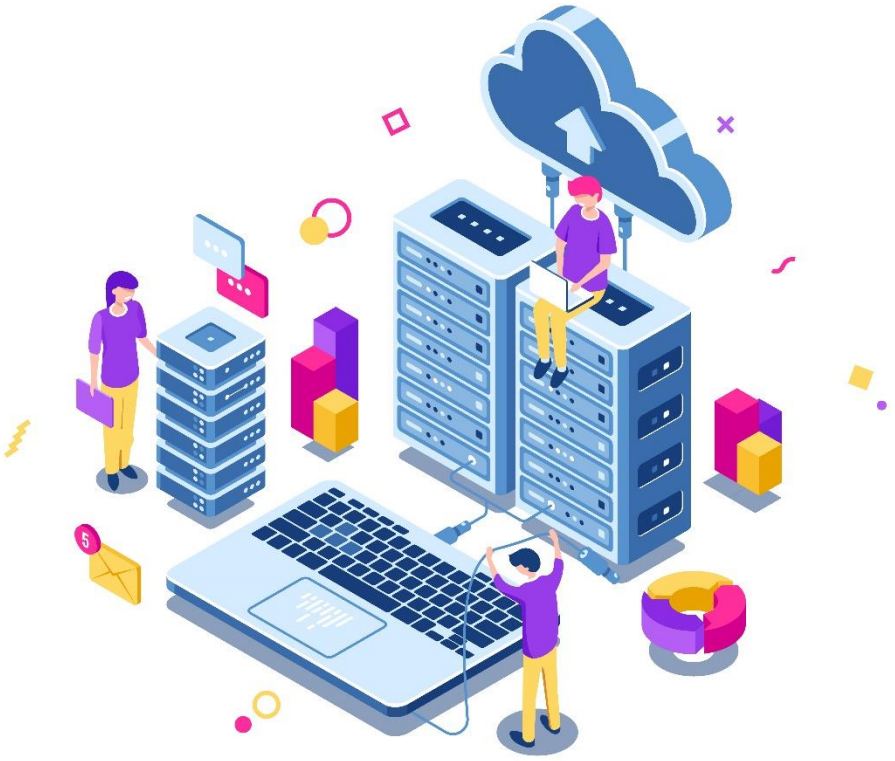


Lab 2: VM using CLI, ARM templates, N-Tier architecture.

Akshar Panchani ID- 202101522

IT457 Cloud Computing

1/30/24

1. Create a VM using CLI: -

```
akshar [ ~ ]$ # create Bash shell variables
resourceGroup=VMTutorialResources
location=eastus

az group create --name $resourceGroup --location $location
{
  "id": "/subscriptions/97e43b90-2dab-44c3-a90a-fa73529dceac/resourceGroups/VMTutorialResources",
  "location": "eastus",
  "managedBy": null,
  "name": "VMTutorialResources",
  "properties": {
    "provisioningState": "Succeeded"
  },
  "tags": null,
  "type": "Microsoft.Resources/resourceGroups"
}
```

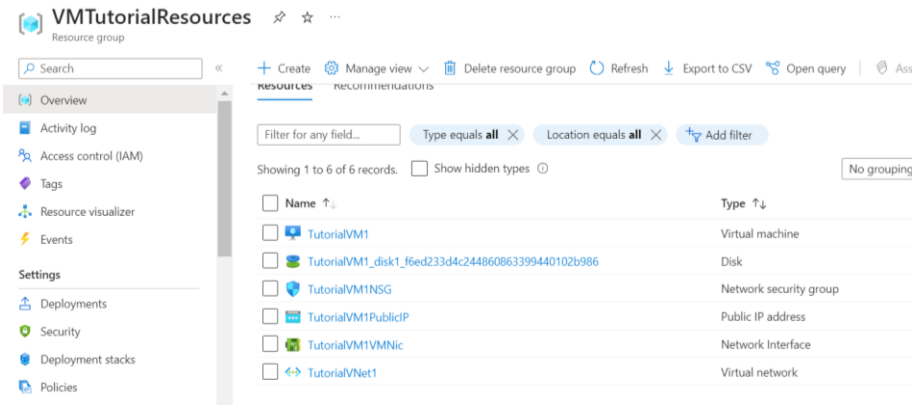
```
akshar [ ~ ]$ # create Bash shell variables
vnetName=TutorialVNet1
subnetName=TutorialSubnet1
vnetAddressPrefix=10.0.0.0/16
subnetAddressPrefix=10.0.0.0/24

# Use the existing resource group
resourceGroup=VMTutorialResources
akshar [ ~ ]$ 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/\"ab372b26-5ac0-4b5d-aba6-0ca4a93c74ba\"",
    "id": "/subscriptions/97e43b90-2dab-44c3-a90a-fa73529dceac/resourceGroups/
    "location": "eastus",
    "name": "TutorialVNet1",
    "provisioningState": "Succeeded",
    "resourceGroup": "VMTutorialResources",
    "resourceGuid": "104d2dde-6c37-49f5-8d5d-c98286db6c80",
    "subnets": [
```

```
    "subnets": [
      {
        "addressPrefix": "10.0.0.0/24",
        "delegations": [],
        "etag": "W/\"ab372b26-5ac0-4b5d-aba6-0ca4a93c74ba\"",
        "id": "/subscriptions/97e43b90-2dab-44c3-a90a-fa73529dceac/resourceGroups/V
t1/subnets/TutorialSubnet1",
        "name": "TutorialSubnet1",
        "privateEndpointNetworkPolicies": "Disabled",
        "privateLinkServiceNetworkPolicies": "Enabled",
        "provisioningState": "Succeeded",
        "resourceGroup": "VMTutorialResources",
        "type": "Microsoft.Network/virtualNetworks/subnets"
      }
    ],
    "type": "Microsoft.Network/virtualNetworks",
    "virtualNetworkPeerings": []
  }
}
```


```
akshar [ ~ ]$ # create Bash shell variable
vmName=TutorialVM1
akshar [ ~ ]$ az vm create \
> --resource-group $resourceGroup \
> --name $vmName \
> --image Ubuntu2204 \
> --vnet-name $vnetName \
> --subnet $subnetName \
> --generate-ssh-keys \
> --output json \
> --verbose
```


```
{
  "fqdns": "",
  "id": "/subscriptions/97e43b90-2dab-44c3-a90a-fa73529dceac/resourceGroups/VMTutorialResources/providers/Microsoft.Compute/virtualMachines/TutorialVM1",
  "location": "eastus",
  "macAddress": "60-45-BD-DA-2B-70",
  "powerState": "VM running",
  "privateIpAddress": "10.0.0.4",
  "publicIpAddress": "172.173.198.63",
  "resourceGroup": "VMTutorialResources",
  "zones": ""
}
Command ran in 87.771 seconds (init: 0.192, invoke: 87.578)
```


Result:



2. Introduction to ARM templates: -

a. Creating first template

JSON:

