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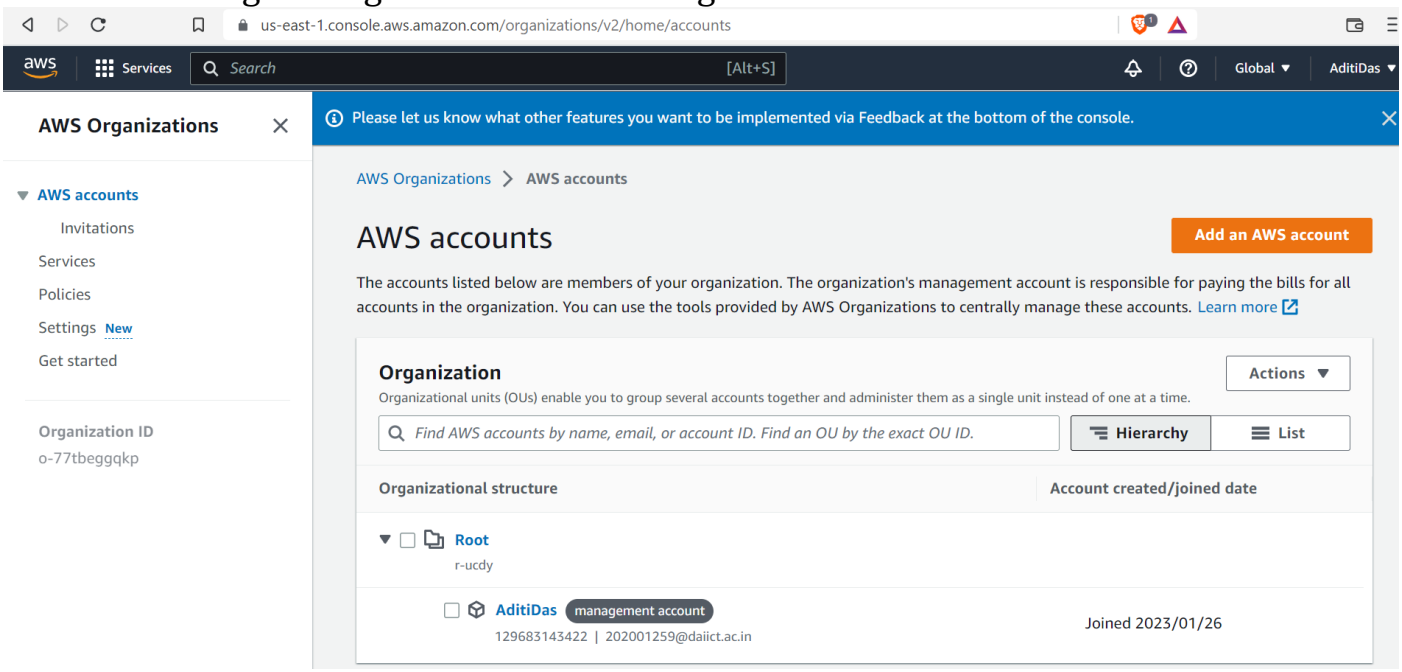
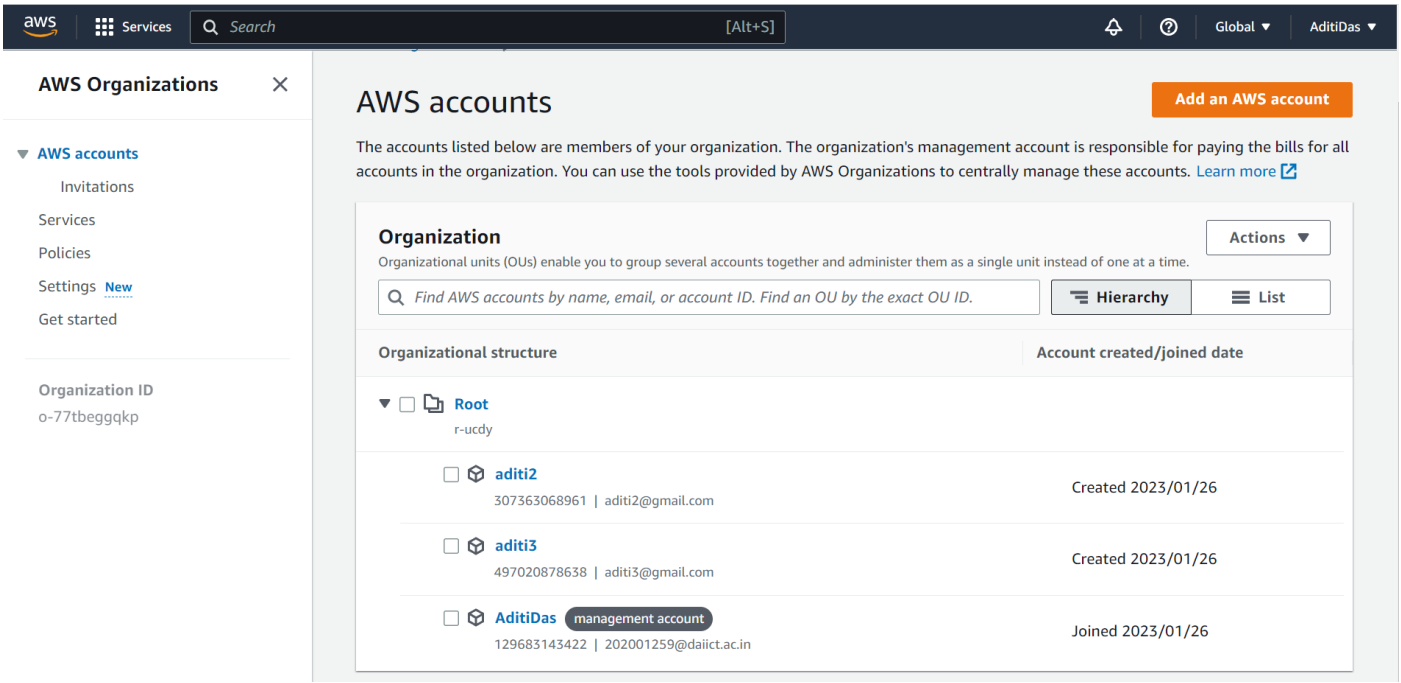
IT491
Date: 26th Jan 2023

1. Go through the following tutorials.

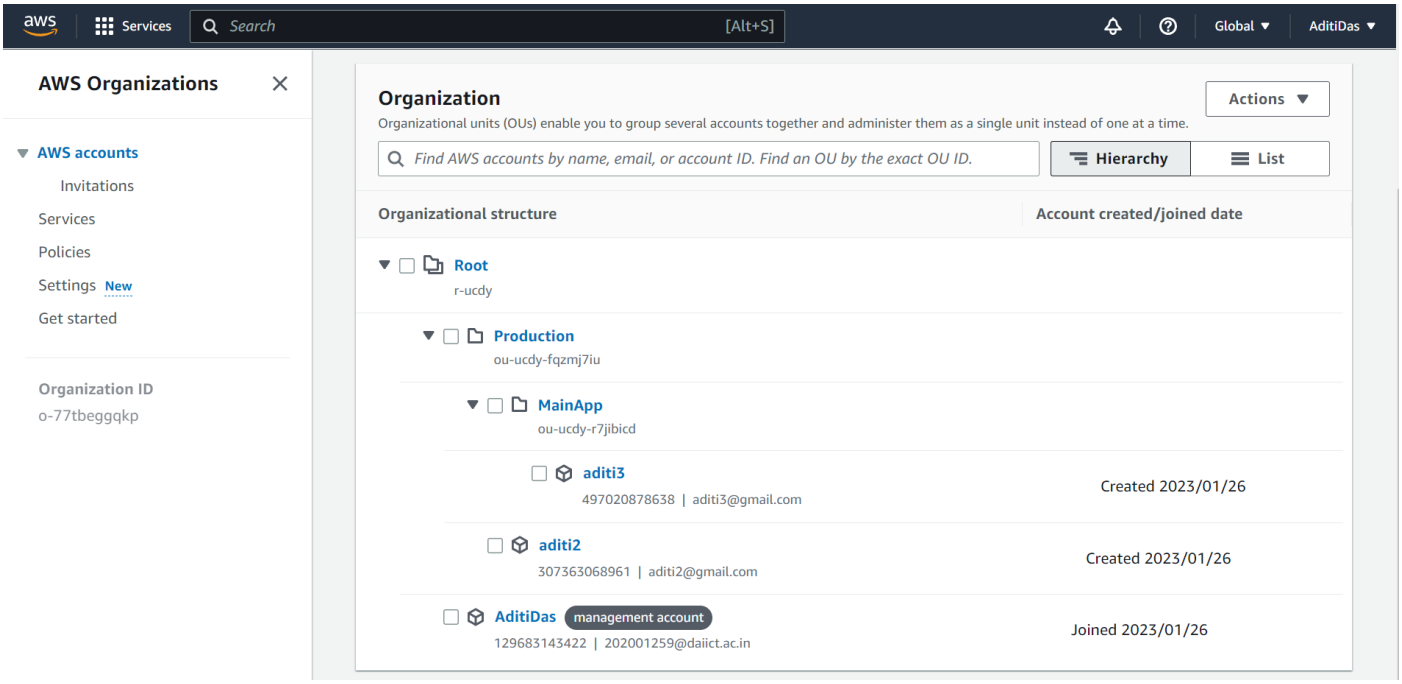
a) AWS

i. Creating the organisation and adding members:

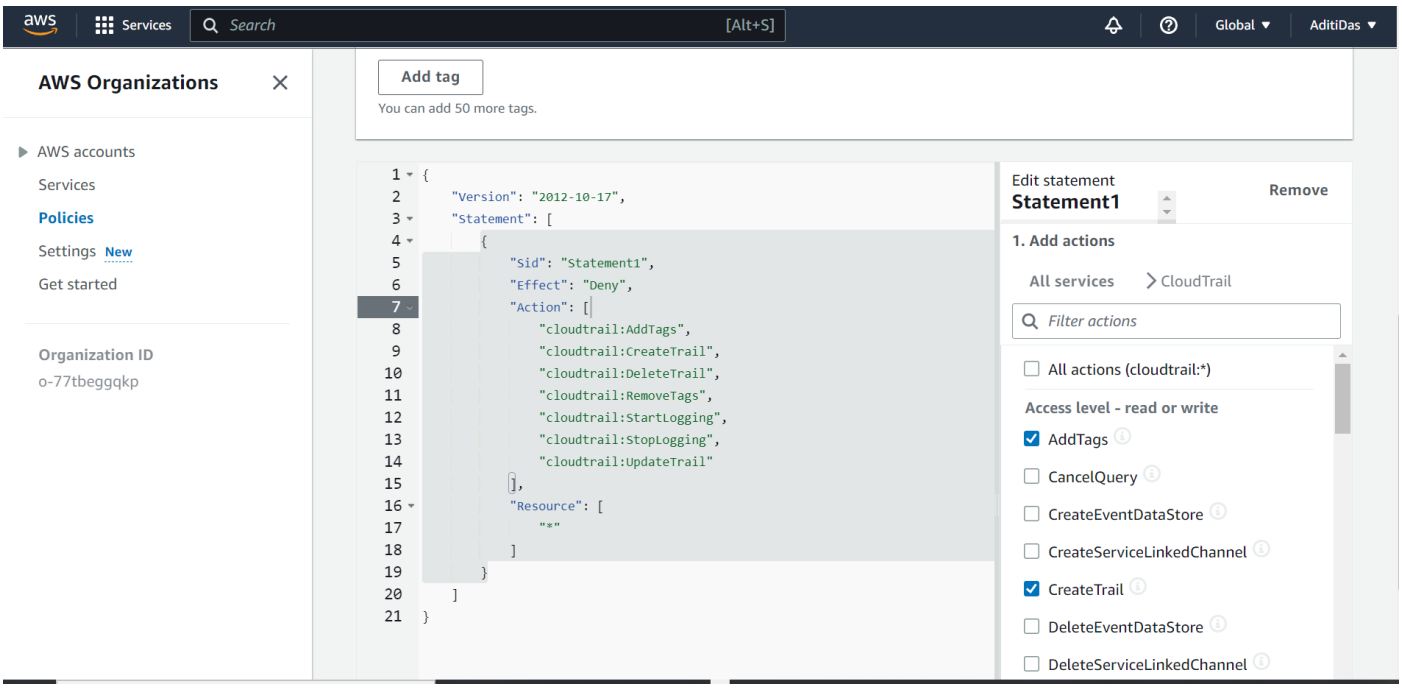




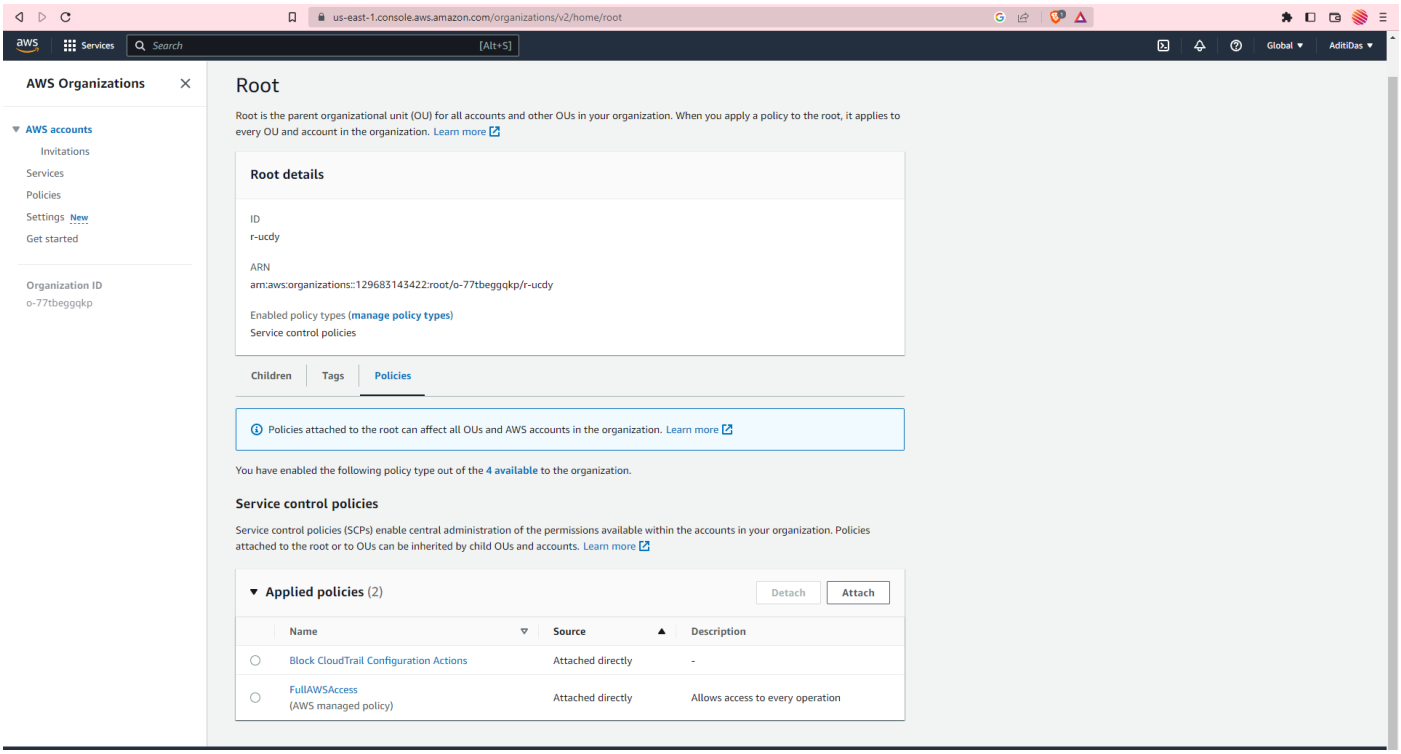
ii. Creating Organisational Unit:



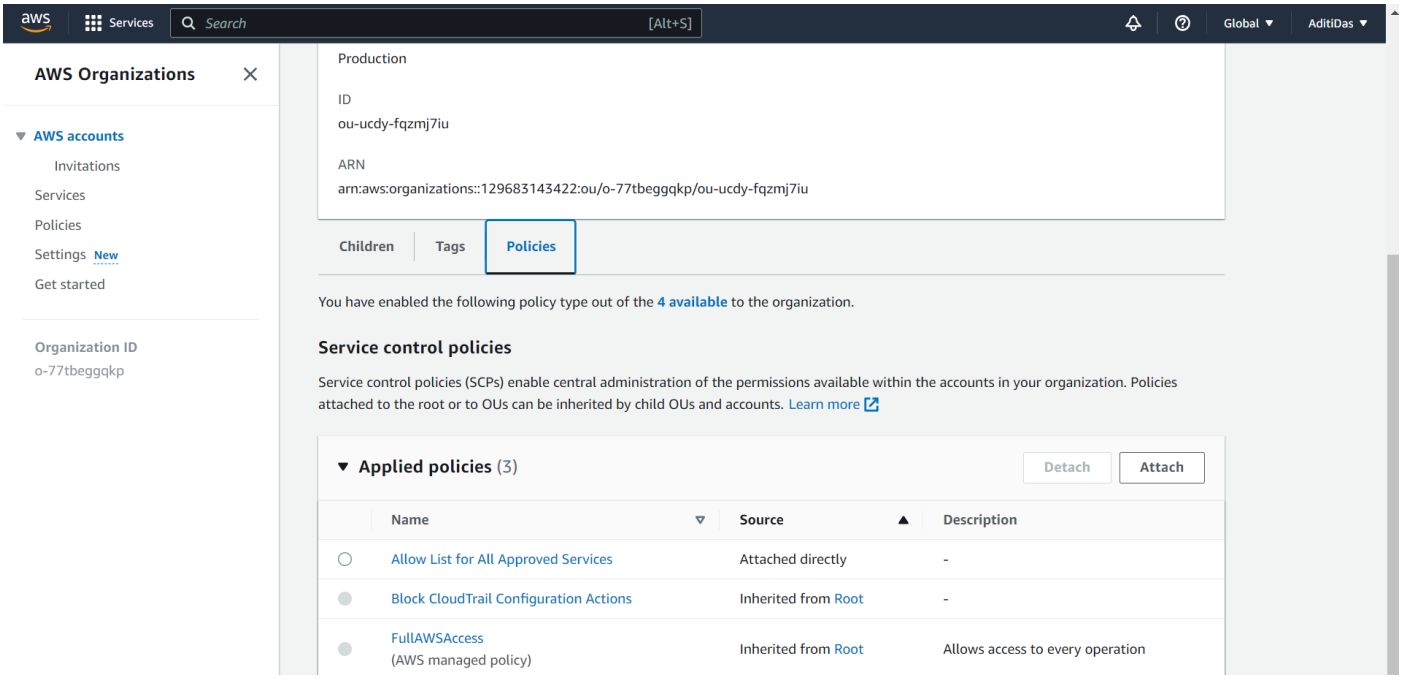
iii. Create Service Control Policies:



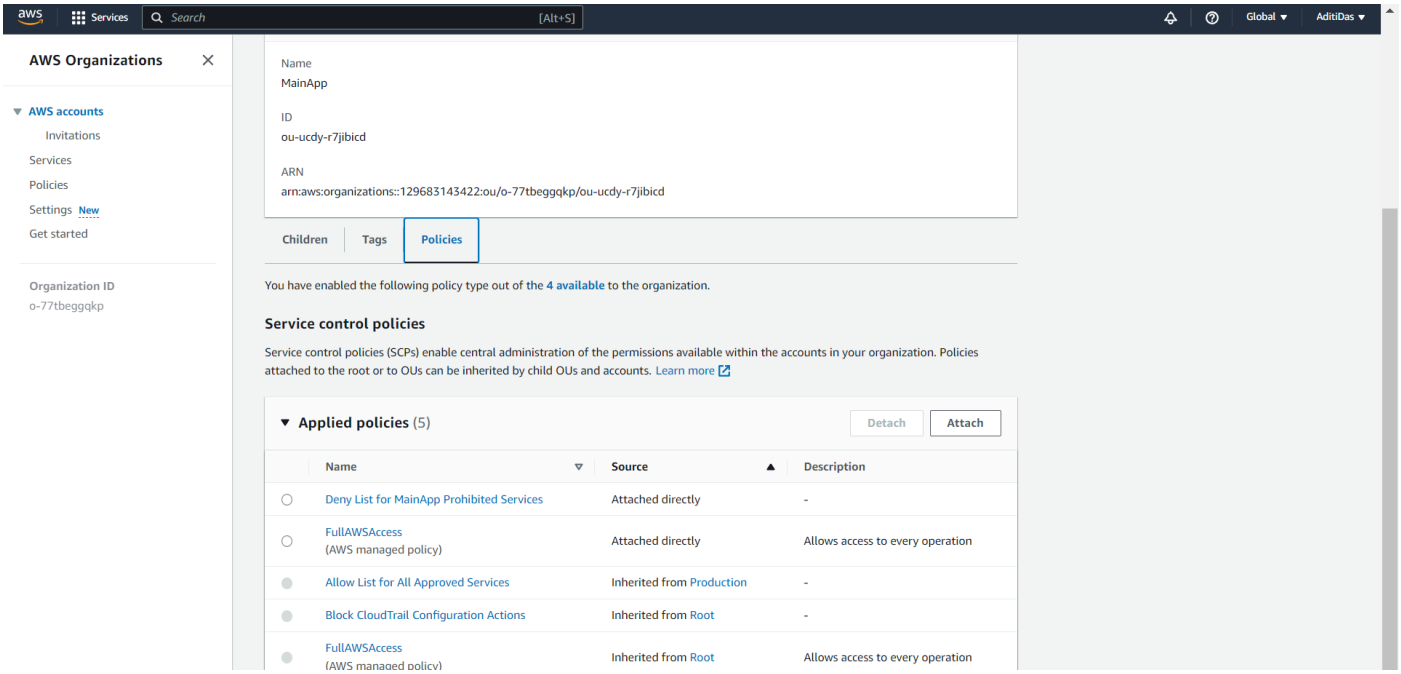
a. Policies for “Root” organisational unit:



b. Policies for “Production” organisational unit :



