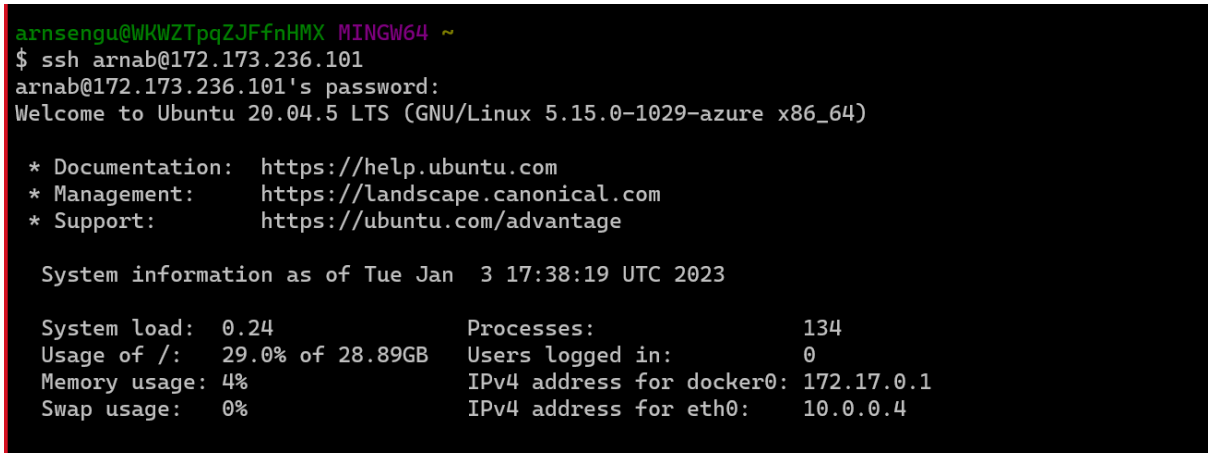
Terraform Advanced Assessment

Problem: As we know that terraform is a provisioning tool use to provision resource in the cloud. Using terraform we want to deploy resources in azure.
Solution: We need to deploy an azure vm with local variable in terraform. Create a bastion host using terraform and using null provisioned upload the ssh key in bastion host. And connect the vm with those ssh key.

1. Create terraform configuration files for provisioning VPC network, app-subnet, web-subnet, network interface, azurevm, bastion-host, bastion-host-subnet, null resource provisioner and input output files.

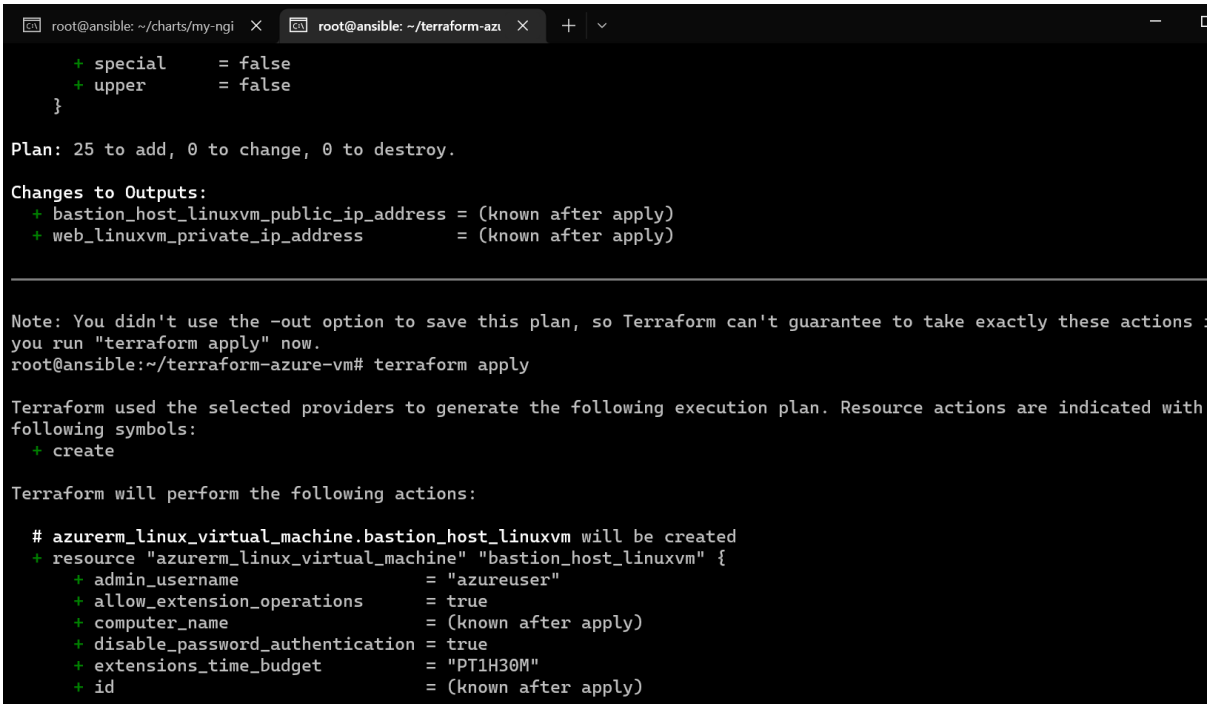
   Repository: https://github.com/arnabcs10/terraform-azure-vm