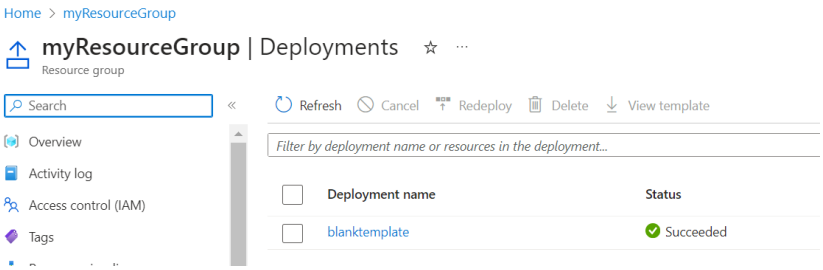
azuredeploy.json

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

Deployment:

```
PS E:\Sem 6\IT457 Cloud Computing\Labs\Lab2\Code> az deployment group create --name blanktemplate --resource-group myResourceGroup --template-file azuredeploy.json
{
  "id": "/subscriptions/97e43b90-2dab-44c3-a90a-fa73529dceac/resourceGroups/myResourceGroup/providers/Microsoft.Resources/deployments/blanktemplate",
  "location": null,
  "name": "blanktemplate",
  "properties": {
    "correlationId": "bfd5ce77-11d2-48ff-84b4-3df60d5d5f53",
    "debugSetting": null,
    "dependencies": [],
    "duration": "PT2.5044527S",
    "error": null,
    "mode": "Incremental",
    "onErrorDeployment": null,
    "outputResources": [],
    "outputs": null,
    "parameters": null,
    "parametersLink": null,
    "providers": [],
    "provisioningState": "Succeeded",
    "templateHash": "11481920352792298114",
    "templateLink": null,
    "timestamp": "2024-01-25T17:01:13.703952+00:00",
    "validatedResources": null
  },
  "resourceGroup": "myResourceGroup",
  "tags": null,
  "type": "Microsoft.Resources/deployments"
}
```

Result:



b. Adding resource

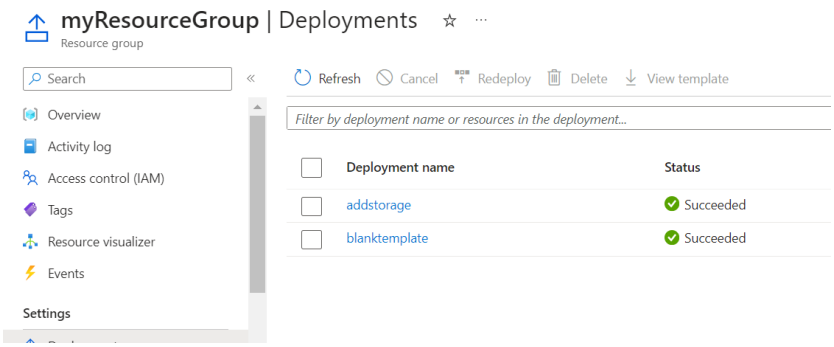
JSON:

```
{
  "$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": "store1abhinav250124",
      "location": "eastus",
      "sku": {
        "name": "Standard_LRS"
      },
      "kind": "StorageV2",
      "properties": {
        "supportsHttpsTrafficOnly": true
      }
    }
  ]
}
```

Deployment:


```
{
  "id": "/subscriptions/97e43b90-2dab-44c3-a90a-fa73529dceac/resourceGroups/myResourceGroup/providers/Microsoft.Resources/dep
  "location": null,
  "name": "addstorage",
  "properties": {
    "correlationId": "b7fea8ea-7789-4be7-9195-221b18853e34",
    "debugSetting": null,
    "dependencies": [],
    "duration": "PT34.3164261S",
    "error": null,
    "mode": "Incremental",
    "onErrorDeployment": null,
    "outputResources": [
      {
        "id": "/subscriptions/97e43b90-2dab-44c3-a90a-fa73529dceac/resourceGroups/myResourceGroup/providers/Microsoft.Storage/
        "resourceGroup": "myResourceGroup"
      }
    ],
    "outputs": null,
    "parameters": null,
```


Result:



c. Adding parameters

JSON:

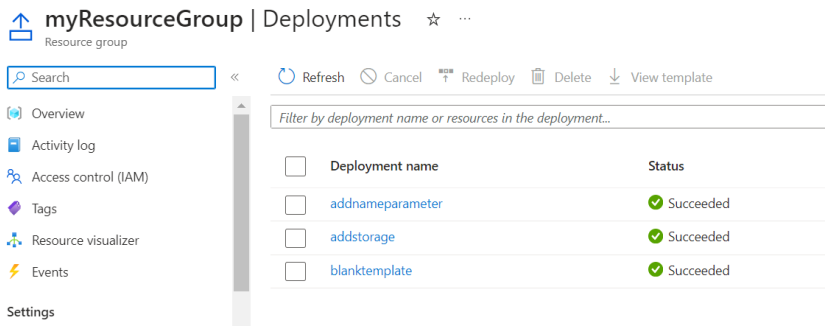
azuredeploy.json

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

Deployment:

```
{
  "id": "/subscriptions/97e43b90-2dab-44c3-a90a-fa73529dceac/resourceGroups/myResourceGroup/providers/Microsoft.Resources/dep
  "location": null,
  "name": "addnameparameter",
  "properties": {
    "correlationId": "1ccd6152-9537-4f94-8fcb-225d6b194ce9",
    "debugSetting": null,
    "dependencies": [],
    "duration": "PT34.2821174S",
    "error": null,
    "mode": "Incremental",
    "onErrorDeployment": null,
    "outputResources": [
      {
        "id": "/subscriptions/97e43b90-2dab-44c3-a90a-fa73529dceac/resourceGroups/myResourceGroup/providers/Microsoft.Storage
        "resourceGroup": "myResourceGroup"
      }
    ],
    "outputs": null,
    "parameters": {
```

Result:



Redeploying with SKU parameters: -

JSON:

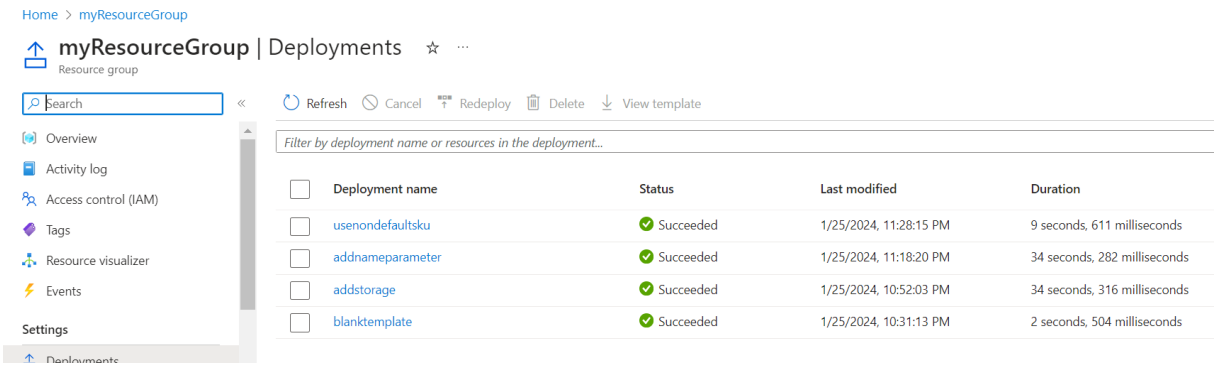
azuredeploy.json

```
{
  "$schema": "https://schema.management.azure.com/schemas/2019-04-01/deploymentTemplate.json#",
  "contentVersion": "1.0.0.0",
  Select or create a parameter file to enable full validation...
  "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": "eastus",
      "sku": {
        "name": "[parameters('storageSKU')]"
      },
      "kind": "StorageV2",
      "properties": {
        "supportsHttpsTrafficOnly": true
      }
    }
  ]
}
```