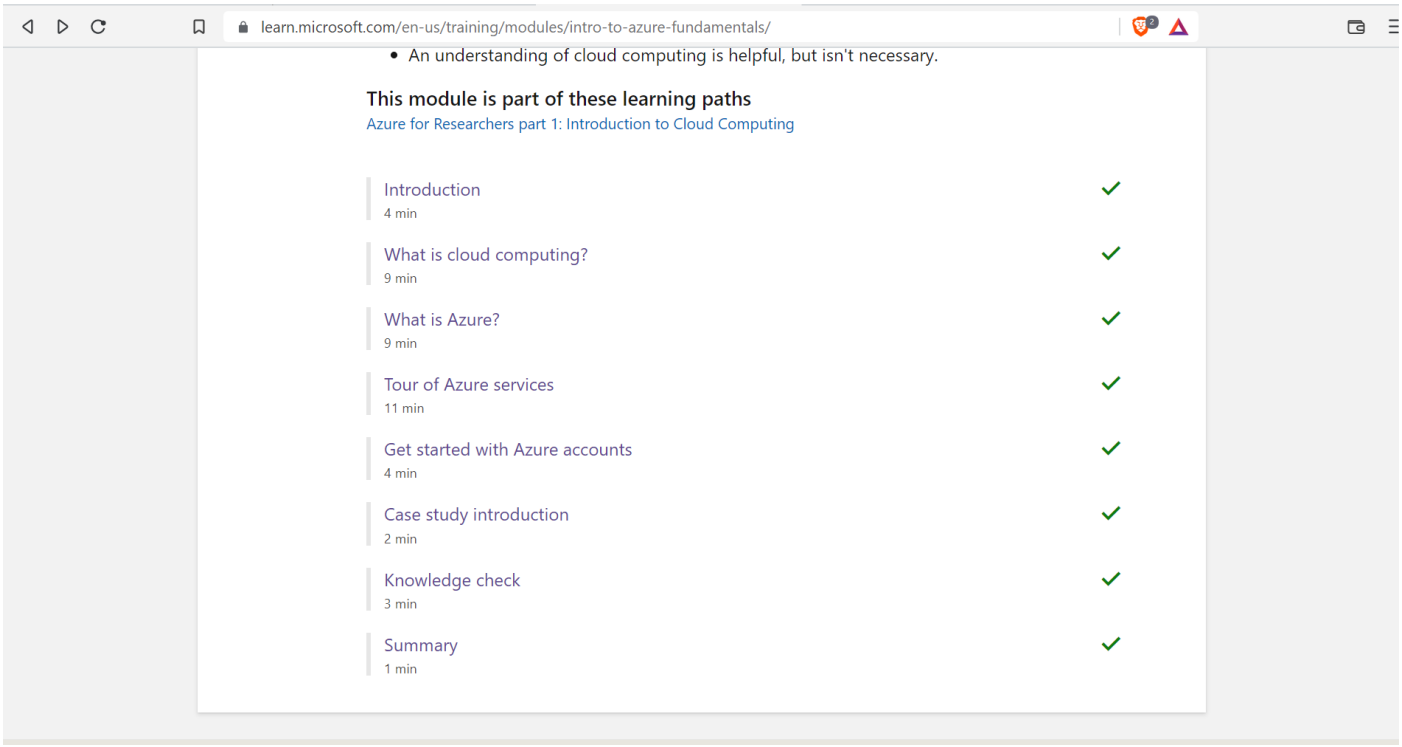
c. Policies for “MainApp” organisational unit :



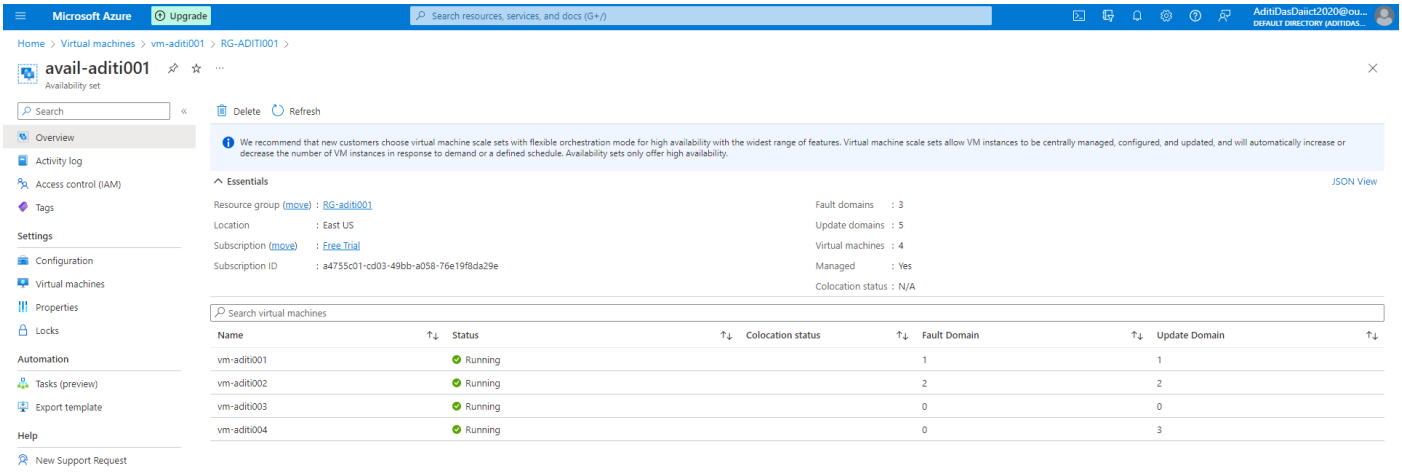
iv. Testing Restrictions:

- If I sign in as a user in the management account (AditiDas), all operations allowed by IAM permissions policies can be performed. SCP’s cannot control any role or user in the management account.
- If I sign in as the root user or an IAM user in account aditi2, I can perform all actions allowed by the allow list and none of the CloudTrail actions can be performed.
- If I sign in as a user in account aditi3, I can perform all actions allowed by the allow list and not present in the deny list. Also, none of the CloudTrail actions can be performed.

b) Intro to Azure module



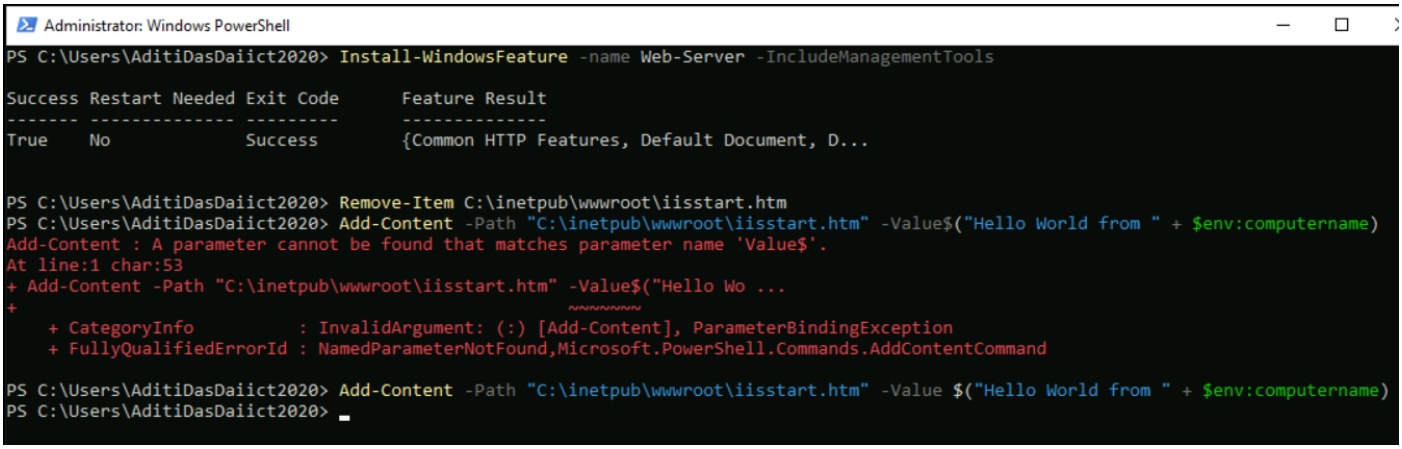
2. Making Availability Set in Azure



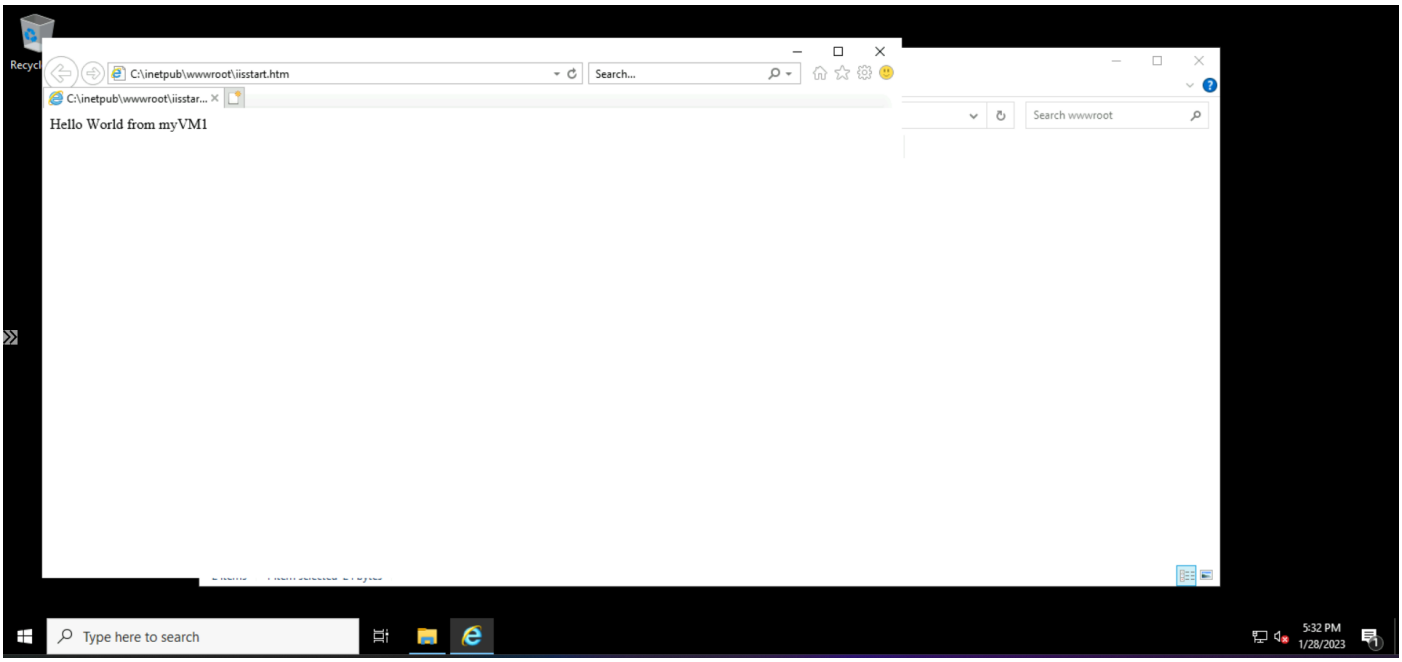
3. Quickstart: Create a public load balancer - Azure portal - Azure Load Balancer

VM1:

i. Code:

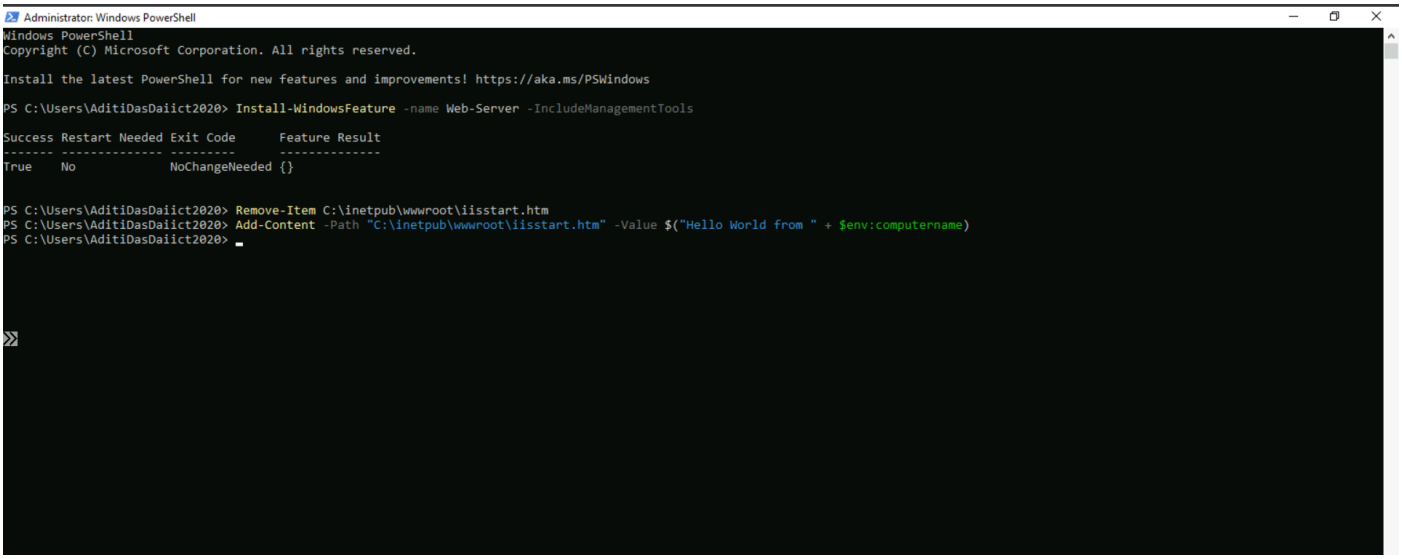


ii. Output:

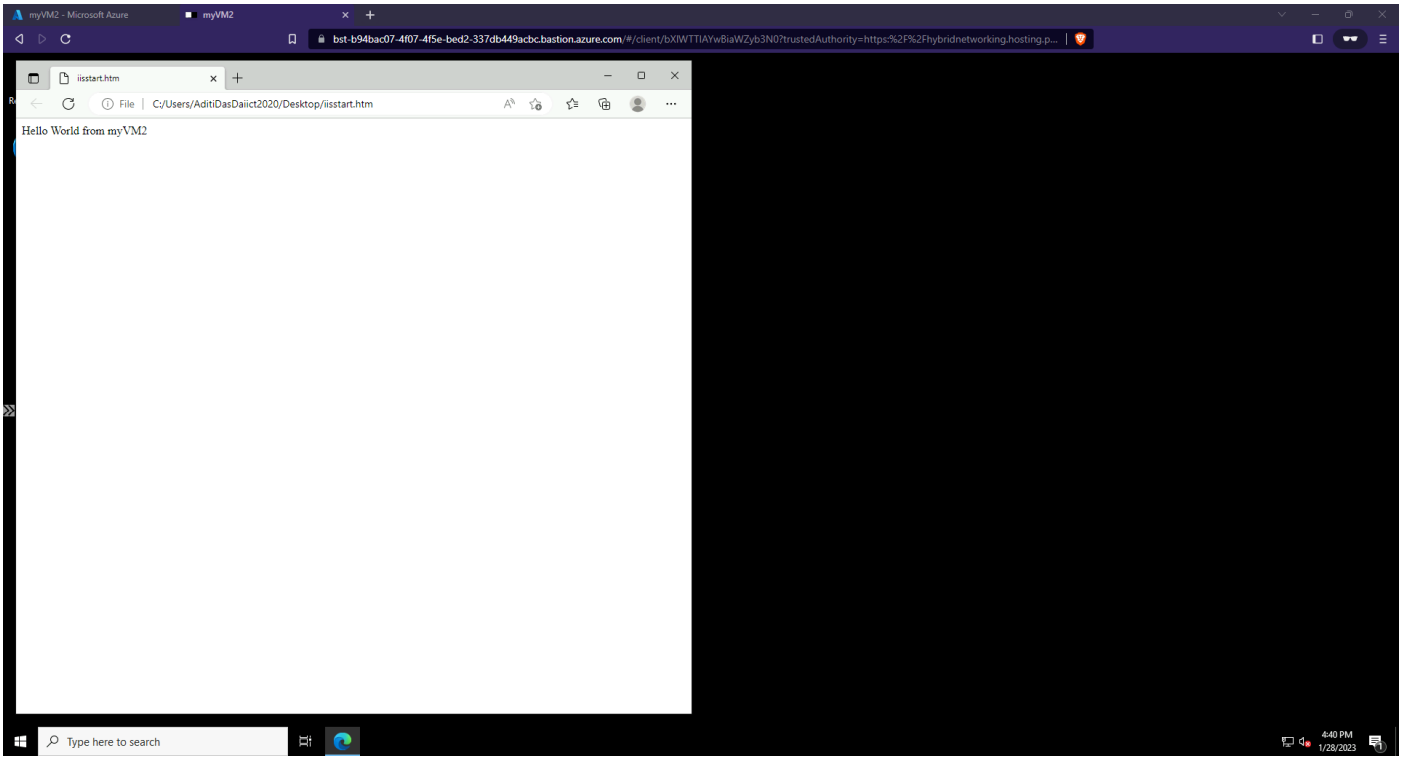


VM2:

i. Code:

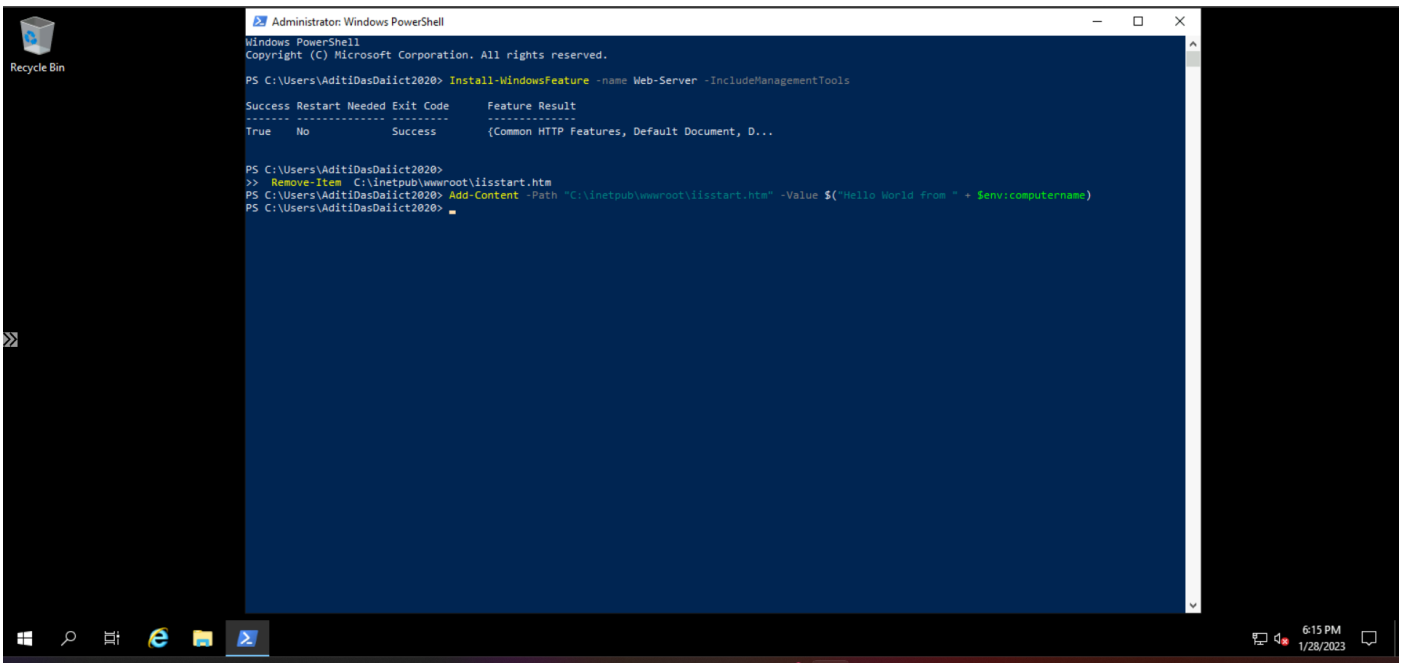


ii. Output:

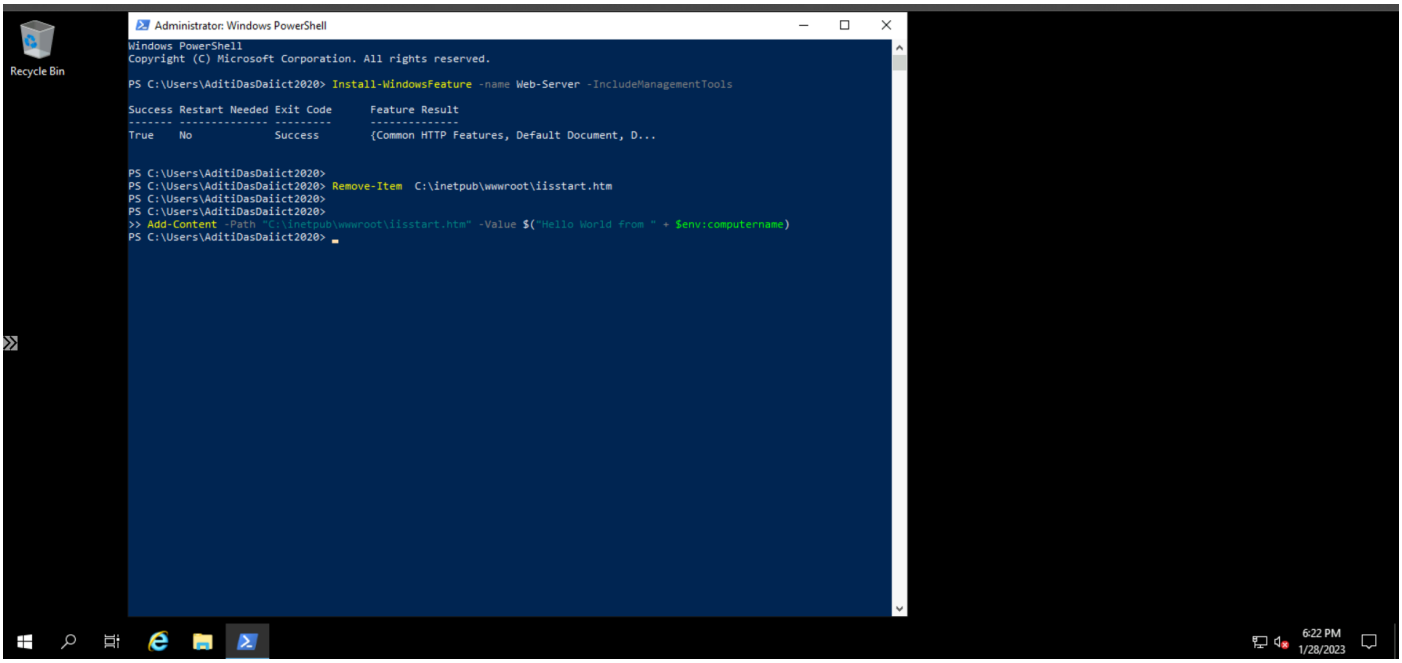


4. Quickstart: Create an internal load balancer - Azure portal - Azure Load Balancer

VM1:

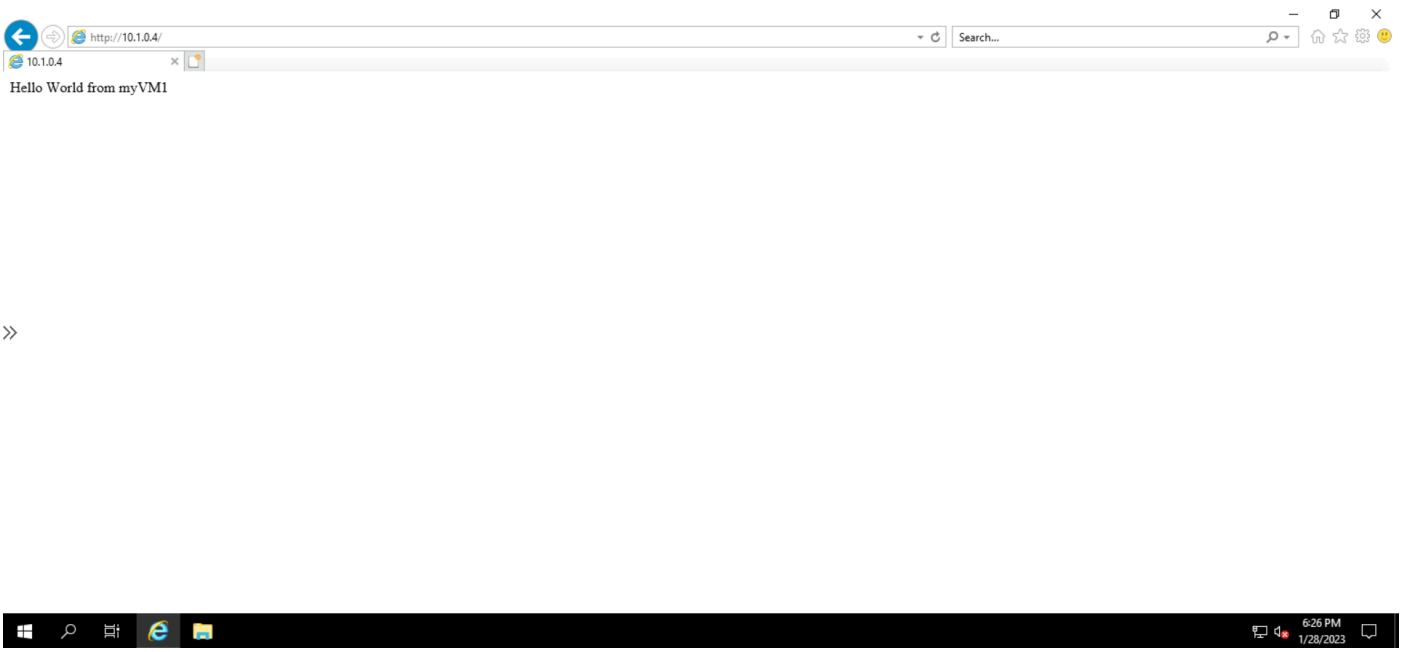


VM2:

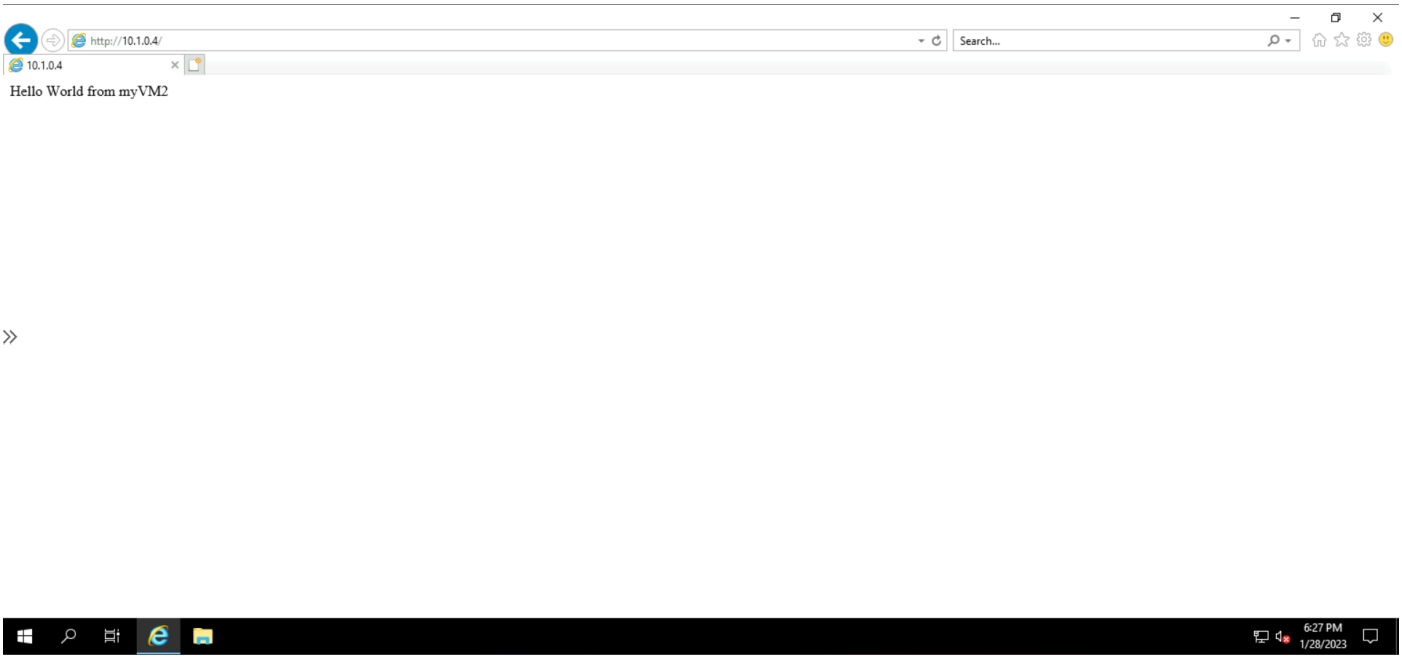


TestVM:

a. From VM1

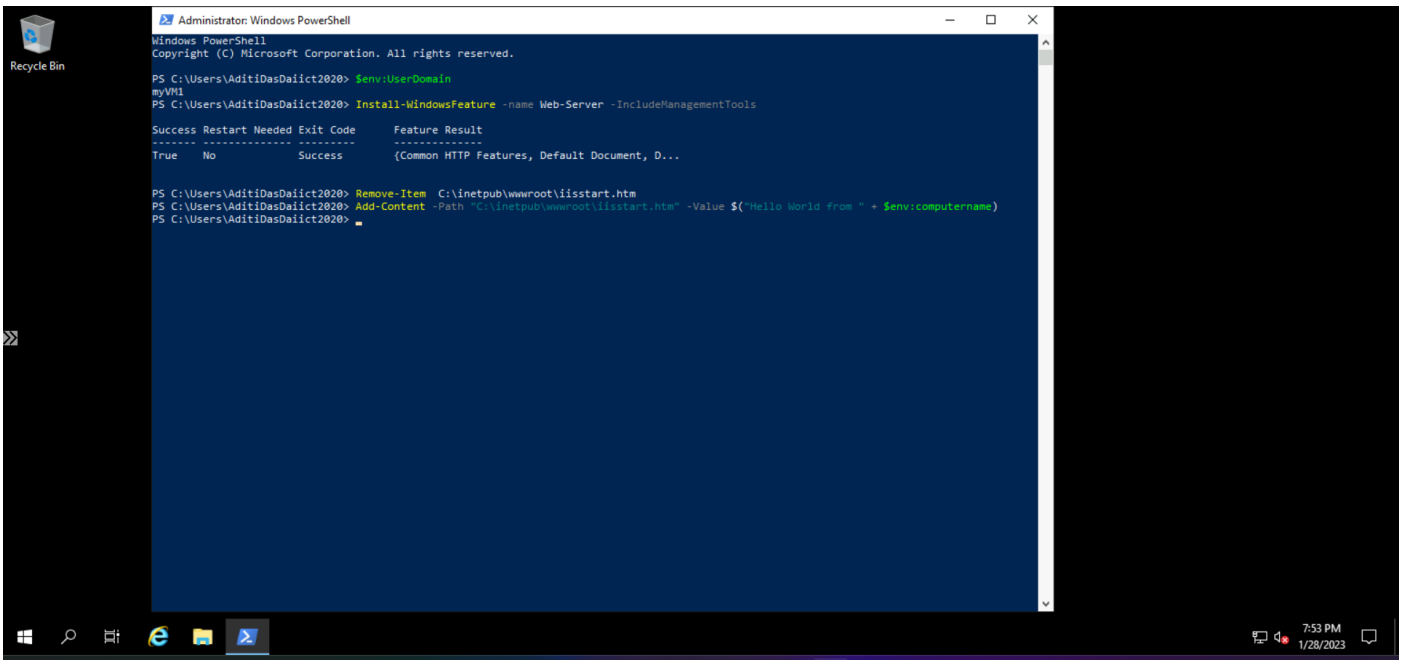


b. From VM2:

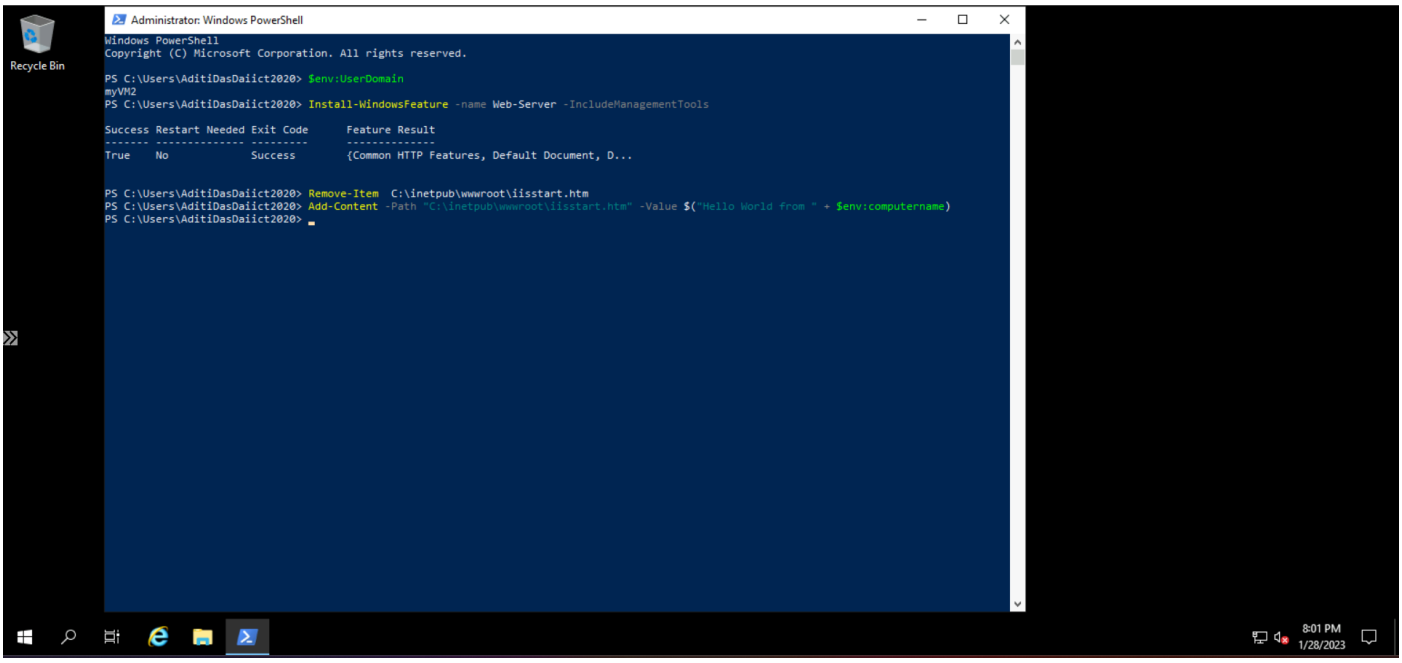


5. Tutorial: Create a load balancer with more than one availability set in the backend pool - Azure portal - Azure Load Balancer

