

# 1.- AZ-104 Azure Administration

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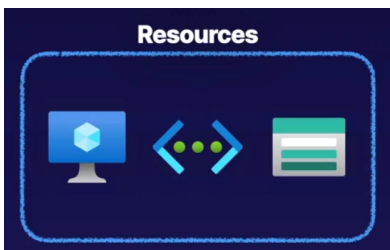
# AZ-104 - Administration - Azure Resource Manager

## What is Azure Resource Manager?

### Azure Clouds made of?

#### Resources:

- Entity managed by azure
- Virtual Machines
- Storage accounts and virtual networks



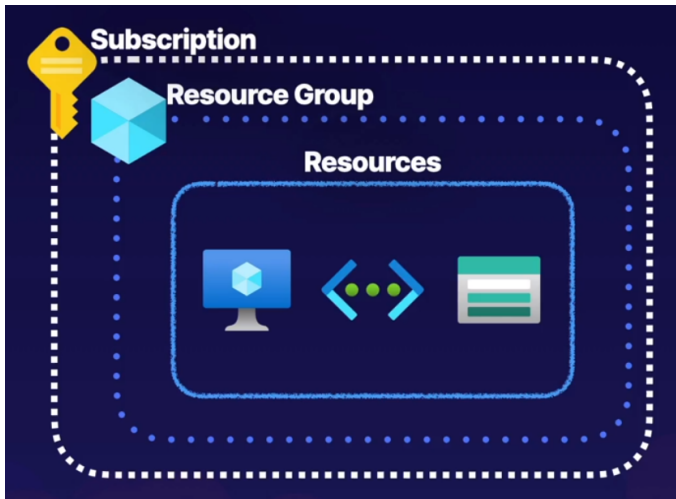
#### Resources groups:

- Logical container for grouping resources
- Group resources based on lifecycle and security
- Associated with an azure subscription



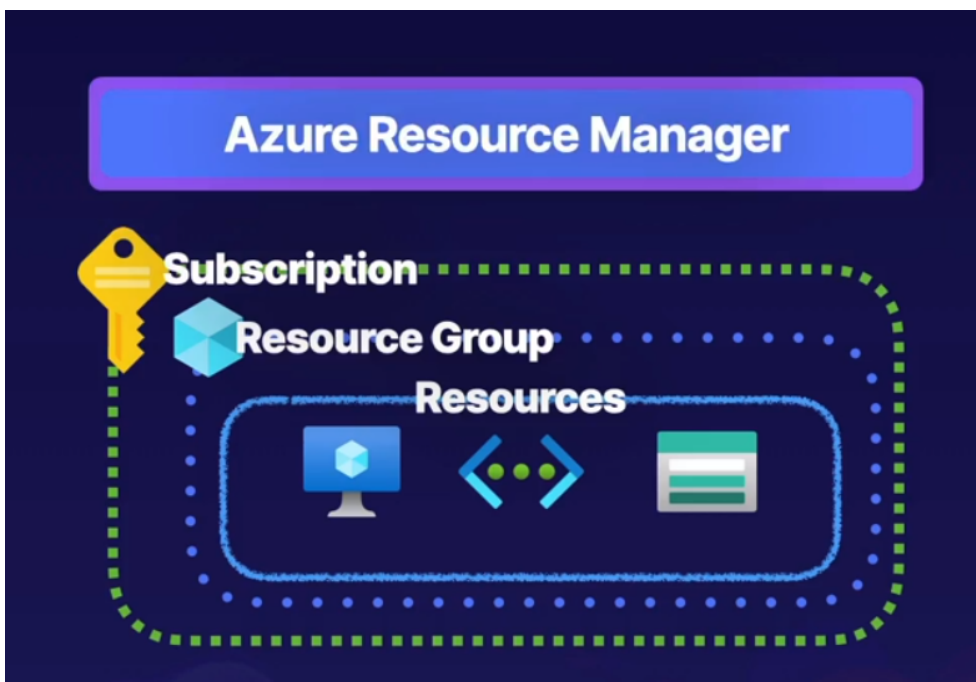
## Azure Subscription:

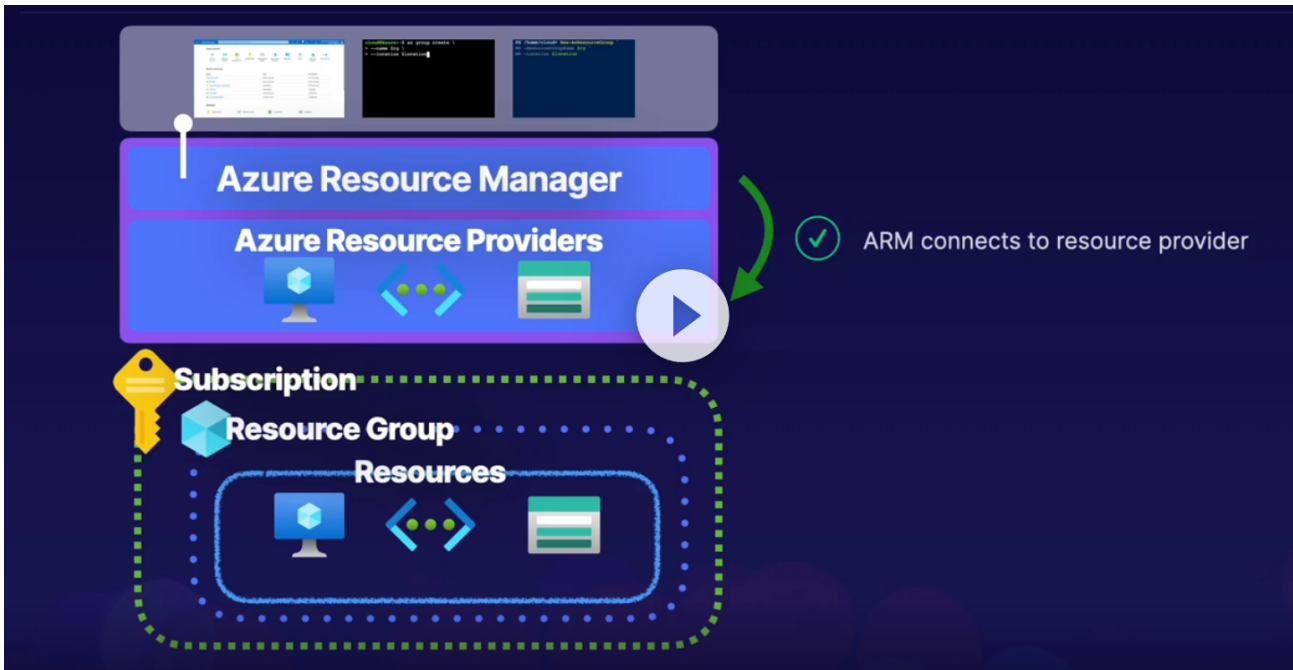
- Logical construct that groups together resource groups and associated resources
- Billing unit for the azure cloud cost



