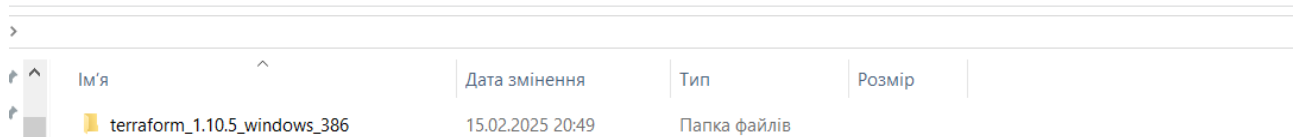
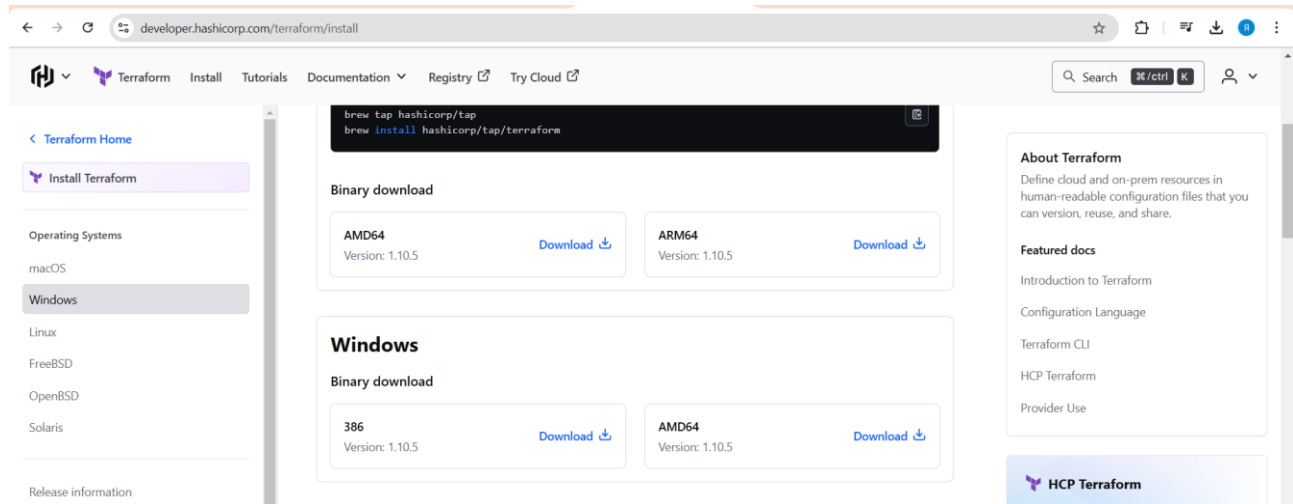


Anatolii Yakubyshyn

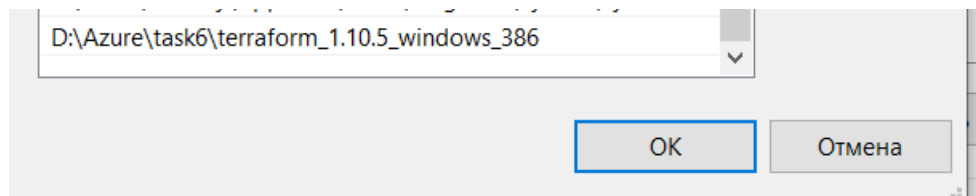
Infrastructure as Code (IaC), Monitoring And Logging Practical Tasks

Practical Task 1: Install, Configure, and Manage Terraform State in Azure

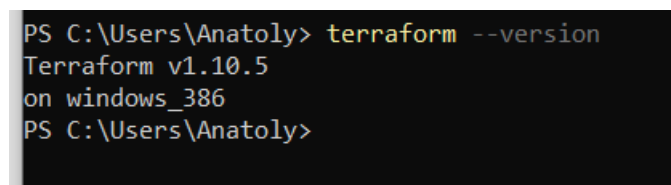
Install Terraform on your local machine.



Set Path env var:



Verify the installation by checking the Terraform version.



Authenticate with Azure using az login and configure Terraform for Azure authentication.