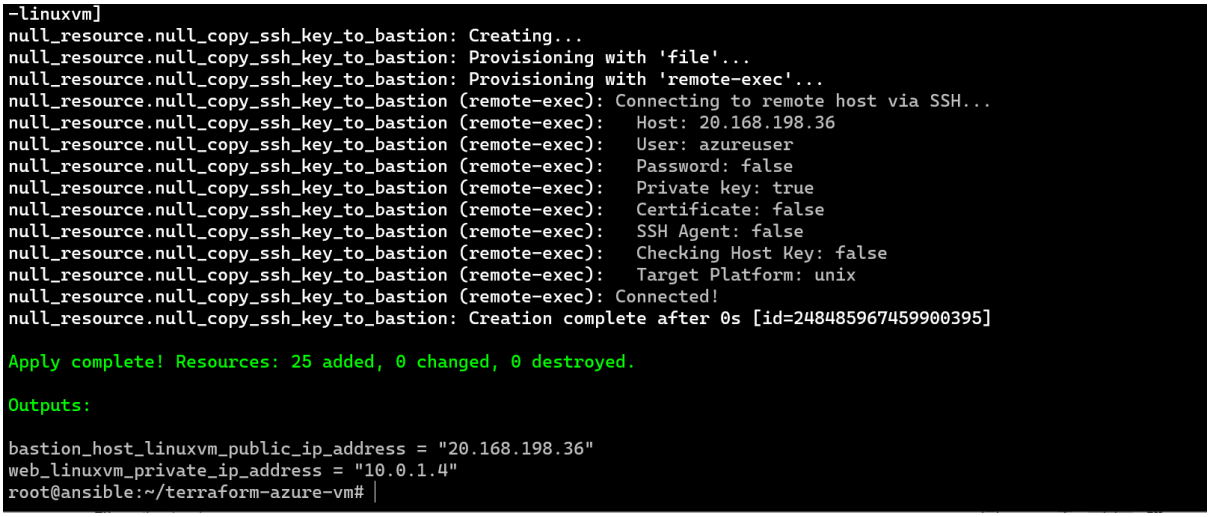
2. Applying the configurations:



```
MINGW64:/c/Users/arns | MINGW64:/c/Users/arns | MINGW64:/c/Drive/Deve | MINGW64:/c/Users/arns | azureuser@websubnet-

bastion-host.tf        locals.tf           output.tf             virtual-network.tf  web-subnet.tf
root@ansible:~/terraform-azure-vm# terraform init

Initializing the backend...

Initializing provider plugins...
- Finding hashicorp/azurerm versions matching "3.0.0"...
- Finding latest version of hashicorp/random...
- Finding latest version of hashicorp/null...
- Installing hashicorp/azurerm v3.0.0...
- Installed hashicorp/azurerm v3.0.0 (signed by HashiCorp)
- Installing hashicorp/random v3.4.3...
- Installed hashicorp/random v3.4.3 (signed by HashiCorp)
- Installing hashicorp/null v3.2.1...
- Installed hashicorp/null v3.2.1 (signed by HashiCorp)

Terraform has created a lock file .terraform.lock.hcl to record the provider
selections it made above. Include this file in your version control repository
so that Terraform can guarantee to make the same selections by default when
you run "terraform init" in the future.

Terraform has been successfully initialized!

You may now begin working with Terraform. Try running "terraform plan" to see
any changes that are required for your infrastructure. All Terraform commands
should now work.

If you ever set or change modules or backend configuration for Terraform,
rerun this command to reinitialize your working directory. If you forget, other
commands will detect it and remind you to do so if necessary.
root@ansible:~/terraform-azure-vm# terraform fmt
app-subnet.tf
```

```
MINGW64:/c/Users/arns | MINGW64:/c/Users/arns | MINGW64:/c/Drive/Deve | MINGW64:/c/Users/arns | azureuser@websubnet-

root@ansible:~/terraform-azure-vm# nano bastion-host-input.tf
root@ansible:~/terraform-azure-vm# terraform validate
Success! The configuration is valid.

root@ansible:~/terraform-azure-vm# terraform plan

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

Terraform will perform the following actions:

  # azurerm_linux_virtual_machine.bastion_host_linuxvm will be created
  + resource "azurerm_linux_virtual_machine" "bastion_host_linuxvm" {
      + admin_username                  = "azureuser"
      + allow_extension_operations      = true
      + computer_name                   = (known after apply)
      + disable_password_authentication = true
      + extensions_time_budget          = "PT1H30M"
      + id                              = (known after apply)
      + location                        = "eastus"
      + max_bid_price                   = -1
      + name                            = "websubnet-bastion-linuxvm"
      + network_interface_ids           = (known after apply)
      + patch_mode                      = "ImageDefault"
      + platform_fault_domain           = -1
      + priority                        = "Regular"
      + private_ip_address              = (known after apply)
      + private_ip_addresses            = (known after apply)
      + provision_vm_agent              = true
      + public_ip_address               = (known after apply)
      + public_ip_addresses             = (known after apply)
```

