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Week2 Assignment
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Q1 Deploy Linux and Windows virtual machine and access them using SSH and RDP

Answers: I created a new account on azure portal then click on create resources then created virtual machine using free versions then created and deployed linux virtual machine using ssh. For windows operating system used RDP. (Create a resource → Compute → Virtual machine)

Configure Networking (Open Ports)

In the "Networking" tab:

- **Select Virtual Network/Subnet** (default is okay)
- Enable **Public IP** (required for SSH/RDP access)
- Under **Inbound port rules**:
    - **Linux VM**:
        - Allow **SSH (TCP 22)**
    - **Windows VM**:
        - Allow **RDP (TCP 3389)**

Connect to VMs

Linux via SSH

After VM deployment:

1. Copy the public IP of your Linux VM.
2. Run the following command from your terminal:

ssh -i ~/Downloads/ubuntu_key.pem azureuser@<Public-IP>

Replace <Public-IP> with my VM IP.

Windows via RDP

After VM deployment:

1. Go to Windows VM in the Azure portal.
2. Click on Connect → RDP → Download RDP File.
3. Open the downloaded .rdp file in Remote Desktop Connection.
4. Enter:
    - Username: azureuser
    - Password: the one you set

Home >

CreateVm-canonical.ubuntu-24_04-lts-server-20250615172702 | Overview

Deployment

Search

- Overview
- Inputs
- Outputs
- Template

Delete | Cancel | Redeploy | Download | Refresh

Your deployment is complete

Deployment name: CreateVm-canonical.ubuntu-24_04-lts-server-2...
Subscription: Azure for Students
Resource group: azurelinux_group

Start time: 6/15/2025, 5:43:20 PM
Correlation ID: 5c1e25d6-6fcc-4d

Deployment details

Next steps

Setup auto-shutdown Recommended

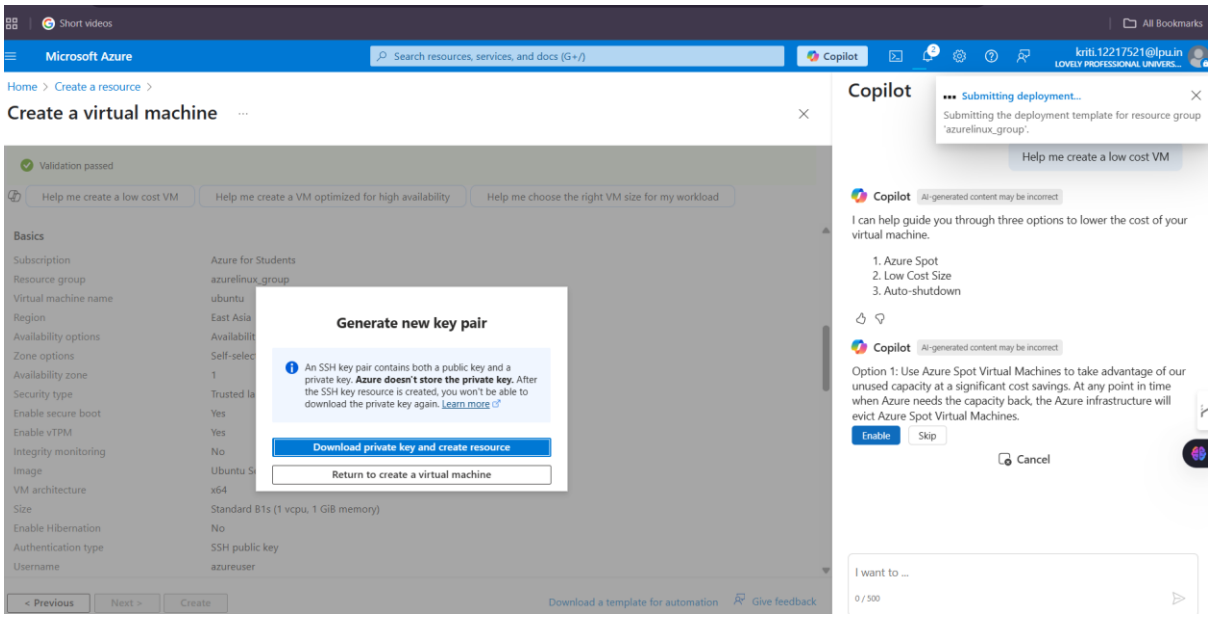
Monitor VM health, performance and network dependencies Recommended

Run a script inside the virtual machine Recommended

Go to resource | Create another VM

Give feedback

Tell us about your experience with deployment



Created and deployed windows virtual machine using RDP

Create a virtual machine ...