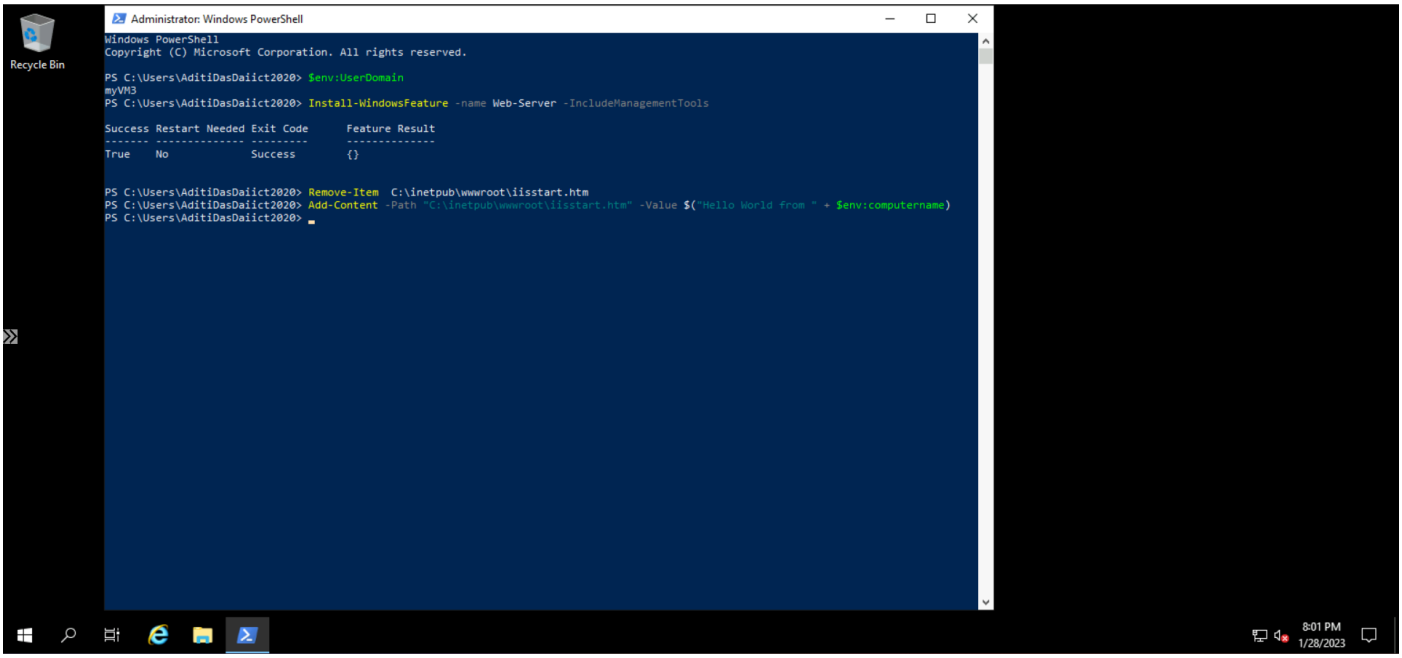
i. VM1



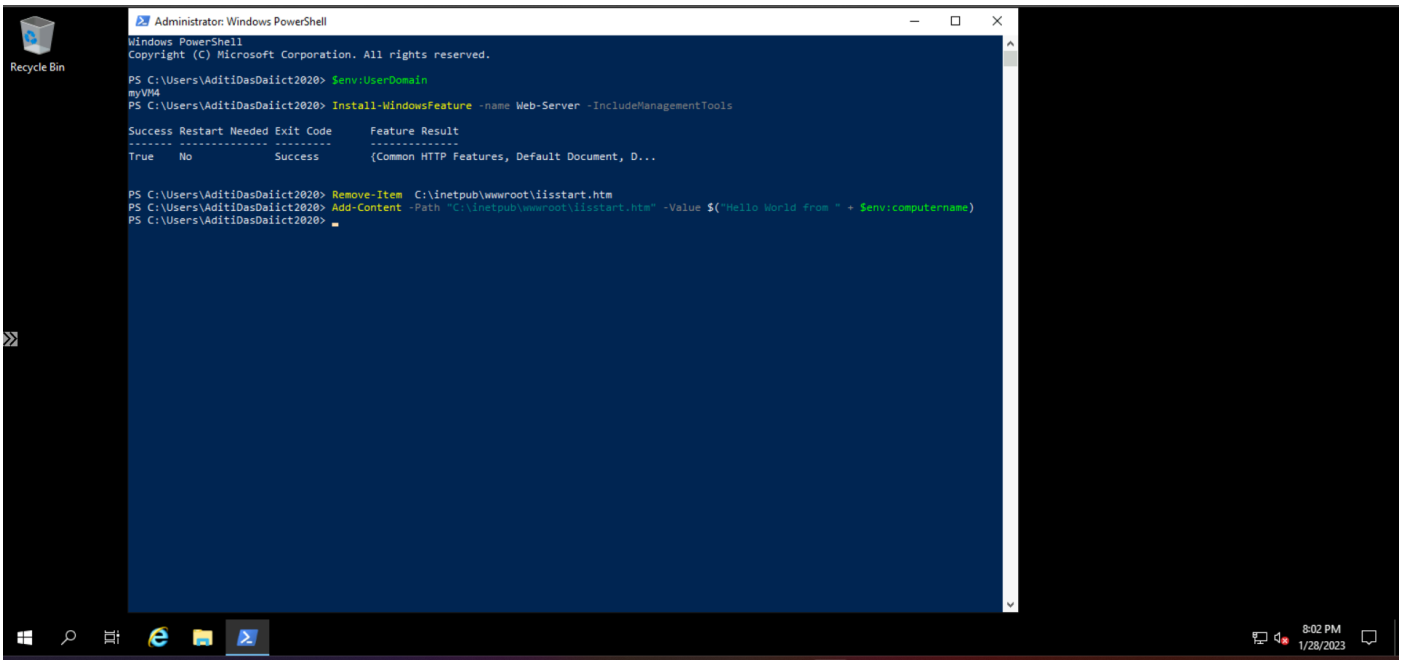
ii. VM2



iii. VM3

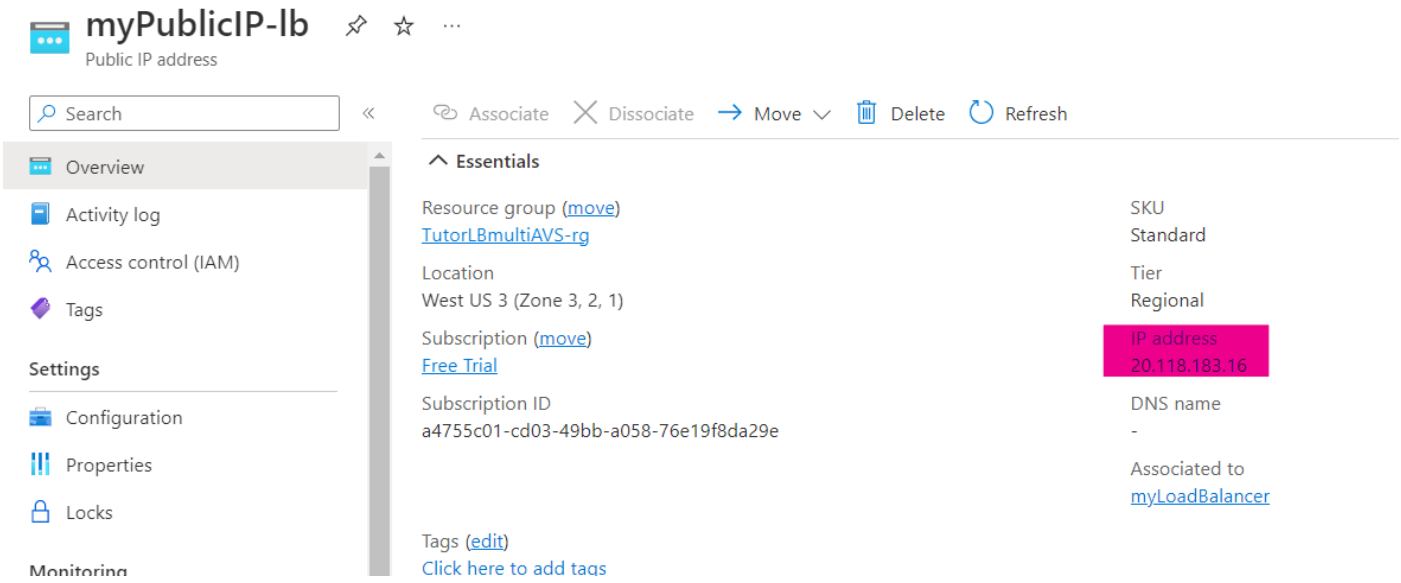


iv. VM4

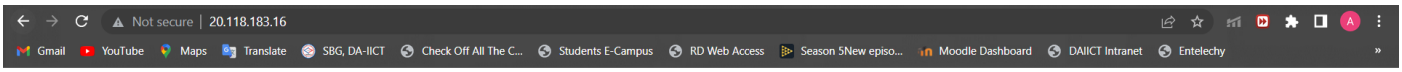


Output:

i. Public-IP address

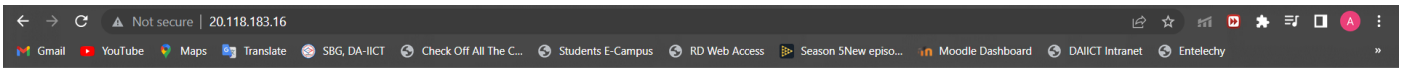


ii. From VM1



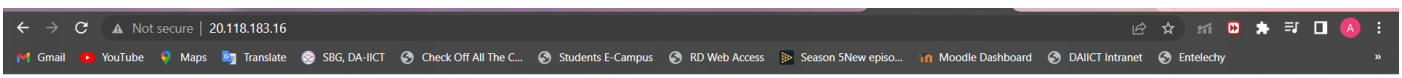
Hello World from myVM1

iii. From VM2



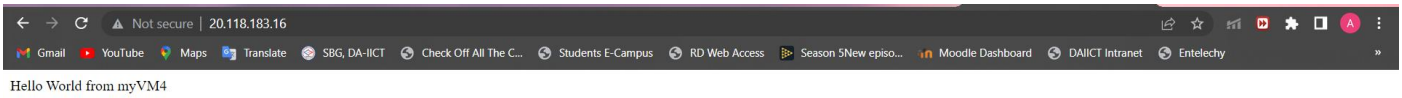
Hello World from myVM2

iv. From VM3



Hello World from myVM3

v. From VM4



6. Create a VM using CLI

i. Setting the variables in CMD :

```
C:\Users\ADMIN>set resourceGroup=VMTutorialResources001

C:\Users\ADMIN>set location=eastus2

C:\Users\ADMIN>set vnetName=TutorialVNet1

C:\Users\ADMIN>set subnetName=TutorialSubnet1

C:\Users\ADMIN>set vnetAddressPrefix=10.0.0.0/16

C:\Users\ADMIN>set subnetAddressPrefix=10.0.0.0/24

C:\Users\ADMIN>set vmName=TutorialVM1
```

ii. Creating a resource group using CLI :

```
C:\Users\ADMIN>az group create --name %resourceGroup% --location %location%
{
  "id": "/subscriptions/a4755c01-cd03-49bb-a058-76e19f8da29e/resourceGroups/VMTutorialResources001",
  "location": "eastus2",
  "managedBy": null,
  "name": "VMTutorialResources001",
  "properties": {
    "provisioningState": "Succeeded"
  },
  "tags": null,
  "type": "Microsoft.Resources/resourceGroups"
}
```

iii. Creating a virtual network using CLI :

