CSI ASSIGNMENT 6
DEPLOYING 3TIER ARCHITECTURE

Objective

The objective of this assignment is to simulate a real-world cloud-based deployment architecture using Microsoft Azure. The architecture will be composed of three distinct tiers, each representing a functional layer in a typical enterprise application stack:

- **Web Tier**: This tier will handle incoming traffic from the internet. It will host public-facing services, such as a web server.
- **App Tier**: This tier will serve as the intermediary between the front-end web servers and the back-end databases. It processes business logic.
- **DB Tier**: This tier will securely store and manage the application's data.

Each tier will be deployed in its own subnet within a Virtual Network (VNet) and will be secured with Network Security Groups (NSGs) to restrict traffic flow. The configuration must ensure that:

- The **Web Tier** can access the **App Tier** and the Internet.
- The **App Tier** can access both the **Web Tier** and the **DB Tier**.
- The **DB Tier** is isolated from both the **Web Tier** and the **App Tier**.
- Only the **Web Tier** is allowed to access the Internet.

Each tier will host two Virtual Machines (VMs): one running **Linux (Apache Web Server)** and one running **Windows (IIS Web Server)**.

1. Prerequisites

Before starting this assignment, ensure you have the following:

- An active **Microsoft Azure subscription**.
- Basic understanding of Azure Portal navigation.
- SSH client installed (for Linux VM access).
- Remote Desktop Client (RDP) installed (for Windows VM access).
- Basic knowledge of networking and HTTP services (Apache/IIS).

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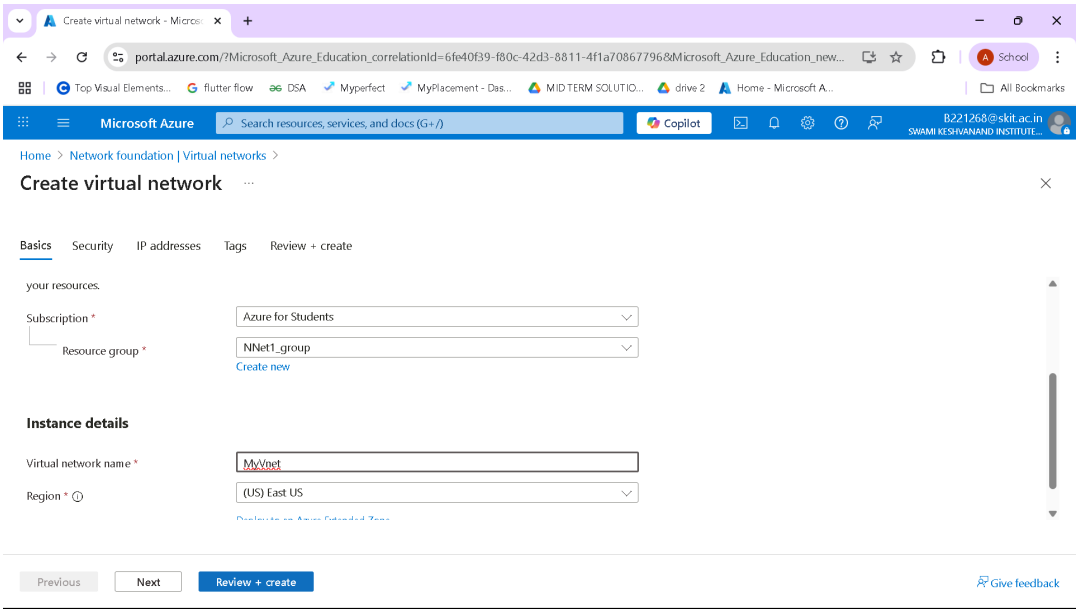
In enterprise applications, tiered architecture is a common design pattern. Here's how our system will be structured:

- **Web Tier**: Acts as a reverse proxy or user interface. Hosts Apache/IIS web servers. Exposed to the internet.
- **App Tier**: Handles logic processing. Not exposed to the internet.
- **DB Tier**: Manages data persistence. Completely isolated.

