FATIMA JINNAH WOMEN UNIVERSITY

Department of Software Engineering

LAB #10

SUBJECT: CLOUD COMPUTING

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REGISTRATION NO: 2023-BSE-066

CLASS: BSSE V-B

GH CLI Codespaces + AWS + Terraform: CLI Automation of VPC/Subnet Creation

Task#01: GitHub CLI, Codespace setup and authentication

Windows PowerShell

```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\HP> gh codespace list
NAME                                 DISPLAY NAME         REPOSITORY       BRANCH  STATE      CREATED AT
turbo-space-pancake-g4vxxxpwvgvxfv5xr  turbo space pancake  Umber-qasim/Lab9  main*   Available  about 1 day ago
```

```
PS C:\Users\HP> gh codespace ssh -c turbo-space-pancake-g4vxxxpwvgvxfv5xr
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.8.0-1030-azure x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/pro
Last login: Fri Dec 12 16:56:34 2025 from ::1
 * Support:        https://ubuntu.com/pro
Last login: Fri Dec 12 16:56:34 2025 from ::1
@Umber-qasim /workspaces/Lab9 (main) $
```

Task#02: Install AWS CLI, Terraform CLI, Provider Setup

Part A — **AWS CLI Install + Configure**

Windows PowerShell

```
  inflating: aws/dist/awscli/botocore/data/rekognition/2016-06-27/waiters-2.json
  inflating: aws/dist/awscli/botocore/data/rekognition/2016-06-27/completions-1.json
  inflating: aws/dist/awscli/botocore/data/rekognition/2016-06-27/paginators-1.json
  inflating: aws/dist/awscli/botocore/data/autoscaling/2011-01-01/paginators-1.json
  inflating: aws/dist/awscli/botocore/data/autoscaling/2011-01-01/endpoint-rule-set-1.json
  inflating: aws/dist/awscli/botocore/data/autoscaling/2011-01-01/completions-1.json
  inflating: aws/dist/awscli/botocore/data/autoscaling/2011-01-01/paginators-1.sdk-extras.json
  inflating: aws/dist/awscli/botocore/data/autoscaling/2011-01-01/service-2.json
  inflating: aws/dist/awscli/botocore/data/keyspacesstreams/2024-09-09/paginators-1.sdk-extras.json
  inflating: aws/dist/awscli/botocore/data/keyspacesstreams/2024-09-09/service-2.json
  inflating: aws/dist/awscli/botocore/data/keyspacesstreams/2024-09-09/endpoint-rule-set-1.json
  inflating: aws/dist/awscli/botocore/data/keyspacesstreams/2024-09-09/paginators-1.json
  inflating: aws/dist/awscli/botocore/.changes/next-release/api-change-connect-59117.json
  inflating: aws/dist/awscli/topics/s3-faq.rst
  inflating: aws/dist/awscli/topics/topic-tags.json
  inflating: aws/dist/awscli/topics/config-vars.rst
  inflating: aws/dist/awscli/topics/s3-config.rst
  inflating: aws/dist/awscli/topics/ddb-expressions.rst
  inflating: aws/dist/awscli/topics/return-codes.rst
  inflating: aws/dist/awscli/data/cli.json
  inflating: aws/dist/awscli/data/metadata.json
  inflating: aws/dist/awscli/data/ac.index
  inflating: aws/dist/awscli/customizations/sso/index.html
  inflating: aws/dist/awscli/customizations/wizard/wizards/configure/_main.yml
  inflating: aws/dist/awscli/customizations/wizard/wizards/events/new-rule.yml
  inflating: aws/dist/awscli/customizations/wizard/wizards/iam/new-role.yml
  inflating: aws/dist/awscli/customizations/wizard/wizards/lambda/new-function.yml
  inflating: aws/dist/awscli/customizations/wizard/wizards/dynamodb/new-table.yml
  inflating: aws/dist/prompt_toolkit-3.0.51.dist-info/INSTALLER
  inflating: aws/dist/prompt_toolkit-3.0.51.dist-info/WHEEL
  inflating: aws/dist/prompt_toolkit-3.0.51.dist-info/RECORD
  inflating: aws/dist/prompt_toolkit-3.0.51.dist-info/top_level.txt
  inflating: aws/dist/prompt_toolkit-3.0.51.dist-info/METADATA
  inflating: aws/dist/prompt_toolkit-3.0.51.dist-info/licenses/AUTHORS.rst
  inflating: aws/dist/prompt_toolkit-3.0.51.dist-info/licenses/LICENSE
  inflating: aws/dist/wheel-0.45.1.dist-info/REQUESTED
  inflating: aws/dist/wheel-0.45.1.dist-info/WHEEL
  inflating: aws/dist/wheel-0.45.1.dist-info/RECORD
  inflating: aws/dist/wheel-0.45.1.dist-info/INSTALLER
  inflating: aws/dist/wheel-0.45.1.dist-info/LICENSE.txt
  inflating: aws/dist/wheel-0.45.1.dist-info/entry_points.txt
  inflating: aws/dist/wheel-0.45.1.dist-info/METADATA
  inflating: aws/dist/wheel-0.45.1.dist-info/direct_url.json
@Umber-qasim /workspaces/Lab9 (main) $ sudo ./aws/install
Found preexisting AWS CLI installation: /usr/local/aws-cli/v2/current. Please rerun install script with --update flag.
@Umber-qasim /workspaces/Lab9 (main) $ sudo ./aws/install --update
You can now run: /usr/local/bin/aws --version
@Umber-qasim /workspaces/Lab9 (main) $ aws --version
aws-cli/2.32.15 Python/3.13.11 Linux/6.8.0-1030-azure exe/x86_64.ubuntu.24
@Umber-qasim /workspaces/Lab9 (main) $
```

```
@Umber-qasim ▣ /workspaces/Lab9 (main) $ aws configure
AWS Access Key ID [****************ZUA5]: [redacted]
AWS Secret Access Key [****************3sHI]: [redacted]
Default region name [me-central-1]: me-central-1
Default output format [json]: json
```

```
@Umber-qasim ▣ /workspaces/Lab9 (main) $ cat ~/.aws/credentials
[default]
aws_access_key_id = [redacted]
aws_secret_access_key = [redacted]
@Umber-qasim ▣ /workspaces/Lab9 (main) $ cat ~/.aws/config
[default]
region = me-central-1
output = json
@Umber-qasim ▣ /workspaces/Lab9 (main) $
```

```
@Umber-qasim ▣ /workspaces/Lab9 (main) $ aws sts get-caller-identity
{
    "UserId": "AIDAWVVSRLSE5SHMR754K",
    "Account": "458862189705",
    "Arn": "arn:aws:iam::458862189705:user/Admin"
}
@Umber-qasim ▣ /workspaces/Lab9 (main) $
```