Deployment:

```
{
  "id": "/subscriptions/97e43b90-2dab-44c3-a90a-fa73529dceac/resourceGroups/myResourceGroup/providers/Microsoft.Resources/dep
  "location": null,
  "name": "usenondefaultsku",
  "properties": {
    "correlationId": "0c8d4266-b572-4191-a371-078878bb4bfc",
    "debugSetting": null,
    "dependencies": [],
    "duration": "PT9.6112141S",
    "error": null,
    "mode": "Incremental",
    "onErrorDeployment": null,
    "outputResources": [
      {
        "id": "/subscriptions/97e43b90-2dab-44c3-a90a-fa73529dceac/resourceGroups/myResourceGroup/providers/Microsoft.Storage
,
        "resourceGroup": "myResourceGroup"
      }
    ],
    "outputs": null,
    "parameters": {
```

Result:

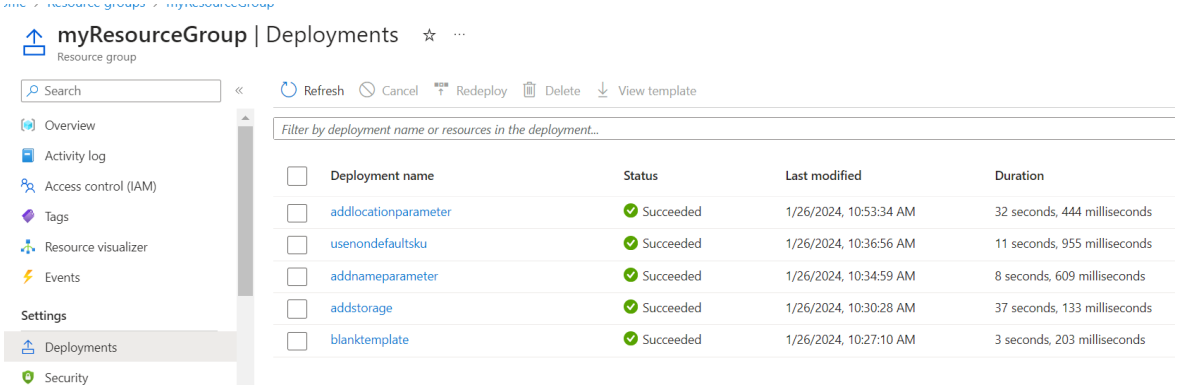


d. Adding template functions

Deployment:

```
{
  "id": "/subscriptions/97e43b90-2dab-44c3-a90a-fa73529dceac/resourceGroups/myResourceGroup/providers/Microsoft.Resources/dep
  "location": null,
  "name": "addlocationparameter",
  "properties": {
    "correlationId": "d634200e-b53b-4fbf-ad6e-65e271ac06df",
    "debugSetting": null,
    "dependencies": [],
    "duration": "PT32.444221S",
    "error": null,
    "mode": "Incremental",
    "onErrorDeployment": null,
    "outputResources": [
      {
        "id": "/subscriptions/97e43b90-2dab-44c3-a90a-fa73529dceac/resourceGroups/myResourceGroup/providers/Microsoft.Storage/
,
        "resourceGroup": "myResourceGroup"
      }
    ],
    "outputs": null,
    "parameters": {
      "location": {
        "type": "String",
        "value": "centralus"
      },
```


Result:



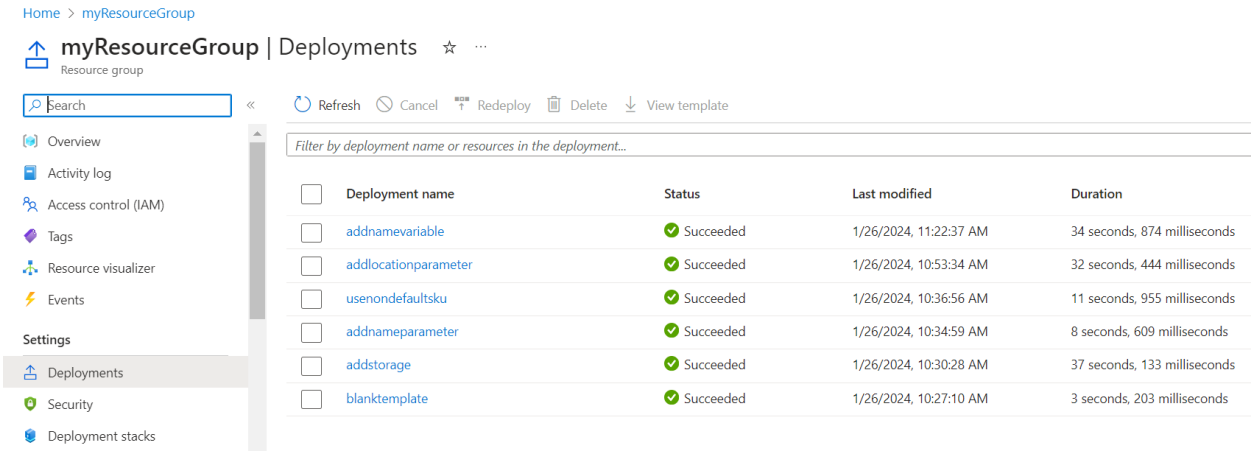
Resource group and storage account location is in Central US.

e. Adding variables

Deployment:


```
PS E:\Sem 6\IT457 Cloud Computing\Labs\Lab2\Code> az deployment group create --name addnamevariable --resource-group myResourceGroup --template-file azuredeploy.j
son --parameters storagePrefix=store storageSKU=Standard_LRS
{
  "id": "/subscriptions/97e43b90-2dab-44c3-a90a-fa73529dceac/resourceGroups/myResourceGroup/providers/Microsoft.Resources/deployments/addnamevariable",
  "location": null,
  "name": "addnamevariable",
  "properties": {
    "correlationId": "054baf65-517f-4e34-b22f-e66cf362be33",
    "debugSetting": null,
    "dependencies": [],
    "duration": "PT34.874578S",
    "error": null,
    "mode": "Incremental",
    "onErrorDeployment": null,
    "outputResources": [
      {
        "id": "/subscriptions/97e43b90-2dab-44c3-a90a-fa73529dceac/resourceGroups/myResourceGroup/providers/Microsoft.Storage/storageAccounts/storedvgdc4efzyzji",
        "resourceGroup": "myResourceGroup"
      }
    ],
    "outputs": null,
    "parameters": {
      "location": {
        "type": "String",
        "value": "centralus"
      },
      "storagePrefix": {
        "type": "String",
        "value": "store"
      },
```


Result:

