CC

Unit 1 Introduction to Cloud Computing

What exactly is the cloud?

⇒
- The cloud is the Internet.
- Specifically, it's all the things you can access remotly over the Internet.
- It means it's stored on Internet servers instead of your computer's hard drive.
- Cloud computing means storing and accessing data and programs over the internet instead of your computer's hard drive

Why Cloud Computing? / Benefits of cc:

→
- Speed to market :- developing in cc enable to develop quickly
- Data security :- Hardware failure do not result in data lost
- Saving on equipment
- 24/7 service
- Pay as you use
- Lower TCO : (total cost of ownership)
- Reliability, scalibility, sustainability
- Highly Automated.

✡ Characteristics:

- on-demand self-service
- Broad network access
- Resource pooling
- Rapid elasticity
- Measured services
- Security
- Cost reduction
- Automatic software update
- Scalability.
- Broad Network access
- Device Independency
- Location Independency.

~~Benefits of cloud~~

✡ Challenges :-

- Security & privacy
- Managing cloud spend
- Portability
- service quality
- Interoperability
- Availability & Realibility
- Compliance Managing Multiple clouds
- Lack of Resources / Expertise
- Governance / control
- Building a private cloud Computing performance.

Imp
Machine reference model.

Virtualization in Cloud Computing:

→ Virtualization is technology that you can use to create virtual representations of servers, storage, networks, and other physical machines.

Virtual software mimics the functions of physical hardware to run multiple virtual machines simultaneously on single physical machine.

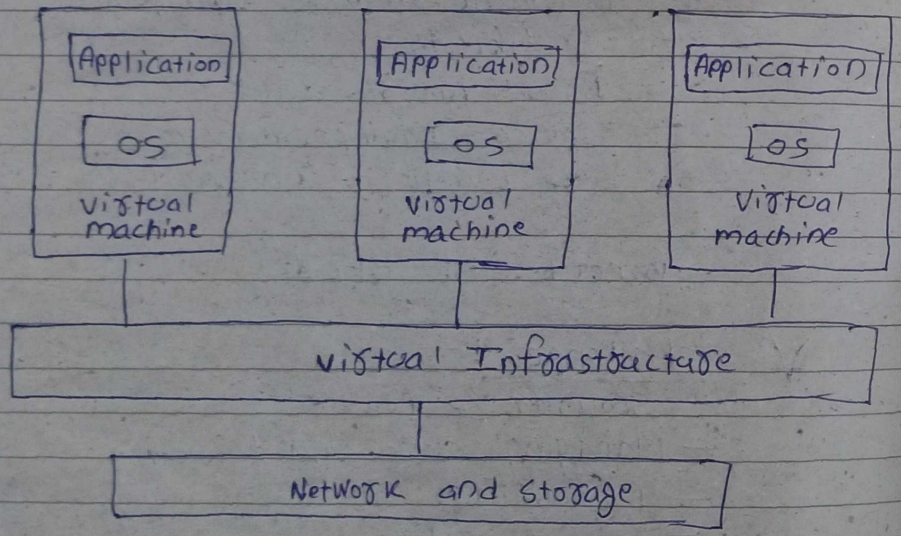


Fig. Virtualized Cloud Model

Difference between Cloud Computing and Virtualization:

Benefits of Virtualization in CC:

- Protection from failure
- Easy to transfer Machines or Data
- Security
- Cost.

Benefits of Server Virtualization:

- Cost savings
- More efficient Resource provisioning
- Improved productivity
- Better management
- Improve storage managment
- Flexibility and scalability
- App dev is easier, safer
- Hosting multiple oses

Imp
Techniques for Virtualization:

1) Para Virtualization: e.g. VMware workstation

2) Full Virtualization: e.g. Hypervisor

3) Partial Virtualization: e.g. JVM in Java
- partial virtualization cannot run the entire operating system. This virtualization is useful for running select apps.

* Imp Types of Virtualization:

i) Desktop Virtualization
ii) Data Virtualization
iii) Network Virtualization
iv) Storage Virtualization
v) Server Virtualization
vi) Application Virtualization
vii) Cloud Virtualization

Pros and Cons of Virtualization :-

* Imp Types of Software Licenses :-

i) Public Domain License :- anyone is free to use and modify the software.
ii) LGPL :- (Lesssed General Public License)
- You can link to open source libraries within your own software.
- Resulting code can be licensed under any other type of license
iii) Permissive :- Few restrictions or requirements for the distribution or modifications of the software.
iv) Copyleft : Restrictive known as reciprocal licenses
v) Proprietary : Most restrictive. Ineligible for copyrighting, modifying or distributing

Different Software Licenses in cc.