2. Step 1: Creating the Virtual Network (VNet)

1. Go to the **Azure Portal**:
2. In the left menu, select **Virtual networks** > **+ Create**.
3. Under the **Basics** tab:
    - Subscription: Choose your subscription
    - Resource Group: Create a new one
    - Name:myvnet
    - Region: Select a region (e.g., East US)
4. Click **Next: IP Addresses**:
    - Address space:10.0.0.0/16 (this gives us space for multiple subnets)
5. Click **Next** until **Review + Create**, then click **Create**.



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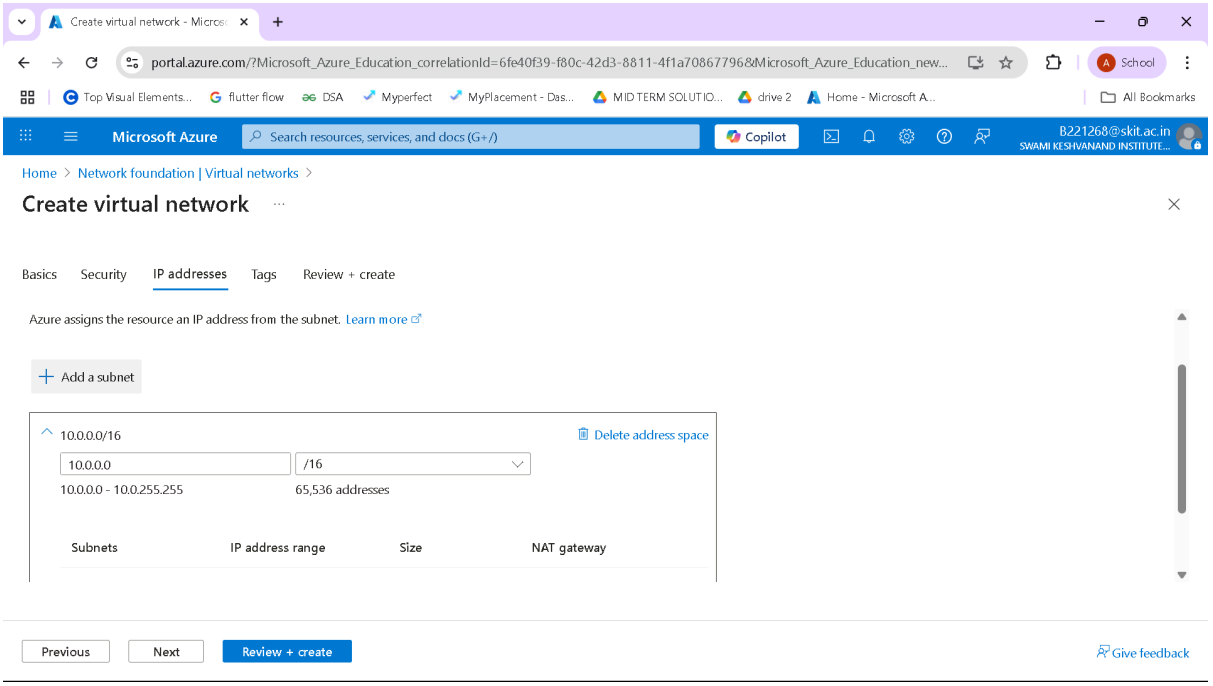
Step 2: Creating Subnets

1. After the VNet is created, go to it → **Subnets** > **+ Subnet**.
2. Create the following subnets:

Subnet Name	Address Range
WebSubnet	10.0.1.0/24
AppSubnet	10.0.2.0/24
DBSubnet	10.0.3.0/24

Repeat for each subnet from add a subnet .



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Step 3: Creating Network Security Groups (NSGs)

Each subnet will be protected by its own NSG to enforce access rules.