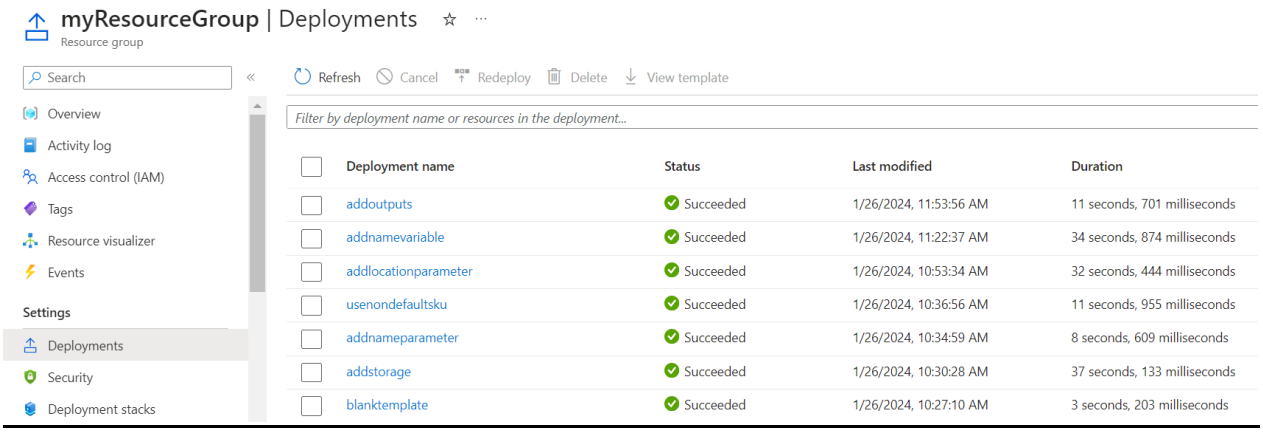


f. Adding outputs

Deployment:

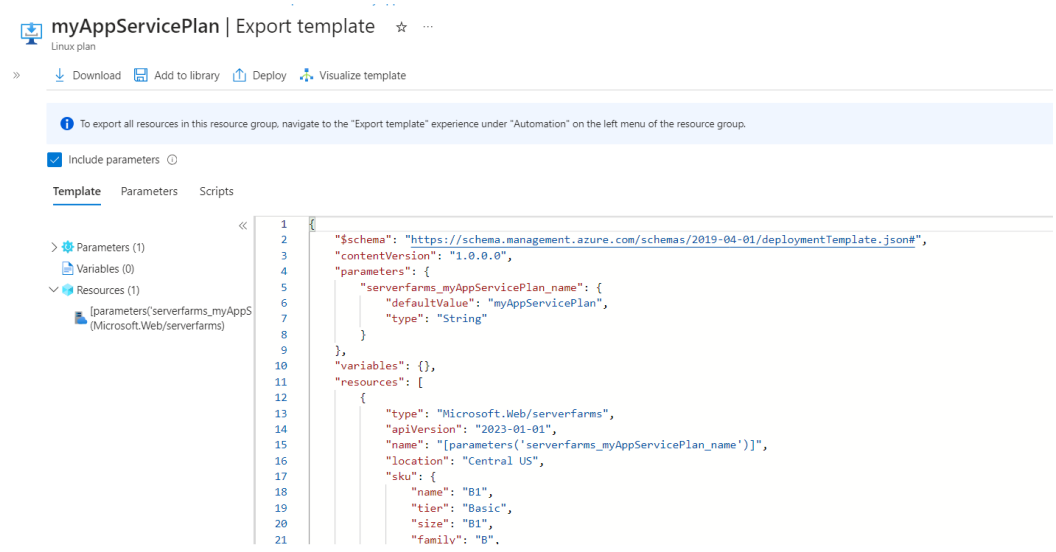
```
PS E:\Sem 6\IT457 Cloud Computing\Labs\Lab2\Code> az deployment group create --name addoutputs --resource-group myResourceGroup
-parameters storagePrefix=store storageSKU=Standard_LRS
{
  "id": "/subscriptions/97e43b90-2dab-44c3-a90a-fa73529dceac/resourceGroups/myResourceGroup/providers/Microsoft.Resources/deploy
  "location": null,
  "name": "addoutputs",
  "properties": {
    "correlationId": "a522b2ce-8837-4a33-a923-301274f89288",
    "debugSetting": null,
    "dependencies": [],
    "duration": "PT11.7015061S",
    "error": null,
    "mode": "Incremental",
    "onErrorDeployment": null,
    "outputResources": [
      {
        "id": "/subscriptions/97e43b90-2dab-44c3-a90a-fa73529dceac/resourceGroups/myResourceGroup/providers/Microsoft.Storage/st
        "resourceGroup": "myResourceGroup"
      }
    ],
    "outputs": {
      "storageEndpoint": {
        "type": "Object",
        "value": {
          "blob": "https://storedvgdc4efzyzji.blob.core.windows.net/",
          "dfs": "https://storedvgdc4efzyzji.dfs.core.windows.net/",
          "file": "https://storedvgdc4efzyzji.file.core.windows.net/",
          "queue": "https://storedvgdc4efzyzji.queue.core.windows.net/",
          "table": "https://storedvgdc4efzyzji.table.core.windows.net/",
          "web": "https://storedvgdc4efzyzji.z19.web.core.windows.net/"
        }
```

Result:



g. Using exported template

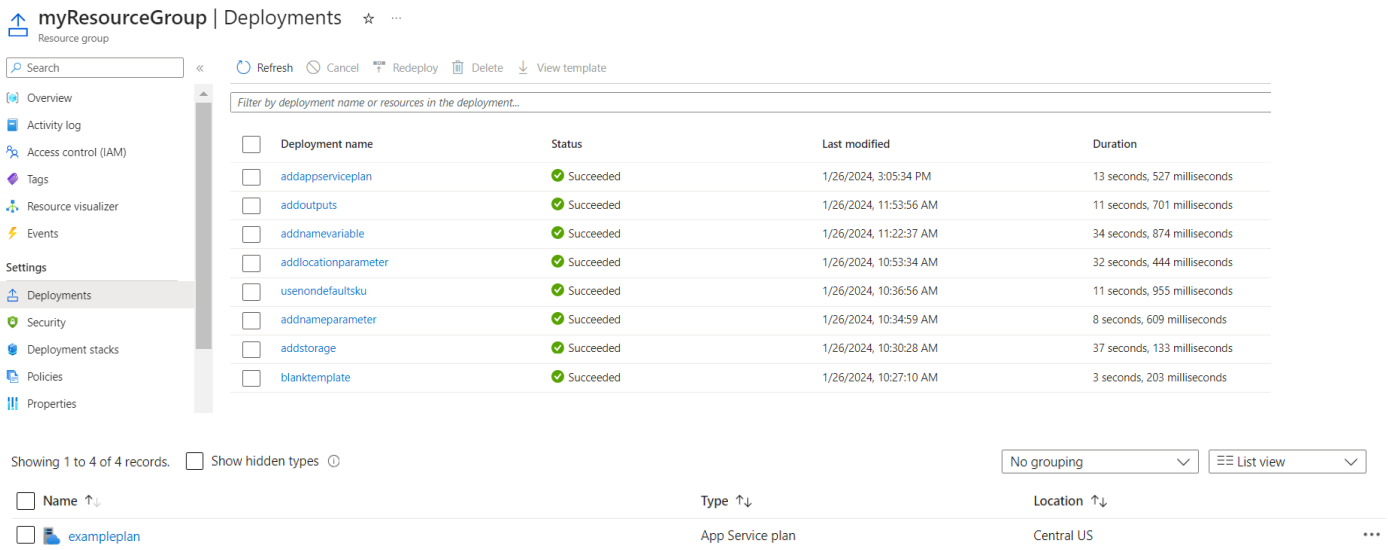
Exporting template:



Deployment of revised exported template:

```
PS E:\Sem 6\IT457 Cloud Computing\Labs\Lab2\Code> az deployment group create --name addappserviceplan --resource-group myResourceGroup --template-file
.json --parameters storagePrefix=store storageSKU=Standard_LRS
{
  "id": "/subscriptions/97e43b90-2dab-44c3-a90a-fa73529dceac/resourceGroups/myResourceGroup/providers/Microsoft.Resources/deployments/addappserviceplan
  "location": null,
  "name": "addappserviceplan",
  "properties": {
    "correlationId": "de7e6efc-786b-4950-9b1b-328b5be33871",
    "debugSetting": null,
    "dependencies": [],
    "duration": "PT13.5275613S",
    "error": null,
    "mode": "Incremental",
    "onErrorDeployment": null,
    "outputResources": [
      {
        "id": "/subscriptions/97e43b90-2dab-44c3-a90a-fa73529dceac/resourceGroups/myResourceGroup/providers/Microsoft.Storage/storageAccounts/storedvgd
        "resourceGroup": "myResourceGroup"
      },
      {
        "id": "/subscriptions/97e43b90-2dab-44c3-a90a-fa73529dceac/resourceGroups/myResourceGroup/providers/Microsoft.Web/serverfarms/exampleplan",
        "resourceGroup": "myResourceGroup"
      }
    ],
    "outputs": {
      "storageEndpoint": {
        "type": "Object",
        "value": {
          "blob": "https://storedvgdc4efzyzji.blob.core.windows.net/",
          "dfs": "https://storedvgdc4efzyzji.dfs.core.windows.net/",
          "file": "https://storedvgdc4efzyzji.file.core.windows.net/",
          "queue": "https://storedvgdc4efzyzji.queue.core.windows.net/",
          "table": "https://storedvgdc4efzyzji.table.core.windows.net/",
          "web": "https://storedvgdc4efzyzji.z19.web.core.windows.net/"
        }
      }
```

Result:



h. Using QuickStart template

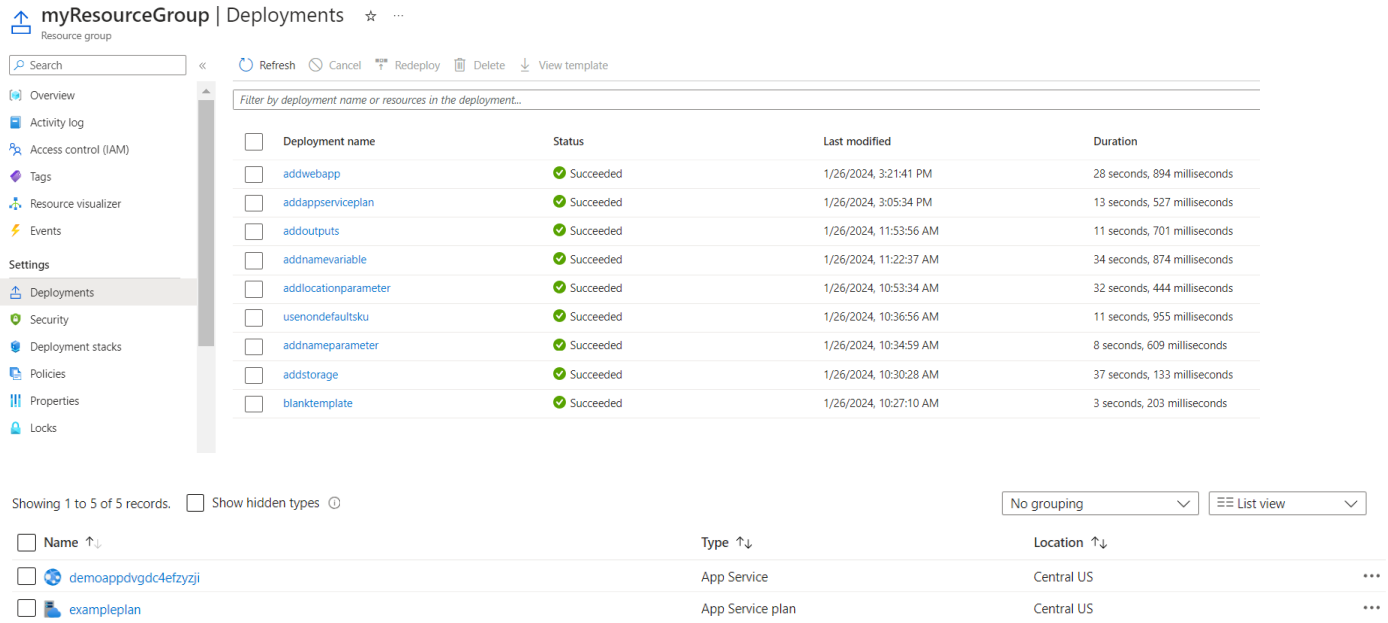
QuickStart template:

```
        "reserved": true
      }
    },
    {
      "type": "Microsoft.Web/sites",
      "apiVersion": "2022-03-01",
      "name": "[variables('webAppPortalName')]",
      "location": "[parameters('location')]",
      "kind": "app",
      "properties": {
        "serverFarmId": "[resourceId('Microsoft.Web/serverfarms', variables('appServicePlanName'))]",
        "siteConfig": {
          "linuxFxVersion": "[parameters('linuxFxVersion')]",
          "ftpsState": "FtpsOnly"
        },
        "httpsOnly": true
      },
      "identity": {
        "type": "SystemAssigned"
      },
      "dependsOn": [
        "[resourceId('Microsoft.Web/serverfarms', variables('appServicePlanName'))]"
```

Deployment:

```
PS E:\Sem 6\IT457 Cloud Computing\Labs\Lab2\Code> az deployment group create --name addwebapp --resource-group myResourceGroup --template-file azuredeploy.json
parameters storagePrefix=store storageSKU=Standard_LRS webAppName=demoapp
{
  "id": "/subscriptions/97e43b90-2dab-44c3-a90a-fa73529dceac/resourceGroups/myResourceGroup/providers/Microsoft.Resources/deployments/addwebapp",
  "location": null,
  "name": "addwebapp",
  "properties": {
    "correlationId": "77fa3a3f-eea2-4bb8-a52a-d4695a3c4c4c",
    "debugSetting": null,
    "dependencies": [
      {
        "dependsOn": [
          {
            "id": "/subscriptions/97e43b90-2dab-44c3-a90a-fa73529dceac/resourceGroups/myResourceGroup/providers/Microsoft.Web/serverfarms/exampleplan",
            "resourceGroup": "myResourceGroup",
            "resourceName": "exampleplan",
            "resourceType": "Microsoft.Web/serverfarms"
          }
        ],
        "id": "/subscriptions/97e43b90-2dab-44c3-a90a-fa73529dceac/resourceGroups/myResourceGroup/providers/Microsoft.Web/sites/demoappdvgdc4efzyzji",
        "resourceGroup": "myResourceGroup",
        "resourceName": "demoappdvgdc4efzyzji",
        "resourceType": "Microsoft.Web/sites"
      }
    ],
    "duration": "PT28.894988S",
    "error": null,
    "mode": "Incremental",
    "onErrorDeployment": null,
    "outputResources": [
      {
        "id": "/subscriptions/97e43b90-2dab-44c3-a90a-fa73529dceac/resourceGroups/myResourceGroup/providers/Microsoft.Storage/storageAccounts/storedvgdc4efzyzji
        "resourceGroup": "myResourceGroup"
      },
      {
```