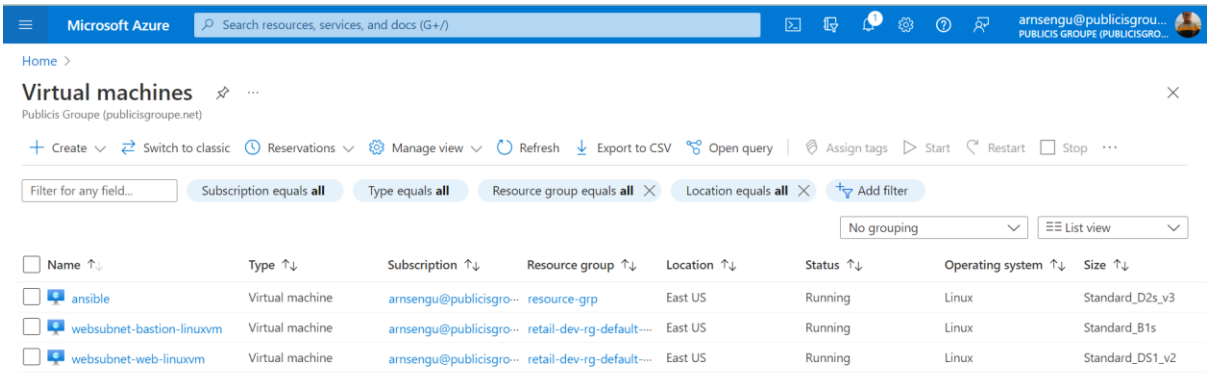

root@ansible: ~/charts/my-ngi
root@ansible: ~/terraform-azu
+ special = false
+ upper = false
}
Plan: 25 to add, 0 to change, 0 to destroy.
Changes to Outputs:
+ bastion_host_linuxvm_public_ip_address = (known after apply)
+ web_linuxvm_private_ip_address = (known after apply)
Note: You didn't use the -out option to save this plan, so Terraform can't guarantee to take exactly these actions
you run "terraform apply" now.
root@ansible:~/terraform-azure-vm# terraform apply
Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with
following symbols:
+ create
Terraform will perform the following actions:
# azurerm_linux_virtual_machine.bastion_host_linuxvm will be created
+ resource "azurerm_linux_virtual_machine" "bastion_host_linuxvm" {
+ admin_username = "azureuser"
+ allow_extension_operations = true
+ computer_name = (known after apply)
+ disable_password_authentication = true
+ extensions_time_budget = "PT1H30M"
+ id = (known after apply)

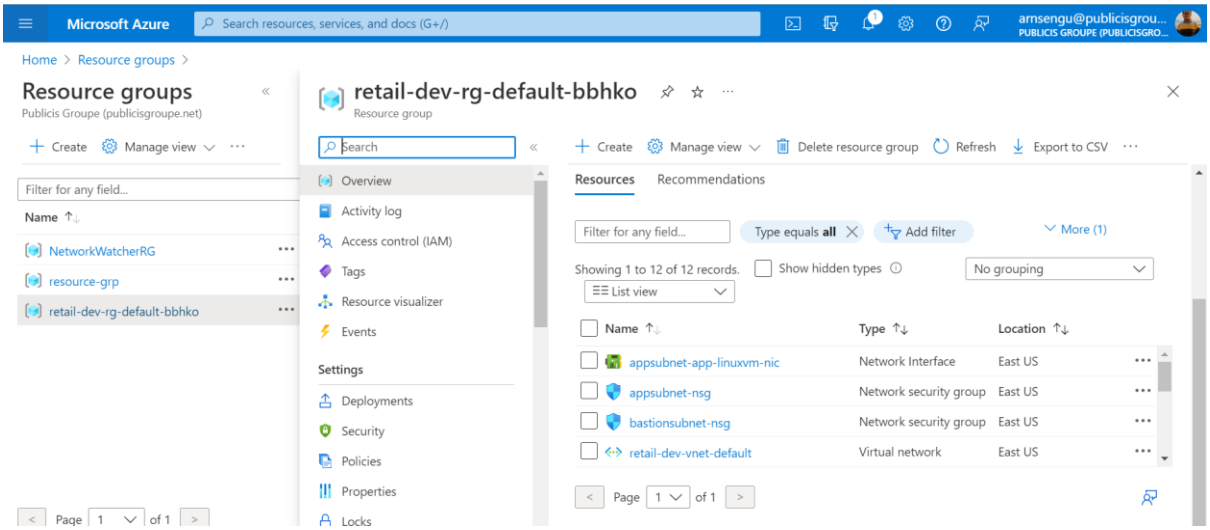

-linuxvm]
null_resource.null_copy_ssh_key_to_bastion: Creating...
null_resource.null_copy_ssh_key_to_bastion: Provisioning with 'file'...