1) Enterprise-wide Model
2) Concurrent users Model
3) ownership - Copyright Holder Model
4) Named user Model
5) Site-wide Model
6) Token Based Model
7) Host ID-Based Model
8) Free open-source Model.

* pros and cons of Virtualization.

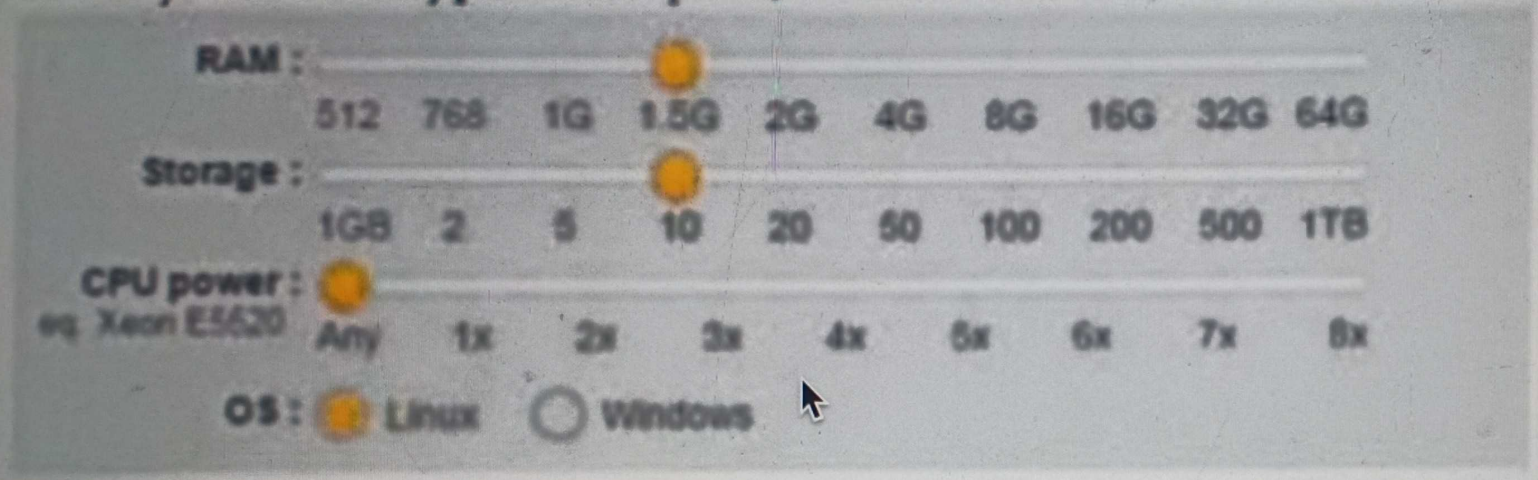
- pros
  - cost savings
  - Increase efficiency
  - Improve flexibility
  - Better security
  - Increase mobility : allow user to access data from anywhere
- cons
  - Complexity
  - performance overhead
  - security concerns
  - single point of failure

Q. difference : Virtualization & cloud computing.

Virtualization	Cloud Computing
① Technology for creating seperate environments	① service for accessing computing resources
② You own the hardware and software	② You share resources with others
③ Location of Resources: on-premises	③ Location of Resources: off-premises
④ You manage the resources	④ Cloud provider manages the resources
⑤ Scalability: limited by your hardware	⑤ Scalability: Highly scalable.
⑥ Upfront investment for hardware & software	⑥ Pay-as-you-go model.

Cloud Cost & Cost Models

- **Cost by Instance Type: CPU Speed, Number of CPUs, Provisioned Memory , Image Type**



- **Charge Per Instance Running**. Minimum charge for off Instances
- Instance Run Time based charge:
  - Business Hours (e.g. On at 8pm, Off at 5pm)
  - 24/7
- **Storage Cost Per Gigabyte**
- **Networking Type** (IP4, IP6) and **Band Width** (Basic, Medium, High)
- **Security Safeguards** (Encryption Type, Security model, etc.)
- **Provisioning Time Management:** The right instance for the right task running for the time needed.