- Create a **Terraform backend** configuration using an **Azure Storage Account** to store the Terraform state remotely:
 - Define a storage account, a container, and a blob in **Terraform configuration**.
 - Use **terraform init** to initialize the backend.
 - Run **terraform apply** to deploy the storage account for state management.
 - Verify that the Terraform state file is stored in the Azure Storage Account.
 - Implement basic **state locking** using Azure blob storage.
 - Destroy the storage account (after confirming the state behavior).

```
terraform {
  backend "azurerm" {}
}

provider "azurerm" {
  features {}
  subscription_id = var.subscription_id
}

resource "azurerm_resource_group" "rg" {
  name     = var.rg
  location = "Poland Central"
}

resource "azurerm_storage_account" "storage" {
  name                = var.storage_account_name
  resource_group_name = azurerm_resource_group.rg.name
  location             = azurerm_resource_group.rg.location
  account_tier        = "Standard"
  account_replication_type = "LRS"
}

resource "azurerm_storage_container" "container" {
  name                = var.blob_container_name
  storage_account_name = azurerm_storage_account.storage.name
  container_access_type = "blob"
}
```

```
variable "rg" {
  type        = string
  description = "resource group name"
}

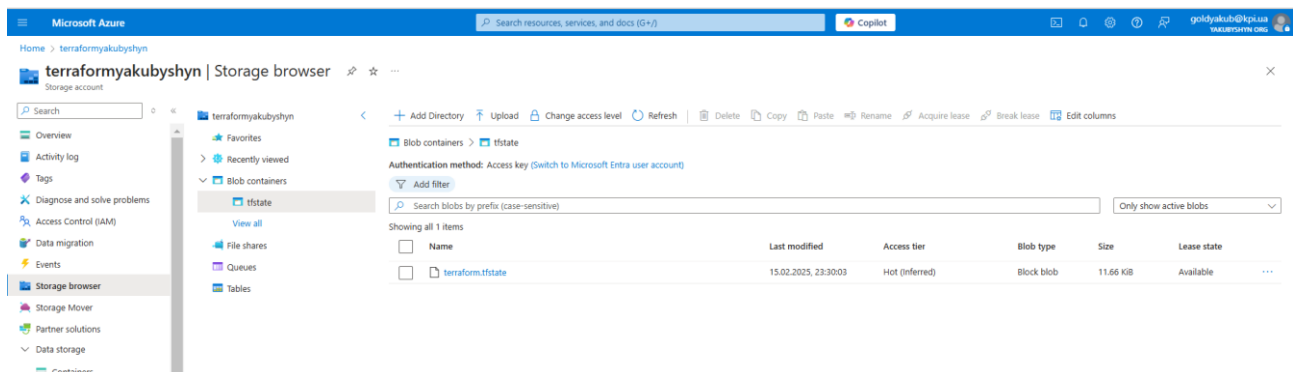
variable "location" {
  type        = string
  description = "location for all resources"
}

variable "storage_account_name" {
  type        = string
  description = "storage account name"
}

variable "subscription_id" {
  type        = string
  description = "storage account name"
}

variable "blob_container_name" {
  type        = string
  default     = "tfstate"
}
```

```
main.tf task1_depr  variables.tf task1_depr  terraform.tfvars task1_depr  .gitignore  run.ps1 task1  variables.tf task1
task1 > run.ps1 > function WriteVars ()
1 param (
2     [string]$rg,
3     [string]$location,
4     [string]$storage_account_name,
5     [string]$blob_container_name,
6     [string]$subscription_id
7 )
8
9 2 references
10 function WriteVars {
11     param (
12         $backend
13     )
14     $tf_vars = "terraform.tfvars"
15
16     "rg = "$rg"" > $tf_vars
17     "location = "$location"" >> $tf_vars
18     "storage_account_name= "$storage_account_name"" >> $tf_vars
19     "blob_container_name = "$blob_container_name"" >> $tf_vars
20     "subscription_id = "$subscription_id"" >> $tf_vars
21     "backend = "$backend"" >> $tf_vars
22
23     $file_content = Get-Content -Path "main.tf" -Raw
24     $file_content = $file_content -replace 'backend.*', "backend "$backend"" {}"
25
26     $file_content | Set-Content -Path "main.tf"
27 }
28
29 WriteVars -backend "local"
30
31 terraform init
32
33 terraform apply -auto-approve
34
35 WriteVars -backend "azurerm"
36 $ACCOUNT_KEY=(Get-AzStorageAccountKey -ResourceGroupName $rg -Name $storage_account_name)[0].value
37
38
39 terraform init -migrate-state `
40     -backend-config="resource_group_name=$rg" `
41     -backend-config="storage_account_name=$storage_account_name" `
42     -backend-config="container_name=$blob_container_name" `
43     -backend-config="key=terraform.tfstate" `
44     -backend-config="access_key=$ACCOUNT_KEY" `
45
46
47 terraform apply -auto-approve
48
49
```



```
Apply complete! Resources: 0 added, 1 changed, 0 destroyed.
PS D:\Azure\task\terraform_task\task1> terraform destroy
azure_rm_resource_group: Refreshing state... [id=/subscriptions/3a612e70-8e22-4425-b3ea-29f6acf32428/resourceGroups/terraform_task1]
azure_rm_storage_account.storage: Refreshing state... [id=/subscriptions/3a612e70-8e22-4425-b3ea-29f6acf32428/resourceGroups/terraform_task1/providers/Microsoft.Storage/storageAccounts/terraform_task1]
azure_rm_storage_container.container: Refreshing state... [id=https://terraformtask1.blob.core.windows.net/tfstate]

Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the following symbols:
- destroy

Terraform will perform the following actions:

# azure_rm_resource_group.rg will be destroyed
- resource "azure_rm_resource_group" "rg" {
  - id           = "/subscriptions/3a612e70-8e22-4425-b3ea-29f6acf32428/resourceGroups/terraform_task1" -> null
  - location     = "polandcentral" -> null
  - name        = "terraform_task1" -> null
  - tags        = {} -> null
  # (1 unchanged attribute hidden)
}

# azure_rm_storage_account.storage will be destroyed
- resource "azure_rm_storage_account" "storage" {
  - access_tier      = "Hot" -> null
  - account_kind     = "StorageV2" -> null
  - account_replication_type = "LRS" -> null
  - account_tier     = "Standard" -> null
  - allow_nested_items_to_be_public = true -> null
  - cross_tenant_replication_enabled = false -> null
  - default_to_outh_authentication = false -> null
  - dns_endpoint_type = "Standard" -> null
  - https_traffic_only_enabled = true -> null
  - id               = "/subscriptions/3a612e70-8e22-4425-b3ea-29f6acf32428/resourceGroups/terraform_task1/providers/Microsoft.Storage/storageAccounts/terraform_task1" -> null
  - infrastructure_encryption_enabled = false -> null
  - is_hns_enabled   = false -> null
  - large_file_share_enabled = false -> null
  - local_user_enabled = true -> null
  - location         = "polandcentral" -> null
  - min_tls_version  = "TLS1_2" -> null
  - name             = "terraformtask1" -> null
  - nfvsi_enabled    = false -> null
  - primary_access_key = (sensitive value) -> null
  - primary_blob_connection_string = (sensitive value) -> null
}
```

Practical Task 2: Deploy an Azure Virtual Machine with a Custom Network and Security Rules

Azure DevOps

AnatoliYakubshyn / anatoliyakubshyn / Pipelines / anatoliyakubshyn / 20250216.44

anatoliyakubshyn

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#20250216.44 • added connection

anatoliyakubshyn

Run Now

This run is being retained as one of 3 recent runs by pipeline.