Create NSG for Web Tier (WebNSG)

- Go to **Network Security Groups** > **+ Create**
- Name:webnsg
- Add the following inbound rules:
    - Allow **HTTP (Port 80)** from Internet (Priority: 100)
    - Allow **SSH (Port 22)** from your IP (Priority: 110)
    - Allow **RDP (Port 3389)** from your IP (Priority: 120)
    - Allow traffic from **AppSubnet** (Priority: 130)

Create NSG for App Tier (AppNSG)

- Allow traffic from **WebSubnet** (Priority: 100)
- Allow traffic to/from **DBSubnet** (Priority: 110)

Create NSG for DB Tier (DBNSG)

- No inbound or outbound rules (Azure blocks all by default)
- This ensures DB is isolated

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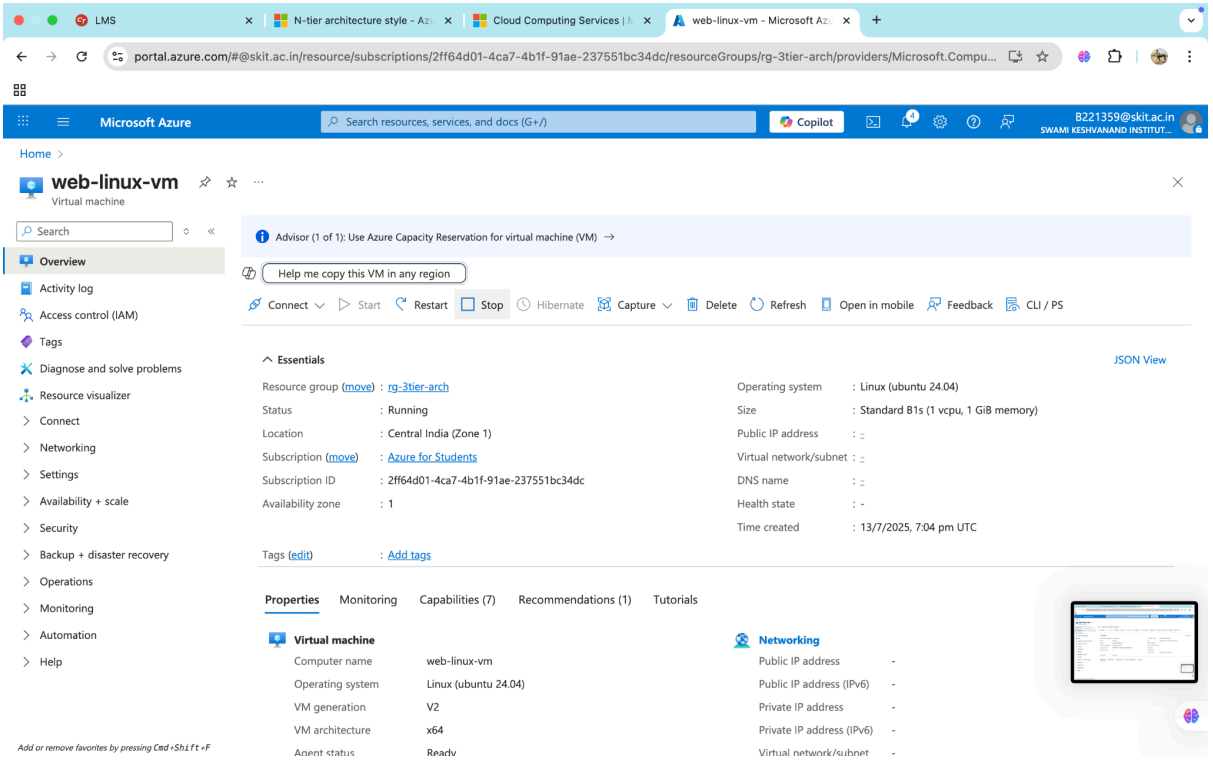
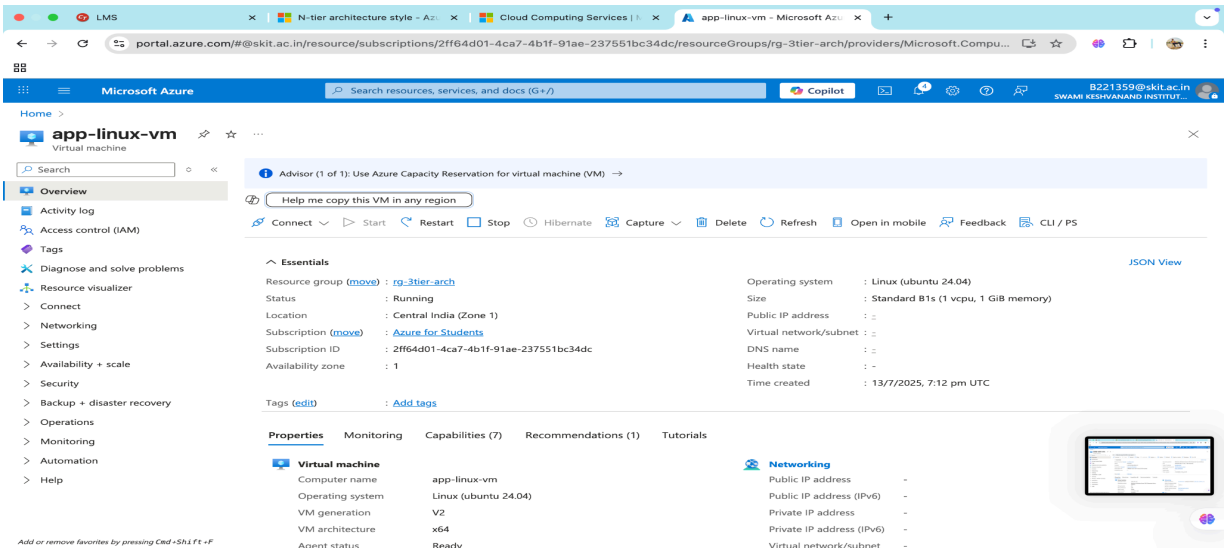
Step 4: Deploying Virtual Machines