Validation passed

Help me create a low cost VM | Help me create a VM optimized for high availability

Resource group	(new) azure_window
Virtual machine name	window
Region	East Asia
Availability options	Availability zone
Zone options	Self-selected zone
Availability zone	1
Security type	Trusted launch virtual machines
Enable secure boot	Yes
Enable vTPM	Yes
Integrity monitoring	No
Image	Windows Server 2025 Datacenter: Azure Edition - Gen2
VM architecture	x64
Size	Standard B1s (1 vcpu, 1 GiB memory)
Enable Hibernation	No
Username	azureuser
Public inbound ports	RDP
Already have a Windows license?	No
Azure Spot	No

Your deployment is complete

Deployment name: CreateVm-MicrosoftWindowsServer.WindowsSe...
Subscription: Azure for Students
Resource group: azure_window

Start time: 6/15/2025, 5:49:57
Correlation ID: 86f06f6d-34ee

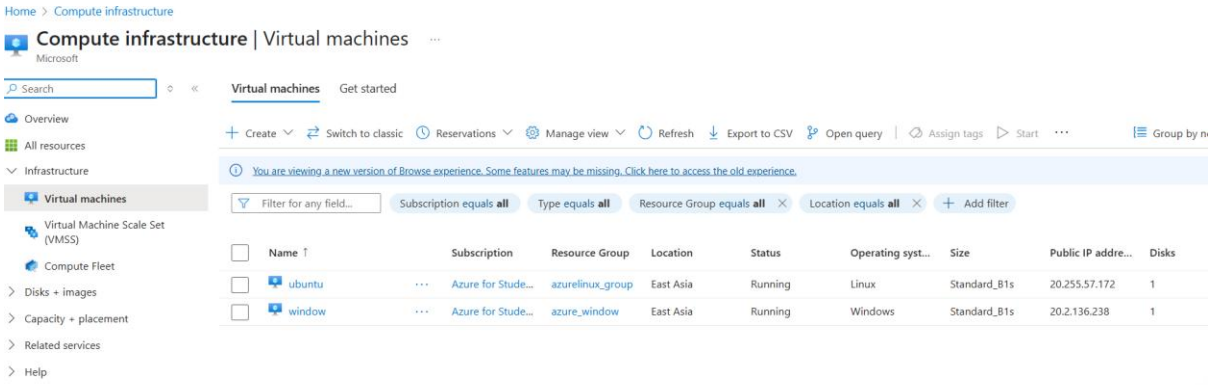
Deployment details

Next steps

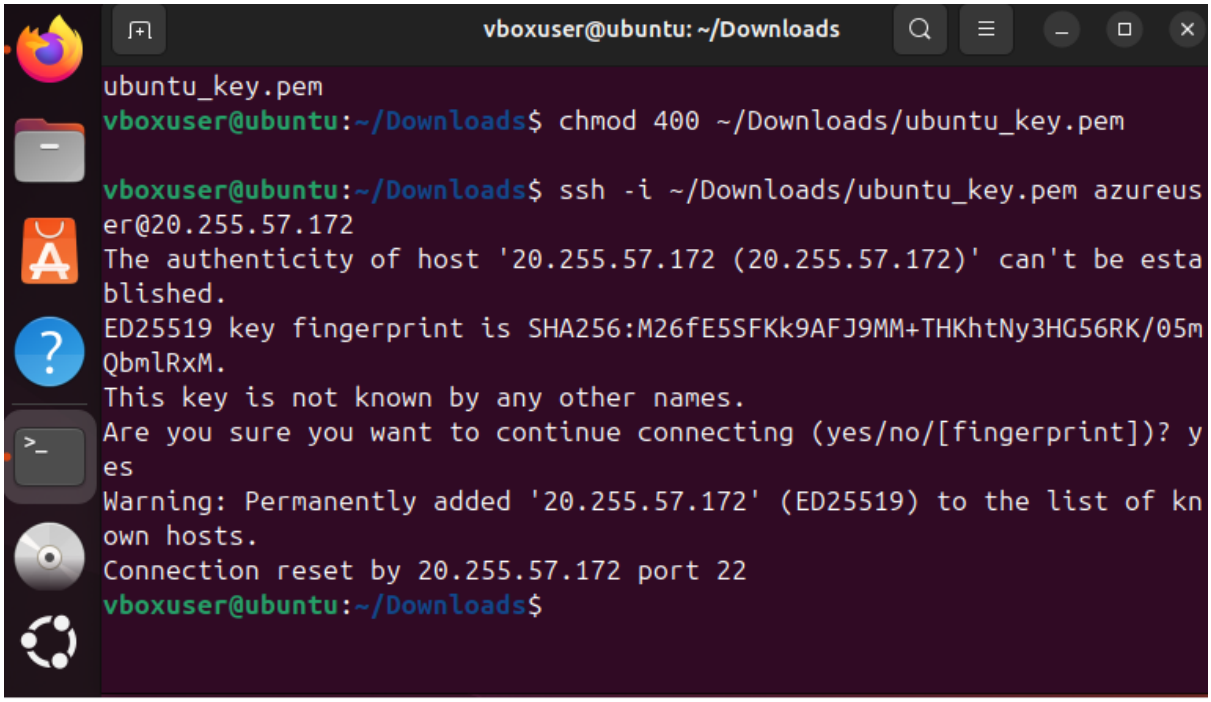
Setup auto-shutdown Recommended

Monitor VM health, performance and network dependencies Recommended

Run a script inside the virtual machine Recommended



Connecting to azure virtual machine with my virtual machine



Q2. Create an App Service Plan Provision a Web App in the existing App Service Plan and deploy a simple welcome page on it .

Answer:

What We'll Do:

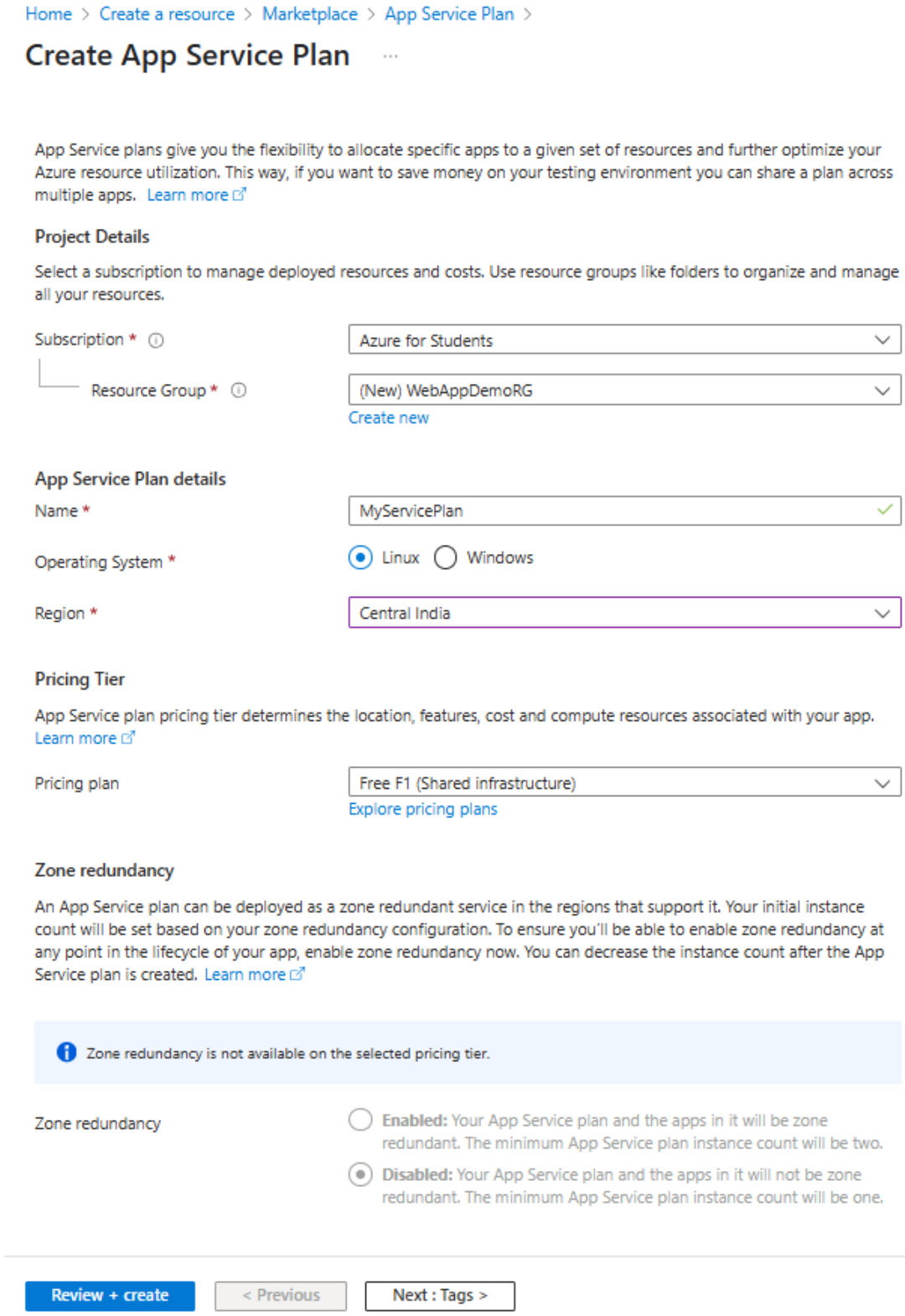
1. Create an App Service Plan (hosting environment)
2. Deploy a Web App with a Node.js runtime
3. Upload a basic "Welcome" web page