null_resource.null_copy_ssh_key_to_bastion: Provisioning with 'remote-exec'...
null_resource.null_copy_ssh_key_to_bastion (remote-exec): Connecting to remote host via SSH...
null_resource.null_copy_ssh_key_to_bastion (remote-exec): Host: 20.168.198.36
null_resource.null_copy_ssh_key_to_bastion (remote-exec): User: azureuser
null_resource.null_copy_ssh_key_to_bastion (remote-exec): Password: false
null_resource.null_copy_ssh_key_to_bastion (remote-exec): Private key: true
null_resource.null_copy_ssh_key_to_bastion (remote-exec): Certificate: false
null_resource.null_copy_ssh_key_to_bastion (remote-exec): SSH Agent: false
null_resource.null_copy_ssh_key_to_bastion (remote-exec): Checking Host Key: false
null_resource.null_copy_ssh_key_to_bastion (remote-exec): Target Platform: unix
null_resource.null_copy_ssh_key_to_bastion (remote-exec): Connected!
null_resource.null_copy_ssh_key_to_bastion: Creation complete after 0s [id=248485967459900395]
Apply complete! Resources: 25 added, 0 changed, 0 destroyed.
Outputs:
bastion_host_linuxvm_public_ip_address = "20.168.198.36"
web_linuxvm_private_ip_address = "10.0.1.4"
root@ansible:~/terraform-azure-vm#

