# Terraform GCP Sample: VM Instances and VPC

**By Ronald Stewart Lim**

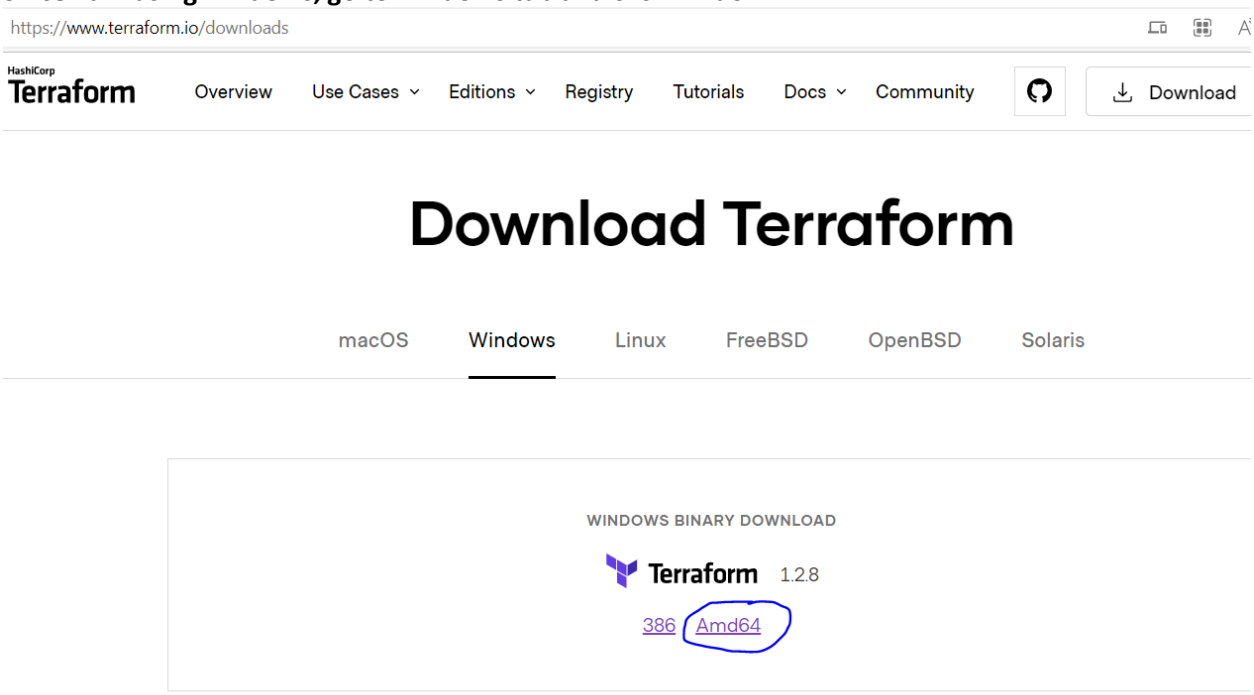
## Terraform GCP pre-requisites:

- Install Terraform and define in Windows environment path if it is in Windows OS
- Generate Access Key

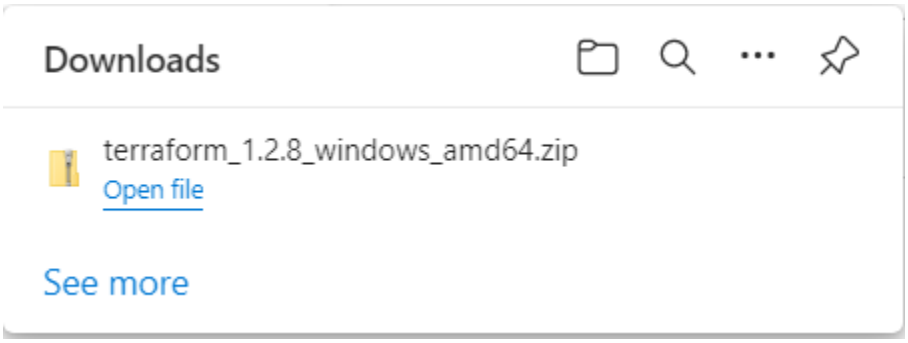
## Pre-requisite: Install Terraform

**Download terraform exe file in terraform site:**
https://www.terraform.io/downloads

**Since I am using windows, go to windows tab and click Amd64**




**Then it will download**




**Then extract file you can see terraform executable file**

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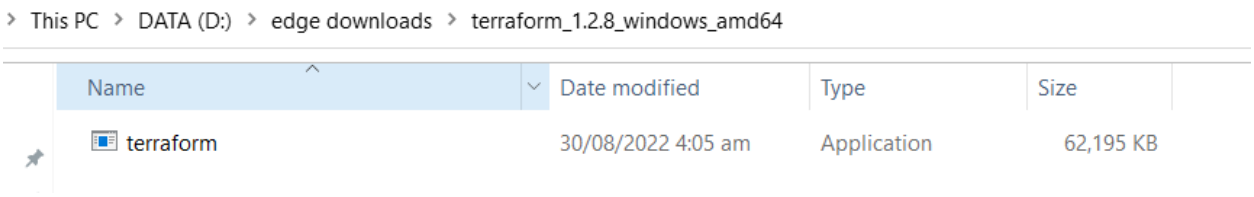
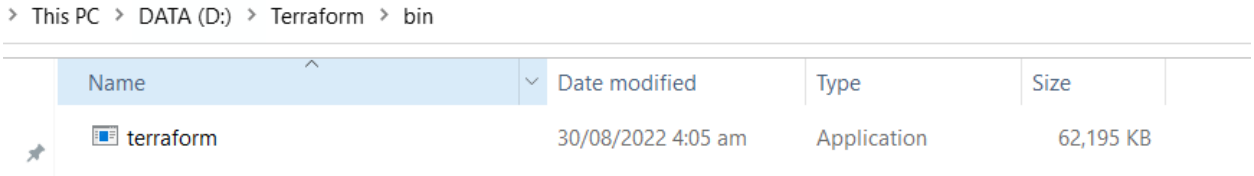
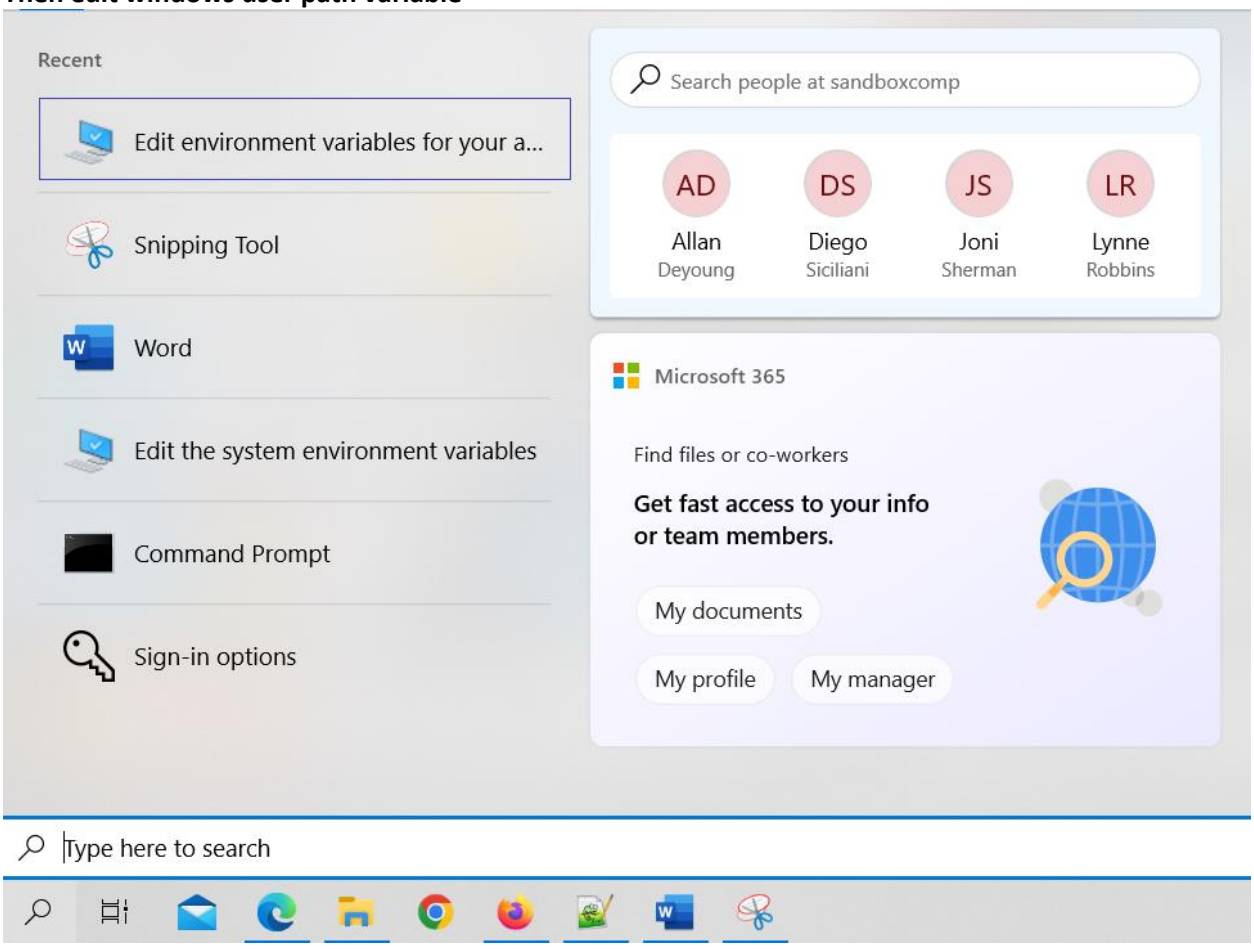