## Azure Resource Manager - ARM

- is the orchestration layer for managing the azure cloud
- Uses REST API endpoints
- ARM connects to resource provider (Powershell, CLI, Azure Portal)
- Resource provider completes the request
- It uses Azure Identity Manager





Resources are Azure Managed Entities like virtual Machines, Storage accounts and Virtual Networks

Resources are contained in resource groups

Resource groups are contained in subscriptions

You can use REST API endpoint to manage Azure through Azure Resource Manager

Azure Resource Manager is a Management Service

Each Resource has a resource provider

# AZ-104 - Administration - Azure Portal and Cloud Shell Basics

Microsoft Azure portal

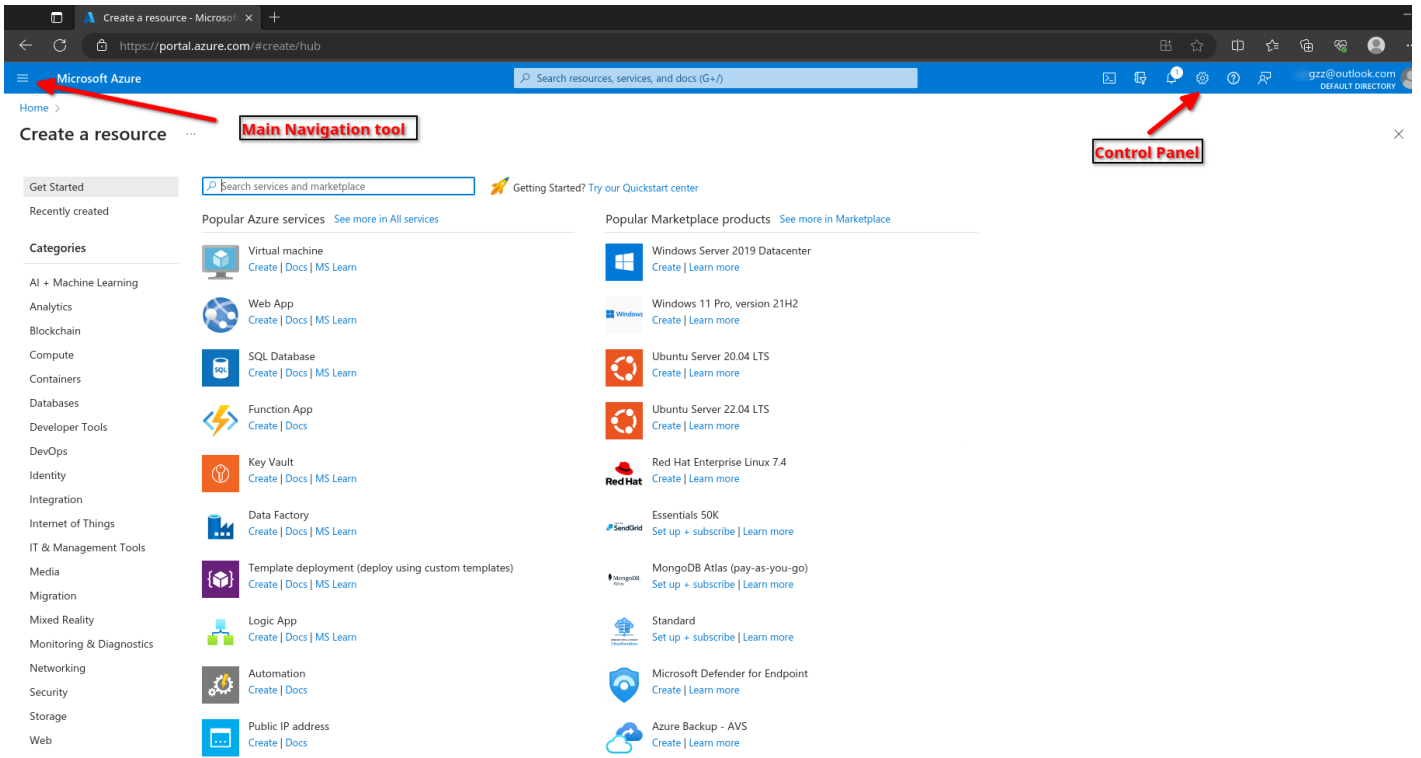
What is Azure Cloud Shell?

