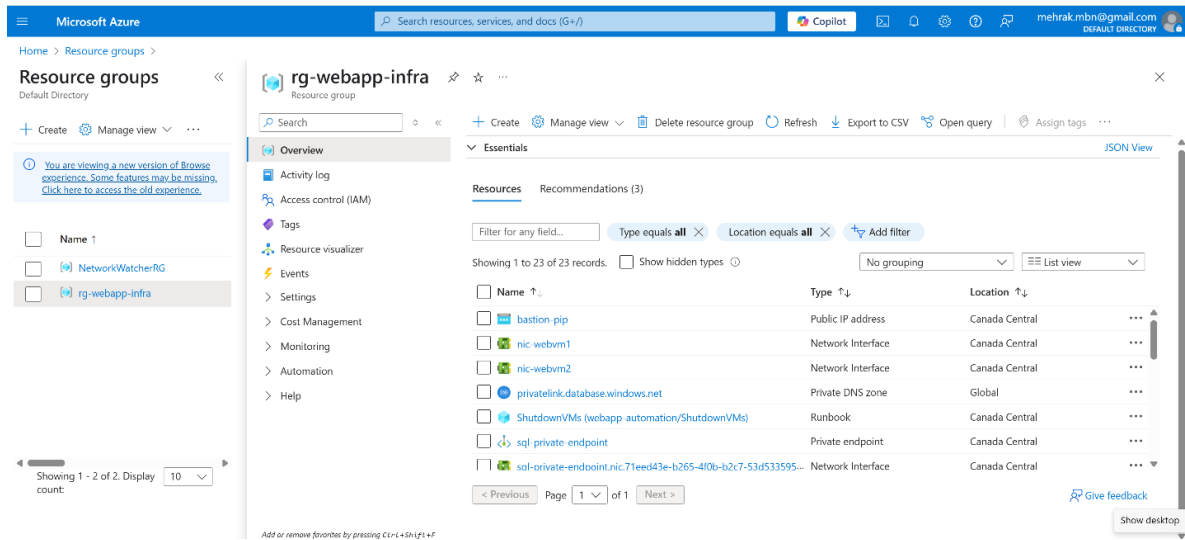


# Full Azure Deployment Project Report (AZ-104)

## 1. Resource Group:

To logically group all related Azure resources under one container, making it easier to manage, deploy, monitor, and delete resources as a unit.

az group create --name rg-webapp-infra --location canadacentral

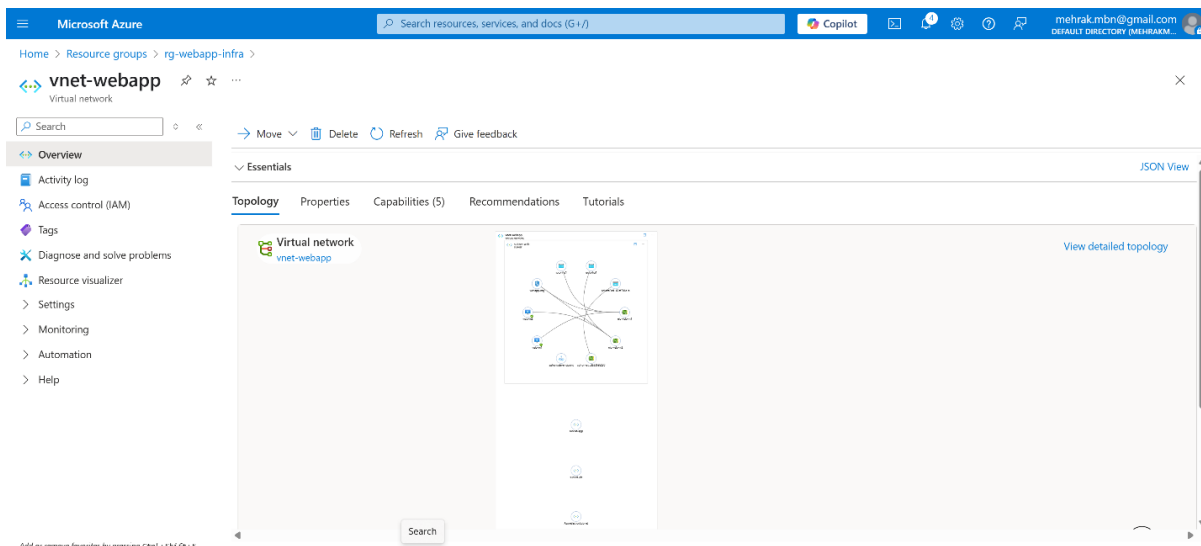


## 2. Virtual Network and Subnets:

To create an isolated and secure network environment for the application infrastructure. Subnets allow for separation of services (web, database, etc.) for better organization and security.