Part B — **Terraform CLI Installation**

Windows PowerShell

```
@Umber-qasim ▣ /workspaces/Lab9 (main) $ echo "deb [arch=$(dpkg --print-architecture) signed-by=/usr/share/keyrings/hashicorp-archive-keyring.gpg] https://apt.releases.hashicorp.com $(grep -oP '(?<=UBUNTU_CODENAME=).*' /etc/os-release || lsb_release -cs) main" | sudo tee /etc/apt/sources.list.d/hashicorp.list
deb [arch=amd64 signed-by=/usr/share/keyrings/hashicorp-archive-keyring.gpg] https://apt.releases.hashicorp.com noble main
@Umber-qasim ▣ /workspaces/Lab9 (main) $ sudo apt update
Get:1 https://apt.releases.hashicorp.com noble InRelease [12.9 kB]
Get:2 https://repo.anaconda.com/pkgs/misc/debrepo/conda stable InRelease [3961 B]
Get:3 https://dl.yarnpkg.com/debian stable InRelease
Get:4 https://apt.releases.hashicorp.com noble/main amd64 Packages [263 kB]
Get:5 https://packages.microsoft.com/repos/microsoft-ubuntu-noble-prod noble InRelease [3600 B]
Get:6 https://repo.anaconda.com/pkgs/misc/debrepo/conda stable/main amd64 Packages [4557 B]
Get:7 https://dl.yarnpkg.com/debian stable/main all Packages [11.8 kB]
Get:8 https://dl.yarnpkg.com/debian stable/main amd64 Packages [11.8 kB]
Get:9 https://packages.microsoft.com/repos/microsoft-ubuntu-noble-prod noble/main all Packages [643 B]
Get:10 https://packages.microsoft.com/repos/microsoft-ubuntu-noble-prod noble/main amd64 Packages [75.3 kB]
Get:11 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]
Get:12 http://archive.ubuntu.com/ubuntu noble InRelease [256 kB]
Get:13 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Packages [33.1 kB]
Get:14 http://security.ubuntu.com/ubuntu noble-security/main amd64 Packages [1736 kB]
Get:15 http://archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:16 http://archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Get:17 http://archive.ubuntu.com/ubuntu noble/restricted amd64 Packages [117 kB]
Get:18 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 Packages [2874 kB]
Get:19 http://archive.ubuntu.com/ubuntu noble/main amd64 Packages [1808 kB]
Get:20 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Packages [1183 kB]
Get:21 http://archive.ubuntu.com/ubuntu noble/multiverse amd64 Packages [331 kB]
Get:22 http://archive.ubuntu.com/ubuntu noble/universe amd64 Packages [19.3 MB]
Get:23 http://archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Packages [3048 kB]
Get:24 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 Packages [2118 kB]
Get:25 http://archive.ubuntu.com/ubuntu noble-updates/multiverse amd64 Packages [35.9 kB]
Get:26 http://archive.ubuntu.com/ubuntu noble-updates/universe amd64 Packages [1944 kB]
Get:27 http://archive.ubuntu.com/ubuntu noble-backports/main amd64 Packages [49.4 kB]
Get:28 http://archive.ubuntu.com/ubuntu noble-backports/universe amd64 Packages [34.3 kB]
Fetched 35.7 MB in 6s (6312 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Selecting previously unselected package terraform.dable' to see them.
(Reading database ... 58631 files and directories currently installed.)
Preparing to unpack .../terraform_1.14.2-1_amd64.deb ...
Unpacking terraform (1.14.2-1) ...
Setting up terraform (1.14.2-1) ...
@Umber-qasim ▣ /workspaces/Lab9 (main) $ which terraform
/usr/bin/terraform
@Umber-qasim ▣ /workspaces/Lab9 (main) $ terraform --version
Terraform v1.14.2ists... Done
on linux_amd64dency tree... Done
```