Describing Azure Portal, Components of Azure portal, Using the azure portal

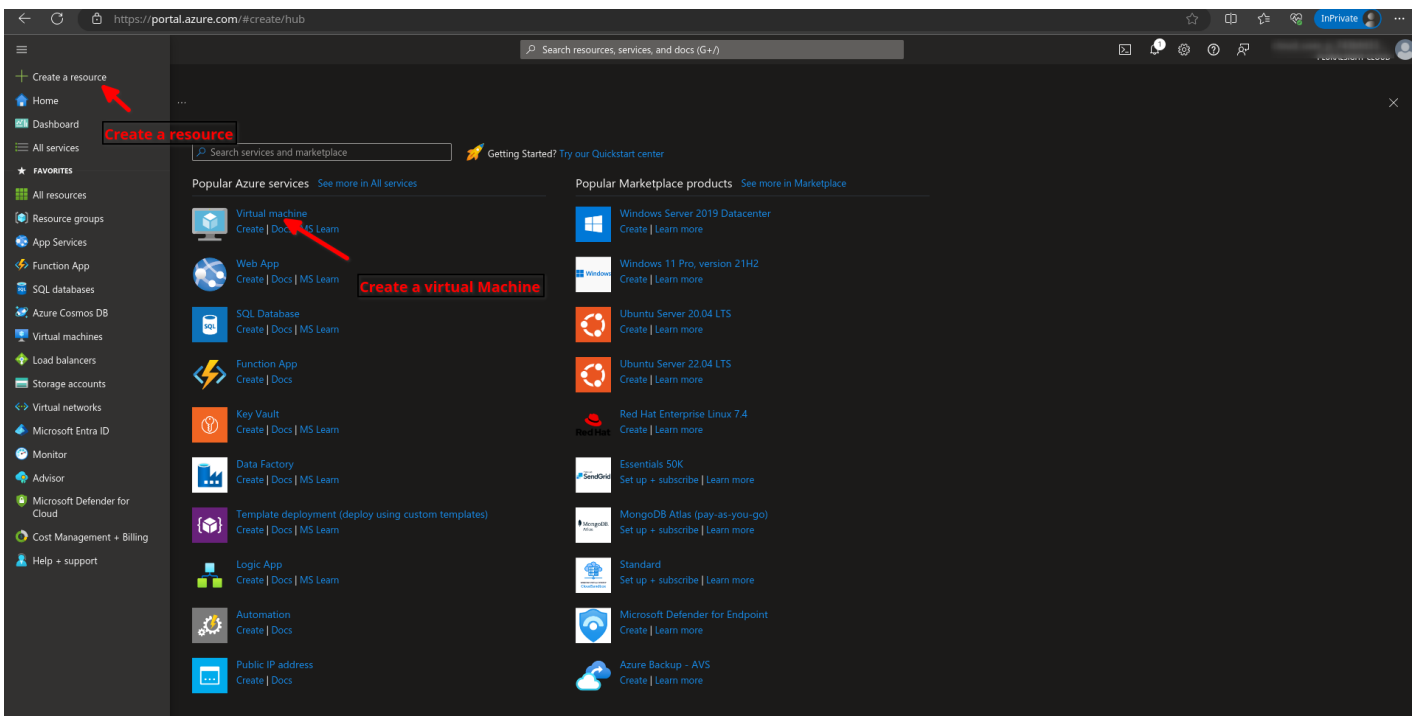
Azure portal:

- Web-based portal for the azure cloud
- Create and manage azure resources
- Uses cloud shell
- Manage Billing

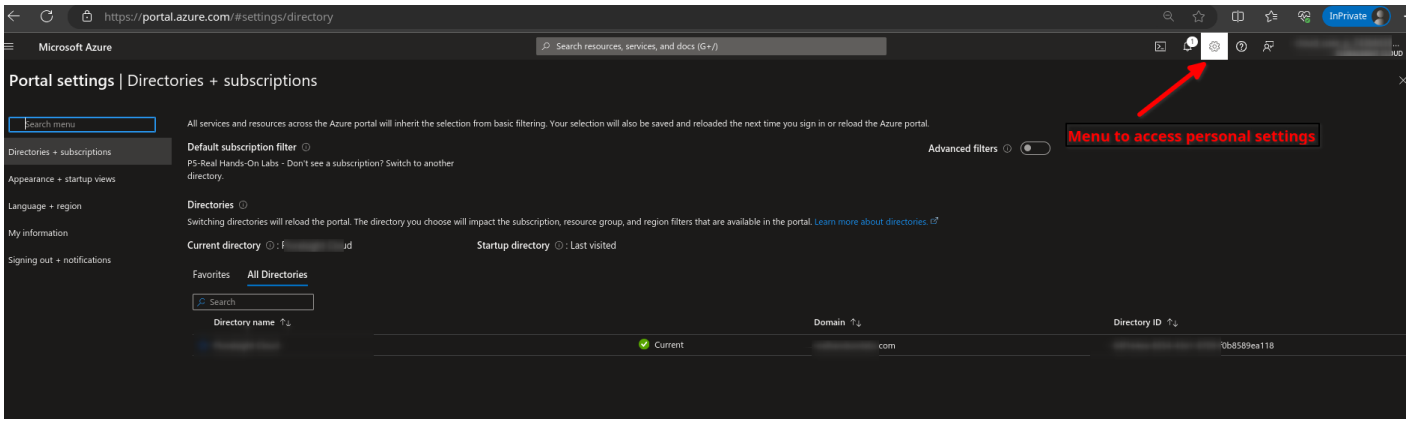
Access <https://portal.azure.com>



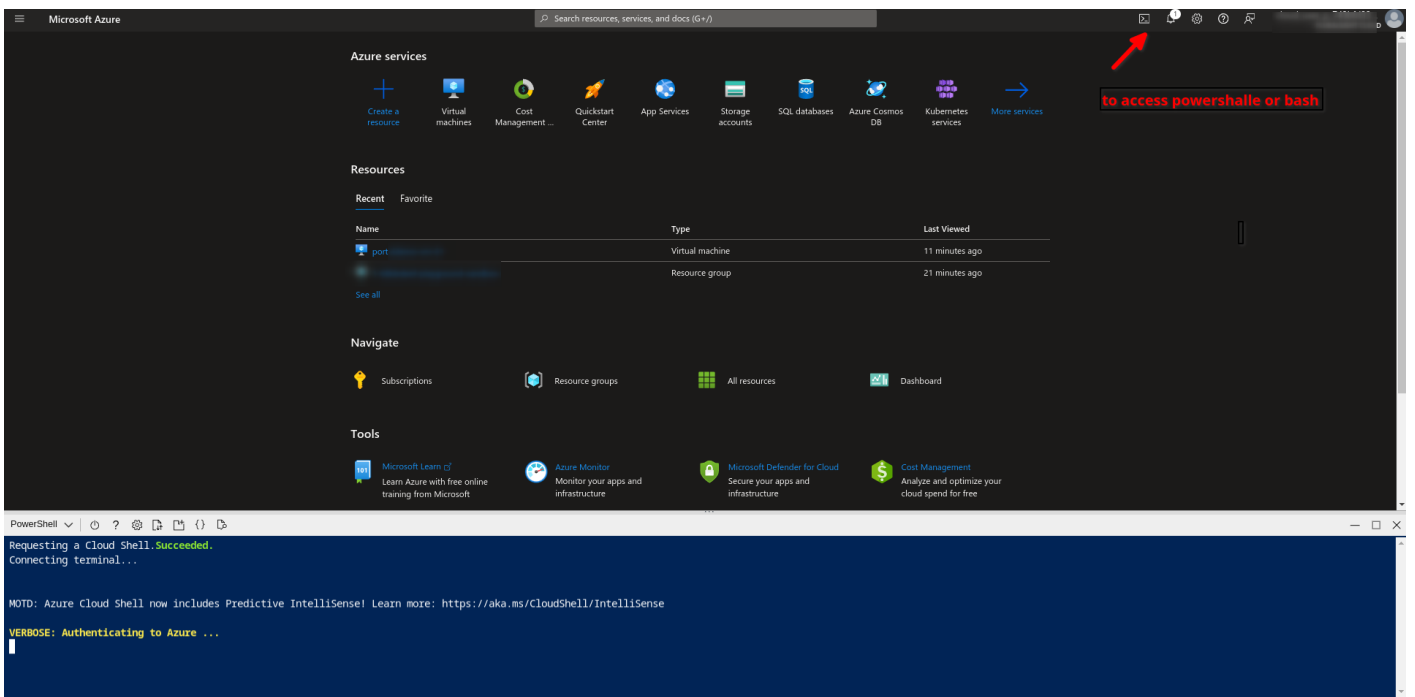
Here you can navigate to create resources such as virtual machines



