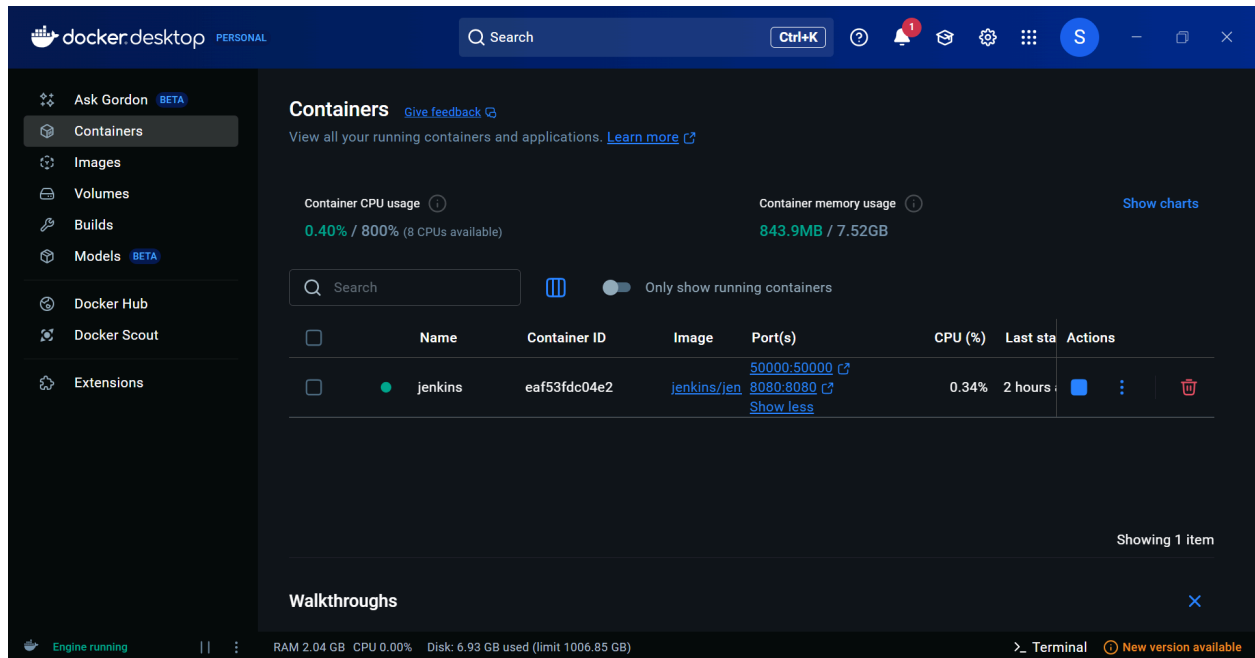


1. Jenkins runs from Docker:



2. Terraform script creates VM:

Build Console Log After Terraform apply:

```
+ terraform apply -auto-approve
[0m[1mazure_rm_resource_group.main: Refreshing state...
[id=/subscriptions/c15a3ad3-647c-4f4b-a4d8-e7d65e487e87/resourceGroups/DevOpsGroup] [0m
[0m[1mazure_rm_public_ip.public_ip: Refreshing state...
[id=/subscriptions/c15a3ad3-647c-4f4b-a4d8-e7d65e487e87/resourceGroups/DevOpsGroup/providers/Microsoft.Network/publicIPAddresses/publicIP] [0m
[0m[1mazure_rm_virtual_network.vnet: Refreshing state...
[id=/subscriptions/c15a3ad3-647c-4f4b-a4d8-e7d65e487e87/resourceGroups/DevOpsGroup/providers/Microsoft.Network/virtualNetworks/vnet] [0m
[0m[1mazure_rm_subnet.subnet: Refreshing state...
[id=/subscriptions/c15a3ad3-647c-4f4b-a4d8-e7d65e487e87/resourceGroups/DevOpsGroup/providers/Microsoft.Network/virtualNetworks/vnet/subnets/subnet] [0m
[0m[1mazure_rm_network_interface.nic: Refreshing state...
[id=/subscriptions/c15a3ad3-647c-4f4b-a4d8-e7d65e487e87/resourceGroups/DevOpsGroup/providers/Microsoft.Network/networkInterfaces/nic] [0m
```

```
[0m[1mazurerm_linux_virtual_machine.vm: Refreshing state...
[id=/subscriptions/c15a3ad3-647c-4f4b-a4d8-e7d65e487e87/resourceGroups/DevOpsGroup/providers/Microsoft.Compute/virtualMachines/devops-vm] [0m
```

```
[1m[36mNote:[0m[1m Objects have changed outside of Terraform
[0m
Terraform detected the following changes made outside of Terraform since
the
last "terraform apply" which may have affected this plan:
```

```
[1m # azurerm_network_interface.nic[0m has been deleted
[0m [31m-[0m[0m resource "azurerm_network_interface" "nic" {
    [31m-[0m[0m id                                =
"/subscriptions/c15a3ad3-647c-4f4b-a4d8-e7d65e487e87/resourceGroups/DevOpsGroup/providers/Microsoft.Network/networkInterfaces/nic" [90m-> null[0m[0m
    name                                = "nic"
    [90m# (14 unchanged attributes hidden) [0m[0m

    [90m# (1 unchanged block hidden) [0m[0m
}
```

```