View retention leases

Summary

Associated pipelines

Code Coverage

Manually run by Anatoli Yakubshyn

View 48 changes

Repository and version	Time started and elapsed	Related	Tests and coverage
anatoliyakubshyn	Today at 15:16	0 work items	Get started
bug/pipelinebug	3m 46s	1 published	

Stages

Jobs

Terraform Plan

1 job completed

49s

1 artifact

Terraform Apply

1 job completed

2m 40s

```

1 provider "azurerm" {
2   features {}
3   subscription_id = var.subscription_id
4   client_id       = var.client_id
5   client_secret   = var.client_secret
6   tenant_id      = var.tenant_id
7 }
8
9 resource "azurerm_virtual_network" "vnet" {
10  name                = var.vnet
11  resource_group_name = var.rg
12  location            = var.location
13  address_space       = [var.vnet_address_space]
14 }
15
16 resource "azurerm_subnet" "subnet" {
17  name                = var.subnet_name
18  resource_group_name = var.rg
19  virtual_network_name = azurerm_virtual_network.vnet.name
20  address_prefixes     = [var.subnet_address_space]
21 }
22
23 resource "azurerm_network_security_group" "nsg" {
24  name                = "my-nsg"
25  location            = var.location
26  resource_group_name = var.rg
27
28  security_rule {
29    name                = "allow_ssh"
30    priority            = 100
31    direction          = "Inbound"
32    access              = "Allow"
33    protocol            = "Tcp"
34    source_port_range   = "*"
35    destination_port_range = "22"
36    source_address_prefix = "20.215.202.204" #MY_IP
37    destination_address_prefix = "*"
38  }
39
40  security_rule {
41    name                = "allow_http"
42    priority            = 200
43    direction          = "Inbound"
44    access              = "Allow"
45    protocol            = "Tcp"
46    source_port_range   = "*"
47    destination_port_range = "80"
48    source_address_prefix = "*"
49    destination_address_prefix = "*"
50  }
51
52  security_rule {
53    name                = "deny_all"
54    priority            = 300
55    direction          = "Inbound"
56    access              = "Deny"
57    protocol            = "Tcp"
58    source_port_range   = "*"
59    destination_port_range = "*"
60    source_address_prefix = "*"
61    destination_address_prefix = "*"
62  }
63 }
64

```

```

62 }
63 }
64
65 resource "azurerm_public_ip" "public_ip" {
66   name                = "my-public-ip"
67   location             = var.location
68   resource_group_name = var.rg
69   allocation_method   = "Static"
70   domain_name_label   = "yakubshynvmpublicip"
71 }
72
73 resource "azurerm_network_interface" "nic" {
74   name                = "my-nic"
75   location             = var.location
76   resource_group_name = var.rg
77
78   ip_configuration {
79     name                = "internal"
80     subnet_id           = azurerm_subnet.subnet.id
81     private_ip_address_allocation = "Dynamic"
82     public_ip_address_id = azurerm_public_ip.public_ip.id
83   }
84 }
85
86 resource "azurerm_network_interface_security_group_association" "nic_nsg" {
87   network_interface_id = azurerm_network_interface.nic.id
88   network_security_group_id = azurerm_network_security_group.nsg.id
89 }
90
91 resource "azurerm_linux_virtual_machine" "vm" {
92   name                = "my-vm"
93   location             = var.location
94   resource_group_name = var.rg
95   size                = "Standard_B1s"
96   admin_username      = var.admin_user
97   admin_password       = var.admin_password
98   network_interface_ids = [azurerm_network_interface.nic.id]
99   disable_password_authentication = false
100
101   source_image_reference {
102     publisher = "Canonical"
103     offer     = "0001-com-ubuntu-server-focal"
104     sku       = "20_04-lts"
105     version   = "latest"
106   }
107
108   os_disk {
109     caching              = "ReadWrite"
110     storage_account_type = "Standard_LRS"
111   }
112
113   provisioner "remote-exec" {
114     inline = [
115       "sudo apt-get update -y",
116       "sudo apt-get install -y nginx",
117       "sudo systemctl start nginx",
118       "sudo systemctl enable nginx"
119     ]
120
121     connection {
122       type        = "ssh"
123       user        = var.admin_user
124       password     = var.admin_password
125       host         = azurerm_linux_virtual_machine.vm_public_ip.address

```

```

103     sku              = "2004-LinuxUbuntuServer-16.04"
104     sku              = "20_04-lts"
105     version          = "latest"
106   }
107
108   os_disk {
109     caching              = "ReadWrite"
110     storage_account_type = "Standard_LRS"
111   }
112
113   provisioner "remote-exec" {
114     inline = [
115       "sudo apt-get update -y",
116       "sudo apt-get install -y nginx",
117       "sudo systemctl start nginx",
118       "sudo systemctl enable nginx"
119     ]
120
121     connection {
122       type        = "ssh"
123       user        = var.admin_user
124       password    = var.admin_password
125       host        = azurerm_linux_virtual_machine.vm.public_ip_address
126     }
127   }
128 }
129 }
130
131
132

```

[Contents](#) [History](#) [Compare](#) [Blame](#)

```

1
2 variable "vnet" {
3   type        = string
4   default     = "example-network"
5   description = "description"
6 }
7
8 variable "rg" {
9   type        = string
10  default     = "AnatoliiVakubshyn"
11  description = "description"
12 }
13
14 variable "location" {
15   type        = string
16   default     = "Poland Central"
17   description = "description"
18 }
19
20 variable "vnet_address_space" {
21   type        = string
22   default     = "10.0.0.0/16"
23   description = "description"
24 }
25
26 variable "subnet_address_space" {
27   type        = string
28   default     = "10.0.0.0/24"
29   description = "description"
30 }
31
32 variable "subnet_name" {
33   type        = string
34   default     = "example-subnet"
35   description = "description"
36 }
37
38 variable "admin_user" {
39   description = "The admin username for the VM"
40   type        = string
41 }
42
43 variable "admin_password" {
44   description = "The admin password for the VM"
45   type        = string
46   sensitive   = true # To ensure password is hidden in the Terraform output
47 }
48
49 variable "client_id" {
50   description = "The Azure client ID for authentication"
51   type        = string
52 }
53
54 variable "client_secret" {
55   description = "The Azure client secret for authentication"
56   type        = string
57   sensitive   = true # Hide in Terraform output
58 }
59
60 variable "subscription_id" {
61   description = "The Azure subscription ID"
62   type        = string
63 }

```

```

61   description = "The Azure subscription ID"
62   type        = string
63 }
64
65 variable "tenant_id" {
66   description = "The Azure tenant ID"
67   type        = string
68 }
69
70

```

Fixed pipeline with Dmytro Slotvinskyi

← → ↺ Не защищено 74.248.144.226

☆ 📄 ⬇️ 🌐 ⋮

Welcome to nginx!

If you see this page, the nginx web server is successfully installed and working. Further configuration is required.

For online documentation and support please refer to nginx.org.
Commercial support is available at nginx.com.

Thank you for using nginx.