Part C — **Terraform Provider Setup**

Windows PowerShell

```
provider "aws" {
  shared_config_files      =  "~/.aws/config"
  shared_credentials_files =  "~/.aws/credentials"
}
```

```
@Umber-qasim /workspaces/Lab9 (main) $ terraform init
Initializing the backend...
Initializing provider plugins... to remove and 47 not upgraded.
- Finding latest version of hashicorp/aws...
- Installing hashicorp/aws v6.26.0...ional disk space will be used.
- Installed hashicorp/aws v6.26.0 (signed by HashiCorp)64 terraform amd64 1.14.2-1 [30.6 MB]
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.
@Umber-qasim /workspaces/Lab9 (main) $
```

```
@Umber-qasim /workspaces/Lab9 (main) $ cat .terraform.lock.hcl
# This file is maintained automatically by "terraform init".
# Manual edits may be lost in future updates.

provider "registry.terraform.io/hashicorp/aws" {
  version = "6.26.0"
  hashes = [
    "h1:B7X8EU6aZ9KzIvP0VBDhhgadgjXIrUgMXt/pJ6EUXvo=",
    "zh:038fd943de79acd9f9f73106fa0eba588c6a0d4e0993e146f51f3aa043728c5f",
    "zh:06fa0177d33d3d3f9cb7e205fbeb1c4c3095ba637e2b4d292429401ec5612e81",
    "zh:212714fc8b6ee57e26d11d0fdf2ecfe23b37a6eac1008b399c1d790528c3f072",
    "zh:3197725d772f360e9e466b68a5ba67363e9f6786809c9adefc50f7f7e525bf42",
    "zh:33385539f3e3fafb96c6036421fd72b05c76505eeefaaff8a089c3eeba25db65",
    "zh:4ce065e0d3c384d11c1b59fe92582d331aae27ff6e019ace07b8cedef5653aae",
    "zh:67863d6ff5517db2c0b8097443708dca548f1922d2e08ad76a98d493ff480cb1",
    "zh:771ccf61fc107013b437b0a05cdb342823a99200653bfe9b892702b9fd8997fe",
    "zh:80adcf83bef9d683606c48bbe53cbb2b5a04878641674e957939b5e8f124ada0",
    "zh:9675c7f209db8e64ba2d5197acc8ba0073bd73b48c3dd61a1961a44844bc8a81",
    "zh:9b12af85486a96aedd8d7984b0ff811a4b42e3d88dad1a3fb4c0b580d04fa425",
    "zh:b47d0f5eff91c94c5d5677815b9361e64dfbe2ee2d59ba2867e2d0f5fa7181e4",
    "zh:b4933663b8d6cc1cfb51aa47bd8f26c06012ee2e278e57663faffdc722dd5baa",
    "zh:d53a94ecdb6b68a8dc19ec6e16ba2d4c2acde575af254d1b8b80143e57c76abf",
    "zh:e7cb8c1770c6f87c5ce1d3e28b838380bb8e5296dd03034b796168de8be1c7ec",
  ]
}
```

```
@Umber-qasim /workspaces/Lab9 (main) $ ls .terraform/
providers
```

Task#03: VPC/Subnet Creation, Initialization, Verification

Windows PowerShell

```
provider "aws" {
  shared_config_files      = ["~/.aws/config"]
  shared_credentials_files = ["~/.aws/credentials"]
}
```

Windows PowerShell

```
provider "aws" {
  shared_config_files      = ["~/.aws/config"]
  shared_credentials_files = ["~/.aws/credentials"]
}
resource "aws_vpc" "development_vpc" {
  cidr_block = "10.0.0.0/16"
}

resource "aws_subnet" "dev_subnet_1" {
  vpc_id     = aws_vpc.development_vpc.id
  cidr_block = "10.0.10.0/24"
  availability_zone = "me-central-1a"
}
```