Result:

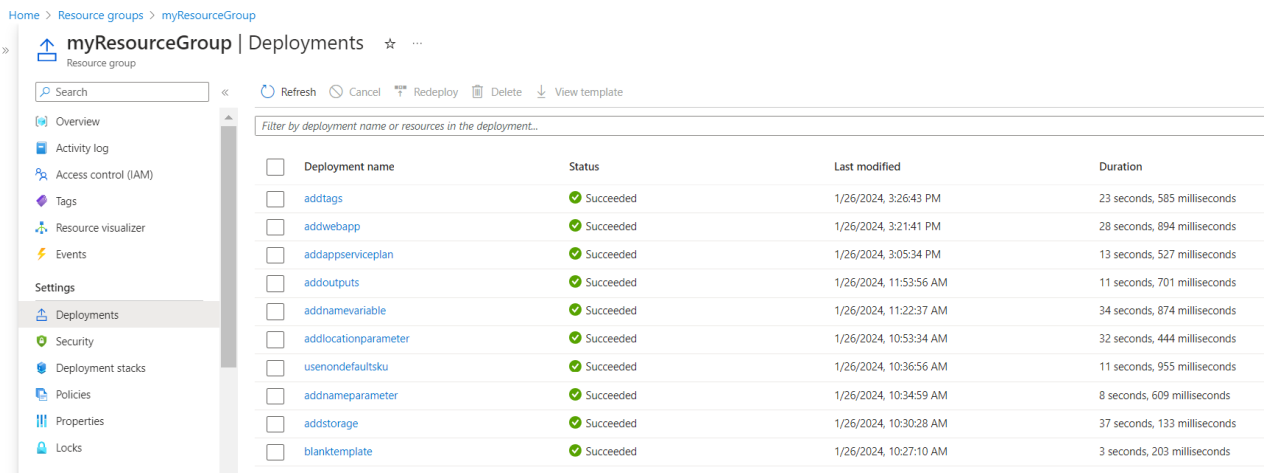


i. Adding Tags

Deployment:

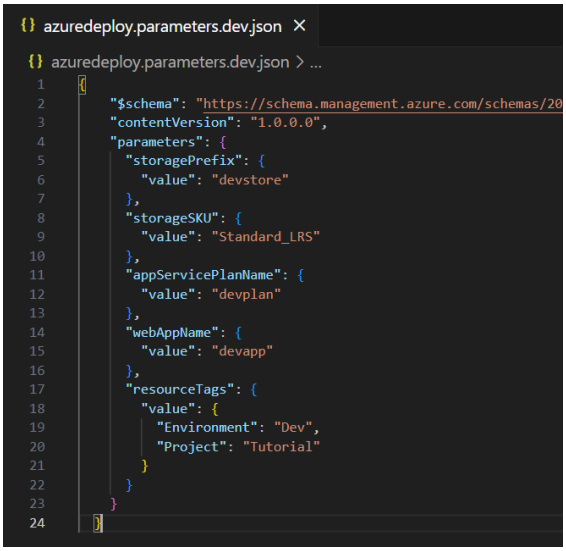
```
PS E:\Sem 6\IT457 Cloud Computing\Labs\Lab2\Code> az deployment group create --name addtags --resource-group myResourceGroup --template-file
rameters storagePrefix=store storageSKU=Standard_LRS webAppName=demoapp
{
  "id": "/subscriptions/97e43b90-2dab-44c3-a90a-fa73529dceac/resourceGroups/myResourceGroup/providers/Microsoft.Resources/deployments/addtags
  "location": null,
  "name": "addtags",
  "properties": {
    "correlationId": "fb9514b6-7540-4a4a-a8e2-0afce32e2f32",
    "debugSetting": null,
    "dependencies": [
      {
        "dependsOn": [
          {
            "id": "/subscriptions/97e43b90-2dab-44c3-a90a-fa73529dceac/resourceGroups/myResourceGroup/providers/Microsoft.Web/serverfarms/exa
            "resourceGroup": "myResourceGroup",
            "resourceName": "exampleplan",
            "resourceType": "Microsoft.Web/serverfarms"
          }
        ],
        "id": "/subscriptions/97e43b90-2dab-44c3-a90a-fa73529dceac/resourceGroups/myResourceGroup/providers/Microsoft.Web/sites/demoappdvgdc4
        "resourceGroup": "myResourceGroup",
        "resourceName": "demoappdvgdc4efzyzji",
        "resourceType": "Microsoft.Web/sites"
      }
    ],
    "duration": "PT23.5855718S",
    "error": null,
    "mode": "Incremental",
    "onErrorDeployment": null,
    "outputResources": [
      {
        "id": "/subscriptions/97e43b90-2dab-44c3-a90a-fa73529dceac/resourceGroups/myResourceGroup/providers/Microsoft.Storage/storageAccounts
        "resourceGroup": "myResourceGroup"
      },
      {
```

Result:



j. Using parameter files

Parameter files:



azuredeploy.parameters.prod.json

```
{
    "$schema": "https://schema.management.azure.com/schemas/2019-
    "contentVersion": "1.0.0.0",
    "parameters": {
      "storagePrefix": {
        "value": "contosodata"
      },
      "storageSKU": {
        "value": "Standard_GRS"
      },
      "appServicePlanName": {
        "value": "contosoplan"
      },
      "webAppName": {
        "value": "contosowebapp"
      },
      "resourceTags": {
        "value": {
          "Environment": "Production",
          "Project": "Tutorial"
        }
      }
    }
}
```

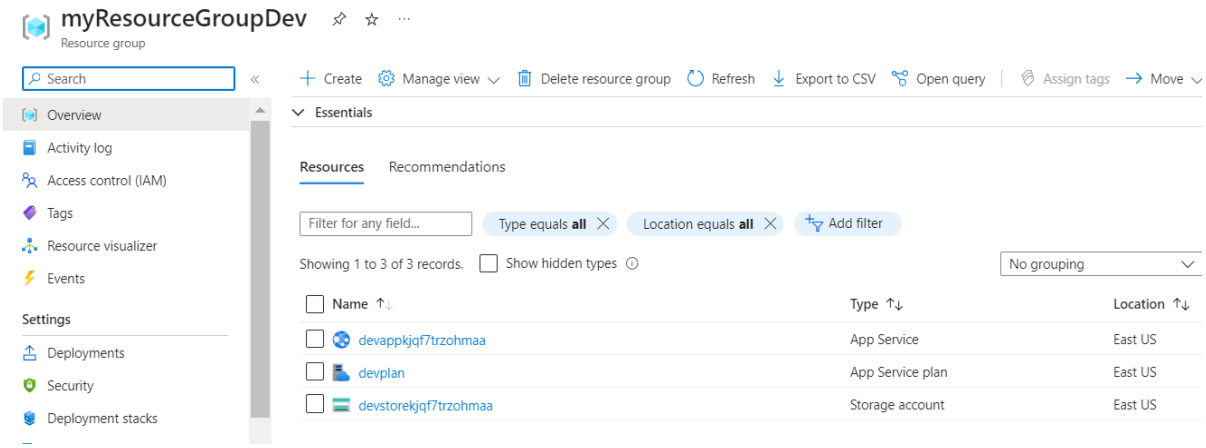
Deployment:

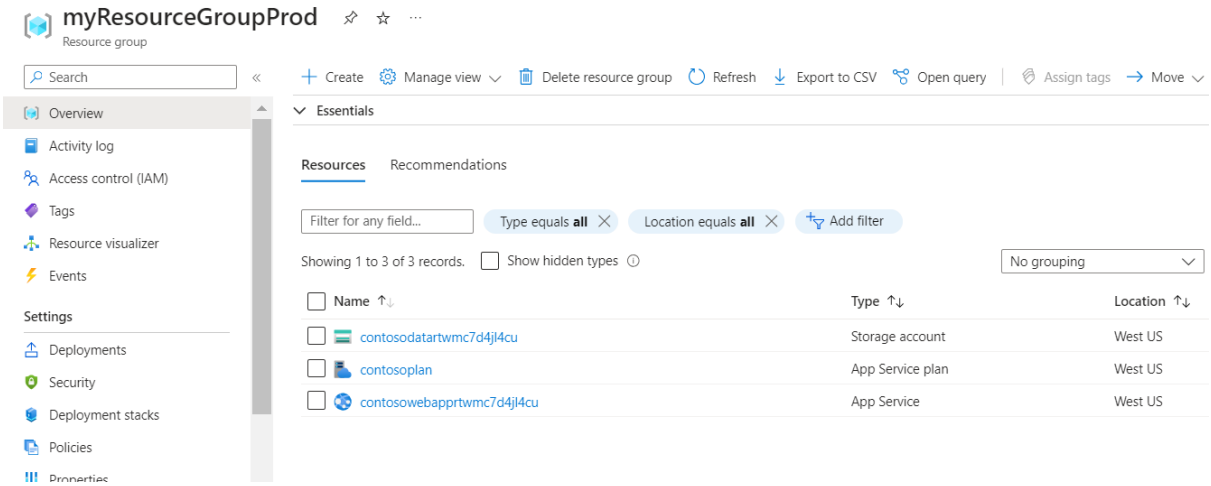
```
PS E:\Sem 6\IT457 Cloud Computing\Labs\Lab2\Code> az deployment group create --name devenvironment --resource-group myResourceGroupDev --template-file azuredeploy
.json --parameters azuredeploy.parameters.dev.json
{
  "id": "/subscriptions/97e43b90-2dab-44c3-a90a-fa73529dceac/resourceGroups/myResourceGroupDev/providers/Microsoft.Resources/deployments/devenvironment",
  "location": null,
  "name": "devenvironment",
  "properties": {
    "correlationId": "a362d4bf-1b54-4589-8d0f-6bc8683250f9",
    "debugSetting": null,
    "dependencies": [
      {
        "dependsOn": [
          {
            "id": "/subscriptions/97e43b90-2dab-44c3-a90a-fa73529dceac/resourceGroups/myResourceGroupDev/providers/Microsoft.Web/serverfarms/devplan",
            "resourceGroup": "myResourceGroupDev",
            "resourceName": "devplan",
            "resourceType": "Microsoft.Web/serverfarms"
          }
        ],
        "id": "/subscriptions/97e43b90-2dab-44c3-a90a-fa73529dceac/resourceGroups/myResourceGroupDev/providers/Microsoft.Web/sites/devappkjqf7trzohmaa",
        "resourceGroup": "myResourceGroupDev",
        "resourceName": "devappkjqf7trzohmaa",
        "resourceType": "Microsoft.Web/sites"
      }
```

```
PS E:\Sem 6\IT457 Cloud Computing\Labs\Lab2\Code> az group create --name myResourceGroupProd --location "West US"
{
  "id": "/subscriptions/97e43b90-2dab-44c3-a90a-fa73529dceac/resourceGroups/myResourceGroupProd",
  "location": "westus",
  "managedBy": null,
  "name": "myResourceGroupProd",
  "properties": {
    "provisioningState": "Succeeded"
  },
  "tags": null,
  "type": "Microsoft.Resources/resourceGroups"
}
```

Result:

Name	Subscription	Location
cloud-shell-storage-centralindia	Azure for Students	Central India
myResourceGroup	Azure for Students	Central US
myResourceGroupDev	Azure for Students	East US
myResourceGroupProd	Azure for Students	West US





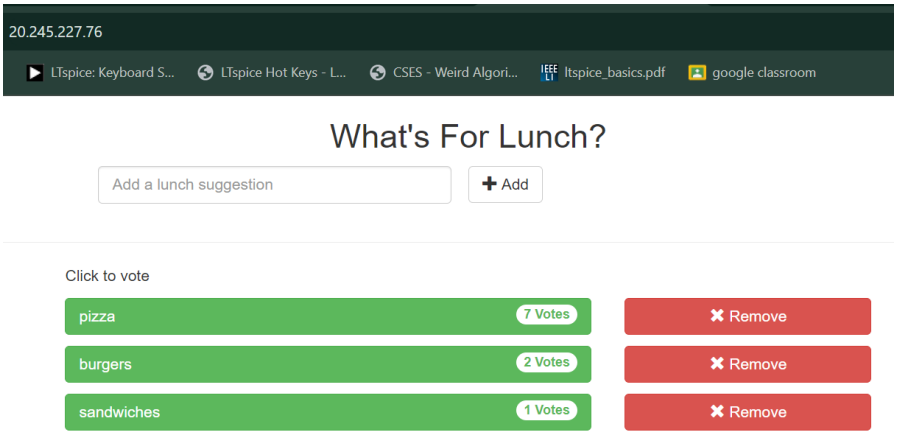
3. N-tier architecture: -

Deployment:

```
akshar [ ~ ]$ az deployment group create \
> --resource-group learn-47e6cfe4-9b6e-4caf-a924-99340fc106b2 \
> --template-uri  https://raw.githubusercontent.com/MicrosoftDocs/mslearn-n-tier-architecture
/master/Deployment/azuredeploy.json \
> --parameters password="$(head /dev/urandom | tr -dc A-Za-z0-9 | head -c 32)"
{
  "id": "/subscriptions/16982123-2d3c-44ce-ab2d-0c419f4ce699/resourceGroups/learn-47e6cfe4-9b
6e-4caf-a924-99340fc106b2/providers/Microsoft.Resources/deployments/azuredeploy",
  "location": null,
  "name": "azuredeploy",
  "properties": {
    "correlationId": "6c65591e-7efe-42d8-b7e6-5c2462246e4d",
    "debugSetting": null,
    "dependencies": [
      {
        "dependsOn": [
          {
            "id": "/subscriptions/16982123-2d3c-44ce-ab2d-0c419f4ce699/resourceGroups/learn-4
7e6cfe4-9b6e-4caf-a924-99340fc106b2/providers/Microsoft.Sql/servers/demo-dbserver-dztydvutelh
du",
            "resourceGroup": "learn-47e6cfe4-9b6e-4caf-a924-99340fc106b2",
            "resourceName": "demo-dbserver-dztydvutelhdu",
            "resourceType": "Microsoft.Sql/servers"
          }
        ],
```

```
akshar [ ~ ]$ az deployment group show \
> --output table \
> --resource-group learn-47e6cfe4-9b6e-4caf-a924-99340fc106b2 \
> --name azuredeploy \
> --query properties.outputs.webSiteUrl
Value
--------------------
http://20.245.227.76
```

