

Deploying a Web Server on Azure Linux VM with Nginx and Monitoring

Objective

The main objective of this project is to simulate a real-world Infrastructure as a Service (IaaS) deployment scenario by setting up a Linux-based virtual machine in Microsoft Azure. The goal is to install and configure an Nginx web server, implement secure network access, enable monitoring and insights, and verify successful web hosting via public access. This project demonstrates essential Azure administration skills.

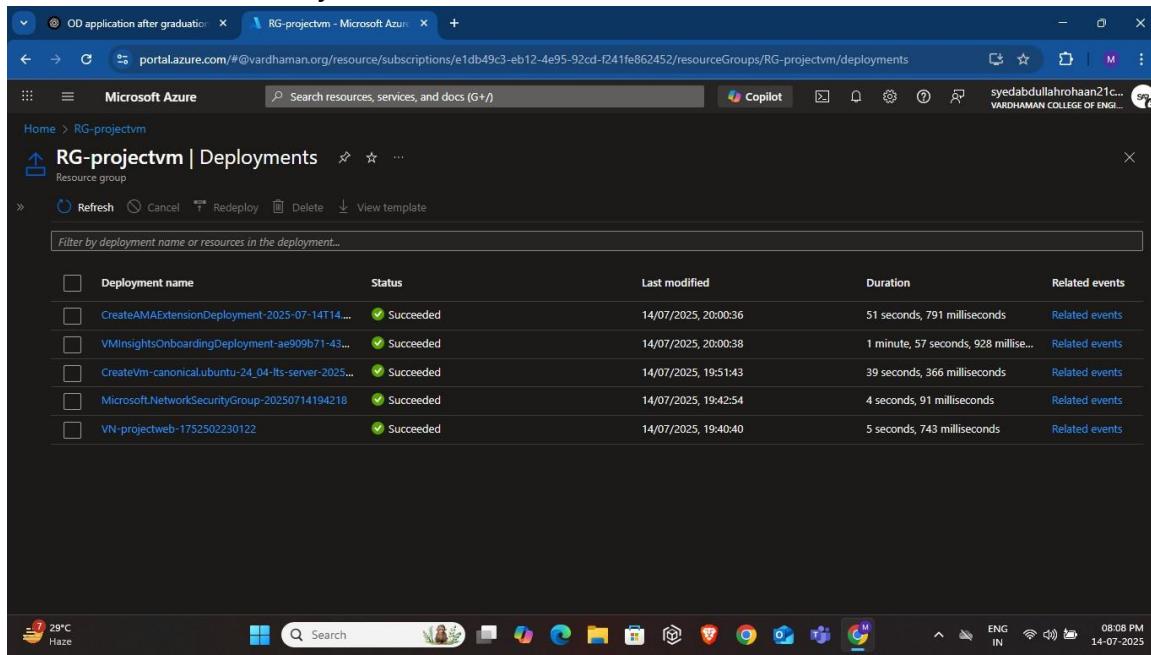
Tools & Technologies Used

- Microsoft Azure Portal (Azure for Students subscription)
- Linux Ubuntu 24.04 LTS
- Azure Virtual Machine (VM)
- Azure Network Security Group (NSG)
- Azure Monitor & Insights
- Nginx Web Server
- SSH Client (for VM access)
- HTML (for static web content)

Deployment Steps

1. Created Resource Group

A new resource group named 'RG-projectvm' was created in the Central India region to logically contain all project resources. Resource groups help organize and manage related Azure resources efficiently.



The screenshot shows the Microsoft Azure portal interface. The browser address bar displays 'portal.azure.com/#@vardhaman.org/resource/subscriptions/e1db49c3-eb12-4e95-92cd-f241fe862452/resourceGroups/RG-projectvm/deployments'. The main content area is titled 'RG-projectvm | Deployments' and shows a table of deployment history. The table has columns for Deployment name, Status, Last modified, Duration, and Related events. All listed deployments are marked as 'Succeeded'. The last deployment listed is 'VN-projectweb-1752502230122' at 14/07/2025, 19:40:40. The status bar at the bottom shows the date '14-07-2025' and time '08:08 PM'.