Windows PowerShell

```
      + enable_resource_name_dns_a_record_on_launch    = false
      + enable_resource_name_dns_aaaa_record_on_launch = false
      + id                                             = (known after apply)
      + ipv6_cidr_block_association_id                 = (known after apply)
      + ipv6_native                                    = false
      + map_public_ip_on_launch                        = false
      + owner_id                                       = (known after apply)
      + private_dns_hostname_type_on_launch            = (known after apply)
      + region                                         = "me-central-1"
      + tags_all                                       = (known after apply)
      + vpc_id                                         = (known after apply)
    }

  # aws_vpc.development_vpc will be created
  + resource "aws_vpc" "development_vpc" {
      + arn                                  = (known after apply)
      + cidr_block                           = "10.0.0.0/16"
      + default_network_acl_id               = (known after apply)
      + default_route_table_id               = (known after apply)
      + default_security_group_id            = (known after apply)
      + dhcp_options_id                      = (known after apply)
      + enable_dns_hostnames                 = (known after apply)
      + enable_dns_support                   = true
      + enable_network_address_usage_metrics = (known after apply)
      + id                                   = (known after apply)
      + instance_tenancy                     = "default"
      + ipv6_association_id                  = (known after apply)
      + ipv6_cidr_block                      = (known after apply)
      + ipv6_cidr_block_network_border_group = (known after apply)
      + main_route_table_id                  = (known after apply)
      + owner_id                             = (known after apply)
      + region                               = "me-central-1"
      + tags_all                             = (known after apply)
    }

Plan: 2 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: yes

aws_vpc.development_vpc: Creating...
aws_vpc.development_vpc: Creation complete after 2s [id=vpc-07ccd99929252bd81]
aws_subnet.dev_subnet_1: Creating...
aws_subnet.dev_subnet_1: Creation complete after 1s [id=subnet-09bfe4ed10e3550b6]

Apply complete! Resources: 2 added, 0 changed, 0 destroyed.
```

```
@Umber-qasim /workspaces/Lab9 (main) $ aws ec2 describe-subnets --filter "Name=subnet-id,Values=subnet-09bfe4ed10e3550b6"
{
    "Subnets": [
        {
            "AvailabilityZoneId": "mec1-az1",
            "MapCustomerOwnedIpOnLaunch": false,
            "OwnerId": "458862189705",
            "AssignIpv6AddressOnCreation": false,
            "Ipv6CidrBlockAssociationSet": [],
            "SubnetArn": "arn:aws:ec2:me-central-1:458862189705:subnet/subnet-09bfe4ed10e3550b6",
            "EnableDns64": false,
            "Ipv6Native": false,
            "PrivateDnsNameOptionsOnLaunch": {
                "HostnameType": "ip-name",
                "EnableResourceNameDnsARecord": false,
                "EnableResourceNameDnsAAAARecord": false
            },
            "BlockPublicAccessStates": {
                "InternetGatewayBlockMode": "off"
            },
            "SubnetId": "subnet-09bfe4ed10e3550b6",
            "State": "available",
            "VpcId": "vpc-07ccd99929252bd81",
            "CidrBlock": "10.0.10.0/24",
            "AvailableIpAddressCount": 251,
            "AvailabilityZone": "me-central-1a",
            "DefaultForAz": false,