To access your preferences such as themes, etc go to the settings page



Here you can navigate and access the powershell or bash



# AZ-104 - Administration - Azure CLI and Powershell

Install PowerShell on Windows, Linux, and macOS

How to install the Azure CLI

Commands

## What is the Azure CLI

- Its a command-line utility for managing azure resources
- Create and manage resources without logging to the azure portal
- Create scripts to automate tasks

```
cloud@Azure:~$ az group create \  
> --name $rg \  
> --location $location
```

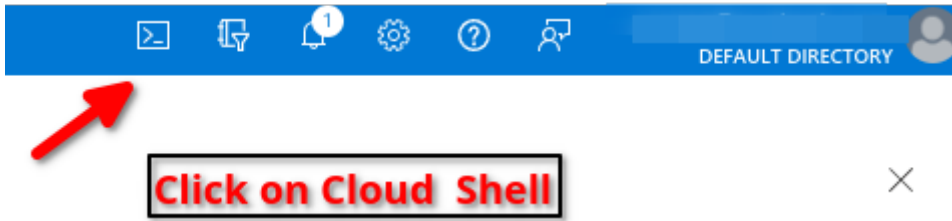
## What is Azure PowerShell

- Its a set of cmdlets for managing Azure resources
- Create and manage resources without logging into the azure portal
- Create scripts to automate tasks.

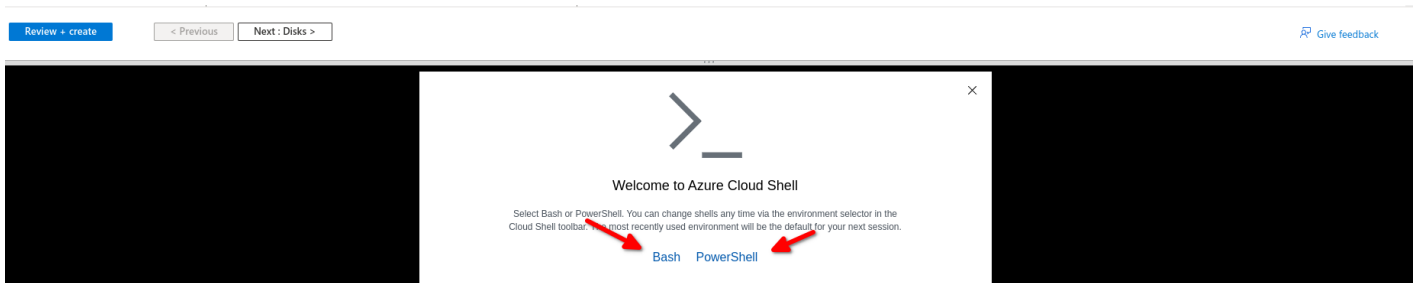
```
PS /home/cloud> New-AzResourceGroup  
>> -ResourceGroupName $rg \  
>> -Location $location
```