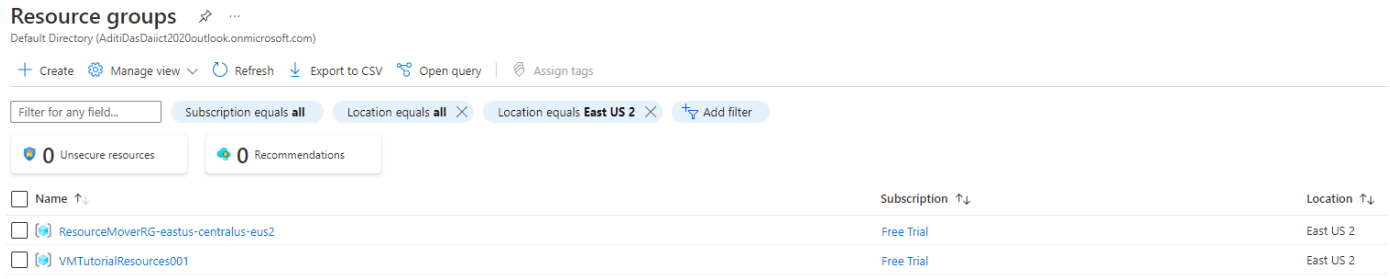
```
C:\Users\ADMIN>az network vnet create --name %vnetName% --resource-group %resourceGroup% --address-prefixes %vnetAddressPrefix% --subnet-name %subnetName% --subnet-prefixes %subnetAddressPrefix%
{
  "newVNet": {
    "addressSpace": {
      "addressPrefixes": [
        "10.0.0.0/16"
      ]
    },
    "enableDdosProtection": false,
    "etag": "W/\"aeb4fadd-feff-46ec-a106-a1fb76eaa97a\"",
    "id": "/subscriptions/a4755c01-cd03-49bb-a058-76e19f8da29e/resourceGroups/VMTutorialResources001/providers/Microsoft.Network/virtualNetworks/TutorialVNet1",
    "location": "eastus2",
    "name": "TutorialVNet1",
    "provisioningState": "Succeeded",
    "resourceGroup": "VMTutorialResources001",
    "resourceGuid": "dee3c3fb-7eba-4148-a1d3-a21efc0ac9f6",
    "subnets": [
      {
        "addressPrefix": "10.0.0.0/24",
        "delegations": [],
        "etag": "W/\"aeb4fadd-feff-46ec-a106-a1fb76eaa97a\"",
        "id": "/subscriptions/a4755c01-cd03-49bb-a058-76e19f8da29e/resourceGroups/VMTutorialResources001/providers/Microsoft.Network/virtualNetworks/TutorialVNet1/subnets/TutorialSubnet1",
        "name": "TutorialSubnet1",
        "privateEndpointNetworkPolicies": "Disabled",
        "privateLinkServiceNetworkPolicies": "Enabled",
        "provisioningState": "Succeeded",
        "resourceGroup": "VMTutorialResources001",
        "type": "Microsoft.Network/virtualNetworks/subnets"
      }
    ],
    "type": "Microsoft.Network/virtualNetworks",
    "virtualNetworkPeerings": []
  }
}
```

iv. Creating a Virtual Machine using CLI :

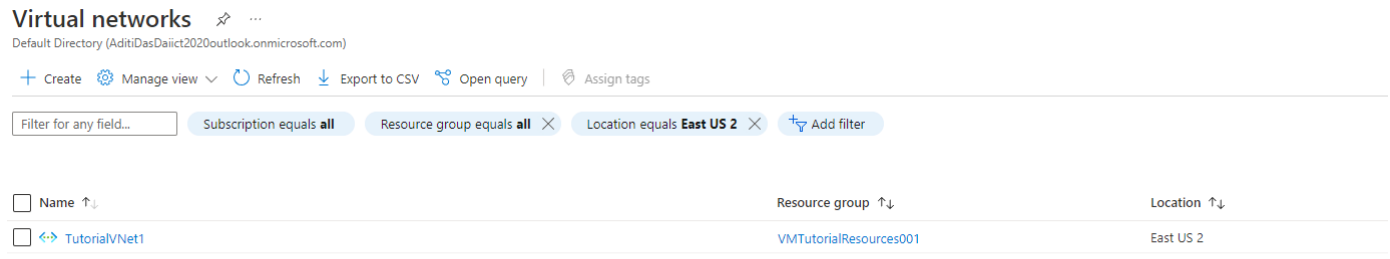
```
C:\Users\ADMIN>az vm create --resource-group %resourceGroup% --name %vmName% --image UbuntuLTS --vnet-name %vnetName% --subnet %subnetName% --generate-ssh-keys --output json --verbose
Default username ADMIN is a reserved username. Use azureuser instead.
Use existing SSH public key file: C:\Users\ADMIN\.ssh\id_rsa.pub
Starting Build 2023 event, "az vm/vmss create" command will deploy Trusted Launch VM by default. To know more about Trusted Launch, please visit https://docs.microsoft.com/en-us/azure/virtual-machines/trusted-launch
It is recommended to use parameter "--public-ip-sku Standard" to create new VM with Standard public IP. Please note that the default public IP used for VM creation will be changed from Basic to Standard in the future.
{
  "fqdns": "",
  "id": "/subscriptions/a4755c01-cd03-49bb-a058-76e19f8da29e/resourceGroups/VMTutorialResources001/providers/Microsoft.Compute/virtualMachines/TutorialVM1",
  "location": "eastus2",
  "macAddress": "60-45-BD-BC-E6-6B",
  "powerState": "VM running",
  "privateIpAddress": "10.0.0.4",
  "publicIpAddress": "20.122.83.126",
  "resourceGroup": "VMTutorialResources001",
  "zones": ""
}
Command ran in 86.717 seconds (init: 0.369, invoke: 86.349)
```

v. Output in Azure portal :

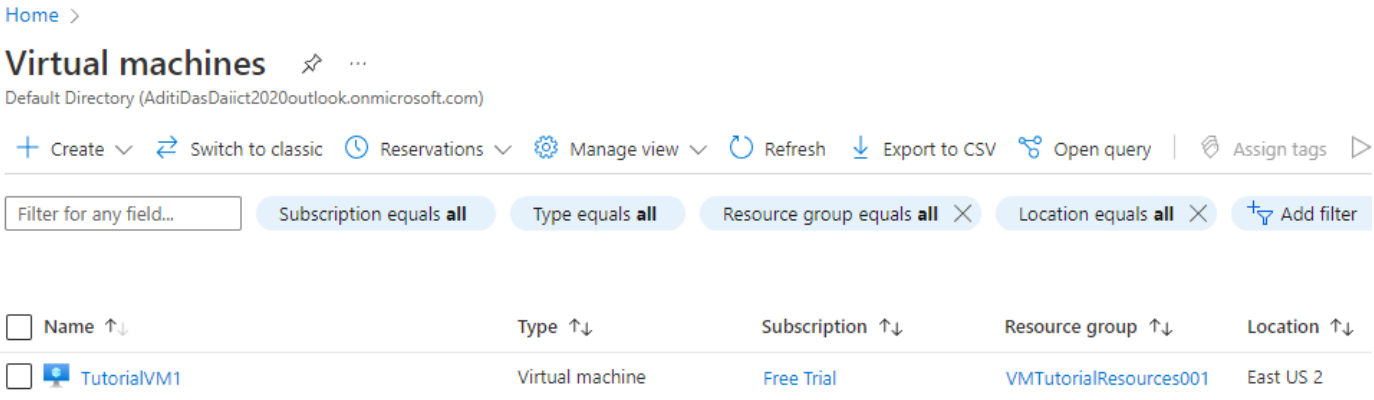
a. Resource Group



b. Virtual Network



c. Virtual Machine

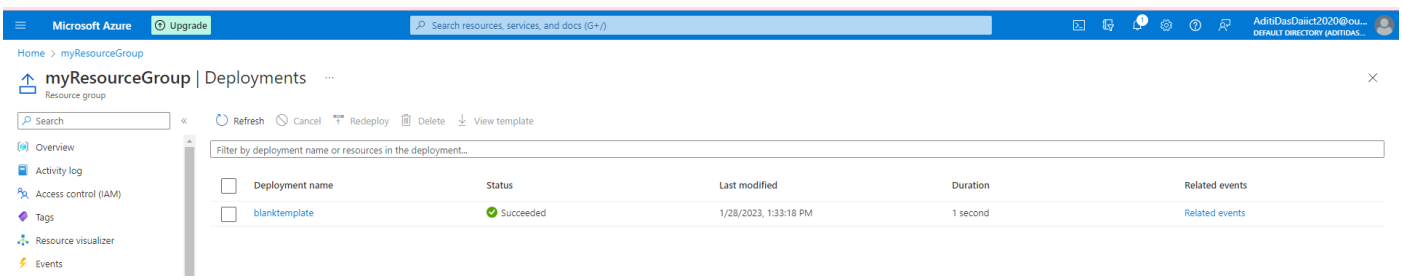


vi. Code :

```
%Setting the variables
set resourceGroup=VMTutorialResources001
set location=eastus2
set vnetName=TutorialVNet1
set subnetName=TutorialSubnet1
set vnetAddressPrefix=10.0.0.0/16
set subnetAddressPrefix=10.0.0.0/24
set vmName=TutorialVM1

%Creating Resource Group
az group create --name %resourceGroup% --location %location%

%Creating Virtual Network
az network vnet create --name %vnetName% --resource-group %resourceGroup% --address-
prefixes %vnetAddressPrefix% --subnet-name %subnetName% --subnet-prefixes
%subnetAddressPrefix%

%Creating Virtual Machine
az vm create --resource-group %resourceGroup% --name %vmName% --image UbuntuLTS --vnet-
name %vnetName% --subnet %subnetName% --generate-ssh-keys --output json --verbose
```