🔹 **Step a: Create App Service Plan**

🗣️ *"First, I log in to the Azure Portal at portal.azure.com. Now I'm creating an App Service Plan."*

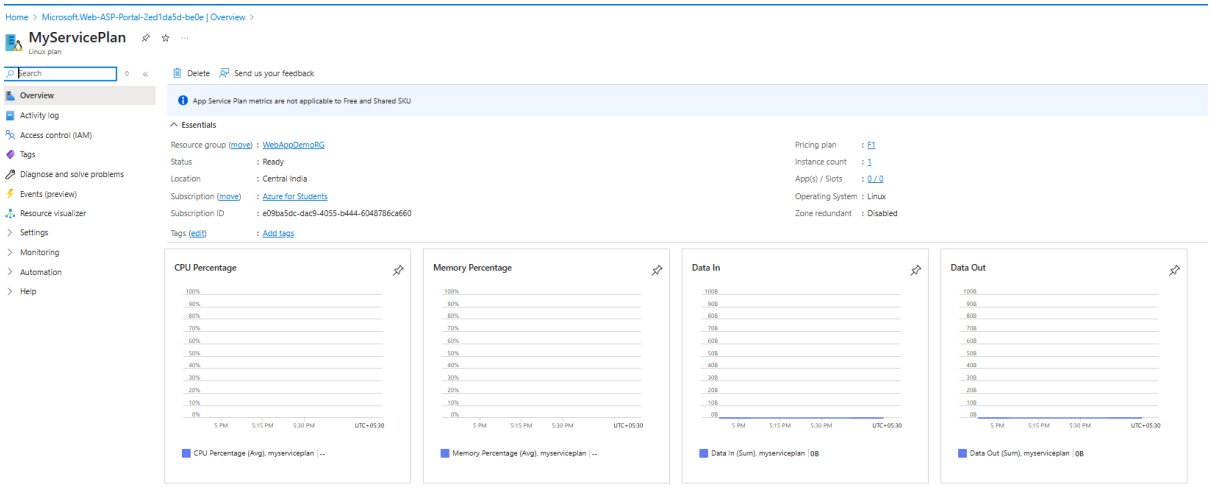
1. Go to Create a resource → Search for App Service Plan
2. Click Create
3. Fill in the form:
    - Subscription: (Your active subscription)
    - Resource Group: Create new or use existing (WebAppDemoRG)
    - Name: MyServicePlan
    - Operating system: windows
    - Region: Select your nearest location (e.g., Central India)
    - Pricing Tier: Click Change size → Select Free (F1)

Screenshot to Take: App Service Plan creation form (with name, region, pricing)



4. Click Review + Create → then Create

"Now the App Service Plan is ready. It defines the compute resources for hosting web apps."