[1m # azurerm_public_ip.public_ip[0m has been deleted
[0m [31m-[0m[0m resource "azurerm_public_ip" "public_ip" {
    [31m-[0m[0m id                                =
"/subscriptions/c15a3ad3-647c-4f4b-a4d8-e7d65e487e87/resourceGroups/DevOpsGroup/providers/Microsoft.Network/publicIPAddresses/publicIP" [90m->
null[0m[0m
    [31m-[0m[0m ip_address                        = "40.114.4.136" [90m->
null[0m[0m
    name                                = "publicIP"
    [90m# (9 unchanged attributes hidden) [0m[0m
}
```

```
[1m # azurerm_resource_group.main[0m has been deleted
[0m [31m-[0m[0m resource "azurerm_resource_group" "main" {
    id                                =
"/subscriptions/c15a3ad3-647c-4f4b-a4d8-e7d65e487e87/resourceGroups/DevOpsGroup"
    [31m-[0m[0m location                        = "eastus" [90m-> null[0m[0m
    [31m-[0m[0m name                            = "DevOpsGroup" [90m-> null[0m[0m
    [90m# (1 unchanged attribute hidden) [0m[0m
}
```

```
[1m # azurerm_subnet.subnet[0m has been deleted
[0m [31m-[0m[0m resource "azurerm_subnet" "subnet" {
    [31m-[0m[0m id                                =
"/subscriptions/c15a3ad3-647c-4f4b-a4d8-e7d65e487e87/resourceGroups/DevOps
```

```

Group/providers/Microsoft.Network/virtualNetworks/vnet/subnets/subnet"
[90m-> null[0m[0m
      name                                     = "subnet"
      [90m# (6 unchanged attributes hidden) [0m[0m
    }

[1m # azurerm_virtual_network.vnet[0m has been deleted
[0m [31m-[0m[0m resource "azurerm_virtual_network" "vnet" {
    id                                     =
"/subscriptions/c15a3ad3-647c-4f4b-a4d8-e7d65e487e87/resourceGroups/DevOps
Group/providers/Microsoft.Network/virtualNetworks/vnet"
    [31m-[0m[0m name                                     = "vnet" [90m->
null[0m[0m
      [90m# (10 unchanged attributes hidden) [0m[0m
    }

```

Unless you have made equivalent changes to your configuration, or ignored the relevant attributes using `ignore_changes`, the following plan may include actions to undo or respond to these changes.