# Cloud Shell

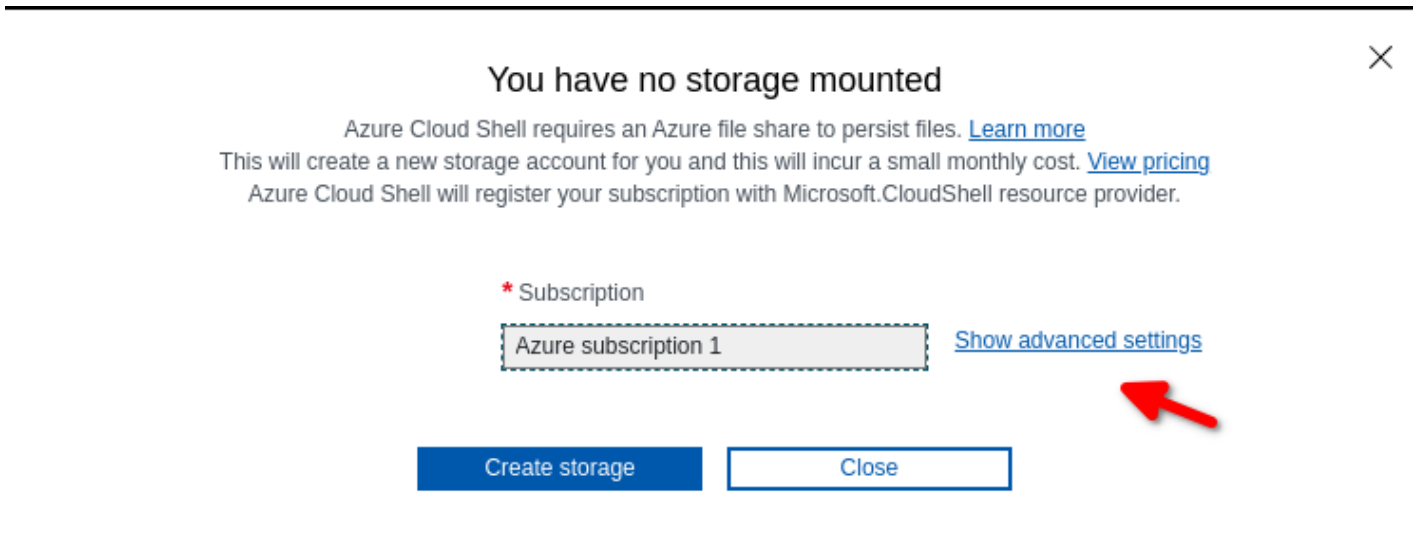
First we need to create a Cloud Shell



Select Bash or Powershell



Go to Advanced settings



Select a random storage account name and a file share name then click on create storage

## You have no storage mounted

\* Subscription

Azure subscription 1

\* Cloud Shell region

East US

[Hide advanced settings](#)

Show VNET isolation settings

\* Resource group

Create new  Use existing

DefaultResourceGroup-CUS

\* Storage account

Create new  Use existing

randomstorageaccountname

\* File share

Create new  Use existing

randomfilesharename

Create storage

Close

if you get this error its more likely your storage account name its already in use, use alphanumeric

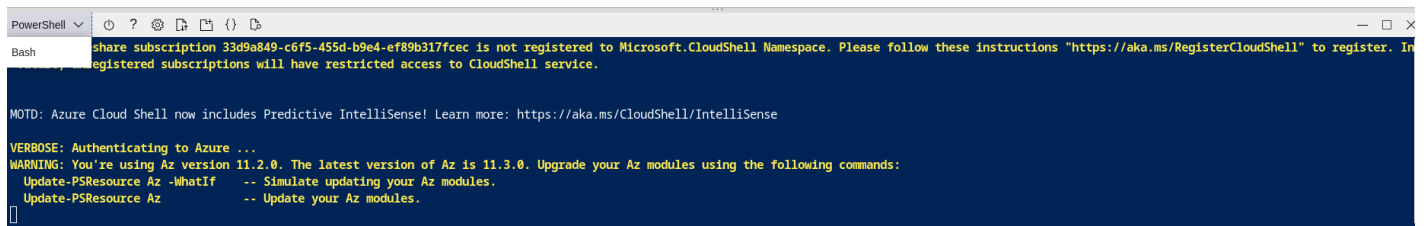
## Storage creation failed

Error: 409

```
{"error":{"code":"StorageAccountAlreadyTaken","message":"The storage account named randomstorageaccountname is already taken."}}
```

Can't create a storage account. Please try again.

Done, you can switch between Powershell and Bash using the drop down menu on the left



```
PowerShell
Bash
share subscription 33d9a849-c6f5-455d-b9e4-ef89b317fcec is not registered to Microsoft.CloudShell Namespace. Please follow these instructions "https://aka.ms/RegisterCloudShell" to register. In
registered subscriptions will have restricted access to CloudShell service.

MOTD: Azure Cloud Shell now includes Predictive IntelliSense! Learn more: https://aka.ms/CloudShell/IntelliSense

VERBOSE: Authenticating to Azure ...
WARNING: You're using Az version 11.2.0. The latest version of Az is 11.3.0. Upgrade your Az modules using the following commands:
Update-PSResource Az -WhatIf -- Simulate updating your Az modules.
Update-PSResource Az -- Update your Az modules.
```

Here we can run AZ CLI commands

```
PS /home/cesar> az group list # list out our resource groups
[
  {
    "id": "/subscriptions/33d9a849-c6f5-455d-b9e4-ef89b317fcec/resourceGroups/DefaultResourceGroup-CUS",
    "location": "centralus",
    "managedBy": null,
    "name": "DefaultResourceGroup-CUS",
    "properties": {
      "provisioningState": "Succeeded"
    },
    "tags": null,
    "type": "Microsoft.Resources/resourceGroups"
  },
  {
    "id": "/subscriptions/33d9a849-c6f5-455d-b9e4-ef89b317fcec/resourceGroups/NetworkWatcherRG",
    "location": "eastus",
    "managedBy": null,
    "name": "NetworkWatcherRG",
    "properties": {
      "provisioningState": "Succeeded"
    },
    "tags": null,
    "type": "Microsoft.Resources/resourceGroups"
  },
  {
    "id": "/subscriptions/33d9a849-c6f5-455d-b9e4-ef89b317fcec/resourceGroups/K8s_group",
    "location": "eastus",
    "managedBy": null,
    "name": "K8s_group",
    "properties": {
      "provisioningState": "Succeeded"
    },
    "tags": null,
    "type": "Microsoft.Resources/resourceGroups"
  }
]
PS /home/cesar> █
```

And here is using the powershell



```
PS /home/cesar> get-cloudDrive
```

```
FileShareName    : random1fileshare
FileSharePath    : //random1storage4.file.core.windows.net/random1fileshare
MountPoint       : /home/cesar/clouddrive
Name             : random1storage4
ResourceGroupName : DefaultResourceGroup-CUS
StorageAccountName : random1storage4
SubscriptionId    : 33d9a849-c6f5-455d-b9e4-ef89b317fcec
```

```
PS /home/cesar> get-azresource | format-Table
```

| Name  | ResourceGroupName        | ResourceType                             | Location  |
|---|--------------------------|--|-----------|
| DefaultWorkspace-33d9a849-c6f5-455d-b9e4-ef89b317fcec-CUS | DefaultResourceGroup-CUS | Microsoft.OperationalInsights/workspaces | centralus |
| random1storage4   | DefaultResourceGroup-CUS | Microsoft.Storage/storageAccounts        | eastus    |
| NetworkWatcher_eastus                                     | NetworkWatcherRG         |  |           |
| Microsoft.Network/networkWatchers                         | eastus                   |  |           |

```
PS /home/cesar>
```

# AZ-104 - Administration - Azure ARM Templates

Deploy Azure infrastructure by using JSON ARM templates

ARM templates are azure resource manager templates we create JSON files and provides

