Cloude Computing
Module -2

- **What is virtualization and virtualization type?**

Virtualization is the "creation of a virtual (rather than actual) version of something, such as a server, a desktop, a storage device, an operating system or network resources".
In other words, Virtualization is a technique, which allows to share a single physical instance of a resource or an application among multiple customers and organizations. It does by assigning a logical name to a physical storage and providing a pointer to that physical resource when demanded.
Types of virtualizations

1. Hardware Virtualization.
2. Operating system Virtualization.
3. Server Virtualization.
4. Storage Virtualization.

- **Type of hypervisor and how to manage it?**

A hypervisor, also known as a virtual machine monitor or VMM. The hypervisor is a piece of software that allows us to build and run virtual machines which are abbreviated as VMs.
A hypervisor allows a single host computer to support multiple virtual machines (VMs) by sharing resources including memory and processing.
To manage remote Hyper-V hosts, enable remote management on both the local computer and remote host.
On Windows Server, open Server Manager >Local Server >Remote management and then click Allow remote connections to this computer.

- **What is snapshot and what is cloning?**

A snapshot can be defined as a system state at a specific point of time in a computer system. The snapshot term is introduced as the **analogy** in photography. The snapshot can assign to the capability given by some systems or to the system snapshot copy of a system's state.
The hard drive snapshots contain the hard disk's directory structure, including each file and folder over the disk efficiently. This backup type can also be assigned as a "**disk image**."
The disk images permit the complete disk to restore in case the main disk fails. Several disk programs that are creating snapshots permit particular files to recover through the snapshot, rather than having to recover the complete backup.

In the context of computer science and cloud computing, cloning refers to the process of creating an exact copy of another application program or object. This term can be used to refer to an object, programming, or an application that has similar functions and behaviour to another object or application program but does not contain the original source code.

- **Roles of virtualization in cloud computing?**

  Virtualization and cloud computing are closely connected, often working together to provide various compelling services. However, while they're often interdependent, they're not interchangeable. Virtualization technology transforms physical hardware into virtual resources, while cloud computing delivers virtualized resources through the internet and on demand.
  Virtualization undoubtedly plays a hugely important role in cloud computing and offers numerous benefits. You may decide to embark on a virtualization journey without cloud computing as a way to maximize your IT resources while remaining in complete control over them. This is especially true if you have stringent security requirements that may be difficult to achieve with a public cloud. Equally, you might decide to leverage cloud computing to reduce costs and increase agility, or if you have limited IT staff to manage your IT landscape.

- **What is container?**

  Containers are packages of software that contain all of the necessary elements to run in any environment. In this way, containers virtualize the operating system and run anywhere, from a private data center to the public cloud or even on a developer’s personal laptop.

- **What is high availability and live migration in virtualization?**

  High availability is a system design protocol and an associated implementation that ensures a certain absolute degree of operational continuity during a given measurement period. Availability refers to the ability of a user’s community to access the system— whether for submitting new work, updating or altering existing work, or collecting the results of the previous work.
  Live migration of process, VM, container, or storage is. the key feature to support the dynamic resource management in both edge and cloud computing. environments. It can migrate and synchronize the running state of the instance, such as VM or. container, from one host to another without disrupting the services

- **Storage configuration –describe block storage, file storage and object storage---DAS NAS and SAN**

Block Storage: Block storage is a technology that controls data storage and storage devices. It divides any data, like a file or database entry, into blocks of equal sizes. The block storage system then stores the data block on underlying physical storage in a manner that is optimized for fast access and retrieval1. Block storage is preferred for applications that require efficient, fast, and reliable data access.

File Storage: File storage is a data storage system that puts complete files in a series of nested folders for organizational purposes. In the context of cloud computing, file storage allows multiple users to share the same file data. But instead of storing data files locally on a NAS device, you can store these files off-site in data centers (the cloud) and access them via the internet.

Object Storage: Object storage is a data storage architecture for storing unstructured data, which sections data into units objects and stores them in a structurally flat data environment. Each object includes the data, metadata, and a unique identifier that applications can use for easy access and retrieval.

DAS (Direct Attached Storage): DAS is a digital storage device connected directly to the server, workstation, or personal computer via the cable. In DAS, applications use the block-level access protocol for accessing the data.

NAS (Network Attached Storage): NAS is a centralized, file server, which allows multiple users to store and share files over a TCP/IP network via Wi-Fi or an Ethernet cable. It is also commonly known as a NAS box, NAS unit, NAS server, or NAS head.

SAN (Storage Area Network): A SAN is a dedicated network of storage devices used to provide a pool of shared storage that multiple computers and servers can access. SANs are primarily used to access data storage devices, such as disk arrays and tape libraries from servers so that the devices appear to the operating system as direct-attached storage.

- **Describe storage allocation and provisioning.**
  Storage Allocation: This refers to the process of assigning physical or virtual memory space to programs and services as efficiently and quickly as possible. In cloud computing, there are several techniques for resource allocation, including static allocation, dynamic allocation, and hybrid allocation. Static allocation involves pre-allocating resources to users and

applications based on their expected workload, while dynamic allocation involves allocating resources in real-time based on current demand.

Storage Provisioning: This is the process of choosing, deploying, and managing software (like load balancers and database server management systems) and hardware resources (including CPU, storage, and networks) to assure application performance. In cloud computing, the allocation of resources and services from a cloud provider to a customer is known as resource provisioning. It includes defining storage requirements, setting up storage classes, and allocating storage resources to meet the needs of applications and services.

In both processes, care should be taken to prevent resource over and under-provisioning. The ultimate objective of a cloud user is to rent resources at the lowest possible cost, while the objective of a cloud service provider is to maximize profit by effectively distributing resources.