—[0m

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

[32m+[0m create[0m

Terraform will perform the following actions:

```

[1m # azurerm_linux_virtual_machine.vm[0m will be created
[0m [32m+[0m[0m resource "azurerm_linux_virtual_machine" "vm" {
    [32m+[0m[0m admin_username                                     =
"azureuser"
    [32m+[0m[0m allow_extension_operations                       =
true
    [32m+[0m[0m bypass_platform_safety_checks_on_user_schedule_enabled =
false
    [32m+[0m[0m computer_name                                     =
(known after apply)
    [32m+[0m[0m disable_password_authentication                 =
true
    [32m+[0m[0m disk_controller_type                             =
(known after apply)
    [32m+[0m[0m extensions_time_budget                         =
"PT1H30M"

```

```

[32m+[0m[0m id                                     =
(known after apply)
[32m+[0m[0m location                                 =
"eastus"
[32m+[0m[0m max_bid_price                             =
-1
[32m+[0m[0m name                                       =
"devops-vm"
[32m+[0m[0m network_interface_ids                     =
(known after apply)
[32m+[0m[0m patch_assessment_mode                     =
"ImageDefault"
[32m+[0m[0m patch_mode                                 =
"ImageDefault"
[32m+[0m[0m platform_fault_domain                     =
-1
[32m+[0m[0m priority                                   =
"Regular"
[32m+[0m[0m private_ip_address                         =
(known after apply)
[32m+[0m[0m private_ip_addresses                     =
(known after apply)
[32m+[0m[0m provision_vm_agent                       =
true
[32m+[0m[0m public_ip_address                         =
(known after apply)
[32m+[0m[0m public_ip_addresses                     =
(known after apply)
[32m+[0m[0m resource_group_name                       =
"DevOpsGroup"
[32m+[0m[0m size                                       =
"Standard_B1s"
[32m+[0m[0m virtual_machine_id                       =
(known after apply)
[32m+[0m[0m vm_agent_platform_updates_enabled         =
(known after apply)

[32m+[0m[0m admin_ssh_key {
  [32m+[0m[0m public_key = <<-EOT
    ssh-rsa
AAAAB3NzaC1yc2EAAAADAQABAAQDTRX+cL1lRaGgXK1yljQzxQFb03ZG1bmuOkXLYRh0LO9
2MFgbVYm/anku65+8wUMuRsea36IQB+4Y78TrAksG5BsvXqePZFptLg1+WDsfr24YSOzd2CoCZ
vPgGYfjjU7hcWjtNdJvhPD4EfysGa9UgQ9BW+hCQNuxtzaABzo5bPOdXfYATNAhoV7DWwAWsaG
z02v6L7q6iayDgYHCIS8sZnExBOcEdZExTwGCrQuG++7YyuBBMvCPhQ6tMqj3Qh1qRxjtkItpk
7kTi5xKtCRnK9lu07BPWQja9tGYsqUm/jXHObtDU1ZNN0QoSBJ5LI3EJG/hHICQ4k8gGhWIACc
CART99VeAh2+xKi7nIDtgmwCJrGnPMEm0GExeJuzh4CxfHEXoc060/Ig4mDL7xAHqm9pTZBYpX
Jea0jC62G/ZgH0f+4o1UBKhW5r2gilbtOzWYt0V4kp6WR70Efr0c5FDW+UsF2E1iBeodgt+754

```



```

        [32m+[0m[0m primary                                     =
(known after apply)
        [32m+[0m[0m private_ip_address                         =
(known after apply)
        [32m+[0m[0m private_ip_address_allocation              =
"Dynamic"
        [32m+[0m[0m private_ip_address_version                 =
"IPv4"
        [32m+[0m[0m public_ip_address_id                       =
(known after apply)
        [32m+[0m[0m subnet_id                                   =
(known after apply)
    }
}

[1m #
azurerm_network_interface_security_group_association.nic_nsg_assoc[0m will
be created
[0m [32m+[0m[0m resource
"azurerm_network_interface_security_group_association" "nic_nsg_assoc" {
    [32m+[0m[0m id                                     = (known after apply)
    [32m+[0m[0m network_interface_id                   = (known after apply)
    [32m+[0m[0m network_security_group_id = (known after apply)
}

[1m # azurerm_network_security_group.nsg[0m will be created
[0m [32m+[0m[0m resource "azurerm_network_security_group" "nsg" {
    [32m+[0m[0m id                                     = (known after apply)
    [32m+[0m[0m location                             = "eastus"
    [32m+[0m[0m name                                   = "devops-nsg"
    [32m+[0m[0m resource_group_name = "DevOpsGroup"
    [32m+[0m[0m security_rule                         = [
        [32m+[0m[0m {
            [32m+[0m[0m access                                     =
"Allow"
                [32m+[0m[0m destination_address_prefix         = "*"
                [32m+[0m[0m destination_address_prefixes       = []
                [32m+[0m[0m destination_application_security_group_ids = []
                [32m+[0m[0m destination_port_range             =
"22"
                [32m+[0m[0m destination_port_ranges           = []
                [32m+[0m[0m direction                           =
"Inbound"
                [32m+[0m[0m name                               =
"Allow-SSH"
                [32m+[0m[0m priority                           =
1002