- IaC (Infrastructure as code)
- Deploy environments quickly
- Repeatable deployments

## ARM Template

Skeleton arm template

```
{
  "$schema" : "https://schema.management.azure.com"
  ,
  "contentVersion":
  "`1.0.0.0",
  "parameters": {},
  "variables": {},
  "resourceS": {},
  "outputs": {}
}
```

**Parameters and variables:** components are used to pass information to the template.

**Resources:** Define resources to use in the template

**Outputs:** Component is used to return output from the execution of the template

Example of a template:

### azuredeploy.json template

```
{
  "$schema": "https://schema.management.azure.com/schemas/2019-04-01/deploymentTemplate.json#",
  "contentVersion": "1.0.0.0",
  "parameters": {
    "adminUsername": {
      "type": "string",
      "metadata": {
        "description": "Username for the Virtual Machine."
      }
    },
    "adminPassword": {
      "type": "secureString",
      "minLength": 12,
      "metadata": {
        "description": "Password for the Virtual Machine."
      }
    },
    "dnsLabelPrefix": {
      "type": "string",
      "defaultValue": "[toLower(format('{0}-{1}', parameters('vmName'), uniqueString(resourceGroup().id, parameters('vmName'))))]",
      "metadata": {
        "description": "Unique DNS Name for the Public IP used to access the Virtual Machine."
      }
    },
    "publicIpName": {
      "type": "string",
      "defaultValue": "myPublicIP",
      "metadata": {
        "description": "Name for the Public IP used to access the Virtual Machine."
      }
    },
    "publicIPAllocationMethod": {
      "type": "string",
      "defaultValue": "Dynamic",
```

```
"allowedValues": [
  "Dynamic",
  "Static"
],
"metadata": {
  "description": "Allocation method for the Public IP used to access the Virtual Machine."
}
},
"publicIpSku": {
  "type": "string",
  "defaultValue": "Basic",
  "allowedValues": [
    "Basic",
    "Standard"
  ],
  "metadata": {
    "description": "SKU for the Public IP used to access the Virtual Machine."
  }
},
"OSVersion": {
  "type": "string",
  "defaultValue": "2022-datacenter-azure-edition-core",
  "allowedValues": [
    "2008-R2-SP1",
    "2008-R2-SP1-smalldisk",
    "2012-Datacenter",
    "2012-datacenter-gensecond",
    "2012-Datacenter-smalldisk",
    "2012-datacenter-smalldisk-g2",
    "2012-Datacenter-zhcn",
    "2012-datacenter-zhcn-g2",
    "2012-R2-Datacenter",
    "2012-r2-datacenter-gensecond",
    "2012-R2-Datacenter-smalldisk",
    "2012-r2-datacenter-smalldisk-g2",
    "2012-R2-Datacenter-zhcn",
    "2012-r2-datacenter-zhcn-g2",
    "2016-Datacenter",
    "2016-datacenter-gensecond",
```

"2016-datacenter-gs",  
"2016-Datacenter-Server-Core",  
"2016-datacenter-server-core-g2",  
"2016-Datacenter-Server-Core-smalldisk",  
"2016-datacenter-server-core-smalldisk-g2",  
"2016-Datacenter-smalldisk",  
"2016-datacenter-smalldisk-g2",  
"2016-Datacenter-with-Containers",  
"2016-datacenter-with-containers-g2",  
"2016-datacenter-with-containers-gs",  
"2016-Datacenter-zhcn",  
"2016-datacenter-zhcn-g2",  
"2019-Datacenter",  
"2019-Datacenter-Core",  
"2019-datacenter-core-g2",  
"2019-Datacenter-Core-smalldisk",  
"2019-datacenter-core-smalldisk-g2",  
"2019-Datacenter-Core-with-Containers",  
"2019-datacenter-core-with-containers-g2",  
"2019-Datacenter-Core-with-Containers-smalldisk",  
"2019-datacenter-core-with-containers-smalldisk-g2",  
"2019-datacenter-gensecond",  
"2019-datacenter-gs",  
"2019-Datacenter-smalldisk",  
"2019-datacenter-smalldisk-g2",  
"2019-Datacenter-with-Containers",  
"2019-datacenter-with-containers-g2",  
"2019-datacenter-with-containers-gs",  
"2019-Datacenter-with-Containers-smalldisk",  
"2019-datacenter-with-containers-smalldisk-g2",  
"2019-Datacenter-zhcn",  
"2019-datacenter-zhcn-g2",  
"2022-datacenter",  
"2022-datacenter-azure-edition",  
"2022-datacenter-azure-edition-core",  
"2022-datacenter-azure-edition-core-smalldisk",  
"2022-datacenter-azure-edition-smalldisk",  
"2022-datacenter-core",  
"2022-datacenter-core-g2",

```
"2022-datacenter-core-smalldisk",
"2022-datacenter-core-smalldisk-g2",
"2022-datacenter-g2",
"2022-datacenter-smalldisk",
"2022-datacenter-smalldisk-g2"
],
"metadata": {
  "description": "The Windows version for the VM. This will pick a fully patched image of this given
Windows version."
}
},
"vmSize": {
  "type": "string",
  "defaultValue": "Standard_B2s",
  "metadata": {
    "description": "Size of the virtual machine."
  }
},
"location": {
  "type": "string",
  "defaultValue": "[resourceGroup().location]",
  "metadata": {
    "description": "Location for all resources."
  }
},
"vmName": {
  "type": "string",
  "defaultValue": "vm-demo-002",
  "metadata": {
    "description": "Name of the virtual machine."
  }
}
},
"variables": {
  "storageAccountName": "[format('bootdiags{0}', uniqueString(resourceGroup().id))]",
  "nicName": "myVMNic",
  "addressPrefix": "10.0.0.0/16",
  "subnetName": "Subnet",
  "subnetPrefix": "10.0.0.0/24",
```

```
"virtualNetworkName": "MyVNET",
"networkSecurityGroupName": "default-NSG"
},
"resources": [
  {
    "type": "Microsoft.Storage/storageAccounts",
    "apiVersion": "2021-04-01",
    "name": "[variables('storageAccountName')]",
    "location": "[parameters('location')]",
    "sku": {
      "name": "Standard_LRS"
    },
    "kind": "Storage"
  },
  {
    "type": "Microsoft.Network/publicIPAddresses",
    "apiVersion": "2021-02-01",
    "name": "[parameters('publicIpName')]",
    "location": "[parameters('location')]",
    "sku": {
      "name": "[parameters('publicIpSku')]"
    },
    "properties": {
      "publicIPAllocationMethod": "[parameters('publicIPAllocationMethod')]",
      "dnsSettings": {
        "domainNameLabel": "[parameters('dnsLabelPrefix')]"
      }
    }
  },
  {
    "type": "Microsoft.Network/networkSecurityGroups",
    "apiVersion": "2021-02-01",
    "name": "[variables('networkSecurityGroupName')]",
    "location": "[parameters('location')]",
    "properties": {
      "securityRules": [
        {
          "name": "default-allow-3389",
          "properties": {
```