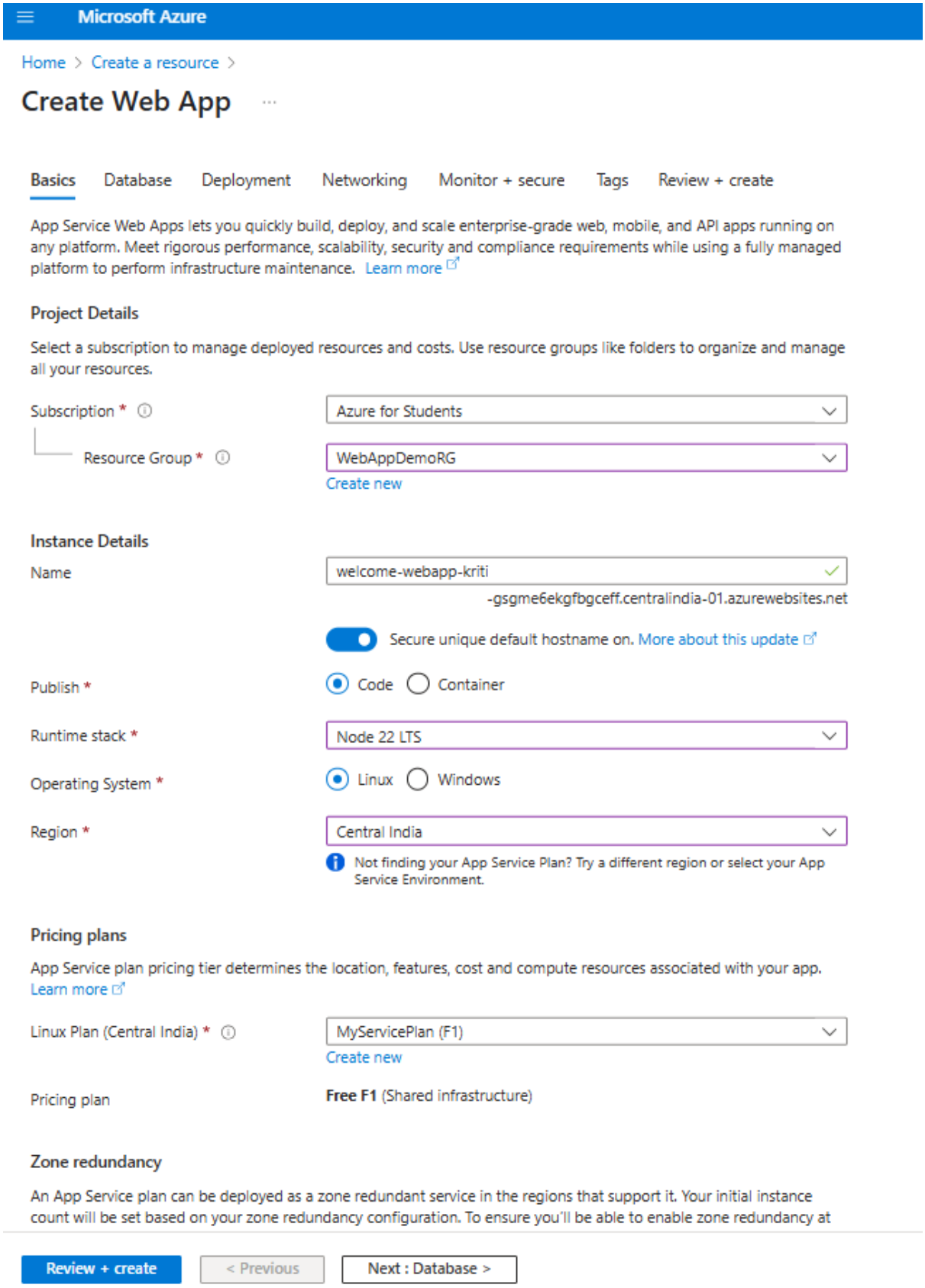


- **Step b: Deploy Web App**

"Now I will deploy a web app using the App Service Plan I just created."

1. In Azure Portal, click Create a resource → Search Web App → Click Create
2. Fill in the form:
    - Subscription: Same as before
    - Resource Group: Use WebAppDemoRG
    - Name: welcome-webapp-kriti *(must be globally unique)*
    - Publish: Code
    - Runtime stack: Node.js (e.g., Node 22 LTS)
    - Operating system: linux
    - Region: Same as App Service Plan (central india)
    - App Service Plan: Select Existing → Choose MyServicePlan