```

```

[32m+[0m[0m protocol                                     =
"Tcp"
[32m+[0m[0m source_address_prefix                           = "*"
[32m+[0m[0m source_address_prefixes                         = []
[32m+[0m[0m source_application_security_group_ids           = []
[32m+[0m[0m source_port_range                               = "*"
[32m+[0m[0m source_port_ranges                             = []
[90m# (1 unchanged attribute hidden) [0m[0m
},
[32m+[0m[0m {
[32m+[0m[0m access                                           =
"Allow"
[32m+[0m[0m destination_address_prefix                     = "*"
[32m+[0m[0m destination_address_prefixes                   = []
[32m+[0m[0m destination_application_security_group_ids     = []
[32m+[0m[0m destination_port_range                         =
"80"
[32m+[0m[0m destination_port_ranges                       = []
[32m+[0m[0m direction                                     =
"Inbound"
[32m+[0m[0m name                                           =
"Allow-HTTP"
[32m+[0m[0m priority                                         =
1001
[32m+[0m[0m protocol                                         =
"Tcp"
[32m+[0m[0m source_address_prefix                           = "*"
[32m+[0m[0m source_address_prefixes                         = []
[32m+[0m[0m source_application_security_group_ids           = []
[32m+[0m[0m source_port_range                               = "*"
[32m+[0m[0m source_port_ranges                             = []
[90m# (1 unchanged attribute hidden) [0m[0m
},
]
}

```

```

[1m # azurerm_public_ip.public_ip[0m will be created
[0m [32m+[0m[0m resource "azurerm_public_ip" "public_ip" {
[32m+[0m[0m allocation_method      = "Static"
[32m+[0m[0m ddos_protection_mode    = "VirtualNetworkInherited"
[32m+[0m[0m fqdn                    = (known after apply)
[32m+[0m[0m id                      = (known after apply)
[32m+[0m[0m idle_timeout_in_minutes = 4
[32m+[0m[0m ip_address              = (known after apply)
[32m+[0m[0m ip_version              = "IPv4"
[32m+[0m[0m location                = "eastus"
[32m+[0m[0m name                    = "publicIP"

```

```

[32m+[0m[0m resource_group_name      = "DevOpsGroup"
[32m+[0m[0m sku                        = "Basic"
[32m+[0m[0m sku_tier                      = "Regional"
}

[1m # azurerm_resource_group.main[0m will be created
[0m [32m+[0m[0m resource "azurerm_resource_group" "main" {
  [32m+[0m[0m id          = (known after apply)
  [32m+[0m[0m location    = "eastus"
  [32m+[0m[0m name        = "DevOpsGroup"
}

[1m # azurerm_subnet.subnet[0m will be created
[0m [32m+[0m[0m resource "azurerm_subnet" "subnet" {
  [32m+[0m[0m address_prefixes                                     = [
    [32m+[0m[0m "10.0.2.0/24",
  ]
  [32m+[0m[0m default_outbound_access_enabled                     = true
  [32m+[0m[0m id                                                  = (known
after apply)
  [32m+[0m[0m name                                              = "subnet"
  [32m+[0m[0m private_endpoint_network_policies                 =
"Disabled"
  [32m+[0m[0m private_link_service_network_policies_enabled = true
  [32m+[0m[0m resource_group_name                             =
"DevOpsGroup"
  [32m+[0m[0m virtual_network_name                           = "vnet"
}

[1m # azurerm_virtual_network.vnet[0m will be created
[0m [32m+[0m[0m resource "azurerm_virtual_network" "vnet" {
  [32m+[0m[0m address_space                                   = [
    [32m+[0m[0m "10.0.0.0/16",
  ]
  [32m+[0m[0m dns_servers                                     = (known after apply)
  [32m+[0m[0m guid                                           = (known after apply)
  [32m+[0m[0m id                                              = (known after apply)
  [32m+[0m[0m location                                        = "eastus"
  [32m+[0m[0m name                                            = "vnet"
  [32m+[0m[0m private_endpoint_vnet_policies                 = "Disabled"
  [32m+[0m[0m resource_group_name                           = "DevOpsGroup"
  [32m+[0m[0m subnet                                          = (known after apply)
}

[1mPlan:[0m 8 to add, 0 to change, 0 to destroy.
[0m
Changes to Outputs:

```

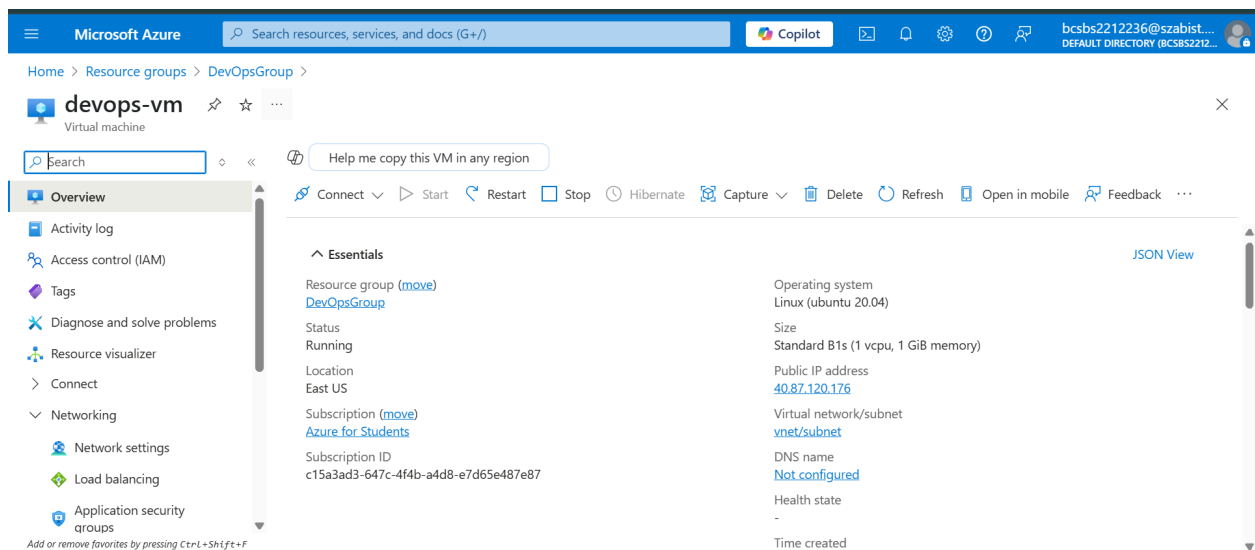


```
[33m~[0m[0m public_ip = "40.114.4.136" -> (known after apply)
[0m[1mazure_resource_group.main: Creating...[0m[0m
[0m[1mazure_resource_group.main: Still creating... [00m10s
elapsed][0m[0m
[0m[1mazure_resource_group.main: Creation complete after 17s
[id=/subscriptions/c15a3ad3-647c-4f4b-a4d8-e7d65e487e87/resourceGroups/Dev
OpsGroup][0m
[0m[1mazure_virtual_network.vnet: Creating...[0m[0m
[0m[1mazure_public_ip.public_ip: Creating...[0m[0m
[0m[1mazure_network_security_group.nsg: Creating...[0m[0m
[0m[1mazure_virtual_network.vnet: Still creating... [00m10s
elapsed][0m[0m
[0m[1mazure_public_ip.public_ip: Still creating... [00m10s
elapsed][0m[0m
[0m[1mazure_network_security_group.nsg: Still creating... [00m10s
elapsed][0m[0m
[0m[1mazure_network_security_group.nsg: Creation complete after 10s
[id=/subscriptions/c15a3ad3-647c-4f4b-a4d8-e7d65e487e87/resourceGroups/Dev
OpsGroup/providers/Microsoft.Network/networkSecurityGroups/devops-nsg][0m
[0m[1mazure_public_ip.public_ip: Creation complete after 12s
[id=/subscriptions/c15a3ad3-647c-4f4b-a4d8-e7d65e487e87/resourceGroups/Dev
OpsGroup/providers/Microsoft.Network/publicIPAddresses/publicIP][0m
[0m[1mazure_virtual_network.vnet: Creation complete after 17s
[id=/subscriptions/c15a3ad3-647c-4f4b-a4d8-e7d65e487e87/resourceGroups/Dev
OpsGroup/providers/Microsoft.Network/virtualNetworks/vnet][0m
[0m[1mazure_subnet.subnet: Creating...[0m[0m
[0m[1mazure_subnet.subnet: Still creating... [00m10s elapsed][0m[0m
[0m[1mazure_subnet.subnet: Creation complete after 13s
[id=/subscriptions/c15a3ad3-647c-4f4b-a4d8-e7d65e487e87/resourceGroups/Dev
OpsGroup/providers/Microsoft.Network/virtualNetworks/vnet/subnets/subnet][
0m