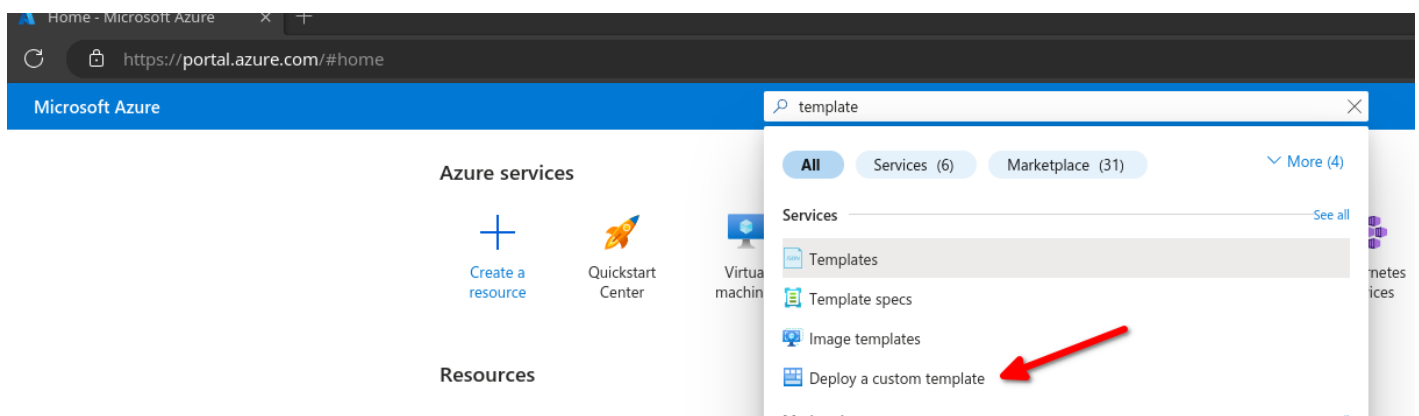
```
    "priority": 1000,
    "access": "Allow",
    "direction": "Inbound",
    "destinationPortRange": "3389",
    "protocol": "Tcp",
    "sourcePortRange": "*",
    "sourceAddressPrefix": "*",
    "destinationAddressPrefix": "*"
  }
}
]
}
},
{
  "type": "Microsoft.Network/virtualNetworks",
  "apiVersion": "2021-02-01",
  "name": "[variables('virtualNetworkName')]",
  "location": "[parameters('location')]",
  "properties": {
    "addressSpace": {
      "addressPrefixes": [
        "[variables('addressPrefix')]"
      ]
    },
    "subnets": [
      {
        "name": "[variables('subnetName')]",
        "properties": {
          "addressPrefix": "[variables('subnetPrefix')]",
          "networkSecurityGroup": {
            "id": "[resourceId('Microsoft.Network/networkSecurityGroups',
variables('networkSecurityGroupName'))]"
          }
        }
      }
    ]
  },
  "dependsOn": [
    "[resourceId('Microsoft.Network/networkSecurityGroups', variables('networkSecurityGroupName'))]"
  ]
}
```

```
]
},
{
  "type": "Microsoft.Network/networkInterfaces",
  "apiVersion": "2021-02-01",
  "name": "[variables('nicName')]",
  "location": "[parameters('location')]",
  "properties": {
    "ipConfigurations": [
      {
        "name": "ipconfig1",
        "properties": {
          "privateIPAllocationMethod": "Dynamic",
          "publicIPAddress": {
            "id": "[resourceId('Microsoft.Network/publicIPAddresses', parameters('publicIpName'))]"
          },
          "subnet": {
            "id": "[resourceId('Microsoft.Network/virtualNetworks/subnets', variables('virtualNetworkName'),
variables('subnetName'))]"
          }
        }
      }
    ]
  },
  "dependsOn": [
    "[resourceId('Microsoft.Network/publicIPAddresses', parameters('publicIpName'))]",
    "[resourceId('Microsoft.Network/virtualNetworks', variables('virtualNetworkName'))]"
  ]
},
{
  "type": "Microsoft.Compute/virtualMachines",
  "apiVersion": "2021-03-01",
  "name": "[parameters('vmName')]",
  "location": "[parameters('location')]",
  "properties": {
    "hardwareProfile": {
      "vmSize": "[parameters('vmSize')]"
    },
    "osProfile": {
```

```
"computerName": "[parameters('vmName')]",
"adminUsername": "[parameters('adminUsername')]",
"adminPassword": "[parameters('adminPassword')]"
},
"storageProfile": {
  "imageReference": {
    "publisher": "MicrosoftWindowsServer",
    "offer": "WindowsServer",
    "sku": "[parameters('OSVersion')]",
    "version": "latest"
  },
  "osDisk": {
    "createOption": "FromImage",
    "managedDisk": {
      "storageAccountType": "StandardSSD_LRS"
    }
  },
  "dataDisks": [
    {
      "diskSizeGB": 1023,
      "lun": 0,
      "createOption": "Empty"
    }
  ]
},
"networkProfile": {
  "networkInterfaces": [
    {
      "id": "[resourceId('Microsoft.Network/networkInterfaces', variables('nicName'))]"
    }
  ]
},
"diagnosticsProfile": {
  "bootDiagnostics": {
    "enabled": true,
    "storageUri": "[reference(resourceId('Microsoft.Storage/storageAccounts',
variables('storageAccountName'))).primaryEndpoints.blob]"
  }
}
```

```
},
"dependsOn": [
  "[resourceId('Microsoft.Network/networkInterfaces', variables('nicName'))]",
  "[resourceId('Microsoft.Storage/storageAccounts', variables('storageAccountName'))]"
]
}
],
"outputs": {
  "hostname": {
    "type": "string",
    "value": "[reference(resourceId('Microsoft.Network/publicIPAddresses',
parameters('publicIpName'))).dnsSettings.fqdn]"
  }
}
}
```