**Then create a directory and copy the file**




**Then edit windows user path variable**




**Go to Path variable and click Edit… button**

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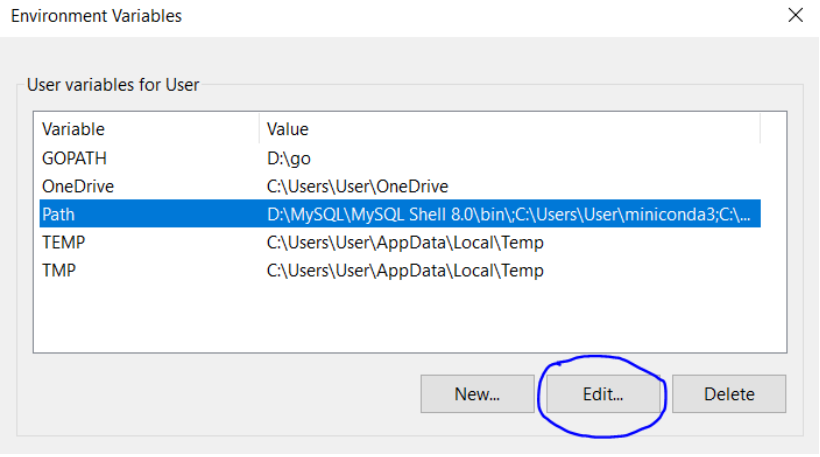
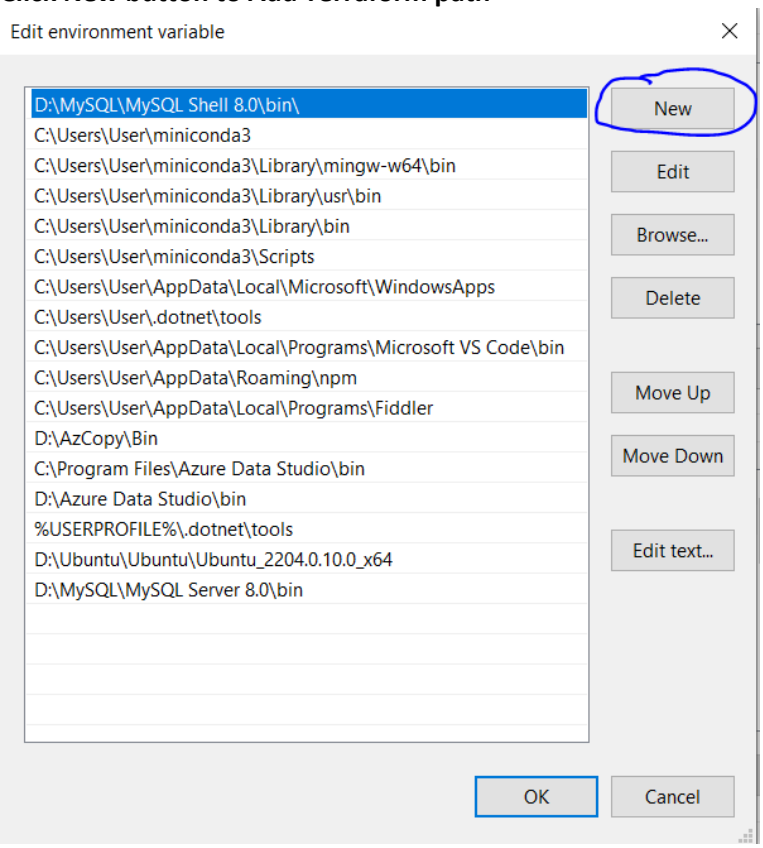



**Click New button to Add Terraform path**



# Terraform GCP Sample: VM Instances and VPC

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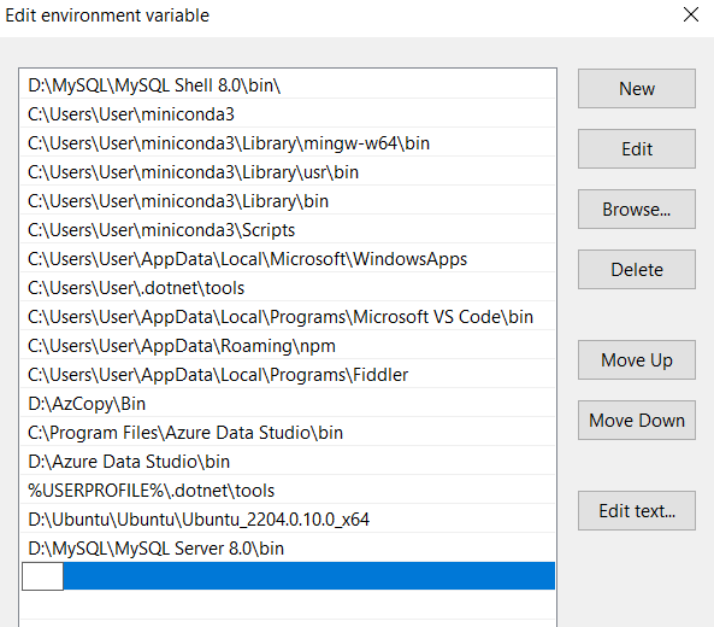
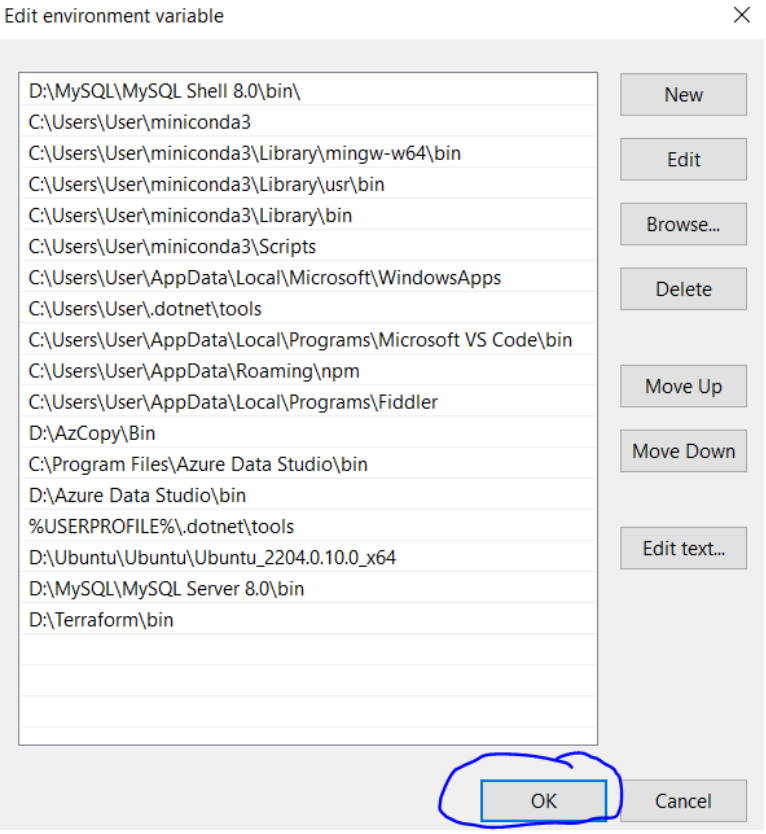