[0m[1mazure_network_interface.nic: Creating...[0m[0m
[0m[1mazure_network_interface.nic: Creation complete after 9s
[id=/subscriptions/c15a3ad3-647c-4f4b-a4d8-e7d65e487e87/resourceGroups/Dev
OpsGroup/providers/Microsoft.Network/networkInterfaces/nic][0m
[0m[1mazure_network_interface_security_group_association.nic_nsg_assoc:
Creating...[0m[0m
[0m[1mazure_linux_virtual_machine.vm: Creating...[0m[0m
[0m[1mazure_network_interface_security_group_association.nic_nsg_assoc:
Still creating... [00m10s elapsed][0m[0m
[0m[1mazure_linux_virtual_machine.vm: Still creating... [00m10s
elapsed][0m[0m
[0m[1mazure_network_interface_security_group_association.nic_nsg_assoc:
Creation complete after 11s
[id=/subscriptions/c15a3ad3-647c-4f4b-a4d8-e7d65e487e87/resourceGroups/Dev
OpsGroup/providers/Microsoft.Network/networkInterfaces/nic|/subscriptions/
```

```
c15a3ad3-647c-4f4b-a4d8-e7d65e487e87/resourceGroups/DevOpsGroup/providers/
Microsoft.Network/networkSecurityGroups/devops-nsg] [0m
[0m[1mazure_rm_linux_virtual_machine: Still creating... [00m20s
elapsed] [0m[0m
[0m[1mazure_rm_linux_virtual_machine: Still creating... [00m30s
elapsed] [0m[0m
[0m[1mazure_rm_linux_virtual_machine: Still creating... [00m40s
elapsed] [0m[0m
[0m[1mazure_rm_linux_virtual_machine: Still creating... [00m50s
elapsed] [0m[0m
[0m[1mazure_rm_linux_virtual_machine: Still creating... [01m00s
elapsed] [0m[0m
[0m[1mazure_rm_linux_virtual_machine: Creation complete after 1m5s
[id=/subscriptions/c15a3ad3-647c-4f4b-a4d8-e7d65e487e87/resourceGroups/Dev
OpsGroup/providers/Microsoft.Compute/virtualMachines/devops-vm] [0m
[0m[1m[32m
Apply complete! Resources: 8 added, 0 changed, 0 destroyed.
[0m[0m[1m[32m
Outputs:

[0mpublic_ip = "40.87.120.176"
```

Azure Portal proof of vm creation:



3. Ansible installs and configures web server:

Jenkins Console Output (Ansible stage):

```
Dashboard > DevOps_Final_Project > #4

[Pipeline] sh
+ ansible-playbook -i 40.87.120.176, install_web.yml --user azureuser --ssh-common-args=-o
StrictHostKeyChecking=no

PLAY [Install Apache and deploy web app] *****

TASK [Gathering Facts] *****
ok: [40.87.120.176]

TASK [Update apt cache] *****
changed: [40.87.120.176]

TASK [Install Apache] *****
changed: [40.87.120.176]

TASK [Copy index.html to web root] *****
changed: [40.87.120.176]

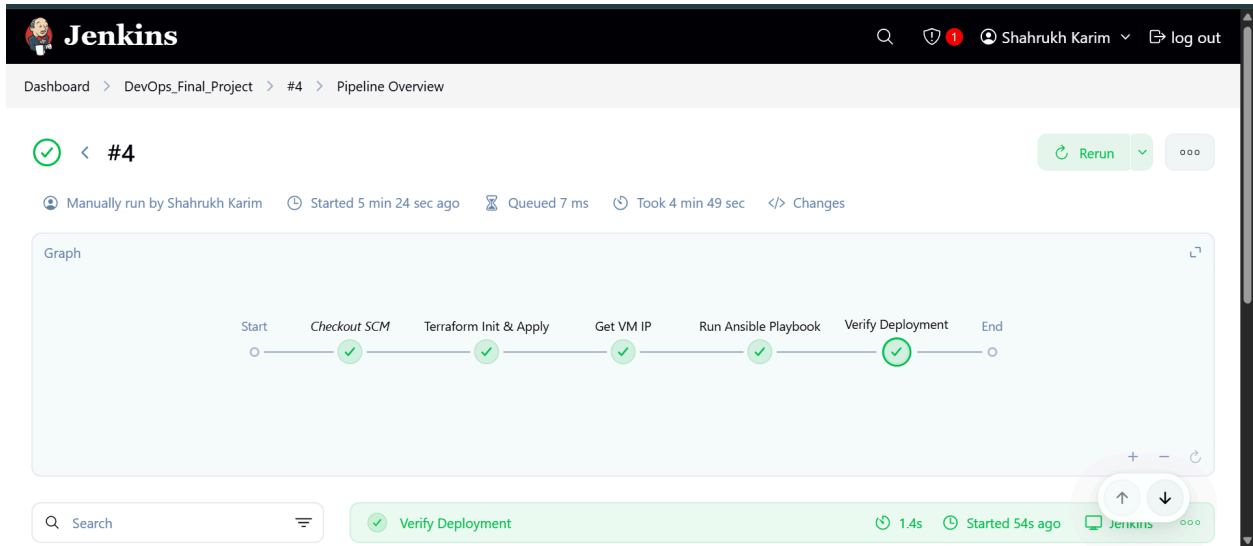
PLAY RECAP *****
40.87.120.176      : ok=4    changed=3    unreachable=0    failed=0    skipped=0    rescued=0
ignored=0
```

4. Static site deployed correctly:



One-Click Jenkins Pipeline Deployment

5. Jenkins pipeline triggers and completes all stages:



The screenshot shows the Jenkins Pipeline Overview page for a pipeline named '#4'. The pipeline is in a completed state, indicated by green checkmarks on all stages. The stages are: Start, Checkout SCM, Terraform Init & Apply, Get VM IP, Run Ansible Playbook, Verify Deployment, and End. The 'Verify Deployment' stage is currently selected, showing a duration of 1.4s and a start time of 54s ago. The pipeline was manually run by Shahrukh Karim. The interface includes a search bar, a rerun button, and a changes button.