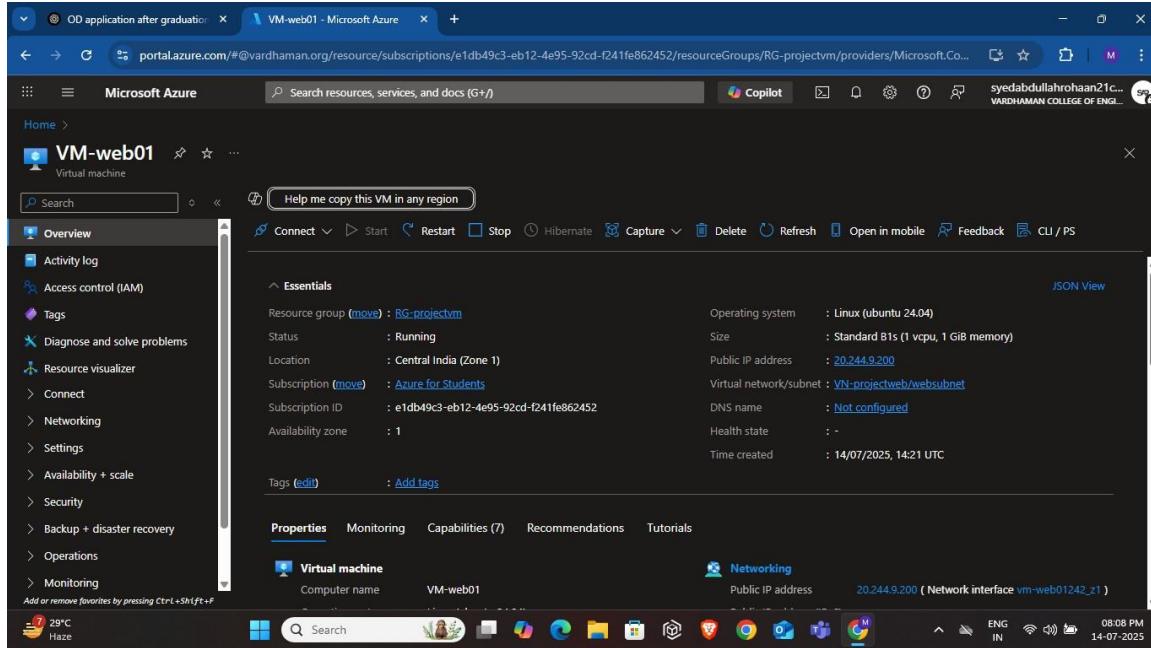
Deployment name	Status	Last modified	Duration	Related events
CreateAMAExtensionDeployment-2025-07-14T14...	Succeeded	14/07/2025, 20:00:36	51 seconds, 791 milliseconds	Related events
VMInsightsOnboardingDeployment-ae909b71-43...	Succeeded	14/07/2025, 20:00:38	1 minute, 57 seconds, 928 millise...	Related events
CreateVm-canonicalUbuntu-24_04-lts-server-2025...	Succeeded	14/07/2025, 19:51:43	39 seconds, 366 milliseconds	Related events
Microsoft.NetworkSecurityGroup-20250714194218	Succeeded	14/07/2025, 19:42:54	4 seconds, 91 milliseconds	Related events
VN-projectweb-1752502230122	Succeeded	14/07/2025, 19:40:40	5 seconds, 743 milliseconds	Related events

2. Created Virtual Network & Subnet

A virtual network (VNet) named 'VN-projectweb' and a subnet named 'websubnet' were created to establish a secure internal communication environment for the virtual machine. The subnet ensures isolation and control over traffic flow.

3. Created Ubuntu Linux VM

An Ubuntu Server 24.04 LTS virtual machine named 'VM-web01' was deployed with the B1s size configuration (1 vCPU, 1 GiB RAM). A public IP was assigned for remote access via SSH. Boot diagnostics were enabled to track the health and logs of the VM.