**Click OK Button after specifying the path**




**Click OK Button again**

# Terraform GCP Sample: VM Instances and VPC

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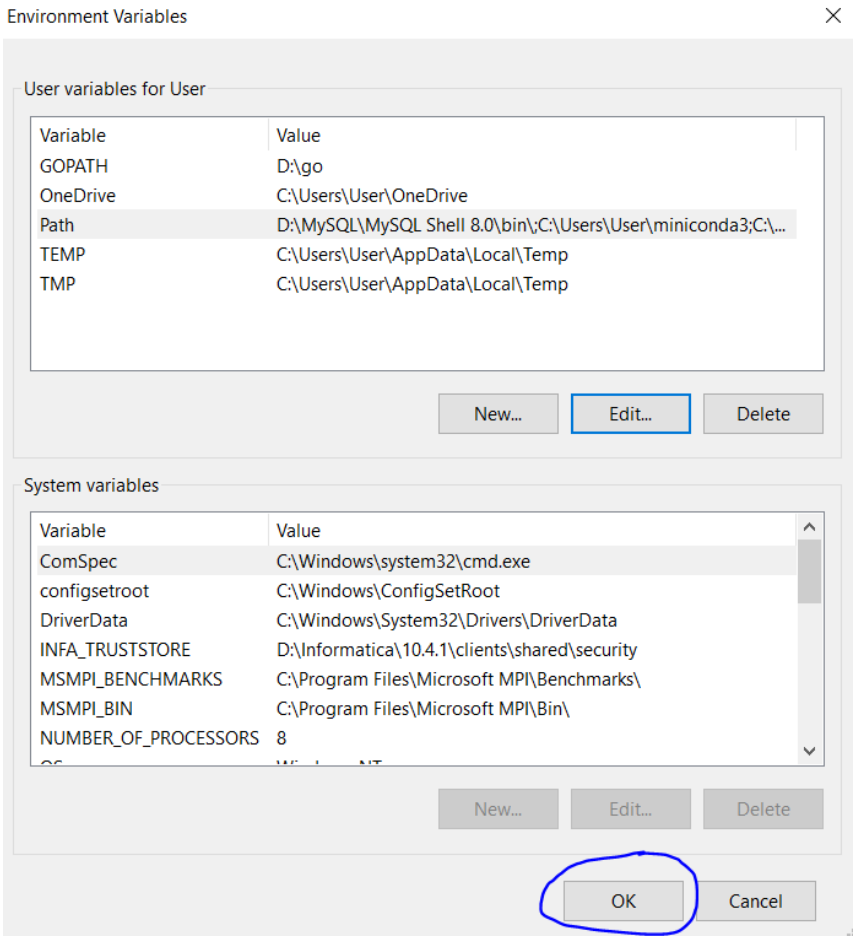
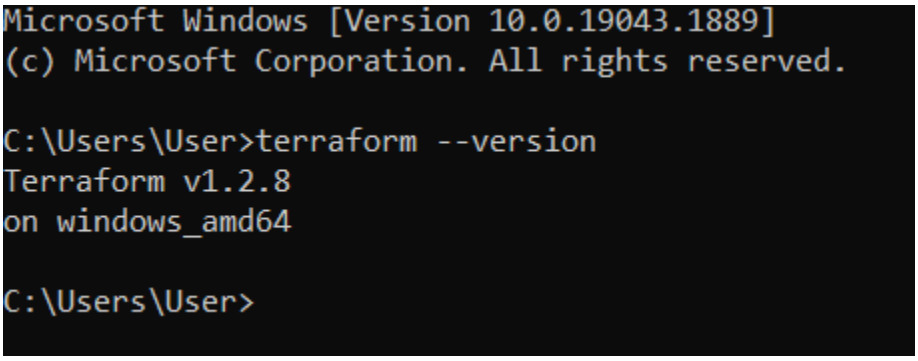