az network vnet create --resource-group rg-webapp-infra --name vnet-webapp --address-prefix 10.0.0.0/16 --subnet-name web --subnet-prefix 10.0.1.0/24

az network vnet subnet create --resource-group rg-webapp-infra --vnet-name vnet-webapp --name db --address-prefix 10.0.2.0/24



### 3. Network Security Group (NSG):

To define inbound and outbound access rules to tightly control which traffic can reach the virtual machines. For example, only allow HTTP (port 80) and RDP (port 3389) from appropriate sources.

```
az network nsg create --resource-group rg-webapp-infra --name webapp-nsg
```

```
az network nsg rule create --resource-group rg-webapp-infra --nsg-name webapp-nsg --name allow-rdp --protocol Tcp --direction Inbound --source-address-prefixes '*' --source-port-ranges '*' --destination-address-prefixes '*' --destination-port-ranges 3389 --access Allow --priority 200
```

```
az network nsg rule create --resource-group rg-webapp-infra --nsg-name webapp-nsg --name allow-http --protocol Tcp --direction Inbound --source-address-prefixes '*' --source-port-ranges '*' --destination-address-prefixes '*' --destination-port-ranges 80 --access Allow --priority 100
```

Priority	Name	Port	Protocol	Source	Destination	Action
100	Allow-HTTP	80	Tcp	Any	Any	Allow
200	Allow-RDP	3389	Tcp	Any	Any	Allow
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalancerInBound	Any	Any	AzureLoadBalancer	Any	Allow
65500	DenyAllInBound	Any	Any	Any	Any	Deny
65000	AllowVnetOutBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow

### 4. Public IP and Load Balancer:

To ensure high availability and load distribution across web VMs. The public IP provides external access, while the Load Balancer routes traffic and monitors health with probes.

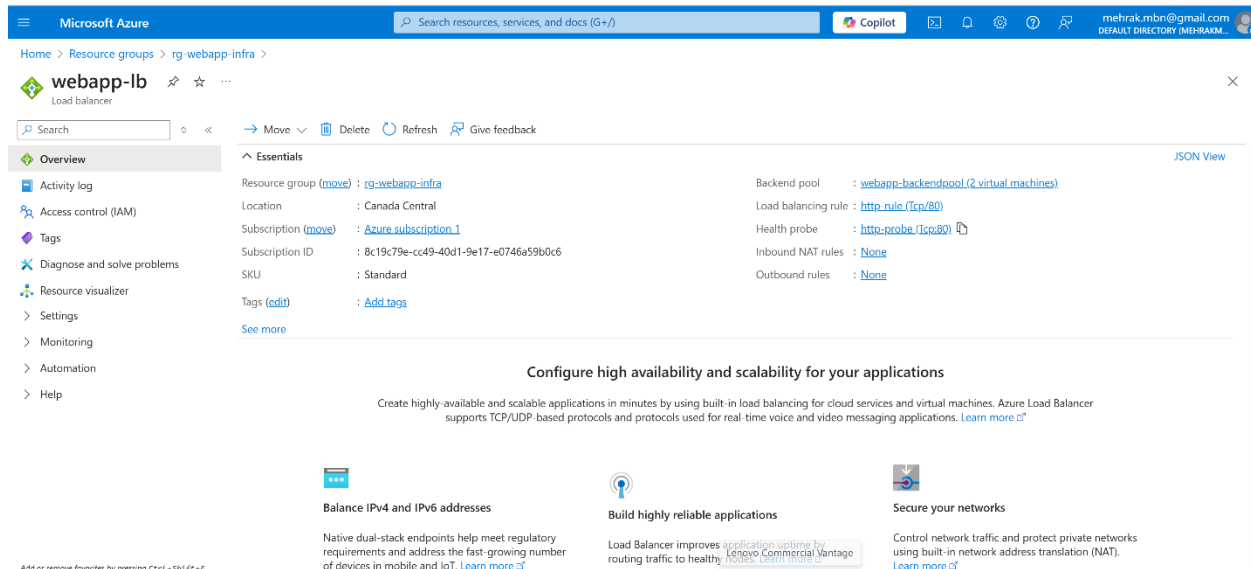
```
az network public-ip create --resource-group rg-webapp-infra --name webapp-pip --sku Standard --allocation-method static --location canadacentral
```