The screenshot shows the Microsoft Azure portal interface for a virtual machine named 'VM-web01'. The left sidebar has a 'Virtual machine' section with options like Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Resource visualizer, Connect, Networking, Settings, Availability + scale, Security, Backup + disaster recovery, Operations, and Monitoring. The main content area displays the 'Essentials' tab with the following details:

Setting	Value
Resource group (move)	RG-projectvm
Status	Running
Location	Central India (Zone 1)
Subscription (move)	Azure for Students
Subscription ID	e1db49c3-eb12-4e95-92cd-f241fe862452
Availability zone	1
Tags (edit)	Add tags
Operating system	Linux (Ubuntu 24.04)
Size	Standard B1s (1 vcpu, 1 GiB memory)
Public IP address	20.244.9.200
Virtual network/subnet	VN-projectweb/websubnet
DNS name	Not configured
Health state	-
Time created	14/07/2025, 14:21 UTC

Below the essentials, there are tabs for Properties, Monitoring, Capabilities (7), Recommendations, and Tutorials. The properties tab shows the VM as a 'Virtual machine' with the computer name 'VM-web01'. The networking tab shows the public IP address '20.244.9.200' and the network interface 'vm-web01242_z1'. The bottom of the screen shows the Windows taskbar with various pinned icons and the system tray indicating the date and time as 14-07-2025 at 08:08 PM.

4. Configured NSG (Network Security Group)

An NSG was configured to define inbound and outbound security rules. Port 22 was opened for SSH access and port 80 for HTTP web traffic. The default 'DenyAllInbound' rule was kept as a fallback to enhance network security.

The screenshot shows the Azure portal interface for managing a Network Security Group (NSG). The left sidebar navigation includes 'Overview', 'Activity log', 'Access control (IAM)', 'Tags', 'Diagnose and solve problems', 'Resource visualizer', 'Settings' (which is expanded to show 'Inbound security rules', 'Outbound security rules', 'Network interfaces', 'Subnets', 'Properties', and 'Locks'), and 'Monitoring'. The main content area is titled 'NSG-webserver | Inbound security rules' and displays a table of security rules:

Priority	Name	Port	Protocol	Source	Destination	Action
100	AllowAnySSHinbound	22	TCP	Any	Any	Allow
110	AllowAnyHTTPinbound	80	TCP	Any	Any	Allow
65000	AllowVnetInbound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalancedInbound	Any	Any	AzureLoadBalancer	Any	Allow
65500	DenyAllInbound	Any	Any	Any	Any	Deny

5. Installed and Configured Nginx

After SSH connection to the VM using its public IP, Nginx web server was installed and started. The default web directory was used to host a custom static HTML file located at '/var/www/html/default.html'. This HTML page was used to verify that the server was running correctly.

Commands used:

```
sudo apt update
sudo apt install nginx y
```

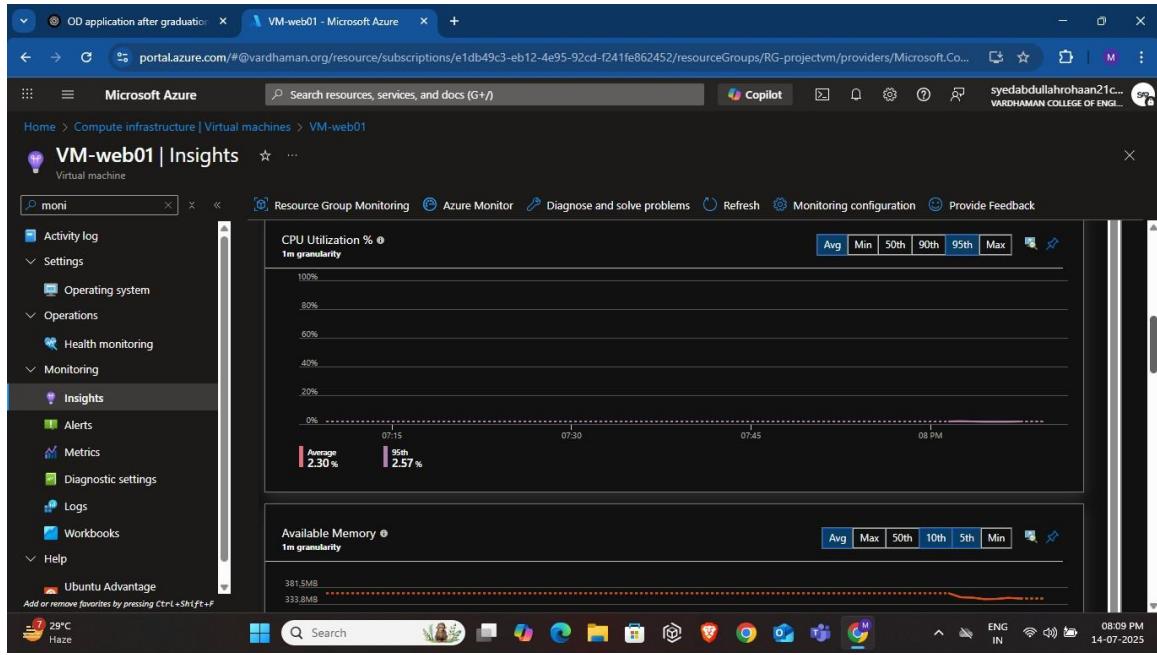
Created Static HTML Page.