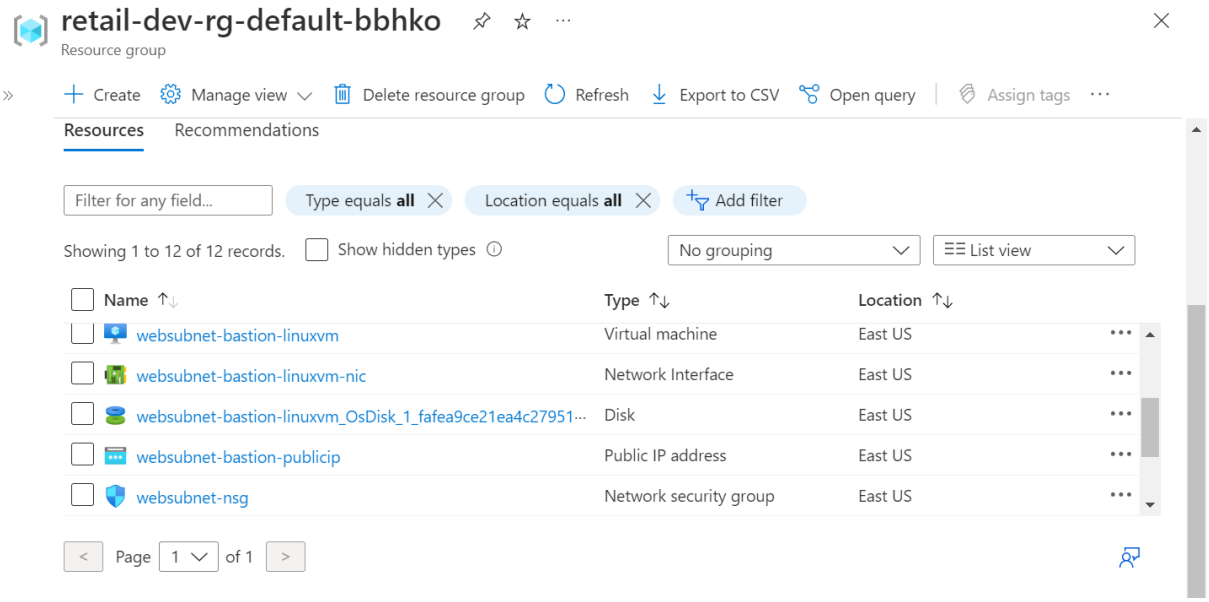
```
bastion_host_linuxvm_public_ip_address = "20.168.198.36"
web_linuxvm_private_ip_address = "10.0.1.4"
root@ansible:~/terraform-azure-vm# ssh azureuser@20.168.198.36
The authenticity of host '20.168.198.36 (20.168.198.36)' can't be established.
ECDSA key fingerprint is SHA256:F8FOjSO+ycZFVjB0ndN1feDT0rmWFGSMs2pl0XimtXs.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '20.168.198.36' (ECDSA) to the list of known hosts.
Welcome to Ubuntu 16.04.7 LTS (GNU/Linux 4.15.0-1113-azure x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

UA Infra: Extended Security Maintenance (ESM) is not enabled.

0 updates can be applied immediately.

52 additional security updates can be applied with UA Infra: ESM
Learn more about enabling UA Infra: ESM service for Ubuntu 16.04 at
https://ubuntu.com/16-04

New release '18.04.6 LTS' available.
Run 'do-release-upgrade' to upgrade to it.


Last login: Wed Jan  4 10:35:31 2023 from 172.173.236.101
azureuser@websubnet-bastion-linuxvm:~$ whoami
azureuser
azureuser@websubnet-bastion-linuxvm:~$
```