Go to Deploy a custom template



Build your own template in the editor



Home >

# Custom deployment

Deploy from a custom template

New! Deployment Stacks let you manage the lifecycle of your deployments. Try it now →

Select a template **Basics** Review + create

Template **6 resources based on template**



Customized template

6 resources

Edit template

Edit parameters

Visualize

**to view diagram**



## Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription \*

Resource group \*

[Create new](#)



## Instance details

Region \*  **select a resource group**

Admin Username \*

Admin Password \*

Dns Label Prefix

Public Ip Name

Public IP Allocation Method

Public Ip Sku

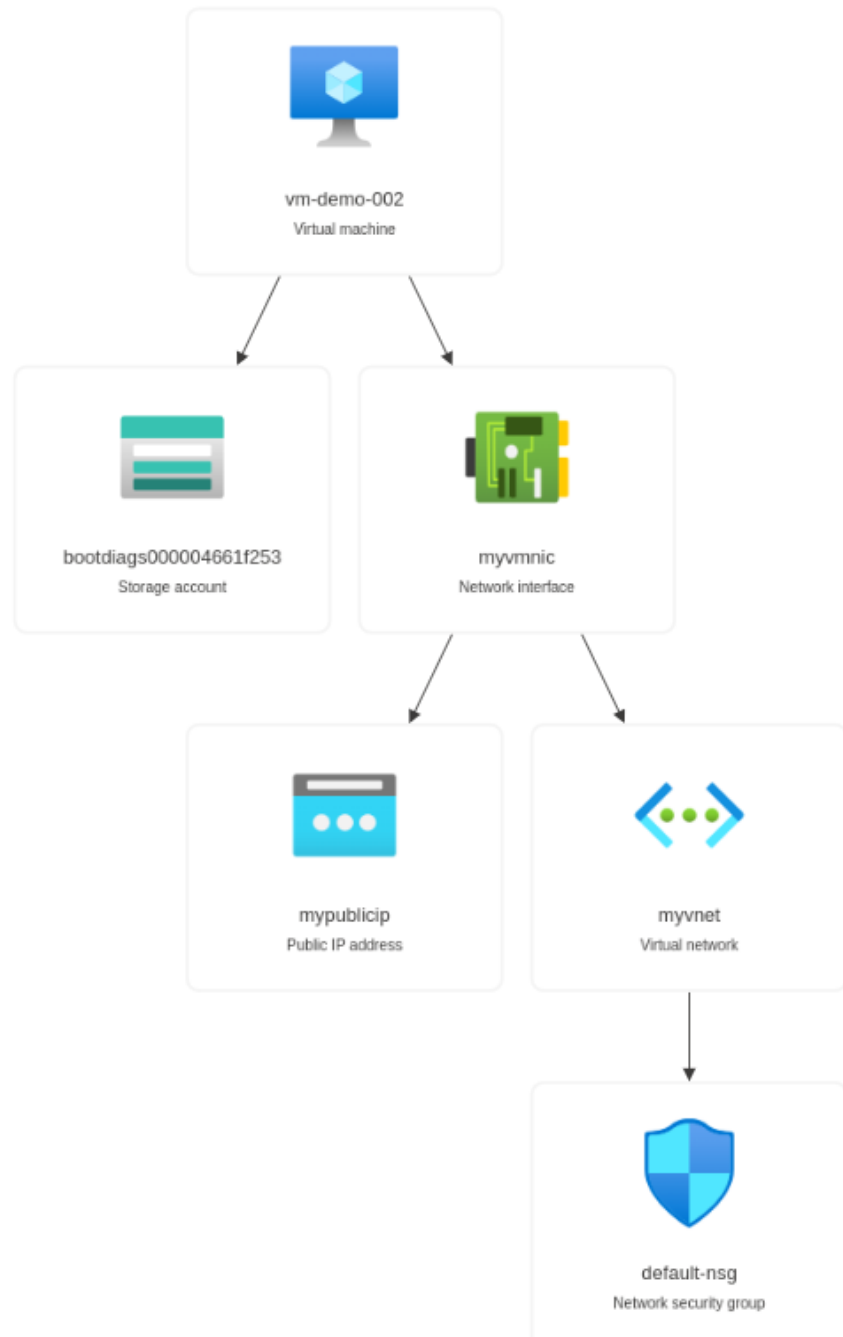
OS Version

Vm Size

Previous

Next

Review + create



Fill out all parameters then review and create

### Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription \* ⓘ

Resource group \* ⓘ

[Create new](#)

### Instance details

Region \* ⓘ

Admin Username \* ⓘ

Admin Password \* ⓘ

Dns Label Prefix ⓘ

Public Ip Name ⓘ

Public IP Allocation Method ⓘ

Public Ip Sku ⓘ

OS Version ⓘ

Vm Size ⓘ

Location ⓘ

Vm Name ⓘ

[Previous](#)

[Next](#)

[Review + create](#)



Deployment in progress

Search  << 🗑️ Delete 🔄 Cancel 🔄 Redeploy ⬇️ Download 🔄 Refresh


Overview

Inputs

Outputs


Template

## Deployment is in progress

 Deployment name : Microsoft.Template-20240206223726  
Subscription : [P4-Real Hands-On Labs](#)  
Resource group : [1-d3dd8e5d-playground-sandbox](#)

Start time : 2/6/2024, 10:37:31 PM  
Correlation ID : fe7a22e3-22a9-44df-a71c-6b6c9c385332

▼ Deployment details

| Resource  | Type   | Status  |
|---|--|---------|
|  default-NSG |  Network security group | Created |

Give feedback

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