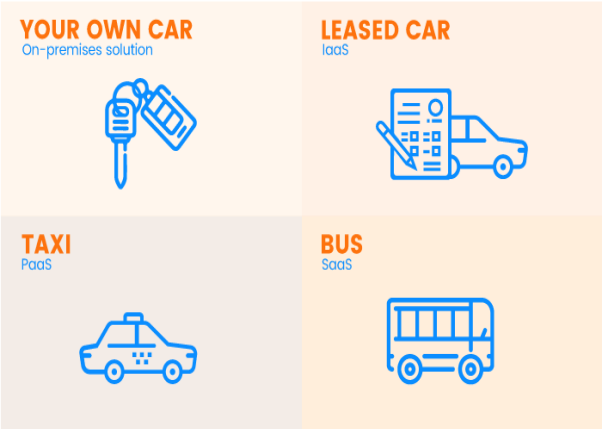
1. Infrastructure as a Service (IAAS) :

- It means, outsourcing of the physical infrastructure of IT (**network**, **storage**, and **servers**) from a third party provider. (**AWS** , **GoGrid** etc.)
- The IT resources are hosted on external servers and users can access them via an **internet connection**.
- All this resources are available to end users via **Server Virtualization**
- These resources are accessed by the customers as if they **own them**
- Organizations use their own platforms and applications with a **service provider's infrastructure**
- **It also provides :**
  - Virtual machine disk storage
  - Virtual Local area network (VLAN's)
  - Load Balances
  - IP Address
- **Key features :**
  - Instead of purchasing h/w **outright**, users pay for IAAS on demand
  - Infrastructure is **scalable** depending on processing on storage needs
- **Issues with IAAS :**
  - Compatibility with legacy (legacy s/w) security penetrability
  - Virtual machine sprawl/out of date (as per security updates)
  - Data erase practices
- **For Who IAAS is :**
  - This cloud computing service model is ideal for large accounts, enterprises or organizations capable of building and managing their own IT platforms.
  - However, they want the flexibility to amend their infrastructure according to their needs.

2. Infrastructure as a Service (PAAS) :

- It provides **runtime environment** for applications, **development** & **deployment** tools etc.
- Provides the facilities required to support the complete life cycle of **building** & **delivering web applications** and **services** entirely from the **internet**
- **Key features :**
  - It provides a platform with **tool (IDE)** to **test**, **develop** and **host applications** in the same environment
  - Enables organization to **focus on development** without to worry about underlying infrastructure
  - Provides manage security, operating system, server and backups
  - Facilities collaborative works even if team work remotely
- **PAAS Benefits :**
  - Lower administrative overhead
  - Lower total cost of ownership
  - Scalable solutions (as per demand)
  - More current system s/w
- **Issues with PAAS :**
  - Lack of portability b/w PAAS clouds
  - Event based processes scheduling
  - Security engineering of PAAS applications
- **Type of PAAS :**
  - Application delivery only environment (on-demand-scaling)
  - Standalone development environment (work as independent)
  - Open platform as a service –OAAS (offers open-source applications)
  - Add-On development facilities (customize existing SAAS Platform)
- **For Who PAAS is :**
  - It is ideal for companies wanting to maintain control over their business applications.
  - However, they wish to get rid of constraints to manage the hardware infrastructure and software environment.





3. Software as a Service (SAAS) :

- It is a **s/w distribution** model in which applications are hosted by a vendor or service provider and made available to customers over a network , typically the **internet**
- Some of SAAS application are not customizable such as **Microsoft Office Suite**
- But it provides us **API** , which allows developer to develop a customize application
- You are entirely free from the infrastructure management and aligning software environment: no installation or software maintenance.
- **SAAS Applications :**
  - Billing & invoice system
  - Customer Relationship Management (CRM) application
  - Help Desk Application
  - Human Resources (HR) Solutions
- **SAAS Benefits :**
  - Easier administration
  - Automatic updates & patch management
  - **Compatibility**, all users will have the same version of s/w
  - Easier collaboration for the same reason
  - Global accessibility
- **Issues with SAAS :**
  - Browser based risk
  - Network dependency
  - Lack of portability b/w SAAS clouds
- **For Who SAAS is :**
  - SAAS model accounts for 60% of sales of cloud solutions. Hence, it is applicable and preferred by most companies