## 1. Virtualization 2

* Virtualization allows multiple operating system instances to run concurrently on a single computer.
* it means of separating hardware from a single os.

### Before using virtualization, we had:

* single os per machine
* software and hardware tightly coupled
* underutilized resources (idle time)
* inflexibility

### virtualization gives you:

* Hardware independence of os and applications
* Ability to encapsulate os and applications into VM
* Ability to provision VM to any system

### Approaches or ways to virtualizes cloud servers

#### 1. Grid Approach:

* where the processing workloads are distributed among different physical servers, and their results are then collected as one.

#### 2. OS - level virtualization:

* Here, multiple instances of an application can run in an isolated form on a single os

## 3. Hypervisor - based virtualization

- with hypervisor's virtualization, there are various sub-approaches to fulfill the goal to run multiple applications & other loads on a single physical host

## 4. Hardware virtualization

- it is the abstraction of computing resources from the software that uses clould resources.

Types

1. Full virtualization
   - Here the hardware architecture is completely simulated.

2. Emulation virtualization
   - Here the virtual machine simulates the H/w & is independent.

3. Para - virtualization
   - Here the H/w is not simulated, instead the guest S/w runs its isolated system.

## 5. Software virtualization

- it is also called application virtualization
- Software virtualization is similar to that of virtualization except that it is capable to abstract the software installation procedure and Creat virtual s/w installation.

## 6. Server virtualization:

- In this process, the server resources are kept hidden from the user.
- This technique is mainly used in web-servers which reduces the cost of web-hosting services.
- Instead of having separate system for each web-server, multiple virtual servers can run on the same system/computer.

## Types of virtualization

1. Hardware
   - full H/w V
   - partial H/w V
   - para H/w V
2. Network
   - Internal N/w V
   - External N/w V
3. Storage
   - Block V
   - file V
4. Memory
   - Application level integration
   - OS level integration
5. Software
   - OS level
   - Application level
   - service level
6. Data - Database
7. Desktop - VDinfra, Hosted VD

H/w = Hardware
V = virtualization
VD = virtual desktop