**Open cmd and try to check if terraform is already accessible in any directory by typing:**
***terraform --version***




## Pre-requisite: Generate Access Key

**Now Terraform environment are ready. We will prepare the GCP access key required for executing Terraform scripts**

# Terraform GCP Sample: VM Instances and VPC

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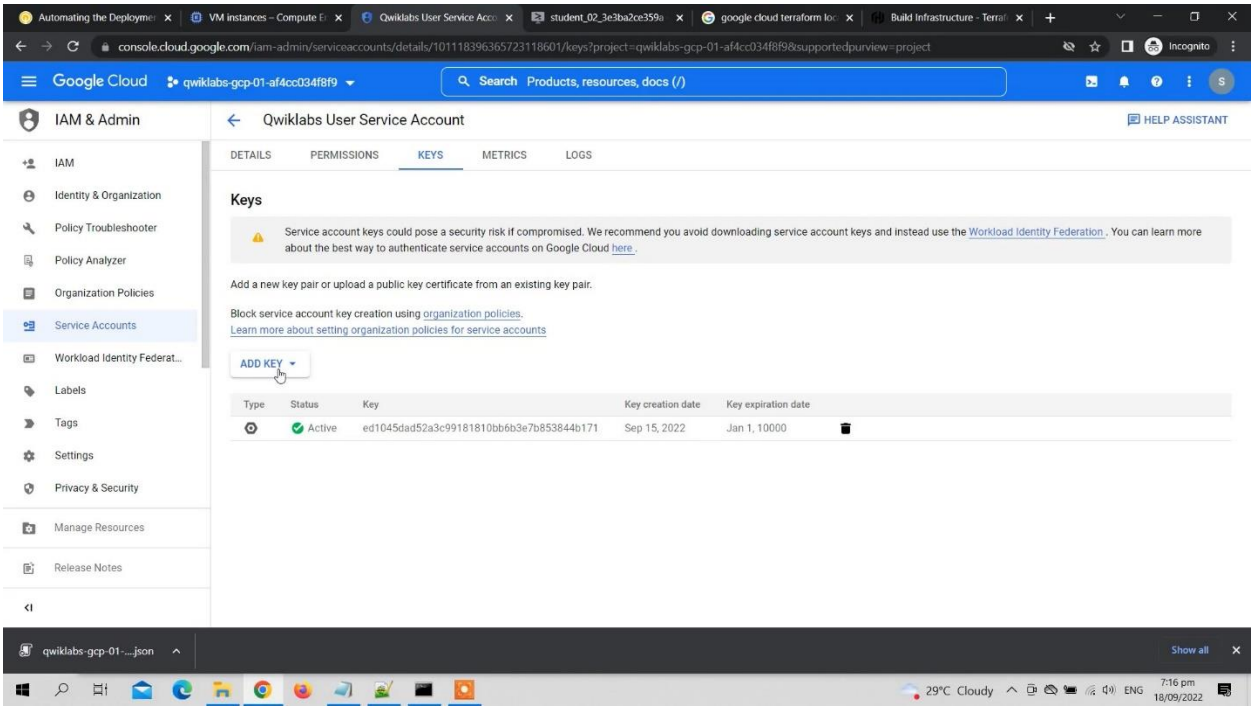
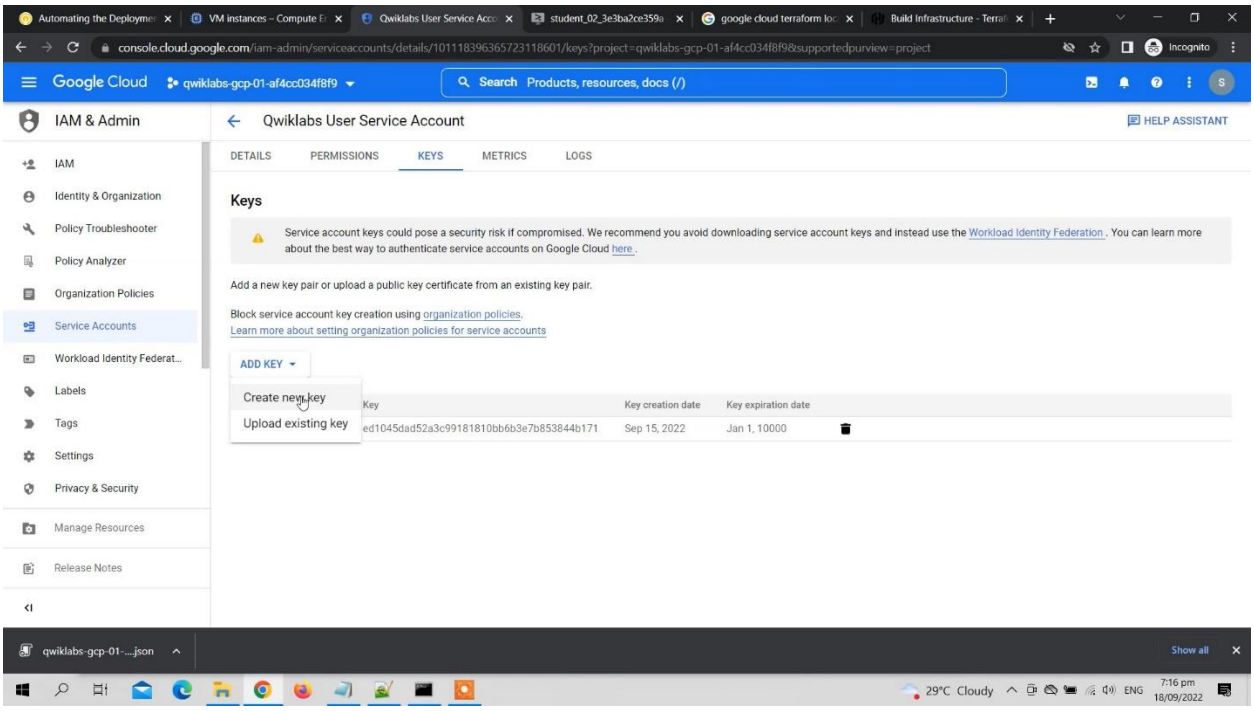
## Go to Google Cloud Console IAM Service Accounts and click a Service Account




## Click Add Key and click Create new key and choose JSON



# Terraform GCP Sample: VM Instances and VPC

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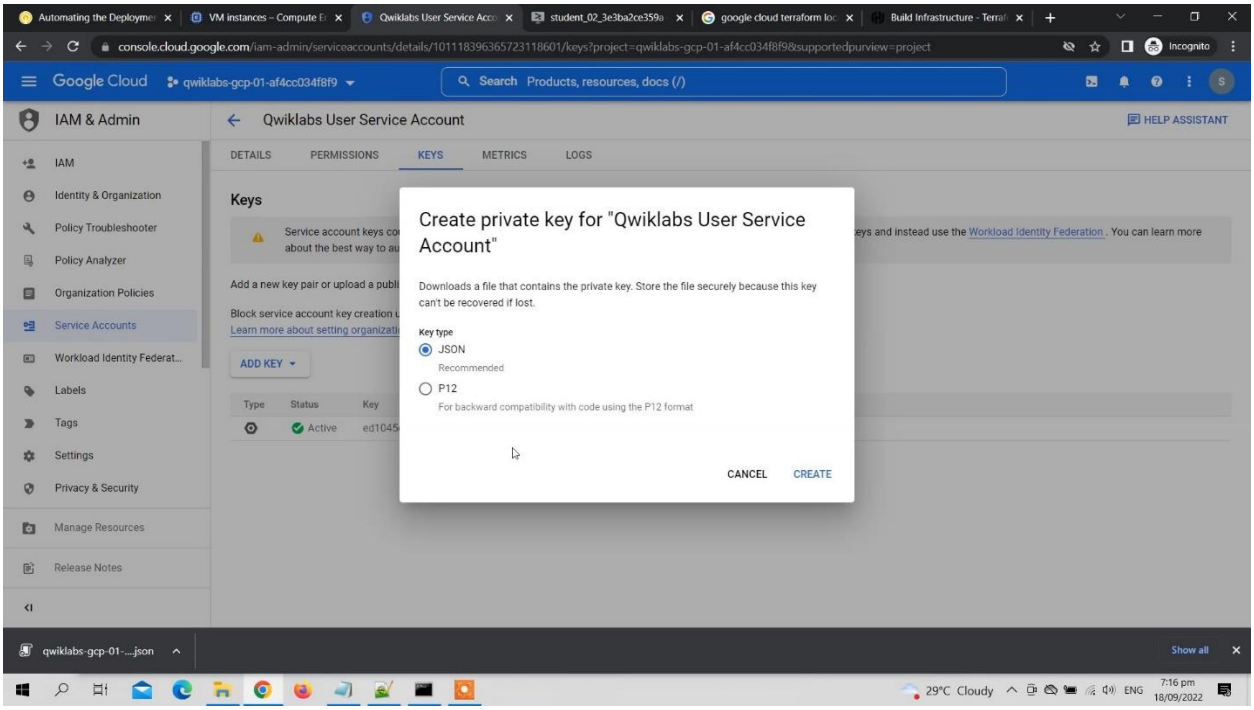
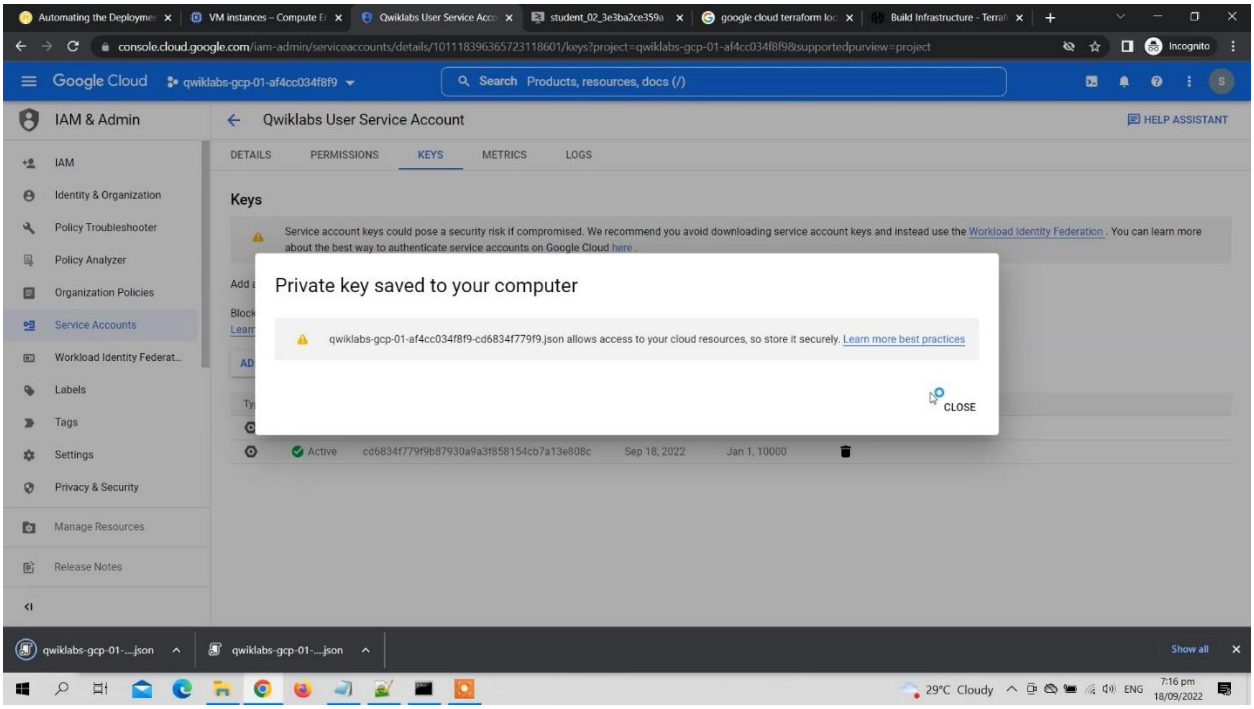