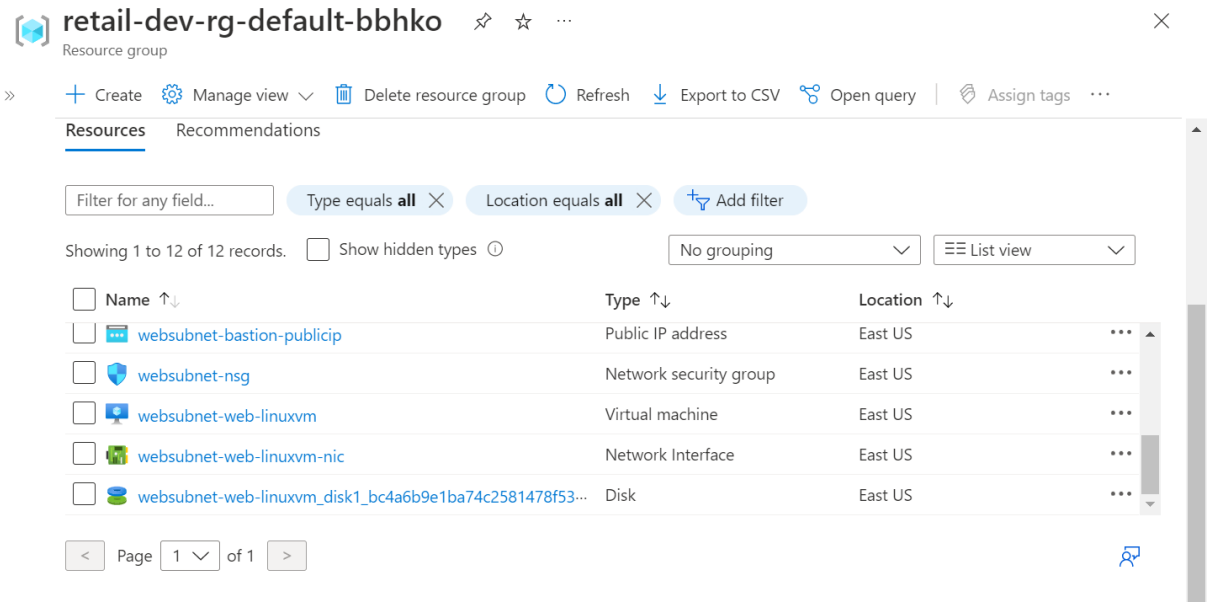
```
Last login: Wed Jan  4 10:35:31 2023 from 172.173.236.101
azureuser@websubnet-bastion-linuxvm:~$ whoami
azureuser
azureuser@websubnet-bastion-linuxvm:~$ ping -c 3 10.0.1.4
PING 10.0.1.4 (10.0.1.4) 56(84) bytes of data.
64 bytes from 10.0.1.4: icmp_seq=1 ttl=64 time=10.7 ms
64 bytes from 10.0.1.4: icmp_seq=2 ttl=64 time=2.49 ms
64 bytes from 10.0.1.4: icmp_seq=3 ttl=64 time=1.58 ms

--- 10.0.1.4 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2003ms
rtt min/avg/max/mdev = 1.582/4.950/10.778/4.138 ms
azureuser@websubnet-bastion-linuxvm:~$ exit
logout
Connection to 20.168.198.36 closed.
root@ansible:~/terraform-azure-vm#
```

3. Resources provisioned


Microsoft Azure
Search resources, services, and docs (G+/)
arnsengu@publicisgrou...
PUBLICIS GROUPE (PUBLICISGRO...
Home
Virtual machines
Publicis Groupe (publicisgroupe.net)
Create
Switch to classic
Reservations
Manage view
Refresh
Export to CSV
Open query
Assign tags
Start
Restart
Stop
Filter for any field...
Subscription equals all
Type equals all
Resource group equals all
Location equals all
Add filter
No grouping
List view
Name
Type
Subscription
Resource group
Location
Status
Operating system
Size
ansible
Virtual machine
arnsengu@publicisgro...
resource-grp
East US
Running
Linux
Standard_D2s_v3
websubnet-bastion-linuxvm
Virtual machine
arnsengu@publicisgro...
retail-dev-rg-default-...
East US
Running
Linux
Standard_B1s
websubnet-web-linuxvm
Virtual machine
arnsengu@publicisgro...
retail-dev-rg-default-...
East US
Running
Linux
Standard_DS1_v2