Property	Value
Resource group	rg-webapp-infra
Location	Canada Central
Subscription	Azure subscription 1
Subscription ID	8c19c79e-cc49-40d1-9e17-e0746a59b0c6
SKU	Standard
Tier	Regional
IP address	4.206.91.44
DNS name	-
Domain name label scope	-
Associated to	webapp-lb
Virtual machine	-
Routing preference	Microsoft network

```
az network lb create --resource-group rg-webapp-infra --name webapp-lb --sku Standard --public-ip-address webapp-pip --frontend-ip-name webapp-fe --backend-pool-name webapp-be
```

```
az network lb probe create --resource-group rg-webapp-infra --lb-name webapp-lb --name webapp-probe --protocol tcp --port 80
```

```
az network lb rule create --resource-group rg-webapp-infra --lb-name webapp-lb --name http-rule --protocol tcp --frontend-port 80 --backend-port 80 --frontend-ip-name webapp-fe --backend-pool-name webapp-be --probe-name webapp-probe
```



## 5. Virtual Machines:

To host the web application in an IaaS model. Two Windows Server VMs ensure redundancy. IIS was installed to serve web content and test Load Balancer behavior.

```
az vm create --resource-group rg-webapp-infra --name webvm1 --image Win2022Datacenter --admin-username azureuser --admin-password Pa$$w0rd1234! --size Standard_B2s --vnet-name vnet-webapp --subnet web --nsg webapp-nsg --public-ip-address "" --nics "" --no-wait
```

<Repeat for webvm2>

On VM via Bastion:

```
Install-WindowsFeature -name Web-Server -IncludeManagementTools
```

## 6. Azure SQL + Private Endpoint:

To store structured application data in a secure managed service. Using a Private Endpoint ensures that the SQL server is not exposed to the public internet, and only accessible from the VNet.

```
az sql server create --name webappsqserver1234 --resource-group rg-webapp-infra --location canadacentral --admin-user sqladmin --admin-password P@ssw0rd123!
```

```
az sql db create --resource-group rg-webapp-infra --server webappsqserver1234 --name webappdb --service-objective S0
```

```
az network private-endpoint create --name sql-private-endpoint --resource-group rg-webapp-infra --vnet-name vnet-webapp --subnet db --private-connection-resource-id <SQL_RESOURCE_ID> --group-id sqlServer --connection-name sql-vnet-connection --location canadacentral
```

```
az network private-dns zone create --resource-group rg-webapp-infra --name  
privatelink.database.windows.net
```

```
az network private-dns link vnet create --resource-group rg-webapp-infra --zone-name  
privatelink.database.windows.net --name sql-dns-link --virtual-network vnet-webapp --registration-enabled false
```

Microsoft Azure

Home > Resource groups > rg-webapp-infra > sql-private-endpoint

Private endpoint

Search

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Resource visualizer

Settings

Monitoring

Automation

Help

Essentials

Resource group (move) : rg-webapp-infra

Location : Canada Central

Subscription (move) : Azure subscription 1

Subscription ID : 8c19c79e-cc49-40d1-9e17-e0746a59b0c6

Provisioning state : Succeeded

Tags (edit) : Add tags

Virtual network/subnet : vnet-webapp/subnet-web

Network interface : sql-private-endpoint-nic-71eed43e-b265-4f0b-b2c7-53d533595230

Private link resource : webappsqlserver1234

Target sub-resource : sqlServer

Connection status : Approved

Request/Response : Auto-approved

JSON View

Give feedback

## 7. Azure File Share:

To enable both VMs to share files such as logs, configuration data, or app content. Mounting it as a drive simplifies access and collaboration between servers.

```
az storage account create --name webappstor1234 --resource-group rg-webapp-infra --location canadacentral  
--sku Standard_LRS --kind StorageV2
```

```
az storage share-rm create --resource-group rg-webapp-infra --storage-account webappstor1234 --name  
webappshare
```

Microsoft Azure

Home > Resource groups > rg-webapp-infra > webappstor1234 | File shares > webappshare

SMB File share

Search

Connect

Upload

Refresh

Add directory

Delete share

Change tier

Edit quota

Give feedback

Overview

Diagnose and solve problems

Access Control (IAM)