**Then click CREATE button. Notice that the JSON Private Key file is downloaded.**




**Then copy the file to the desired directory**

# Terraform GCP Sample: VM Instances and VPC

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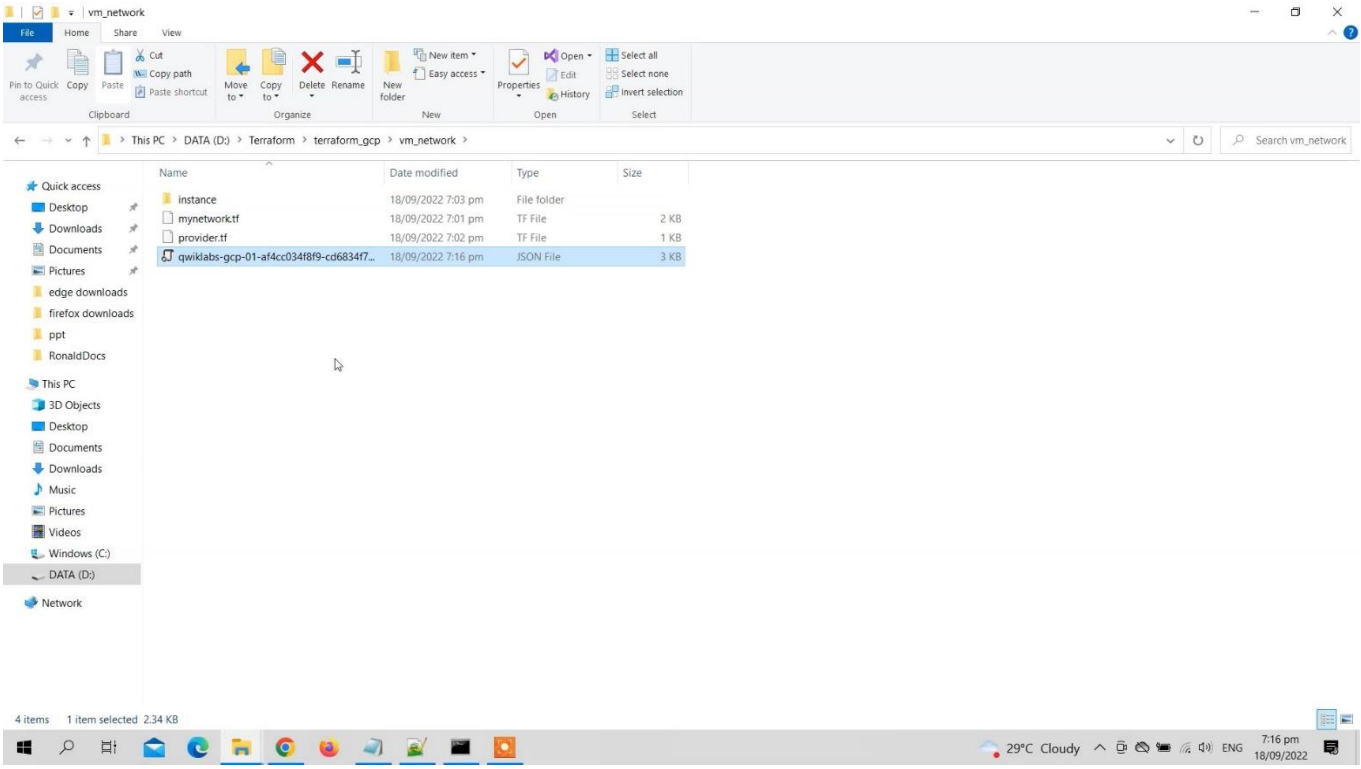


Please see sample files to be used

**mynetwork.tf**

# Terraform GCP Sample: VM Instances and VPC

**By Ronald Stewart Lim**

mynetwork.tf - Notepad

File Edit Format View Help

```
# Create the mynetwork network
resource "google_compute_network" "mynetwork" {
  name = "mynetwork"
  # RESOURCE properties go here
  auto_create_subnetworks = "true"
}

# Add a firewall rule to allow HTTP, SSH, RDP and ICMP traffic on mynetwork
resource "google_compute_firewall" "mynetwork-allow-http-ssh-rdp-icmp" {
  name = "mynetwork-allow-http-ssh-rdp-icmp"
  # RESOURCE properties go here
  network = google_compute_network.mynetwork.self_link
  allow {
    protocol = "tcp"
    ports    = ["22", "80", "3389"]
  }
  allow {
    protocol = "icmp"
  }
  source_ranges = ["0.0.0.0/0"]
}
# Create the mynet-us-vm instance
module "mynet-us-vm" {
  source           = "./instance"
  instance_name    = "mynet-us-vm"
  instance_zone    = "us-central1-a"
  instance_network = google_compute_network.mynetwork.self_link
}
# Create the mynet-eu-vm" instance
module "mynet-eu-vm" {
  source           = "./instance"
  instance_name    = "mynet-eu-vm"
  instance_zone    = "europe-west1-c"
  instance_network = google_compute_network.mynetwork.self_link
}
```

**Provider.tf (Note, you need to specify the project ID and the location of Private Key JSON file and region and zone**

provider.tf - Notepad

File Edit Format View Help

```
provider "google" {
  credentials = file("qwiklabs-gcp-01-af4cc034f8f9-cd6834f779f9.json")

  project = "qwiklabs-gcp-01-af4cc034f8f9"
  region  = "us-central1"
  zone    = "us-central1-c"
}
```

**main.tf**

# Terraform GCP Sample: VM Instances and VPC

**By Ronald Stewart Lim**

main.tf - Notepad

File Edit Format View Help

```
resource "google_compute_instance" "vm_instance" {
  name = "${var.instance_name}"
  # RESOURCE properties go here
  zone         = "${var.instance_zone}"
  machine_type = "${var.instance_type}"
  boot_disk {
    initialize_params {
      image = "debian-cloud/debian-11"
      }
  }
  network_interface {
    network = "${var.instance_network}"
    access_config {
      # Allocate a one-to-one NAT IP to the instance
    }
  }
}
```

**variables.tf**

variables.tf - Notepad

File Edit Format View Help

```
variable "instance_name" {}
variable "instance_zone" {}
variable "instance_type" {
  default = "e2-micro"
  }
variable "instance_network" {}
```

**Initialize the Terraform using command below:**
***terraform init***

# Terraform GCP Sample: VM Instances and VPC

**By Ronald Stewart Lim**

```
D:\Terraform\terraform_gcp\vm_network>terraform init
Initializing modules...
- mynet-eu-vm in instance
- mynet-us-vm in instance

Initializing the backend...

Initializing provider plugins...
- Finding latest version of hashicorp/google...
- Installing hashicorp/google v4.36.0...
- Installed hashicorp/google v4.36.0 (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.

D:\Terraform\terraform_gcp\vm_network>
```

**To check and validate the terraform-based codes, execute the command below:**
***terraform validate***

**If the validation found no errors, then it will output the success message**

```
D:\Terraform\terraform_gcp\vm_network>terraform validate
Success! The configuration is valid.


D:\Terraform\terraform_gcp\vm_network>
```