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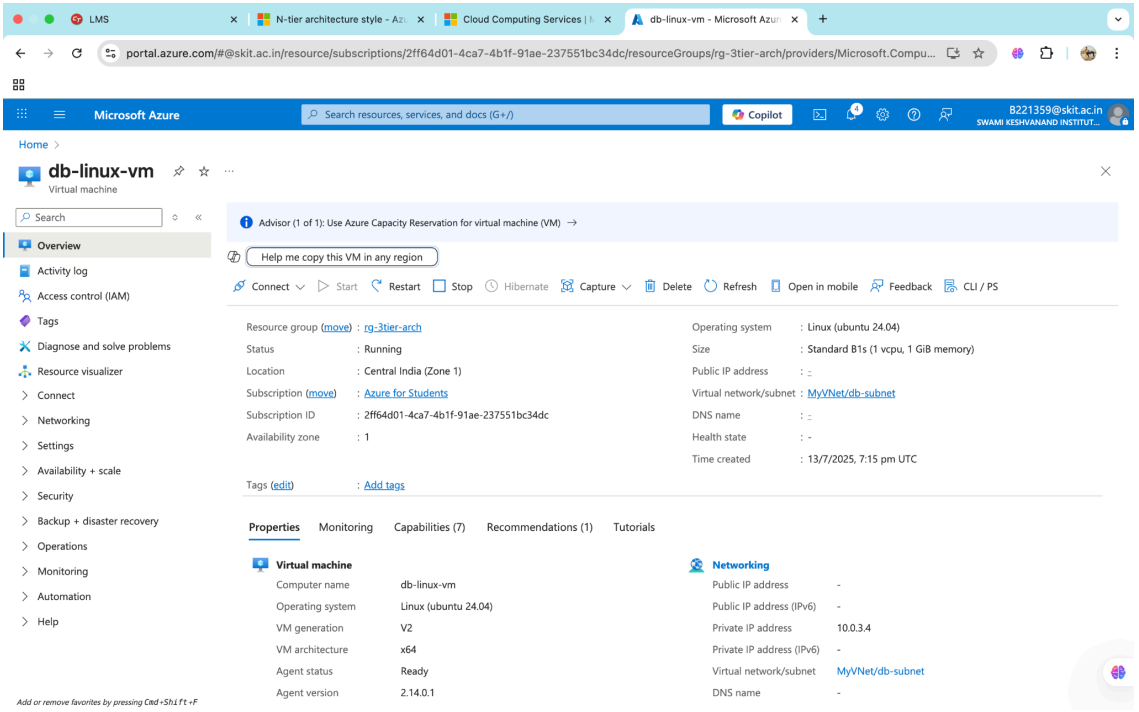