Azure DevOps

AnatoliYakubshyn / anatoliyakubshyn / Pipelines / anatoliyakubshyn (2) / 20250216.5

anatoliyakubshyn

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Jobs in run #20250216.5

anatoliyakubshyn (2)

Terraform Destroy

1m 23s

Initialize job

2s

Checkout anatoliyakubshyn@fix...

3s

Install unzip

3s

Install Terraform

8s

Set environment variables for Azu...

2s

Terraform Init with Backend Config

7s

Terraform Destroy

53s

Post-job: Checkout anatoliyakubsh...

Terraform Destroy

```
237 } -> null
238 - aws_servers = [] -> null
239 - flow_timeout_in_minutes = 0 -> null
240 - guid = "e6c0e47-abfc-4d86-bc02-628041f03240" -> null
241 - id = "/subscriptions/9a6ae428-dbc3-44fe-bdf2-4e08593981a0/resourceGroups/AnatoliYakubshyn/providers/Microsoft.Network/virtualNetworks/example-network" -> null
242 - location = "polandcentral" -> null
243 - name = "example-network" -> null
244 - private_endpoint_network_policies = "disabled" -> null
245 - resource_group_name = "AnatoliYakubshyn" -> null
246 - subnet = [
247   - {
248     - address_prefixes = [
249       - "10.0.0.0/24",
250     ]
251     - default_outbound_access_enabled = true
252     - delegation = [
253       - {
254         - id = "/subscriptions/9a6ae428-dbc3-44fe-bdf2-4e08593981a0/resourceGroups/AnatoliYakubshyn/providers/Microsoft.Network/virtualNetworks/example-network/subnets/example-subnet"
255         - name = "example-subnet"
256         - private_endpoint_network_policies = "disabled"
257         - private_link_service_network_policies_enabled = true
258         - route_table_id = ""
259         - security_group = ""
260         - service_endpoint_policy_ids = [
261         ]
262         - service_endpoints = [
263         ]
264       }
265     ]
266   } -> null
267 ] -> null
268 - tags = {} -> null
269 }
270
271 Plan: 0 to add, 0 to change, 7 to destroy.
272
273 azure_rm_network_interface_security_group_association.nic_sg: Destroying... [id=/subscriptions/9a6ae428-dbc3-44fe-bdf2-4e08593981a0/resourceGroups/AnatoliYakubshyn/providers/Microsoft.Network/networkInterfaces/my-nic]
274 azure_rm_linux_virtual_machine.vms: Destroying... [id=/subscriptions/9a6ae428-dbc3-44fe-bdf2-4e08593981a0/resourceGroups/AnatoliYakubshyn/providers/Microsoft.Compute/virtualMachines/my-vm]
275 azure_rm_network_interface_security_group_association.nic_sg: Destruction complete after 6s
276 azure_rm_network_security_group.ms: Destroying... [id=/subscriptions/9a6ae428-dbc3-44fe-bdf2-4e08593981a0/resourceGroups/AnatoliYakubshyn/providers/Microsoft.Network/networkSecurityGroups/my-ns]
277 azure_rm_linux_virtual_machine.vms: Still destroying... [id=/subscriptions/9a6ae428-dbc3-44fe-bdf2-4e08593981a0/resourceGroups/AnatoliYakubshyn/providers/Microsoft.Compute/virtualMachines/my-vm, 15s elapsed]
278 azure_rm_network_security_group.ms: Still destroying... [id=/subscriptions/9a6ae428-dbc3-44fe-bdf2-4e08593981a0/resourceGroups/AnatoliYakubshyn/providers/Microsoft.Network/networkSecurityGroups/my-ns, 10s elapsed]
279 azure_rm_network_security_group.ms: Destruction complete after 11s
280 azure_rm_linux_virtual_machine.vms: Still destroying... [id=/subscriptions/9a6ae428-dbc3-44fe-bdf2-4e08593981a0/resourceGroups/AnatoliYakubshyn/providers/Microsoft.Compute/virtualMachines/my-vm, 20s elapsed]
281 azure_rm_linux_virtual_machine.vms: Destruction complete after 20s
282 azure_rm_network_interface.nic: Destroying... [id=/subscriptions/9a6ae428-dbc3-44fe-bdf2-4e08593981a0/resourceGroups/AnatoliYakubshyn/providers/Microsoft.Network/networkInterfaces/my-nic]
```

Azure DevOps

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anatoliyakubshyn

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Jobs in run #20250216.5

anatoliyakubshyn (2)

Terraform Destroy

1m 48s

Initialize job

2s

Checkout anatoliyakubshyn@fix...

3s

Install unzip

3s

Install Terraform

8s

Set environment variables for Azu...

2s

Terraform Init with Backend Config

7s

Terraform Destroy

1m 18s

Post-job: Checkout anatoliyaku...

<1s

Finalize job

<1s

Report build status

<1s

Terraform Destroy

```
1 Pool: Default
2 Queue: Today at 15:18 [max_concurrent_jobs]
3 Agent: Ubuntu-runner
4 Started: Just now
5 Duration: 1m 48s
6
7 The agent request is already running or has already completed.
8
9 Job preparation parameters
10 Job live console data:
11 Starting: Terraform Destroy
12 Async Command Start: DetectDockerContainer
13 Async Command End: DetectDockerContainer
14 Async Command Start: DetectDockerContainer
15 Async Command End: DetectDockerContainer
16 Finishing: Terraform Destroy
```


Microsoft Azure

Search resources, services, and docs (G+)

Copilot

AnatoliYakubysyn@L...
DEFAULT DIRECTORY

Home >

AnatoliYakubysyn
Resource group

Search

+ Create Manage view Delete resource group Refresh Export to CSV Open query Assign tags Move Delete Export template Open in mobile

Overview

Activity log

Access control (IAM)

Tags

Resource visualizer

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Subscription (move): [Azure subscription 1](#)

Subscription ID: 9a6ae428-d8c3-44fe-bdf2-4e08593901a0

Deployments: 1 [Failed](#) 6 [Succeeded](#)

Location: UK South

Tags: [Add tag](#)