Microsoft Azure
Search resources, services, and docs (G+/)
arnsengu@publicisgrou...
PUBLICIS GROUPE (PUBLICISGRO...
Home
Resource groups
Resource groups
Publicis Groupe (publicisgroupe.net)
Create
Manage view
Filter for any field...
Name
NetworkWatcherRG
resource-grp
retail-dev-rg-default-bbhko
Page 1 of 1
retail-dev-rg-default-bbhko
Resource group
Search
Overview
Activity log
Access control (IAM)
Tags
Resource visualizer
Events
Settings
Deployments
Security
Policies
Properties
Locks
Create
Manage view
Delete resource group
Refresh
Export to CSV
Resources
Recommendations
Filter for any field...
Type equals all
Add filter
More (1)
Showing 1 to 12 of 12 records.
Show hidden types
No grouping
List view
Name
Type
Location
appsubnet-app-linuxvm-nic
Network Interface
East US
appsubnet-nsg
Network security group
East US
bastionsubnet-nsg
Network security group
East US
retail-dev-vnet-default
Virtual network
East US
Page 1 of 1


retail-dev-rg-default-bbhko
Resource group
Create
Manage view
Delete resource group
Refresh
Export to CSV
Open query
Assign tags
Resources
Recommendations
Filter for any field...
Type equals all
Location equals all
Add filter
Showing 1 to 12 of 12 records.
Show hidden types
No grouping
List view
Name
Type
Location
websubnet-bastion-linuxvm
Virtual machine
East US
websubnet-bastion-linuxvm-nic
Network Interface
East US
websubnet-bastion-linuxvm_OsDisk_1_fafea9ce21ea4c27951...
Disk
East US
websubnet-bastion-publicip
Public IP address
East US
websubnet-nsg
Network security group
East US
Page 1 of 1



4. Finally Destroying the infrastructure

```
azurerm_subnet.websubnet: Destroying... [id=/subscriptions/70c6ff6d-44c7-461c-a2b1-c1a1bbd37492/resourceGroup
v-rg-default-bbhko/providers/Microsoft.Network/virtualNetworks/retail-dev-vnet-default/subnets/retail-dev-web
azurerm_subnet.websubnet: Still destroying... [id=/subscriptions/70c6ff6d-44c7-461c-a2b1-...t-default/subnets
-websubnet, 10s elapsed]
azurerm_subnet.websubnet: Destruction complete after 11s
azurerm_virtual_network.vnet: Destroying... [id=/subscriptions/70c6ff6d-44c7-461c-a2b1-c1a1bbd37492/resourceG
l-dev-rg-default-bbhko/providers/Microsoft.Network/virtualNetworks/retail-dev-vnet-default]
azurerm_virtual_network.vnet: Still destroying... [id=/subscriptions/70c6ff6d-44c7-461c-a2b1-...irtualNetwork
v-vnet-default, 10s elapsed]
azurerm_virtual_network.vnet: Destruction complete after 10s
azurerm_resource_group.rg: Destroying... [id=/subscriptions/70c6ff6d-44c7-461c-a2b1-c1a1bbd37492/resourceGrou
ev-rg-default-bbhko]
azurerm_resource_group.rg: Still destroying... [id=/subscriptions/70c6ff6d-44c7-461c-a2b1-...urceGroups/retai
fault-bbhko, 10s elapsed]
azurerm_resource_group.rg: Destruction complete after 15s
random_string.myrandom: Destroying... [id=bbhko]
random_string.myrandom: Destruction complete after 0s

Destroy complete! Resources: 25 destroyed.
root@ansible:~/terraform-azure-vm#
```