Browse

Operations

Essentials

Storage account : webappstor1234

Resource group (move) : rg-webapp-infra

Location : Canada Central

Subscription (move) : Azure subscription 1

Subscription ID : 8c19c79e-cc49-40d1-9e17-e0746a59b0c6

Share URL : https://webappstor1234.file.core.windows.net/webappshare

Redundancy : Locally-redundant storage (LRS)

Configuration modified : 6/4/2025, 1:40:07 PM

JSON View

Properties

Capabilities (2)

Tutorials

Size

Maximum storage (GiB) : 102400

Used storage capacity (GiB) : 0

Access tier : Transaction optimized

Performance

IOPS : Varies by region. Learn more

Throughput (MiB/sec) : Varies by region. Learn more

Feature status

Soft delete : 7 days

Large file shares : Enabled

Identity-based access

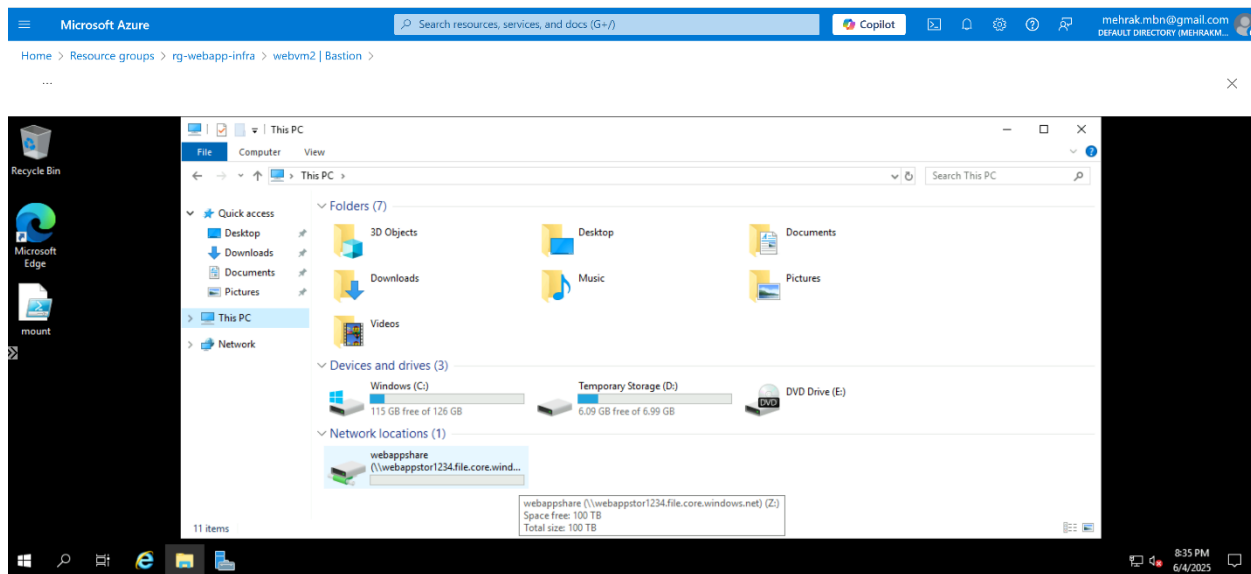
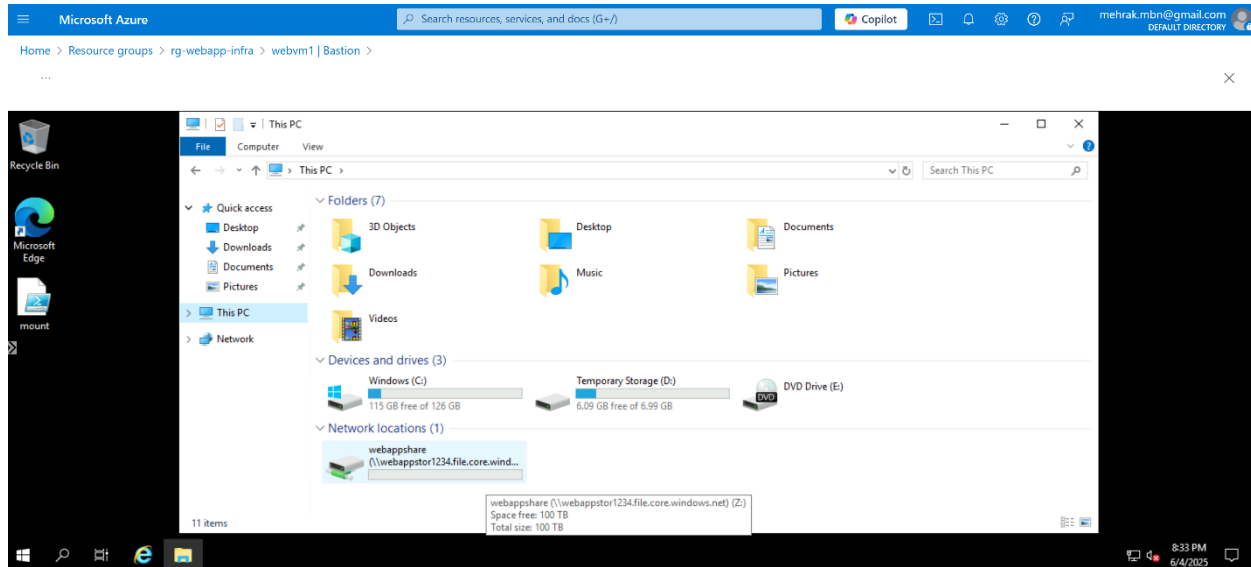
Directory service : Not configured