Resources Recommendations

Filter for any field... Type equals all Location equals all Add filter

Showing 1 to 8 of 8 records. Show hidden types

Name	Type	Location
Ubuntu-runner	Virtual machine	Poland Central
Ubuntu-runner-ip	Public IP address	Poland Central
Ubuntu-runner-nsg	Network security group	Poland Central
Ubuntu-runner-vnet	Virtual network	Poland Central
ubuntu-runner345_21	Network interface	Poland Central
Ubuntu-runner_key	SSH key	Poland Central
Ubuntu-runner_OsDisk_1_90229d04434e4aa8ba48975c152f60b1	Disk	Poland Central
yakubysynterraform	Storage account	Poland Central

< Previous Page 1 of 1 Next >

Close feedback

Deleted resources successfully

```

30 }
31
32 output "nginx_url" {
33   value = "http://${azurerm_public_ip.public_ip.ip_address}"
34 }

```

Then Added and pushed to main

```

5
6
7 Apply complete! Resources: 7 added, 0 changed, 0 destroyed.
8
9 Outputs:
10
11 nginx_url = "http://74.248.147.38"
12
13 Finishing: Terraform Apply

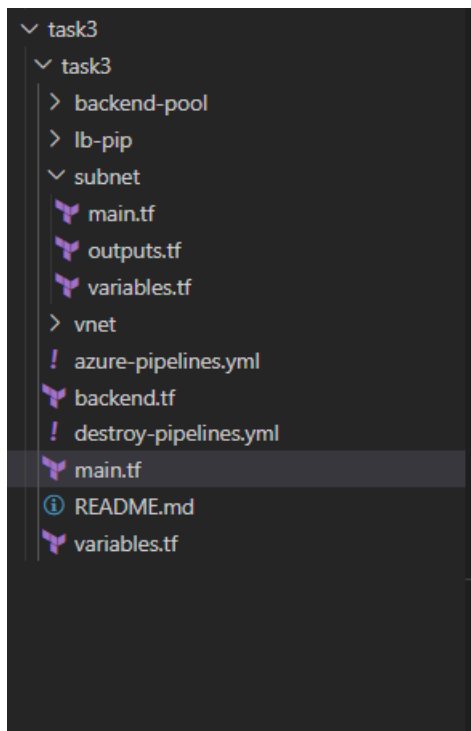
```

Practical Task 3: Implement a Scalable Infrastructure with Load Balancer and Auto Scaling

Requirements:

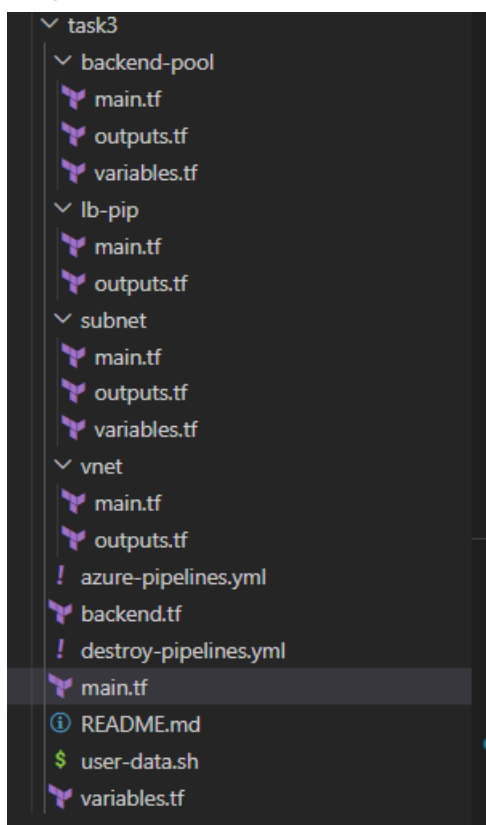
Extend the Terraform configuration to create a highly available infrastructure by deploying:

- A Virtual Network (VNet) with multiple subnets across two Azure Availability Zones.
- An Azure Load Balancer with:
 - o A backend pool of multiple Virtual Machines (VMs).
 - o A health probe for HTTP on port 80.
 - o A load-balancing rule to distribute traffic across VMs.
- A Virtual Machine Scale Set (VMSS) with:
 - o At least two VM instances that auto-scale based on CPU usage.
 - o A startup script to install Apache and deploy a sample website.
- A Storage Account to store Terraform state remotely.
- Verify that:
 - o The Load Balancer IP distributes traffic between VM instances.
 - o Auto-scaling works when CPU usage spikes.
- Implement Terraform modules to modularize networking, compute, and security configurations.
- Destroy the infrastructure when testing is complete.



More info you can find in repo

In general I created modules with vars and outputs



And then referenced

```
module "subnet1" {
  source           = "./subnet"
  subnet_name      = "sbfirst"
  vnet              = module.vnet.vnet_name
  subnet_address_space = "10.0.1.0/24"
}
```

Recent All Runs			Filter pipelines
Recently run pipelines			
Pipeline	Last run		
task3 (4)	#20250216.1 • fixed typo in rg name Manually triggered for dev	4m ago 2m 29s	
task3	#20250216.20 • fixed typo in rg name Manually triggered for dev	7m ago 2m 0s	

Azure DevOps interface showing the Terraform Apply task in a pipeline.

Jobs in run #20250216.28

- Terraform Plan (46s)
- Terraform Apply (1m 35s)
 - Initialize job (3s)
 - Checkout task3@main to s (3s)
 - Install unzip (4s)
 - Install Terraform (8s)
 - Download tfplan artifact (1s)
 - Verify downloaded tfplan (1s)
 - Set environment variables for Azu... (2s)
 - Terraform init with Backend Config (6s)
 - Terraform Apply (59s)
 - Post-job: Checkout task3@main ... (<1s)
 - Finalize Job (<1s)
- Finalize build (<1s)
- Report build status (<1s)