Web App creation form with runtime and selected App Service Plan



3. Click Review + Create → then Create

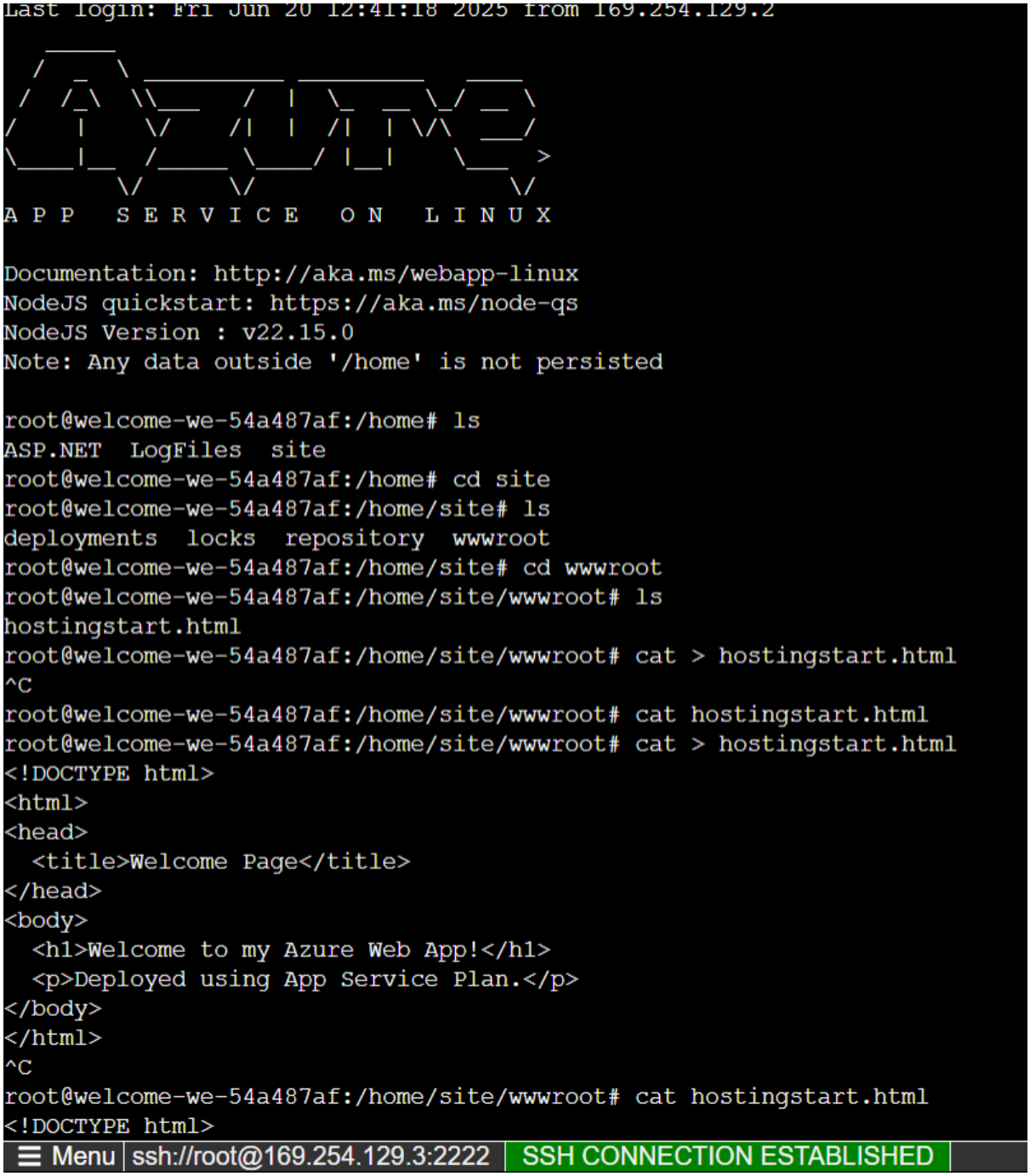
🗣️ *"Now my web app is being deployed on Azure under the Node.js runtime."*

🔹 **Step c: Upload a Simple Welcome Page**

🗣️ *"Now I'll upload a simple HTML welcome page to the web app using the Azure Portal editor."*

1. Once the Web App is deployed, go to:
    - App Services → Click on your app (e.g., welcome-webapp-kriti)
2. In the left menu, go to:
    - Development Tools → Advanced Tools (Kudu) → Click Go
3. In the new tab (Kudu), go to:
    - Debug console → CMD
    - Navigate to: site/wwwroot/
4. Click Upload, and upload a file named index.html with the following content

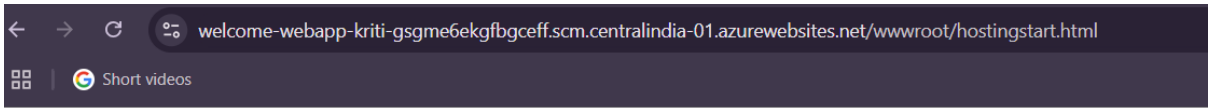
index.html in Kudu's wwwroot directory



5. Now visit your web app URL:

(**https://welcome-webapp-kriti-gsgme6ekgfbgceff.scm.centralindia-01.azurewebsites.net/wwwroot/hostingstart.html** **)**

Final web page showing your welcome message in the browser



"I successfully created an App Service Plan, deployed a Node.js web app using it, and uploaded a welcome page. The page is now live and accessible publicly on Azure."

Q3. Create ACR and pull image from ACR and Create a container from it

Answer:

Goal:

