**Virtual Machine (VM) Notes**

**1. Definition**

A **Virtual Machine (VM)** is a software-based computer that runs inside a physical machine (server) using virtualization.  
It behaves like a real computer with CPU, memory, storage, and networking.

In **Cloud (Azure/AWS)**, VMs are **on-demand servers** that you can create, scale, and delete easily

**2. Why use VMs?**

* To host websites/applications.
* To run custom software.
* For testing and development.
* To simulate a physical server without buying hardware.
* To run multiple OS (Linux, Windows, etc.) on the same hardware.

**3. VM Components**

* **Compute** → CPU + RAM (size of VM).
* **Storage** → Disks attached to VM (OS Disk, Data Disk).
* **Networking** → Public IP, Private IP, VNet/Subnet, NSG.
* **OS** → Windows Server, Linux distributions.

### 4. ****VM in Cloud vs On-Premises****

* **On-Premises**: You buy servers, maintain hardware, cooling, and networking.
* **Cloud (Azure/AWS)**: You rent VMs from Microsoft/Amazon. Pay only for usage.

### 5. ****VM Advantages****

* On-demand scaling (increase/decrease size).
* Multiple OS support.
* Pay-as-you-go pricing.
* High availability with Load Balancer + VMSS (in Azure).
* Easy integration with other cloud services.

**In simple words**:  
A **VM is like renting a computer inside the cloud** where you decide the OS, apps, and configuration