Terraform Apply

```
1 Starting: Terraform Apply
2 =====
3 Task : Command line
4 Description : Run a command line script using Bash on Linux and macOS and cmd.exe on Windows
5 Version : 2.0.0.1
6 Author : Microsoft Corporation
7 Help : https://docs.microsoft.com/azure/devops/pipelines/tasks/utility/command-line
8 =====
9 Generating script.
10 Script contents:
11 terraform apply -auto-approve /home/***/_work/1/tfplan/tfplan
12 =====
13 /usr/bin/bash --noprofile --norc /home/***/_work/_temp/terraform-B0ed-439d-51e4-2e93d0d813f.sh
14 azurerm_subnet_network_security_group_association.subnet_nsg: Creating...
15 azurerm_linux_virtual_machine_scale_set.vms: Modifying... [id=/subscriptions/9a6ae628-d8c3-44fe-bdf2-4e08593981a8/resourceGroups/AnatoliyYakubshyn/providers/Microsoft.Compute/virtualMachineScaleSets/vms, 38s elapsed]
16 azurerm_subnet_network_security_group_association.subnet_nsg: Creation complete after 5s [id=/subscriptions/9a6ae628-d8c3-44fe-bdf2-4e08593981a8/resourceGroups/AnatoliyYakubshyn/providers/Microsoft.Compute/virtualMachineScaleSets/vms, 38s elapsed]
17 azurerm_linux_virtual_machine_scale_set.vms: Still modifying... [id=/subscriptions/9a6ae628-d8c3-44fe-bdf2-4e08593981a8/resourceGroups/AnatoliyYakubshyn/providers/Microsoft.Compute/virtualMachineScaleSets/vms, 28s elapsed]
18 azurerm_linux_virtual_machine_scale_set.vms: Still modifying... [id=/subscriptions/9a6ae628-d8c3-44fe-bdf2-4e08593981a8/resourceGroups/AnatoliyYakubshyn/providers/Microsoft.Compute/virtualMachineScaleSets/vms, 38s elapsed]
19 azurerm_linux_virtual_machine_scale_set.vms: Still modifying... [id=/subscriptions/9a6ae628-d8c3-44fe-bdf2-4e08593981a8/resourceGroups/AnatoliyYakubshyn/providers/Microsoft.Compute/virtualMachineScaleSets/vms, 48s elapsed]
20 azurerm_linux_virtual_machine_scale_set.vms: Still modifying... [id=/subscriptions/9a6ae628-d8c3-44fe-bdf2-4e08593981a8/resourceGroups/AnatoliyYakubshyn/providers/Microsoft.Compute/virtualMachineScaleSets/vms, 58s elapsed]
21 azurerm_linux_virtual_machine_scale_set.vms: Modifications complete after 53s [id=/subscriptions/9a6ae628-d8c3-44fe-bdf2-4e08593981a8/resourceGroups/AnatoliyYakubshyn/providers/Microsoft.Compute/virtualMachineScaleSets/vms, 58s elapsed]
22
23 Apply complete! Resources: 1 added, 1 changed, 0 destroyed.
24
25 Outputs:
26 url = "https://75-248-145-193"
27
28
29
30 Finishing: Terraform Apply
```

74.248.144.193

Azure Linux VM with Web Server

Microsoft Azure

Search resources, services, and docs (G+7)

Copy

AnatoliYakubysyn@...
Resource group: AnatoliYakubysyn

Search

Create Manage view Delete resource group Refresh Export to CSV Open query Assign tags Move Delete Export template Open in mobile

Overview

Activity log Access control (IAM) Tags Resource visualizer Events Settings Deployments Security Deployment stacks Policies Properties Locks Cost Management Cost analysis Cost alerts (preview) Budgets Advisor recommendations Monitoring Automation Help

Essentials

Subscription (copy) Azure subscription 1

Subscriptions ID : 966ae428-d8c3-44fe-b0f2-4e0593901a0

Deployments : 1 Failed 5 Succeeded

Location : UK South

Tags (add) Add tags

Resources Recommendations (8)

Filter for any field... Type equals all Location equals all Add filter

Showing 1 to 13 of 13 records. Show hidden types

No grouping EE List view

Name	Type	Location
to-public-ip	Public IP address	Poland Central
my-load-balancer	Load balancer	Poland Central
nsg	Network security group	Poland Central
Ubuntu-runner	Virtual machine	Poland Central
Ubuntu-runner-ip	Public IP address	Poland Central
Ubuntu-runner-nsg	Network security group	Poland Central
Ubuntu-runner-vnet	Virtual network	Poland Central
Ubuntu-runner-345_z1	Network interface	Poland Central
Ubuntu-runner_key	SSH key	Poland Central
Ubuntu-runner_OsDisk_1_90229d94454e4a8ba48975c152702b1	Disk	Poland Central
vmss	Virtual machine scale set	Poland Central
yakubysyn	Virtual network	Poland Central
yakubysynterraform	Storage account	Poland Central

Azure DevOps AnatoliYakubysyn / anatoliyakubysyn / Pipelines / task3 (4) / 20250216.3

Search

anatoliyakubysyn

Overview Boards Repos Pipelines Pipelines Environments Library Test Plans Artifacts

Jobs in run #20250216.3

task3 (4)

Terraform Destroy

Initialize job 3s

Checkout task3@main to s 3s

Install unzip 3s

Install Terraform 8s

Set environment variables for Azu... 2s

Terraform init with Backend Config 6s

Terraform Destroy 2m 3s

Post-job: Checkout task3@main ... <1s

Finalize job <1s

Report build status <1s

Terraform Destroy

```
1 Pool: Default
2 Queued: Today at 22:55 [manage_parallel_jobs]
3 Agent: Ubuntu-runner
4 Started: Today at 22:52
5 Duration: 2m 31s
6
7 The agent request is already running or has already completed.
8 Job preparation parameters
9 Job live console data
10 Starting: Terraform destroy
11 Async Command Start: DetectDockerContainer
12 Async Command End: DetectDockerContainer
13 Async Command Start: DetectDockerContainer
14 Async Command End: DetectDockerContainer
15 Finishing: Terraform Destroy
```

Microsoft Azure

Search resources, services, and docs (G+7)

Copy

AnatoliYakubysyn@...
Resource group: AnatoliYakubysyn

Search

Create Manage view Delete resource group Refresh Export to CSV Open query Assign tags Move Delete Export template Open in mobile

Overview

Activity log Access control (IAM) Tags Resource visualizer Events Settings Deployments Security Deployment stacks Policies Properties Locks Cost Management Cost analysis Cost alerts (preview) Budgets Advisor recommendations Monitoring Automation Help

Essentials

Subscription (copy) Azure subscription 1

Subscriptions ID : 966ae428-d8c3-44fe-b0f2-4e0593901a0

Deployments : 1 Failed 5 Succeeded

Location : UK South

Tags (add) Add tags

Resources Recommendations (9)