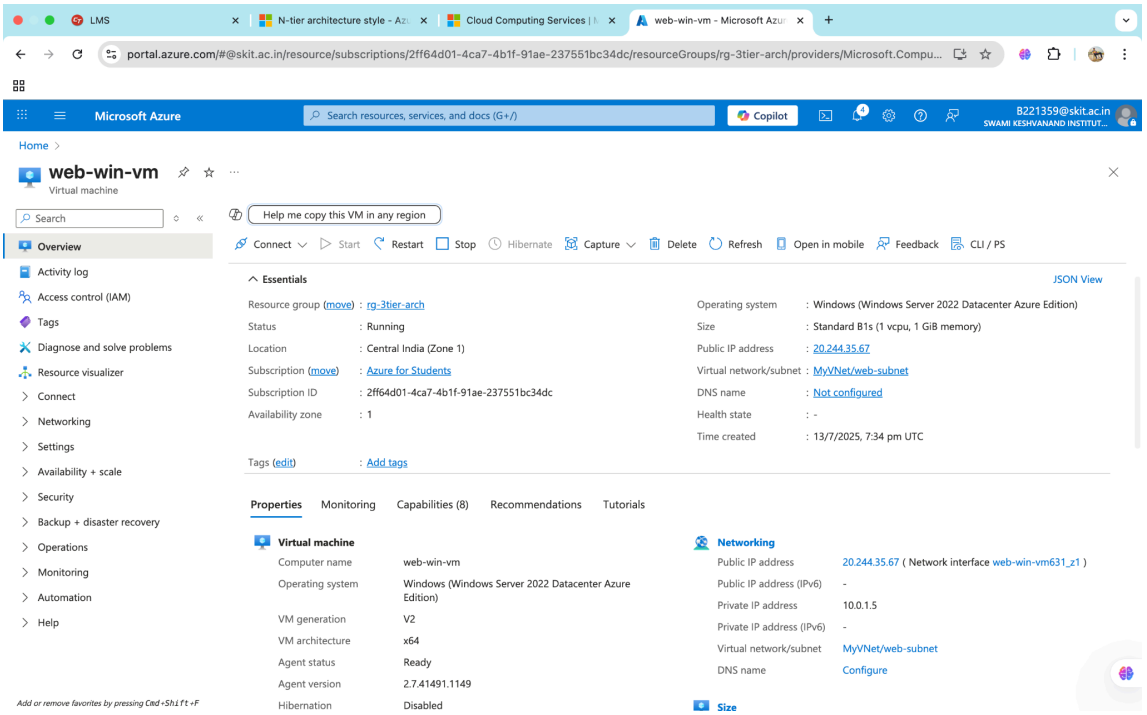

Common Settings:

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- Resource Group:threetierrg
- Size: Use B1s (for cost-saving)
- Region: Same as VNet

Linux VM (Ubuntu Server)

1. VM Name: e.g.,weblinuxvm
2. Image: Ubuntu 20.04 LTS
3. Authentication: SSH Public Key
4. Networking:
    - VNet:myvnet
    - Subnet:websubnet (or as required)
    - NSG:webbnsg