**(Optional) Check the Terraform execution plan by using the command below:**
***terraform plan***
Sample output below:

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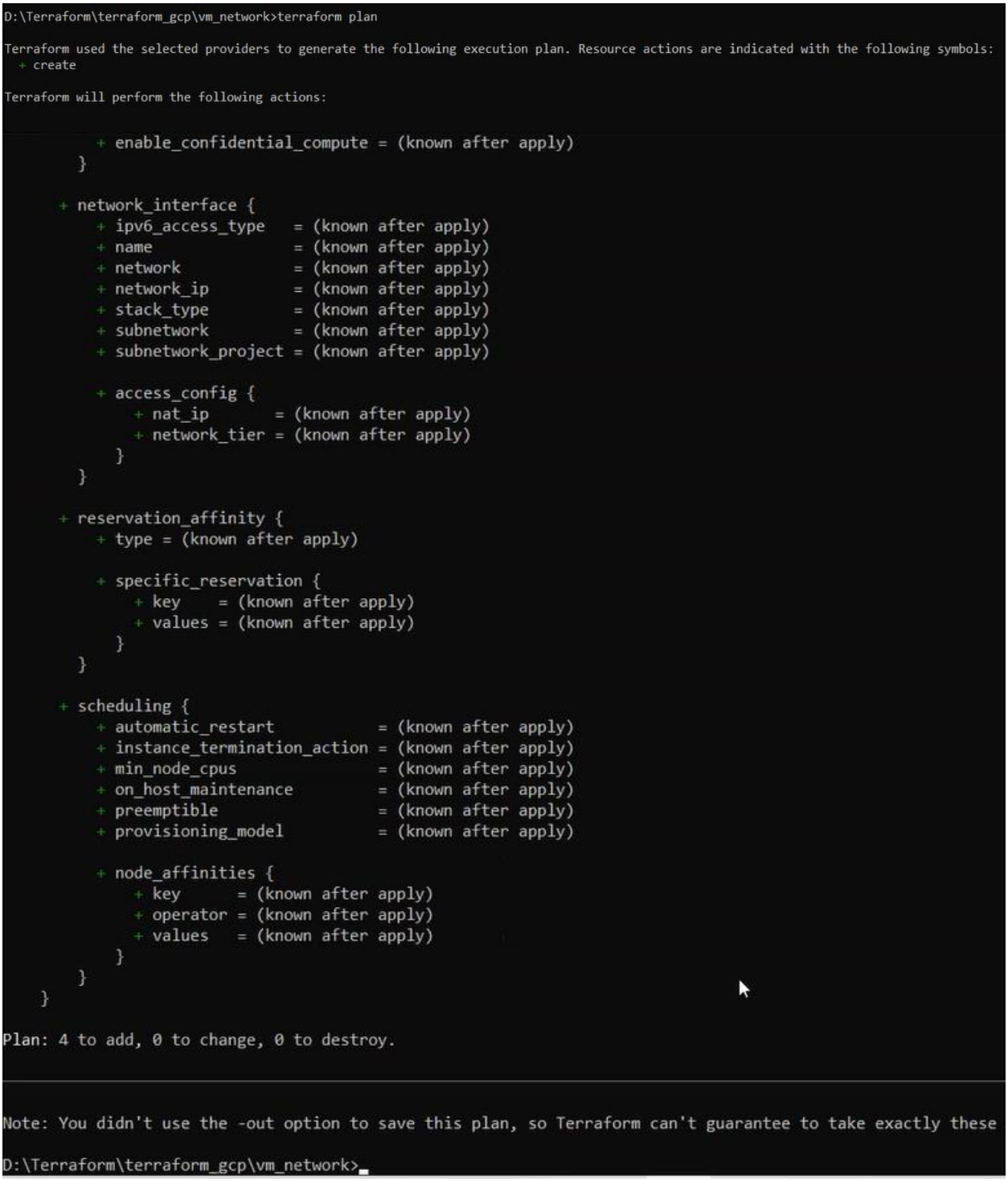


**Before applying changes, check the before state of the VM instances by going to Compute Engine -> VM instances. Notice that the instances are not yet created.**

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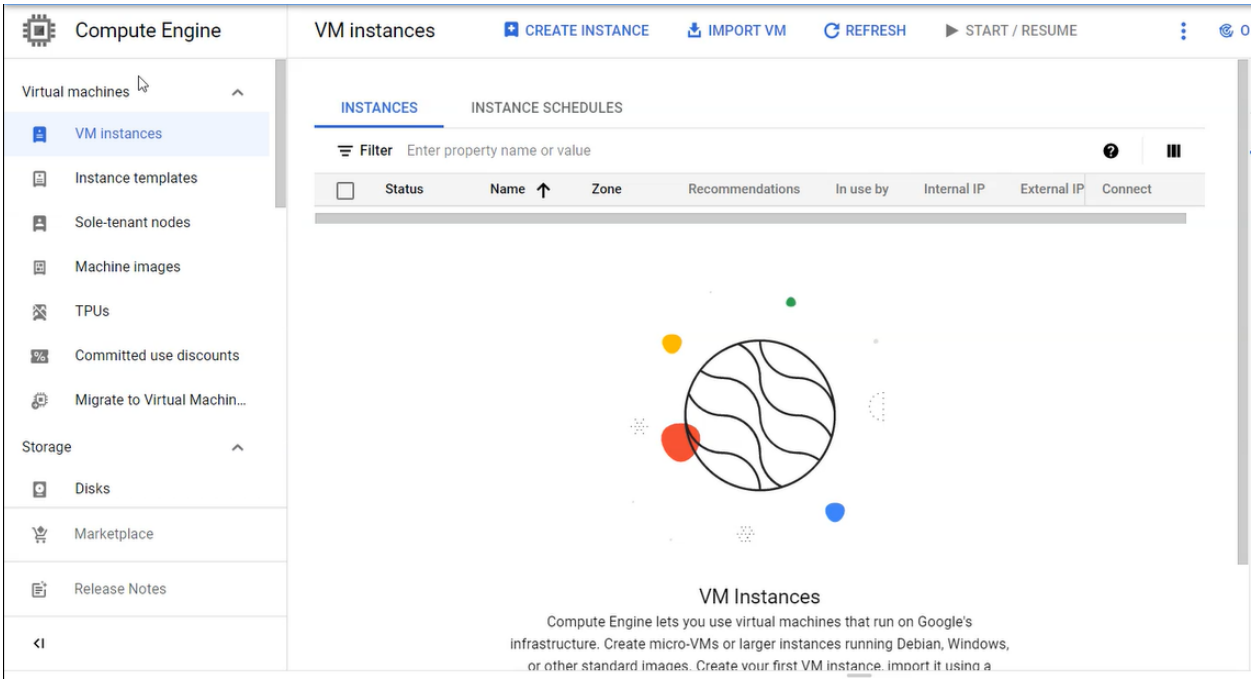