Filter for any field... Type equals all Location equals all Add filter

Showing 1 to 8 of 8 records. Show hidden types

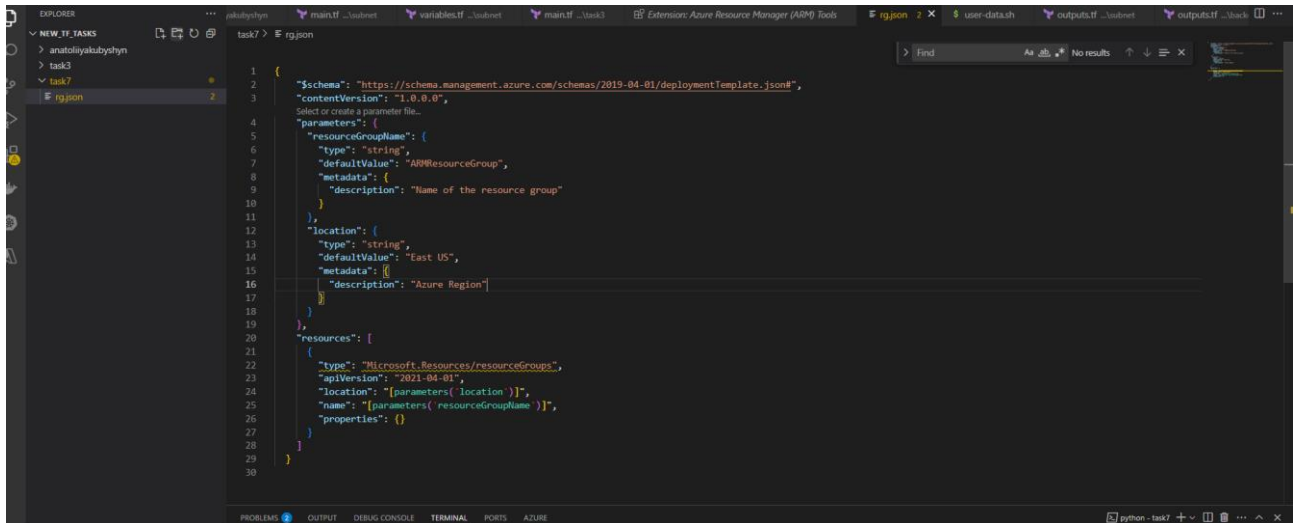
No grouping EE List view

Name	Type	Location
Ubuntu-runner	Virtual machine	Poland Central
Ubuntu-runner-ip	Public IP address	Poland Central
Ubuntu-runner-nsg	Network security group	Poland Central
Ubuntu-runner-vnet	Virtual network	Poland Central
Ubuntu-runner-345_z1	Network interface	Poland Central
Ubuntu-runner_key	SSH key	Poland Central
Ubuntu-runner_OsDisk_1_90229d94454e4a8ba48975c152702b1	Disk	Poland Central
yakubysynterraform	Storage account	Poland Central

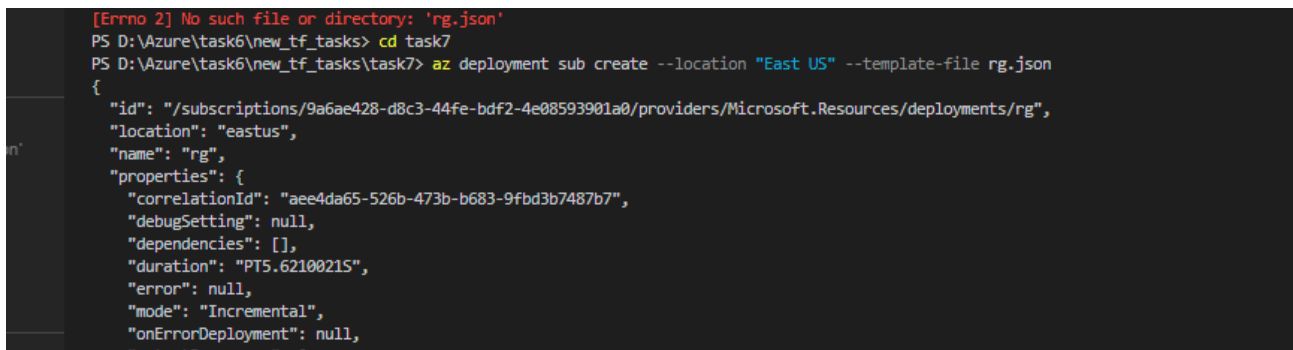
Practical Task 7: Deploy a Resource Group Using an ARM Template

Requirements:

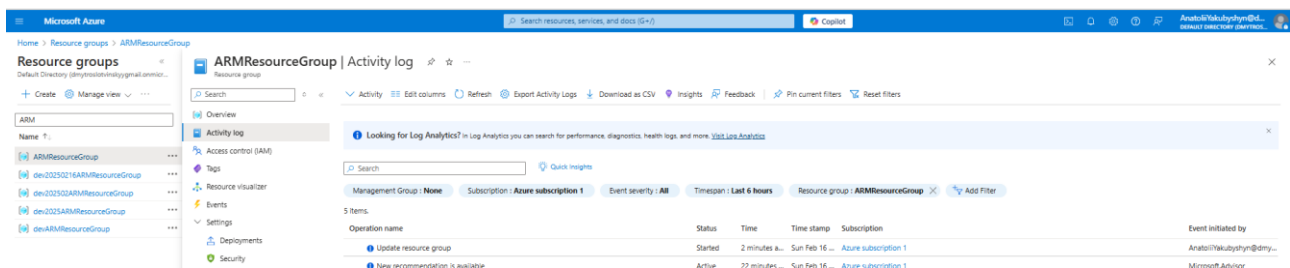
- Create a **JSON-based ARM Template** that defines a **resource group** named **ARMResourceGroup** in the **East US** region.
- Use **az deployment sub create** to deploy the resource group using the ARM template.
- Verify the deployment in the Azure Portal or using the Azure CLI (**az group list**).
- Modify the template to add **tags** to the resource group and redeploy it.
- Remove the resource group after verification.



```
1 {
2   "$schema": "https://schema.management.azure.com/schemas/2019-04-01/deploymentTemplate.json#",
3   "contentVersion": "1.0.0.0",
4   "parameters": {
5     "resourceGroupName": {
6       "type": "string",
7       "defaultValue": "ARMResourceGroup",
8       "metadata": {
9         "description": "Name of the resource group"
10      }
11    },
12    "location": {
13      "type": "string",
14      "defaultValue": "East US",
15      "metadata": {
16        "description": "Azure Region"
17      }
18    }
19  },
20  "resources": [
21    {
22      "type": "Microsoft.Resources/resourceGroups",
23      "apiVersion": "2021-04-01",
24      "location": "[parameters('location')]",
25      "name": "[parameters('resourceGroupName')]",
26      "properties": {}
27    }
28  ]
29 }
30
```



```
[Errno 2] No such file or directory: 'rg.json'
PS D:\Azure\task6\new_tf_tasks> cd task7
PS D:\Azure\task6\new_tf_tasks\task7> az deployment sub create --location "East US" --template-file rg.json
{
  "id": "/subscriptions/9a6ae428-d8c3-44fe-bdf2-4e08593901a0/providers/Microsoft.Resources/deployments/rg",
  "location": "eastus",
  "name": "rg",
  "properties": {
    "correlationId": "aee4da65-526b-473b-b683-9fbd3b7487b7",
    "debugSetting": null,
    "dependencies": [],
    "duration": "PT5.6210021S",
    "error": null,
    "mode": "Incremental",
    "onErrorDeployment": null,
    "outputResources": []
  }
}
```