Windows VM (Windows Server 2019)

1. VM Name:
2. Image: Windows Server 2019 Datacenter
3. Authentication: Password
4. Networking: Same as Linux VM (choose appropriate subnet & NSG)

Create the following VMs:

Tier	Linux VM	Windows VM
web	Web-Linux-VM	Web-Windows-VM
App	App-Linux-VM	App-Windows-VM
DB	DB-Linux-VM	DB-Windows-VM

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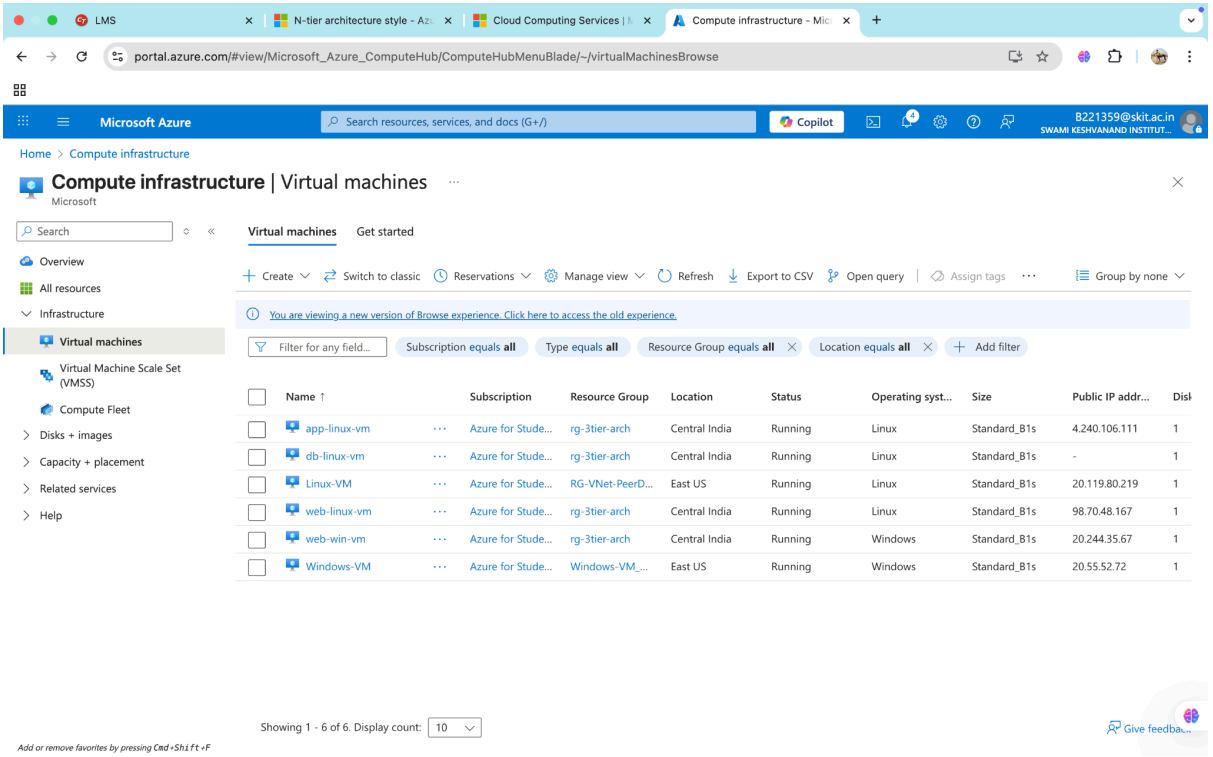

Step 5: Configuring IIS on Windows VMs

1. RDP into the VM using public IP
2. Open **Server Manager**
3. Click **Add roles and features**
4. Select **Web Server (IIS)**
5. Click **Next**
6. Test access and your 3 tier architecture is successfully launched.

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