**Execute the command below and confirm changes to create VM instances in GCP:**
***terraform apply***

**Note: terraform apply command already contains terraform plan so no need to execute terraform plan**
**terraform apply = terraform plan + confirmation to apply changes**

sample output:

```
D:\Terraform\terraform_gcp\vm_network>terraform apply
```

# Terraform GCP Sample: VM Instances and VPC

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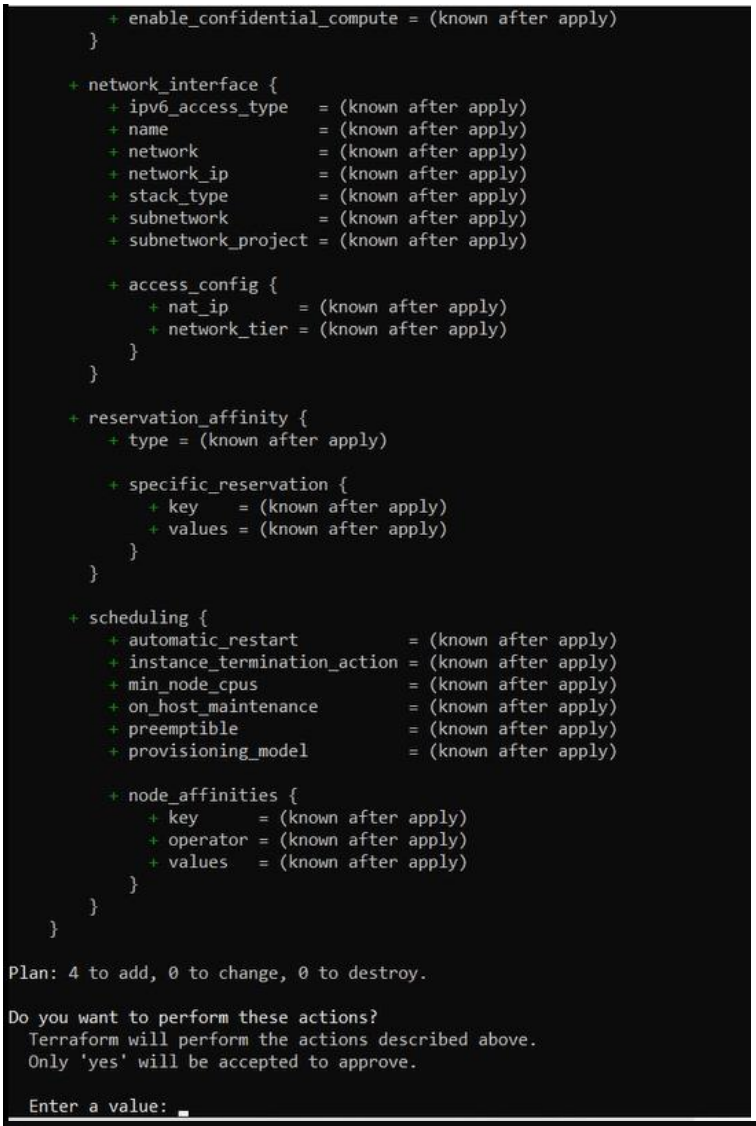
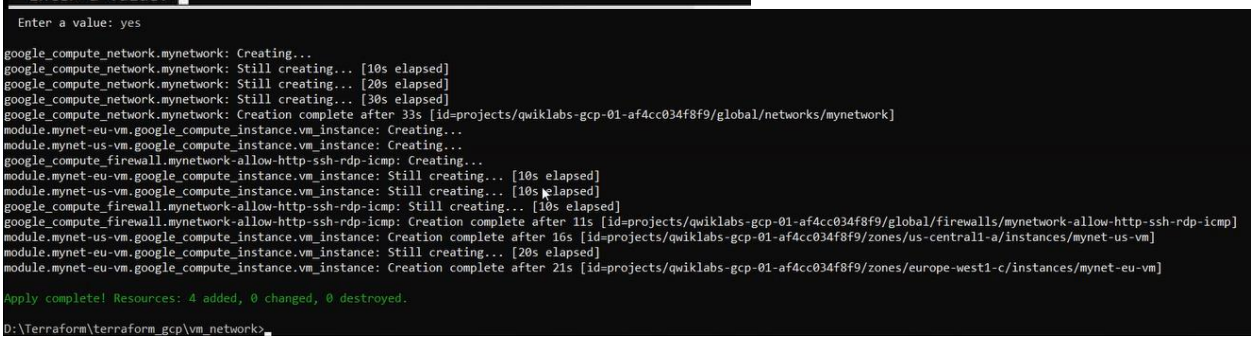


```
      + enable_confidential_compute = (known after apply)
    }

  + network_interface {
      + ipv6_access_type   = (known after apply)
      + name               = (known after apply)
      + network            = (known after apply)
      + network_ip         = (known after apply)
      + stack_type         = (known after apply)
      + subnetwork         = (known after apply)
      + subnetwork_project = (known after apply)

      + access_config {
          + nat_ip       = (known after apply)
          + network_tier = (known after apply)
        }
    }

  + reservation_affinity {
      + type = (known after apply)

      + specific_reservation {
          + key    = (known after apply)
          + values = (known after apply)
        }
    }

  + scheduling {
      + automatic_restart           = (known after apply)
      + instance_termination_action = (known after apply)
      + min_node_cpus               = (known after apply)
      + on_host_maintenance         = (known after apply)
      + preemptible                 = (known after apply)
      + provisioning_model          = (known after apply)

      + node_affinities {
          + key      = (known after apply)
          + operator = (known after apply)
          + values   = (known after apply)
        }
    }
}

Plan: 4 to add, 0 to change, 0 to destroy.

Do you want to perform these actions?
  Terraform will perform the actions described above.
  Only 'yes' will be accepted to approve.

  Enter a value: _
```



```
  Enter a value: yes

google_compute_network.mynetwork: Creating...
google_compute_network.mynetwork: Still creating... [10s elapsed]
google_compute_network.mynetwork: Still creating... [20s elapsed]
google_compute_network.mynetwork: Still creating... [30s elapsed]
google_compute_network.mynetwork: Creation complete after 33s [id=projects/qwiklabs-gcp-01-af4cc034f8f9/global/networks/mynetwork]
module.mynet-eu-vm.google_compute_instance.vm_instance: Creating...
module.mynet-us-vm.google_compute_instance.vm_instance: Creating...
google_compute_firewall.mynetwork-allow-http-ssh-rdp-icmp: Creating...
module.mynet-eu-vm.google_compute_instance.vm_instance: Still creating... [10s elapsed]
module.mynet-us-vm.google_compute_instance.vm_instance: Still creating... [10s elapsed]
google_compute_firewall.mynetwork-allow-http-ssh-rdp-icmp: Still creating... [10s elapsed]
google_compute_firewall.mynetwork-allow-http-ssh-rdp-icmp: Creation complete after 11s [id=projects/qwiklabs-gcp-01-af4cc034f8f9/global/firewalls/mynetwork-allow-http-ssh-rdp-icmp]
module.mynet-us-vm.google_compute_instance.vm_instance: Creation complete after 16s [id=projects/qwiklabs-gcp-01-af4cc034f8f9/zones/us-central1-a/instances/mynet-us-vm]
module.mynet-eu-vm.google_compute_instance.vm_instance: Still creating... [20s elapsed]
module.mynet-eu-vm.google_compute_instance.vm_instance: Creation complete after 21s [id=projects/qwiklabs-gcp-01-af4cc034f8f9/zones/europe-west1-c/instances/mynet-eu-vm]

Apply complete! Resources: 4 added, 0 changed, 0 destroyed.

D:\Terraform\terraform_gcp\vm_network>_
```

**Check the after state of the VM instances by going to Compute Engine -> VM instances. Notice that the instances are now created successfully.**

