Module -2

1-What is virtualization and virtualization type?

ANS - Virtualization is a technology that allows one physical hardware system (server, storage or network) to be divided into multiple virtual environments, each working like an independent system.

- **Benefits –** Better hardware utilization, Reduced cost, Isolation of environments, easy backup & recovery, Scalability.
- **Types of Virtualizations: -**
  1. Server Virtualization (Eg – Vmware ESXi, Hyper-V)
  2. Desktop Virtualization (Virtual Desktop Infrastructure)
  3. Storage Virtualization (NAS virtualization)
  4. Network Virtualization (VLAN, VXLAN, SDN)
  5. Application Virtualization (Microsoft App-V)

2-Type of hypervisor and how to manage it?

ANS – A hypervisor is software that creates, runs, and manages virtual machines.

- Type-1 Hypervisor (Bare Metal) – Installed directly on hardware, no host OS required, High performance & secure (Eg- VMware ESXi, KVM).

- Management: - vCenter (Vmware)
- Hyper-V Manager
- Web UI / CLI
- PowerShell

- Type-2 Hypervisor (Hosted) - Installed on top of an operating system, Used for testing & learning (Eg – VirtualBox).
    - Management: - GUI-based tools, CLI commands.

3-Roles of virtualization in cloud computing?

ANS - Virtualization is the foundation of cloud computing.

- Key Roles:

A. Resource pooling (CPU, RAM)
B. Multi- Tenancy (Multiple customers use same hardware securely)
C. Scalability (VMs can be created/deleted instantly)
D. Cost optimization (pay-as-you-go model)
E. Disaster recovery (VM snapshots & backups)
F. High availability (VM auto-restart on failure

4-What is container?

ANS: A container is a lightweight virtualization technology that packages like Application, libraries, Dependencies.

Containers share the host OS kernel Eg: Docker, Podman, Kubernetes.

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

ANS: High availability (HA) – it ensures continuous service availability even if a server fails

- VM is automatically restarted on another host, Uses cluster + shared storage Eg: VMware HA, Hyper-V failover Cluster.

➢ Live Migration: live migration moves a running VM from one host to another without downtime. It is needed for hardware maintenance, load balancing, fault prevention Eg: VMware vMotion, Hyper-V live Migration.

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

ANS: Block Storage: Data stored in blocks, appears as a raw disk to OS, it is used for Database VM disks Eg: SAN, AWS EBS.

➢ File storage: Data stored as files and folders, shared access. It is used for file sharing, home directories Eg: NAS, NFS, SMB.

- Object Storage: Data stored as objects with metadata, highly scalable. It is used for Backup Media Cloud storage Eg: AWS S3, Azure Blob.
- DAS: Direct Attached Storage, it has direct access and it uses local disks.
- NAS: Network Attached Storage, it has File-level and it uses File sharing.
- SAN: Storage Area Network, it has Block-level and it uses Databases and VMs.

7-Describe storage allocation and provisioning. Storage Allocation?

ANS: Storage Allocation- Assigning storage space to servers or VMs.

- Types:
- Thick Provisioning: full storage allocated upfront.
- Thin Provisioning: Storage allocates as needed (efficient).

- Storage Provisioning: process of creating, configuring, and assigning storage to systems.
  - It includes LUN creation, Volume assignment, Access permissions, Formatting & mounting.