7. Introduction to ARM templates

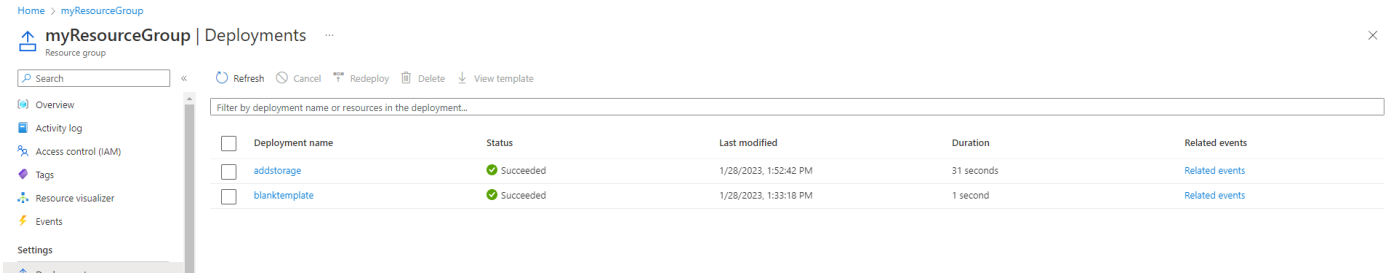
i. Create first template



JSON:

```
{
  "$schema": "https://schema.management.azure.com/schemas/2019-04-
01/deploymentTemplate.json#",
  "contentVersion": "1.0.0.0",
  "resources": []
}
```

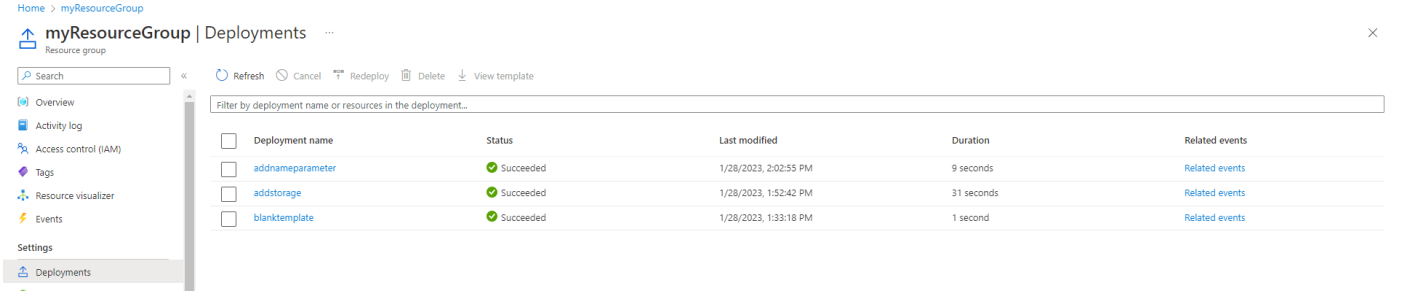
ii. Adding resource



JSON:

```
{
  "$schema": "https://schema.management.azure.com/schemas/2019-04-
01/deploymentTemplate.json#",
  "contentVersion": "1.0.0.0",
  "resources": [
    {
      "type": "Microsoft.Storage/storageAccounts",
      "apiVersion": "2021-09-01",
      "name": "store1abcad280123",
      "location": "eastus2",
      "sku": {
        "name": "Standard_LRS"
      },
      "kind": "StorageV2",
      "properties": {
        "supportsHttpsTrafficOnly": true
      }
    }
  ]
}
```

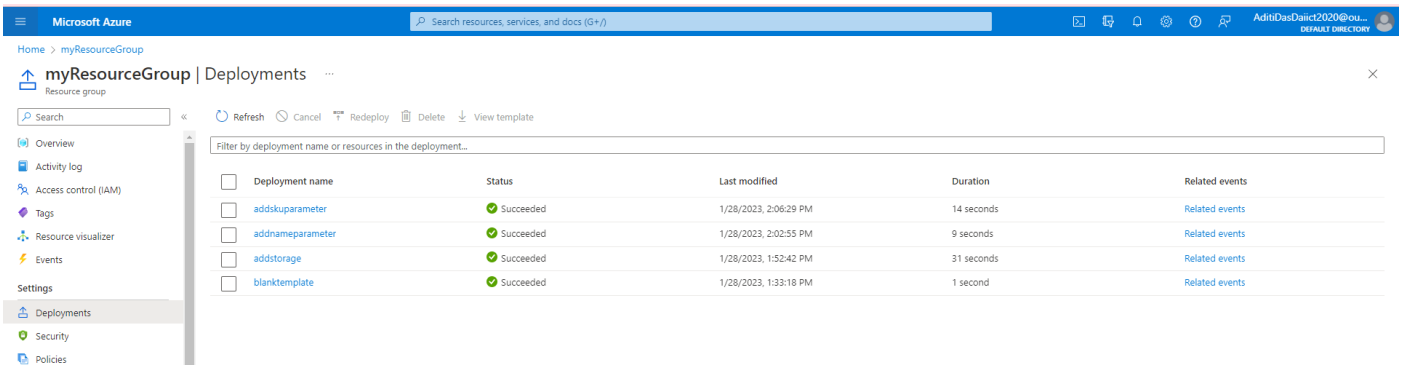
iii. a. Adding parameters : (Deployment 1)



JSON:

```
{
  "$schema": "https://schema.management.azure.com/schemas/2019-04-
01/deploymentTemplate.json#",
  "contentVersion": "1.0.0.0",
  "parameters": {
    "storageName": {
      "type": "string",
      "minLength": 3,
      "maxLength": 24
    }
  },
  "resources": [
    {
      "type": "Microsoft.Storage/storageAccounts",
      "apiVersion": "2021-09-01",
      "name": "[parameters('storageName')]",
      "location": "eastus2",
      "sku": {
        "name": "Standard_LRS"
      },
      "kind": "StorageV2",
      "properties": {
        "supportsHttpsTrafficOnly": true
      }
    }
  ]
}
```

iii. b. Adding Parameters (Deployment 2) :



JSON:

```
{
  "$schema": "https://schema.management.azure.com/schemas/2019-04-
01/deploymentTemplate.json#",
  "contentVersion": "1.0.0.0",
  "parameters": {
    "storageName": {
      "type": "string",
      "minLength": 3,
      "maxLength": 24
    },
    "storageSKU": {
      "type": "string",
      "defaultValue": "Standard_LRS",
      "allowedValues": [
        "Standard_LRS",
        "Standard_GRS",
        "Standard_RAGRS",
        "Standard_ZRS",
        "Premium_LRS",
        "Premium_ZRS",
        "Standard_GZRS",
        "Standard_RAGZRS"
      ]
    }
  },
  "resources": [
    {
      "type": "Microsoft.Storage/storageAccounts",
      "apiVersion": "2021-09-01",
      "name": "[parameters('storageName')]",
      "location": "eastus2",
      "sku": {
        "name": "[parameters('storageSKU')]"
      },
      "kind": "StorageV2",
      "properties": {
        "supportsHttpsTrafficOnly": true
      }
    }
  ]
}
```

This deployment is flexible as long as the SKU parameters are within the permissible values.

Code :

```
az group create --name myResourceGroup --location eastus2

set templateFile=C:\Users\ADMIN\Desktop\azuredeploy.json

az deployment group create --name blanktemplate --resource-group myResourceGroup --
template-file %templateFile%

az deployment group create --name addstorage --resource-group myResourceGroup --template-
file %templateFile%

az deployment group create --name addnameparameter --resource-group myResourceGroup --
template-file %templateFile% --parameters storageName=store1abcad280123
az deployment group create --name addskuparameter --resource-group myResourceGroup --
template-file %templateFile% --parameters storageName=store1abcad280123
```

8. Go through the following tutorial on N-Tier architecture

Check your knowledge

1. A three-tier application needs to be updated to integrate with a partner API. Which layer should this functionality be added to?

- ○ Presentation tier
- ◉ Application tier

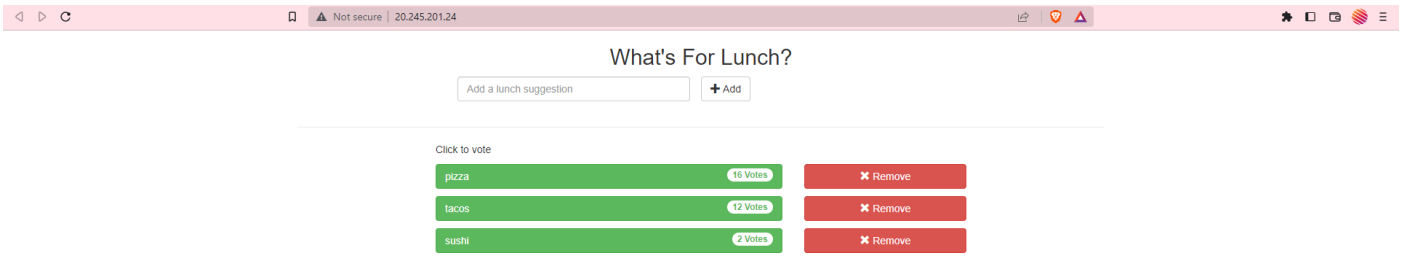
  ✔ API calls to other systems are best located in the application tier, where returned data can be easily integrated with new or existing business logic.
- ○ Data tier

2. On which layer is it acceptable to allow access to users?

- ◉ Presentation tier

  ✔ This tier handles the interaction with the end user, and should be the tier accessed by the end user.
- ○ Application tier
- ○ Data tier

```
Requesting a Cloud Shell.Succeeded.
Connecting terminal...

Welcome to Azure Cloud Shell

Type "az" to use Azure CLI
Type "help" to learn about Cloud Shell

aditidasdaiict2020 [ ~ ]$ az deployment group create \
  --resource-group learn-ef0ebf82-2105-4fb7-bf74-9af9d781dd52 \
  --template-uri  https://raw.githubusercontent.com/MicrosoftDocs/mslearn-n-tier-architecture/master/Deployment/azure
deploy.json \
  --parameters password="$(head /dev/urandom | tr -dc A-Za-z0-9 | head -c 32)"
{
  "id": "/subscriptions/d6d5f527-564e-46e8-a8c1-1853446b9d96/resourceGroups/learn-ef0ebf82-2105-4fb7-bf74-9af9d781dd5
2/providers/Microsoft.Resources/deployments/azuredeploy",
  "location": null,
  "name": "azuredeploy",
  "properties": {
    "correlationId": "9498fb6c-d111-497d-bbb7-ddcfd6a6d497",
    "debugSetting": null,
    "dependencies": [
      {
        "dependsOn": [
          {
            "id": "/subscriptions/d6d5f527-564e-46e8-a8c1-1853446b9d96/resourceGroups/learn-ef0ebf82-2105-4fb7-bf74-9
af9d781dd52/providers/Microsoft.Sql/servers/demo-dbserver-r26gtui33jh4g",
```



Check your knowledge

1. Which of the following might be a way to improve performance of an application on an N-tier architecture, while keeping costs optimized?

- ○ Deploy larger virtual machines to each tier.
- ◉ Use autoscaling to handle fluctuations in load.
  - ✔ This is a good way to minimize your costs. As load increases or decreases, your compute resources can adjust with them, ensuring your costs are optimized to your load.
- ○ Place your application behind a load balancer.

2. Which of the following actions would improve the security of an application?

- ◉ Restrict access to your data tier from the internet.
  - ✔ Isolating access to your data tier is a recommended way to improve the security of your application.
- ○ Allow remote administration of your application tier servers from the internet.
- ○ Add a caching technology between your application and data tiers.