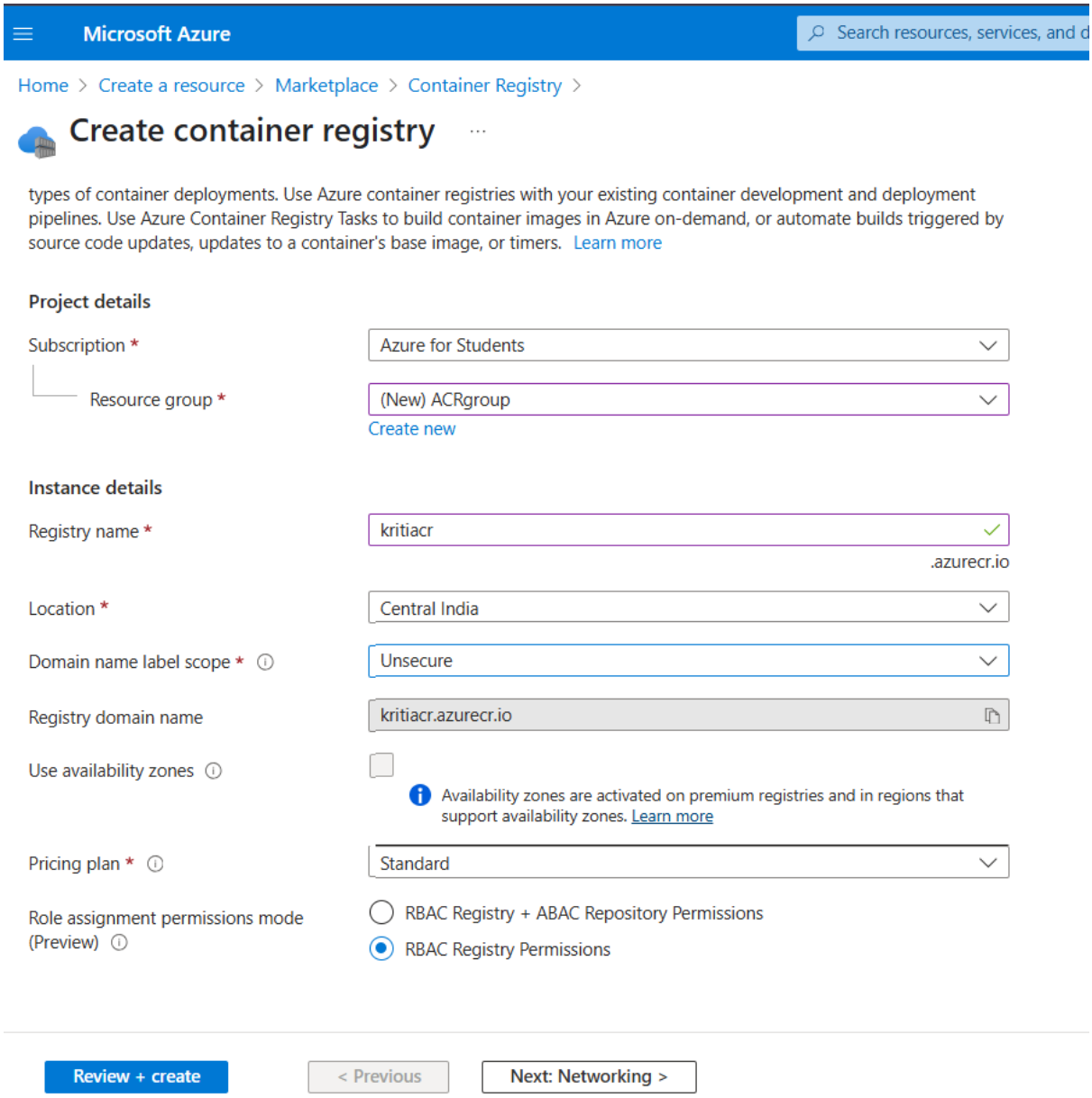
- **Create a private Docker registry (ACR) in Azure**
- **Push a Docker image to ACR**
- **Pull and run it from any VM**

◆ **Step a) Provision ACR**

"I'll first create an Azure Container Registry to store my Docker images securely."

1. Go to https://portal.azure.com
2. Click Create a resource → Containers → Container Registry
3. Fill in:
    - Registry name: kritiacr *(must be globally unique)*
    - Resource Group: Create or select (e.g., ACRGroup)
    - Location: (e.g., Central India)
    - **SKU: Choose Basic**
4. **Click Review + Create → Create**

Final ACR creation page before clicking "Create"



"My Azure Container Registry is ready at: kritiacr.azurecr.io"

- **Step b) Build & Push Image**

"Next, I'll build a Docker image and push it to my ACR from my local machine."

- **Pre-requisites:**
  - **Docker installed locally**
  - **Azure CLI authenticated (az login)**
  - **Dockerfile ready (example below)**

Sample Dockerfile:

```
FROM nginx
COPY index.html /usr/share/nginx/html/index.html
```

"This image will serve a custom HTML page using Nginx."

Terminal Steps:

 # 1. Login to ACR from your local machine

az acr login --name kritiacr

 # OR using Docker directly:

docker login kritiacr.azurecr.io

 # 2. Build Docker image

docker build -t kritiacr.azurecr.io/hello:v1 .