            "MapPublicIpOnLaunch": false
        }
    ]
}
```

```
@Umber-qasim /workspaces/Lab9 (main) $ aws ec2 describe-vpcs --filter "Name=vpc-id,Values=vpc-07ccd99929252bd81"
{
    "Vpcs": [
        {
            "OwnerId": "458862189705",
            "InstanceTenancy": "default",
            "CidrBlockAssociationSet": [
                {
                    "AssociationId": "vpc-cidr-assoc-037a75dee5aec7522",
                    "CidrBlock": "10.0.0.0/16",
                    "CidrBlockState": {
                        "State": "associated"
                    }
                }
            ],
            "IsDefault": false,
            "BlockPublicAccessStates": {
                "InternetGatewayBlockMode": "off"
            },
            "VpcId": "vpc-07ccd99929252bd81",
            "State": "available",
            "CidrBlock": "10.0.0.0/16",
            "DhcpOptionsId": "dopt-0f6507644ddf11aee"
        }
    ]
}
```

Task#04: Data Source, Targeted Destroy, Tags

Part A — **Data Source + Resource Creation**

Windows PowerShell

```
provider "aws" {
  shared_config_files      = ["~/.aws/config"]
  shared_credentials_files = ["~/.aws/credentials"]
}
resource "aws_vpc" "development_vpc" {
  cidr_block = "10.0.0.0/16"
}

resource "aws_subnet" "dev_subnet_1" {
  vpc_id     = aws_vpc.development_vpc.id
  cidr_block = "10.0.10.0/24"
  availability_zone = "me-central-1a"
}
data "aws_vpc" "existing_vpc" {
  default = true
}

resource "aws_subnet" "dev_subnet_1_existing" {
  vpc_id     = data.aws_vpc.existing_vpc.id
  cidr_block = "172.31.48.0/24"
  availability_zone = "me-central-1a"
}
```

```
@Umber-qasim /workspaces/Lab9 (main) $ terraform apply
data.aws_vpc.existing_vpc: Reading...
aws_vpc.development_vpc: Refreshing state... [id=vpc-07ccd99929252bd81]
data.aws_vpc.existing_vpc: Read complete after 1s [id=vpc-0d2fbb78883682acc]
aws_subnet.dev_subnet_1: Refreshing state... [id=subnet-09bfe4ed10e3550b6]

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

Terraform will perform the following actions:

  # aws_subnet.dev_subnet_1_existing will be created
  + resource "aws_subnet" "dev_subnet_1_existing" {
      + arn                                            = (known after apply)
      + assign_ipv6_address_on_creation                = false
      + availability_zone                              = "me-central-1a"
      + availability_zone_id                           = (known after apply)
      + cidr_block                                     = "172.31.48.0/24"
      + enable_dns64                                   = false
      + enable_resource_name_dns_a_record_on_launch    = false
      + enable_resource_name_dns_aaaa_record_on_launch = false
      + id                                             = (known after apply)
      + ipv6_cidr_block_association_id                 = (known after apply)
      + ipv6_native                                    = false
      + map_public_ip_on_launch                        = false
      + owner_id                                       = (known after apply)
      + private_dns_hostname_type_on_launch            = (known after apply)
      + region                                         = "me-central-1"
      + tags_all                                       = (known after apply)
      + vpc_id                                         = "vpc-0d2fbb78883682acc"
    }

Plan: 1 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: yes

aws_subnet.dev_subnet_1_existing: Creating...
aws_subnet.dev_subnet_1_existing: Creation complete after 0s [id=subnet-036800dd732ebd4ce]

Apply complete! Resources: 1 added, 0 changed, 0 destroyed.
```