File Path: /var/www/html/default.html **Content:**

```
<h1>Welcome to My Azure Project!</h1>
<p>This VM is deployed and configured using Azure>Portal</p>
```

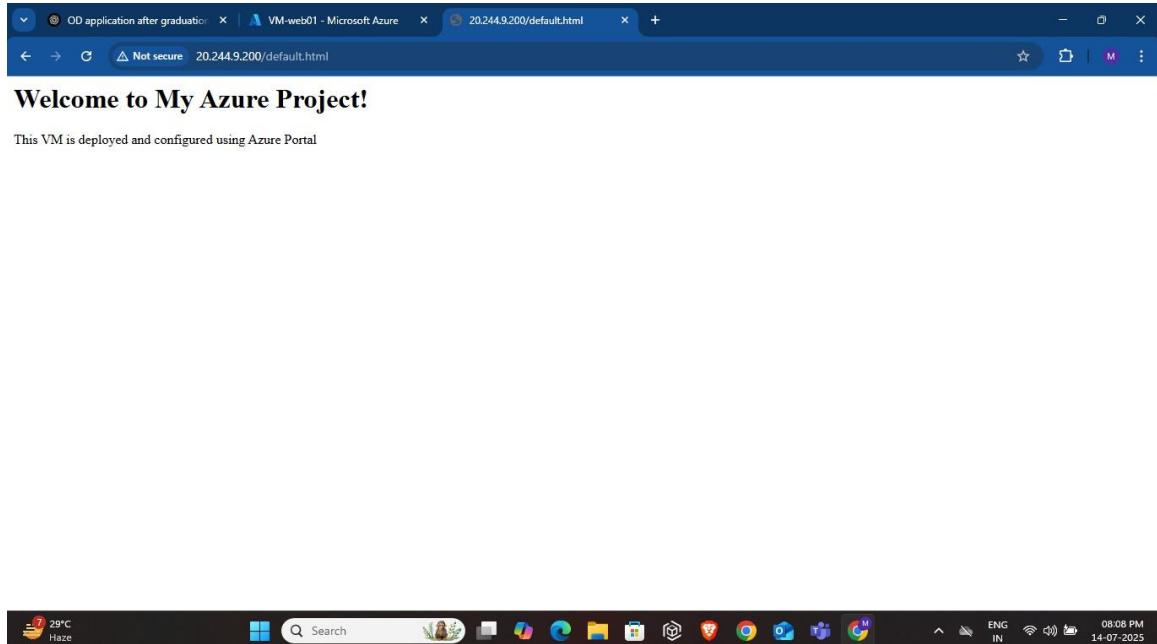
6. Enabled Monitoring and Insights

Azure Monitor and VM Insights were enabled to track performance metrics such as CPU usage, memory utilization, disk IOPS, and network activity. These insights helped validate that the virtual machine and web service were operating optimally.



7. Verified Public Access

The hosted web page was successfully accessed from the browser using the VM's public IP address (<http://20.244.9.200/default.html>). The page displayed the custom HTML message, confirming that Nginx was serving content publicly.



Outcome

The project was completed successfully. It demonstrates the full deployment lifecycle of an Azure Virtual Machine for web hosting, covering provisioning, security, web configuration,

monitoring, and validation. The Nginx web page was accessible from the public internet using the VM's IP address, proving correct setup.

Skills Demonstrated

- Azure Infrastructure Setup (IaaS)
- Virtual Machine provisioning and configuration
- Network Security and NSG Rule Management
- Linux system administration
- Nginx installation and web hosting
- Azure Monitoring and Performance Insights

Subscription Used

Azure for Students (No billing involved).