 # 3. Push to ACR

docker push kritiacr.azurecr.io/hello:v1

✅ **Docker login + docker build + docker push terminal output**

🗣️ ***"Now my image 'hello:v1' is stored in my private registry."***

🔹 **Step c) Pull & Run Container (from VM)**

🗣️ ***"Now I'll SSH into a Linux VM and pull the image from ACR to run it."***

✅ **From your Azure VM:**

 # 1. Login to ACR

docker login kritiacr.azurecr.io

 # 2. Pull the image

docker pull kritiacr.azurecr.io/hello:v1

 # 3. Run the container

docker run -d -p 80:80 kritiacr.azurecr.io/hello:v1

✅ 📸 **Screenshot to capture: docker pull and docker run output on VM terminal**

🗣️ ***"The container is now running on port 80 of the VM."***

Test in Browser

Visit:

http://<your-vm-public-ip>

You should see your custom HTML served via the Docker container.

✅ 📸 **Screenshot to capture: Final web page opened in browser from your VM**

"I successfully created an ACR, pushed a Docker image to it, then logged into a VM, pulled the image, and ran it using Docker. The entire process demonstrates private container deployment in Azure."

A. Creating a Virtual Network with 2 Subnets for VMs and Database

I started by creating a Virtual Network (VNet) to logically group and isolate Azure resources for communication.

🔧 Steps I Followed:

1. Go to Azure Portal → Search for Virtual Networks → Click Create.

2. In the Basics tab:
    - Subscription: Azure for Students
    - Resource group: vnet_project_group (I created a new one)
    - Name: MainVNet
    - Region: East Asia
3. In the IP Address tab:
    - Left the default IP range: 10.0.0.0/16
4. Then I created two subnets:
    - Subnet-1: VMSubnet → 10.0.1.0/24 (For Linux VM and Windows VM)
    - Subnet-2: DBSubnet → 10.0.2.0/24 (For SQL Database)
5. I reviewed and created the VNet.

Deployed VMs in Subnet-1

- Linux VM: Named linuxvm, created in VMSubnet
- Windows VM: Named windowsvm, also in VMSubnet

During VM creation, in the Networking tab, I selected:

- Virtual Network: MainVNet
- Subnet: VMSubnet

Planned for SQL DB in Subnet-2

Although I didn't deploy a real SQL Server, I reserved DBSubnet to simulate a secure backend subnet that can later host:

- **Azure SQL Managed Instance**
- **SQL Server VM (if required)**

B. Hub-and-Spoke Network: 4 VNets + VM Communication Test

Now I created 4 VNets to design a Hub-and-Spoke architecture, a common Azure enterprise pattern for network security and control.

VNets I Created:

1. **Management VNet – HUB**
    - **Name: mgmt-vnet**
    - **Address space: 10.10.0.0/16**
    - **Subnet: mgmt-subnet → 10.10.1.0/24**
2. **Production VNet – Spoke**
    - **Name: prod-vnet**
    - **Address space: 10.20.0.0/16**
    - **Subnet: prod-subnet → 10.20.1.0/24**
3. **Testing VNet – Spoke**
    - **Name: test-vnet**
    - **Address space: 10.30.0.0/16**
    - **Subnet: test-subnet → 10.30.1.0/24**
4. **Development VNet – Spoke**

- Name: dev-vnet
- Address space: 10.40.0.0/16
- Subnet: dev-subnet → 10.40.1.0/24

🔁 Created Peering (Hub-and-Spoke Architecture)

Then I configured VNet peering between:

- mgmt-vnet ↔ prod-vnet
- mgmt-vnet ↔ test-vnet
- mgmt-vnet ↔ dev-vnet

➡️ This allows VMs in the management network to communicate with VMs in all spokes, but the spokes cannot communicate directly with each other (default behavior of hub-and-spoke).

Steps:

1. Go to mgmt-vnet → Peerings → Add
2. Peer to prod-vnet, check allow traffic both ways
3. Repeat for test-vnet and dev-vnet

💻 Launched VMs in Each VNet

I created 1 VM in each of the 4 VNets:

- vm-mgmt in mgmt-vnet
- vm-prod in prod-vnet
- vm-test in test-vnet
- vm-dev in dev-vnet

Verified Communication (Ping Test)

Then I logged in to the Management VM (vm-mgmt) using SSH and tested connectivity using ping:

ping 10.20.1.4 # vm-prod IP

ping 10.30.1.4 # vm-test IP

ping 10.40.1.4 # vm-dev IP

Ping was successful to all 3 VMs, which verified that VNet peering and routing were working correctly.

It also demonstrated that the Management VM could control and monitor all other VMs across different VNets, just like a real-world management setup.