Part B — **Targeted Destroy + Refresh**

```
Windows PowerShell
      availability_zone_id                          = "mec1-az1" -> null
      cidr_block                                    = "172.31.48.0/24" -> null
      enable_dns64                                  = false -> null
      enable_lni_at_device_index                    = 0 -> null
      enable_resource_name_dns_a_record_on_launch   = false -> null
      enable_resource_name_dns_aaaa_record_on_launch = false -> null
      id                                            = "subnet-036800dd732ebd4ce" -> null
      ipv6_native                                   = false -> null
      map_customer_owned_ip_on_launch               = false -> null
      map_public_ip_on_launch                       = false -> null
      owner_id                                      = "458862189705" -> null
      private_dns_hostname_type_on_launch           = "ip-name" -> null
      region                                        = "me-central-1" -> null
      tags                                          = {} -> null
      tags_all                                      = {} -> null
      vpc_id                                        = "vpc-0d2fbb78883682acc" -> null
      # (4 unchanged attributes hidden)
    }

Plan: 0 to add, 0 to change, 1 to destroy.

  Warning: Resource targeting is in effect

  You are creating a plan with the -target option, which means that the result of this plan may not represent all of the changes requested by the current configuration.

  The -target option is not for routine use, and is provided only for exceptional situations such as recovering from errors or mistakes, or when Terraform specifically suggests to use it as
  part of an error message.


Do you really want to destroy all resources?
  Terraform will destroy all your managed infrastructure, as shown above.
  There is no undo. Only 'yes' will be accepted to confirm.

  Enter a value: yes

aws_subnet.dev_subnet_1_existing: Destroying... [id=subnet-036800dd732ebd4ce]
aws_subnet.dev_subnet_1_existing: Destruction complete after 0s

  Warning: Applied changes may be incomplete

  The plan was created with the -target option in effect, so some changes requested in the configuration may have been ignored and the output values may not be fully updated. Run the
  following command to verify that no other changes are pending:
      terraform plan

  Note that the -target option is not suitable for routine use, and is provided only for exceptional situations such as recovering from errors or mistakes, or when Terraform specifically
  suggests to use it as part of an error message.


Destroy complete! Resources: 1 destroyed.
```

```
@Umber-qasim /workspaces/Lab9 (main) $ terraform refresh
data.aws_vpc.existing_vpc: Reading...
aws_vpc.development_vpc: Refreshing state... [id=vpc-07ccd99929252bd81]
data.aws_vpc.existing_vpc: Read complete after 1s [id=vpc-0d2fbb78883682acc]
aws_subnet.dev_subnet_1: Refreshing state... [id=subnet-09bfe4ed10e3550b6]
```

```
@Umber-qasim /workspaces/Lab9 (main) $ terraform apply
data.aws_vpc.existing_vpc: Reading...
aws_vpc.development_vpc: Refreshing state... [id=vpc-07ccd99929252bd81]
data.aws_vpc.existing_vpc: Read complete after 0s [id=vpc-0d2fbb78883682acc]
aws_subnet.dev_subnet_1: Refreshing state... [id=subnet-09bfe4ed10e3550b6]

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

Terraform will perform the following actions:

  # aws_subnet.dev_subnet_1_existing will be created
  + resource "aws_subnet" "dev_subnet_1_existing" {
      + arn                                            = (known after apply)
      + assign_ipv6_address_on_creation                = false
      + availability_zone                              = "me-central-1a"
      + availability_zone_id                           = (known after apply)
      + cidr_block                                     = "172.31.48.0/24"
      + enable_dns64                                   = false
      + enable_resource_name_dns_a_record_on_launch    = false
      + enable_resource_name_dns_aaaa_record_on_launch = false
      + id                                             = (known after apply)
      + ipv6_cidr_block_association_id                 = (known after apply)
      + ipv6_native                                    = false
      + map_public_ip_on_launch                        = false
      + owner_id                                       = (known after apply)
      + private_dns_hostname_type_on_launch            = (known after apply)
      + region                                         = "me-central-1"
      + tags_all                                       = (known after apply)
      + vpc_id                                         = "vpc-0d2fbb78883682acc"
    }

Plan: 1 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: yes

aws_subnet.dev_subnet_1_existing: Creating...
aws_subnet.dev_subnet_1_existing: Creation complete after 1s [id=subnet-08e7751f86e809aea]

Apply complete! Resources: 1 added, 0 changed, 0 destroyed.
```