Jenkins Pipeline Overview

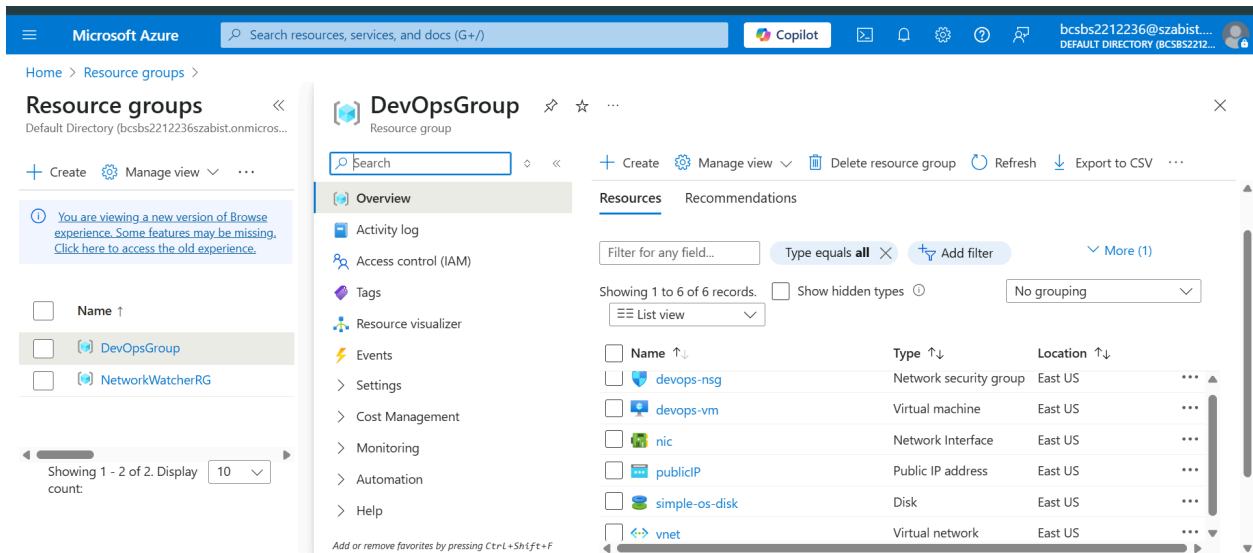
Dashboard > DevOps_Final_Project > #4 > Pipeline Overview

Manually run by Shahrukh Karim | Started 5 min 24 sec ago | Queued 7 ms | Took 4 min 49 sec | Changes

Graph

Start → Checkout SCM → Terraform Init & Apply → Get VM IP → Run Ansible Playbook → Verify Deployment → End

Search | Verify Deployment | 1.4s | Started 54s ago | Jenkins



The screenshot shows the Microsoft Azure portal interface for the 'DevOpsGroup' resource group. The 'Overview' tab is selected, displaying a list of resources. The resources include: devops-nsg (Network security group), devops-vm (Virtual machine), nic (Network Interface), publicIP (Public IP address), simple-os-disk (Disk), and vnet (Virtual network). The interface includes a search bar, a filter for any field, and a list view option. The resources are sorted by Name, Type, and Location.

Microsoft Azure

Home > Resource groups > DevOpsGroup

Resource groups

Default Directory (bcsbs2212236szabist.onmicros...)

+ Create | Manage view | ...

You are viewing a new version of Browse experience. Some features may be missing. Click here to access the old experience.

Showing 1 - 2 of 2. Display count: 10

DevOpsGroup Resource group

Search | Create | Manage view | Delete resource group | Refresh | Export to CSV | ...

Overview

Activity log | Access control (IAM) | Tags | Resource visualizer | Events | Settings | Cost Management | Monitoring | Automation | Help

Resources | Recommendations

Filter for any field... | Type equals all | Add filter | More (1)

Showing 1 to 6 of 6 records. | Show hidden types | No grouping

List view

Name	Type	Location
devops-nsg	Network security group	East US
devops-vm	Virtual machine	East US
nic	Network Interface	East US
publicIP	Public IP address	East US
simple-os-disk	Disk	East US
vnet	Virtual network	East US

Add or remove favorites by pressing Ctrl+L+Shift+F

Dashboard > DevOps_Final_Project > #4 > Pipeline Overview

Q Search

✓ Checkout SCM 1.8s

✓ Terraform Init & Apply 3m 3s

✓ Get VM IP 1.2s

✓ Run Ansible Playbook 1m 37s

✓ Verify Deployment 1.4s

✓ Verify Deployment 1.4s Started 54s ago Jenkins

✓ curl http://40.87.120.176 1.2s

0 + curl http://40.87.120.176

1	% Total	% Received	% Xferd	Average	Speed	Time	Time	Time	Current
2				Dload	Upload	Total	Spent	Left	Speed
3									
	0	0	0	0	0	0	0	--:--:--	0
	100	85	100	85	0	103	0	--:--:--	103
4	<html>								
5	<body>								
6	<h1>One-Click Jenkins Pipeline Deployment</h1>								
7	</body>								
8	</html>								

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All Bookmarks

One-Click Jenkins Pipeline Deployment