Domain : -

PowerShell to mount:

New-PSDrive -Name "Z" -PSProvider FileSystem -Root

"\\webappstor1234.file.core.windows.net\\webappshare" -Persist -Credential (New-Object  
PSCredential("webappstor1234", (ConvertTo-SecureString "<key>" -AsPlainText -Force)))



## 8. Monitoring and Alerts:

To collect telemetry from the infrastructure (CPU, memory, disk, etc.) using Log Analytics. Alerts notify administrators if certain thresholds are exceeded (e.g., CPU > 80%).

az monitor log-analytics workspace create --resource-group rg-webapp-infra --workspace-name webapp-law

az vm extension set --publisher Microsoft.Azure.Monitor --name AzureMonitorWindowsAgent --resource-group rg-webapp-infra --vm-name webvm1 --version 1.0 --enable-auto-upgrade true

az monitor metrics alert create --name HighCPUAlert --resource-group rg-webapp-infra --scopes <VM\_RESOURCE\_ID> --condition "avg Percentage CPU > 80" --window-size 5m --evaluation-frequency 1m

## 9. Automation:

To save cost by automatically shutting down VMs at night when they're not needed. Azure Automation with scheduled Runbooks ensures operational efficiency with minimal manual effort.

```
az automation account create --resource-group rg-webapp-infra --name webapp-automation --location canadacentral --sku Free
```

Runbook: ShutdownVMs.ps1

```
$vmNames = @("webvm1", "webvm2")
```

```
foreach ($vm in $vmNames) {
```

```
Stop-AzVM -Name $vm -ResourceGroupName "rg-webapp-infra" -Force
```

```
}
```

Schedule:

```
az automation schedule create --resource-group rg-webapp-infra \
```

```
--automation-account-name webapp-automation --name NightlyShutdown \
```

```
--start-time "2024-06-07T03:00:00+00:00" --frequency Day --interval 1 --time-zone "UTC"
```

Microsoft Azure

Search resources, services, and docs (G+I)

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Home > Resource groups > rg-webapp-infra > webapp-automation

webapp-automation | Runbooks

Automation Account

Search

Create a runbookImport a runbookBrowse galleryLearn moreFeedbackRefresh

OverviewActivity logAccess control (IAM)TagsDiagnose and solve problemsResource visualizerProcess AutomationRunbooksJobsHybrid worker groupsConfiguration ManagementShared ResourcesRelated ResourcesAccount SettingsSettingsMonitoring

PowerShell 7.1 and Python 2.7 are no longer supported by their respective parent products PowerShell and Python. It is strongly recommended to update outdated runbooks to latest supported versions using Runtime environment. [Learn more](#)

Search runbooks...Runbook type: AllAuthoring Status: All

Showing 1 to 1 of 1 records

Name	Authoring status	Runbook type	Runtime version	Last modified	Tags
ShutdownVMs	Published	PowerShell	5.1	6/4/2025, 3:16 PM	

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ShutdownVMs (webapp-automation/ShutdownVMs) | Schedules

Runbook

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Name	Next run
NightlyShutdown	6/7/2025, 3:00 AM

NightlyShutdown

Schedule

SaveDiscardUnlink

Properties

Last modified  
6/4/2025, 3:23 PM

Enabled \*  
☒ Yes ☐ No

Description

Starts \*  
06/07/2025 3:00 AM

Time zone  
Coordinated Universal Time

Recurrence  
☐ Once ☒ Recurring

Recurrence Details  
Recur every \*  
1 Day

Set expiration  
☐ Vec ☒ No

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