Result:



a. Presentation Tier

```
akshar [ ~ ]$ az resource list --tag tier=presentation --output table
Name                 ResourceGroup                              Location
                         Status
-------------------  ----------------------------------------  ----------
----------------------  --------
demo-web-vm-disk     LEARN-47E6CFE4-9B6E-4CAF-A924-99340FC106B2  westus
e/disks
demo-web-vm          learn-47e6cfe4-9b6e-4caf-a924-99340fc106b2  westus
e/virtualMachines
demo-web-vm-nic      learn-47e6cfe4-9b6e-4caf-a924-99340fc106b2  westus
k/networkInterfaces
demo-web-nsg         learn-47e6cfe4-9b6e-4caf-a924-99340fc106b2  westus
k/networkSecurityGroups
demo-web-vm-nic-pip  learn-47e6cfe4-9b6e-4caf-a924-99340fc106b2  westus
k/publicIPAddresses
```

b. Application Tier

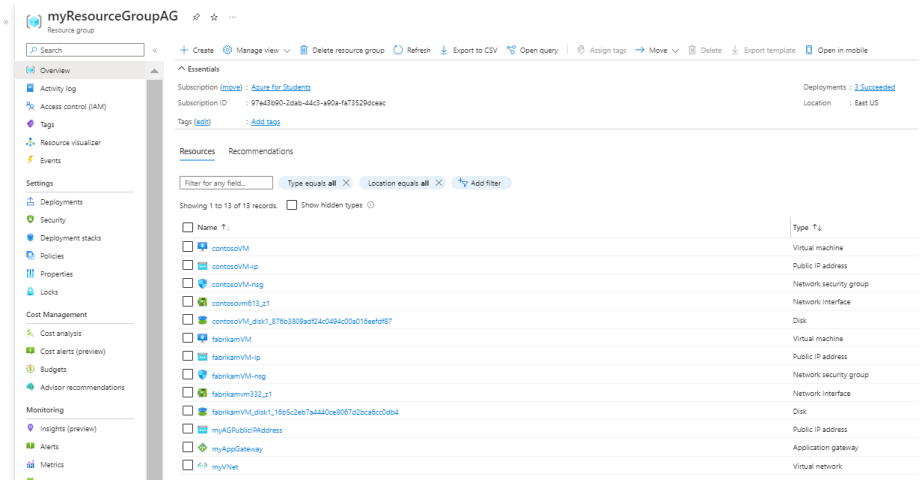
```
akshar [ ~ ]$ az resource list --tag tier=application --output table
Name              ResourceGroup                              Location
                      Status
----------------  ----------------------------------------  ---------
-------------------  --------
demo-biz-vm-disk  LEARN-47E6CFE4-9B6E-4CAF-A924-99340FC106B2  westus
isks
demo-biz-vm       learn-47e6cfe4-9b6e-4caf-a924-99340fc106b2  westus
irtualMachines
demo-biz-vm-nic   learn-47e6cfe4-9b6e-4caf-a924-99340fc106b2  westus
etworkInterfaces
demo-biz-nsg      learn-47e6cfe4-9b6e-4caf-a924-99340fc106b2  westus
etworkSecurityGroups
```

c. Data Tier

```
akshar [ ~ ]$ az resource list --tag tier=data --output table
Name                                  ResourceGroup                              Location
   Type                            Status
-------------------------------------  ----------------------------------------  ---------
-  ------------------------------  --------
demo-dbserver-dztydvutelhdu            learn-47e6cfe4-9b6e-4caf-a924-99340fc106b2  westus
   Microsoft.Sql/servers
demo-dbserver-dztydvutelhdu/demo-sqldb  learn-47e6cfe4-9b6e-4caf-a924-99340fc106b2  westus
   Microsoft.Sql/servers/databases
```

4. Application Gateway Tutorial: -

Resources created:



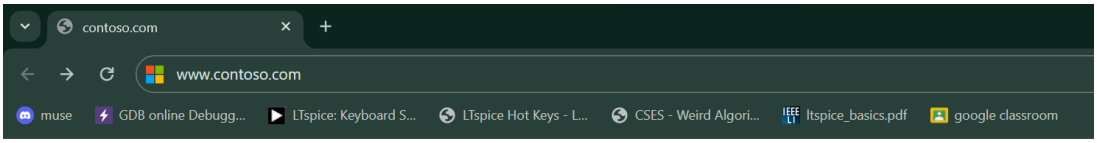
IIS installation:

```
VERBOSE: Authenticating to Azure ...
VERBOSE: Building your Azure drive ...
PS /home/akshar > Set-AzVMExtension `
>>    -ResourceGroupName myResourceGroupAG `
>>    -ExtensionName IIS `
>>    -VMName contosoVM `
>>    -Publisher Microsoft.Compute `
>>    -ExtensionType CustomScriptExtension `
>>    -TypeHandlerVersion 1.4 `
>>    -SettingString '{"commandToExecute":"powershell Add-WindowsFeature Web-Server;
>>    -Location eastus

RequestId IsSuccessStatusCode StatusCode ReasonPhrase
--------- ------------------- ---------- ------------
                         True         OK
```

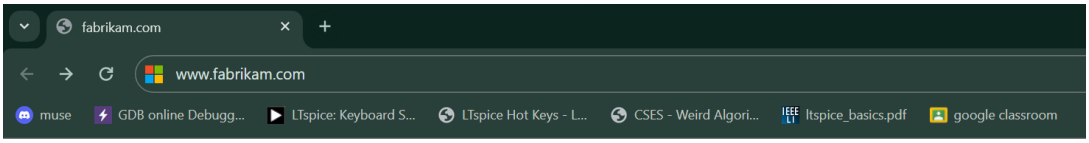
```
PS /home/akshar > Set-AzVMExtension `
>>    -ResourceGroupName myResourceGroupAG `
>>    -ExtensionName IIS `
>>    -VMName fabrikamVM `
>>    -Publisher Microsoft.Compute `
>>    -ExtensionType CustomScriptExtension `
>>    -TypeHandlerVersion 1.4 `
>>    -SettingString '{"commandToExecute":"powershell Add-WindowsFeature Web-Server;
>>    -Location eastus

RequestId IsSuccessStatusCode StatusCode ReasonPhrase
--------- ------------------- ---------- ------------
                         True         OK
```

IP Address: 20.127.93.242

Result:



contosoVM



fabrikamVM