Microsoft Azure

ARMResourceGroup | Activity log

Looking for Log Analytics? In Log Analytics you can search for performance, diagnostics, health logs, and more. [View Log Analytics](#)

5 items

Operation name	Status	Time	Time stamp	Subscription	Event initiated by
Update resource group	Started	2 minutes ago	Sun Feb 16 ...	Azure subscription 1	AnatoliyYakubyshtyn@dm...
None recommendation is available	Artifacts	22 minutes ago	Sun Feb 16 ...	Azure subscription 1	Microsoft.Aadutor

```
task7 > rg.json
1 {
2   "$schema": "https://schema.management.azure.com/schemas/2019-04-01/deploymentTemplate.json#",
3   "contentVersion": "1.0.0.0",
4   "parameters": {
5     "resourceGroupName": {
6       "type": "string",
7       "defaultValue": "ARMResourceGroup",
8       "metadata": {
9         "description": "Name of the resource group"
10      }
11    },
12    "location": {
13      "type": "string",
14      "defaultValue": "East US",
15      "metadata": {
16        "description": "Azure Region"
17      }
18    },
19    "tags": {
20      "type": "object",
21      "defaultValue": {
22        "Project": "AzureDeployment",
23        "Owner": "Anatolii"
24      },
25      "metadata": {
26        "description": "Tags for the resource group"
27      }
28    }
29  },
30  "resources": [
31    {
32      "type": "Microsoft.Resources/resourceGroups",
33      "apiVersion": "2021-04-01",
34      "location": "[parameters('location')]",
35      "name": "[parameters('resourceGroupName')]",
36      "properties": {},
37      "tags": "[parameters('tags')]"
38    }
39  ]
40 }
41
```

```

PS D:\Azure\task6\new_tf_tasks\task7> az deployment sub create --location "East US" --template-file rg.json
{
  "id": "/subscriptions/9a6ae428-d8c3-44fe-bdf2-4e88593981a0/providers/Microsoft.Resources/deployments/rg",
  "location": "eastus",
  "name": "rg",
  "properties": {
    "correlationId": "6fc83ccb-9ca1-48c6-93bb-efb8abf88f07",
    "debugSetting": null,
    "dependencies": [],
    "duration": "PT3.95636785",
    "error": null,
    "mode": "Incremental",
    "onErrorDeployment": null,
    "outputResources": [
      {
        "id": "/subscriptions/9a6ae428-d8c3-44fe-bdf2-4e88593981a0/resourceGroups/ARMResourceGroup"
      }
    ],
    "outputs": null,
    "parameters": {
      "location": {
        "type": "String",
        "value": "East US"
      },
      "resourceGroupName": {
        "type": "String",
        "value": "ARMResourceGroup"
      }
    },
    "tags": {
      "type": "Object",
      "value": {
        "Owner": "Anatolii",
        "Project": "AzureDeployment"
      }
    }
  },
  "parametersLink": null,
  "providers": [
    {
      "id": null,
      "namespace": "Microsoft.Resources",
      "providerAuthorizationConsentState": null,
      "registrationPolicy": null,
      "registrationState": null,
      "resourceTypes": [
        {
          "aliases": null,
          "apiProfiles": null,
          "apiVersions": null,
          "capabilities": null,
          "defaultApiVersion": null,
          "locationMappings": null,
          "locations": [
            "eastus"
          ],
          "properties": null,
          "resourceType": "resourceGroups",
          "zoneMappings": null
        }
      ]
    }
  ],
  "provisioningState": "Succeeded",
  "templateHash": "8216342804954073804",
  "templateLink": null,
  "timestamp": "2025-02-16T21:18:44.127537+00:00",
  "validatedResources": null,
  "tags": null,
  "type": "Microsoft.Resources/deployments"
}

```

Microsoft Azure

Home > Resource groups > ARMResourceGroup

Resource groups

Default Directory (anonymous\anonymous@amir...)

+ Create Manage View

ARM

Name 1:

- ARMResourceGroup
- dev20250216ARMResourceGroup
- dev20250216ARMResourceGroup
- dev20250216ARMResourceGroup
- devARMResourceGroup

ARMResourceGroup | Tags

Resource group

Search

Delete all Feedback

Overview

Activity log

Access control (IAM)

Tags

Resource visualizer

Events

Settings

Deployments

Security

Deployment stacks

Policies

Properties

Locks

Cost Management

Cost analysis

Cost alerts (preview)

Budgets

Advisor recommendations

Tags are name/value pairs that enable you to categorize resources and view consolidated billing by applying the same tag to multiple resources and resource groups. Tag names are case insensitive, but tag values are case sensitive. [Learn more about tags?](#)

Do not enter names or values that could make your resources less secure or that contain personal/sensitive information because tag data will be replicated globally.

Name	Value
Owner	Anatolii
Project	AzureDeployment

ARMResourceGroup (Resource group)

Project: AzureDeployment Owner: Anatolii

No changes

```

PS D:\Azure\task6\new_tf_tasks\task7> az group delete --name ARMResourceGroup --yes --no-wait
PS D:\Azure\task6\new_tf_tasks\task7>

```