# Terraform GCP Sample: VM Instances and VPC

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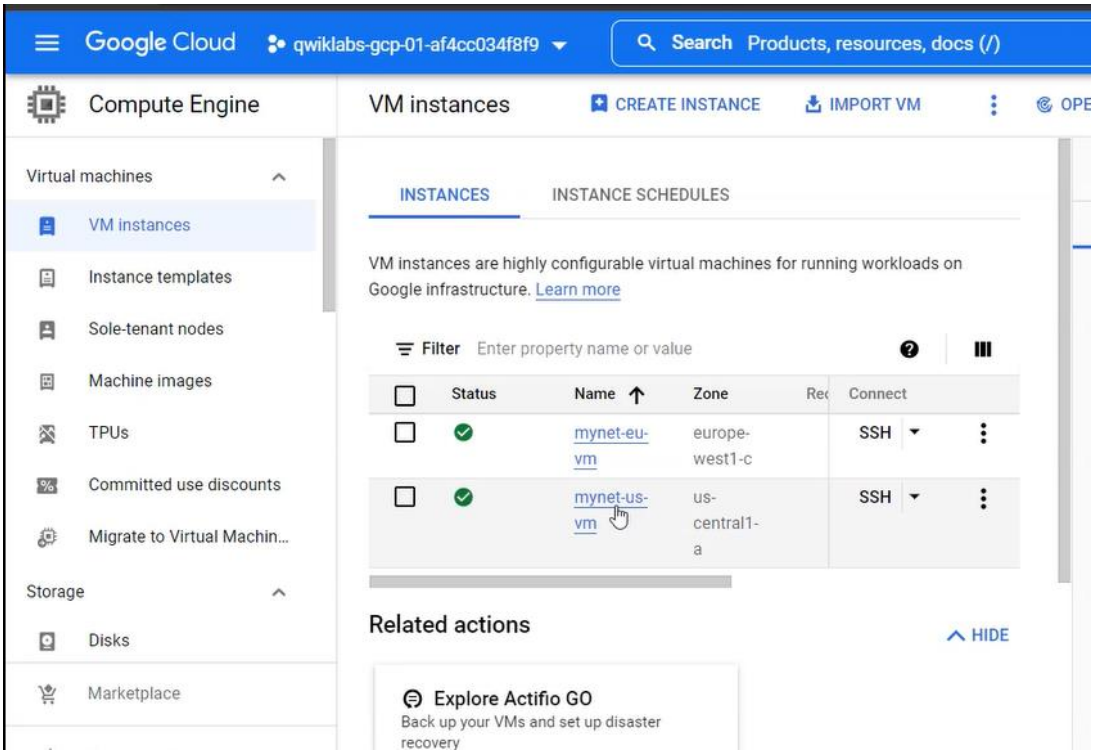


**Then let us try to destroy what we created for learning purposes using command below and confirm:**
***terraform destroy***

**sample output:**

```
D:\Terraform\terraform_gcp\vm_network>terraform destroy
google_compute_network.mynetwork: Refreshing state... [id=projects/qwiklabs-gcp-01-af4cc034f8f9/global/networks/mynetwork]
google_compute_firewall.mynetwork-allow-http-ssh-rdp-icmp: Refreshing state... [id=projects/qwiklabs-gcp-01-af4cc034f8f9/global/firewalls/mynetwork-allow-http-ssh-rdp-icmp]
module.mynet-us-vm.google_compute_instance.vm_instance: Refreshing state... [id=projects/qwiklabs-gcp-01-af4cc034f8f9/zones/us-central1-a/instances/mynet-us-vm]
module.mynet-eu-vm.google_compute_instance.vm_instance: Refreshing state... [id=projects/qwiklabs-gcp-01-af4cc034f8f9/zones/europe-west1-c/instances/mynet-eu-vm]

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:

  # google_compute_firewall.mynetwork-allow-http-ssh-rdp-icmp will be destroyed
  - resource "google_compute_firewall" "mynetwork-allow-http-ssh-rdp-icmp" {
      - creation_timestamp      = "2022-09-18T04:19:05.378-07:00" -> null
      - destination_ranges      = [] -> null
      - direction               = "INGRESS" -> null
      - disabled                = false -> null
      - id                      = "projects/qwiklabs-gcp-01-af4cc034f8f9/global/firewalls/mynetwork-allow-http-ssh-rdp-icmp" -> null
      - name                    = "mynetwork-allow-http-ssh-rdp-icmp" -> null
      - network                 = "https://www.googleapis.com/compute/v1/projects/qwiklabs-gcp-01-af4cc034f8f9/global/networks/mynetwork" -> null
      - priority                = 1000 -> null
      - project                 = "qwiklabs-gcp-01-af4cc034f8f9" -> null
      - self_link               = "https://www.googleapis.com/compute/v1/projects/qwiklabs-gcp-01-af4cc034f8f9/global/firewalls/mynetwork-allow-http-ssh-rdp-icmp" -> null
      - source_ranges           = [
          - "0.0.0.0/0",
        ] -> null
      - source_service_accounts = [] -> null
      - source_tags             = [] -> null
      - target_service_accounts = [] -> null
      - target_tags             = [] -> null

      - allow {
          - ports    = [
              - "22",
              - "80",
              - "3389",
            ] -> null
          - protocol = "tcp" -> null
        }
      - allow {
          - ports    = [] -> null
          - protocol = "icmp" -> null
        }
    }
```

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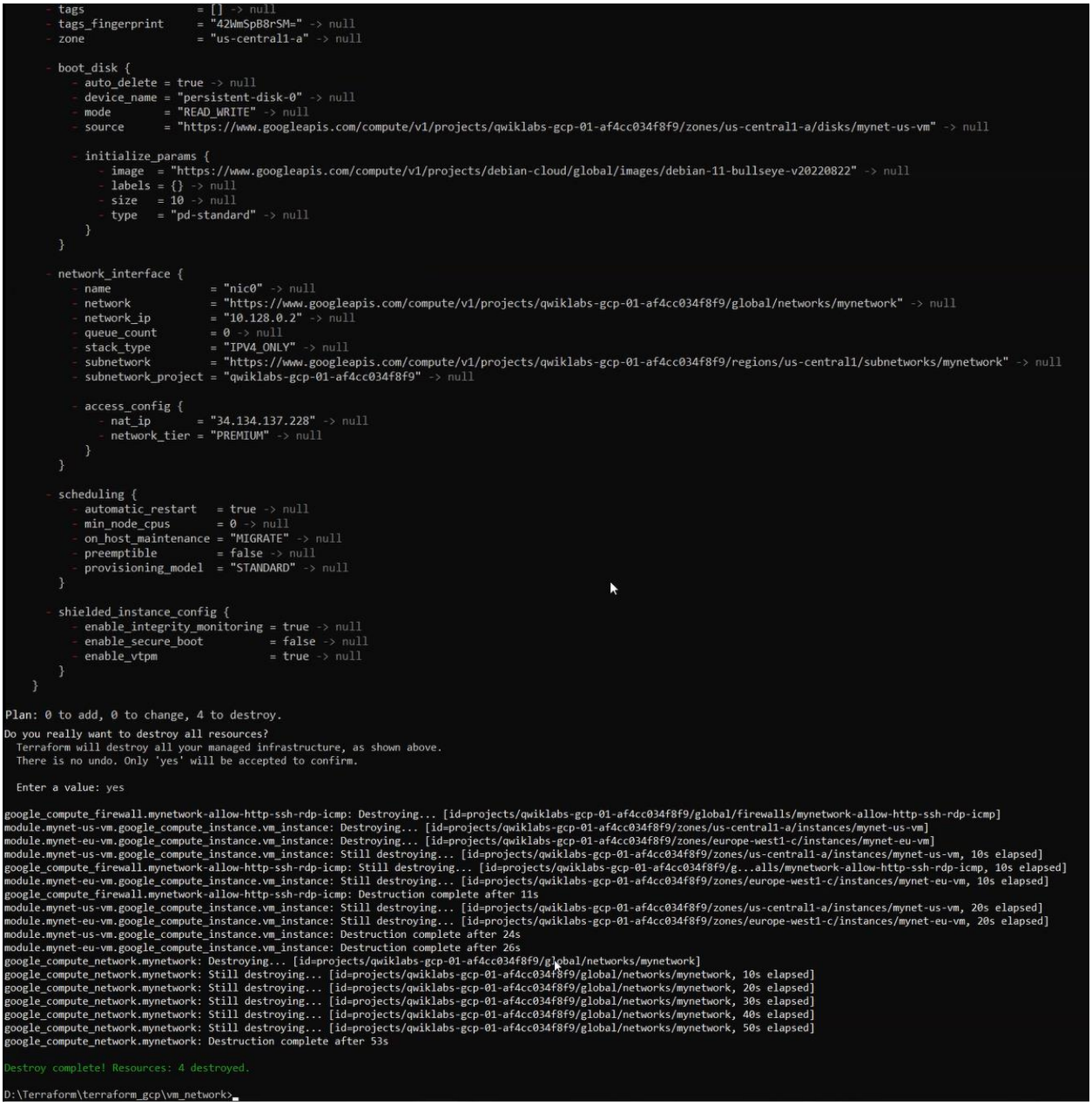


**Check the destroy state of the VM instances by going to Compute Engine -> VM instances. Notice that the instances are now deleted.**

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