Windows PowerShell

```
      - map_public_ip_on_launch                          = false -> null
      - owner_id                                         = "458862189705" -> null
      - private_dns_hostname_type_on_launch              = "ip-name" -> null
      - region                                           = "me-central-1" -> null
      - tags                                             = {} -> null
      - tags_all                                         = {} -> null
      - vpc_id                                           = "vpc-0d2fbb78883682acc" -> null
        # (4 unchanged attributes hidden)
    }

  # aws_vpc.development_vpc will be destroyed
  - resource "aws_vpc" "development_vpc" {
      - arn                                = "arn:aws:ec2:me-central-1:458862189705:vpc/vpc-07ccd99929252bd81" -> null
      - assign_generated_ipv6_cidr_block   = false -> null
      - cidr_block                         = "10.0.0.0/16" -> null
      - default_network_acl_id             = "acl-0a62dbd914aa8e6a6" -> null
      - default_route_table_id             = "rtb-011a85b1614cc64e7" -> null
      - default_security_group_id          = "sg-03738083efe8e4000" -> null
      - dhcp_options_id                    = "dopt-0f6507644ddf11aee" -> null
      - enable_dns_hostnames               = false -> null
      - enable_dns_support                 = true -> null
      - enable_network_address_usage_metrics = false -> null
      - id                                 = "vpc-07ccd99929252bd81" -> null
      - instance_tenancy                   = "default" -> null
      - ipv6_netmask_length                = 0 -> null
      - main_route_table_id                = "rtb-011a85b1614cc64e7" -> null
      - owner_id                           = "458862189705" -> null
      - region                             = "me-central-1" -> null
      - tags                               = {} -> null
      - tags_all                           = {} -> null
        # (4 unchanged attributes hidden)
    }

Plan: 0 to add, 0 to change, 3 to destroy.

Do you really want to destroy all resources?
  Terraform will destroy all your managed infrastructure, as shown above.
  There is no undo. Only 'yes' will be accepted to confirm.

  Enter a value: yes

aws_subnet.dev_subnet_1: Destroying... [id=subnet-09bfe4ed10e3550b6]
aws_subnet.dev_subnet_1_existing: Destroying... [id=subnet-08e7751f86e809aea]
aws_subnet.dev_subnet_1_existing: Destruction complete after 1s
aws_subnet.dev_subnet_1: Destruction complete after 1s
aws_vpc.development_vpc: Destroying... [id=vpc-07ccd99929252bd81]
aws_vpc.development_vpc: Destruction complete after 1s

Destroy complete! Resources: 3 destroyed.
```

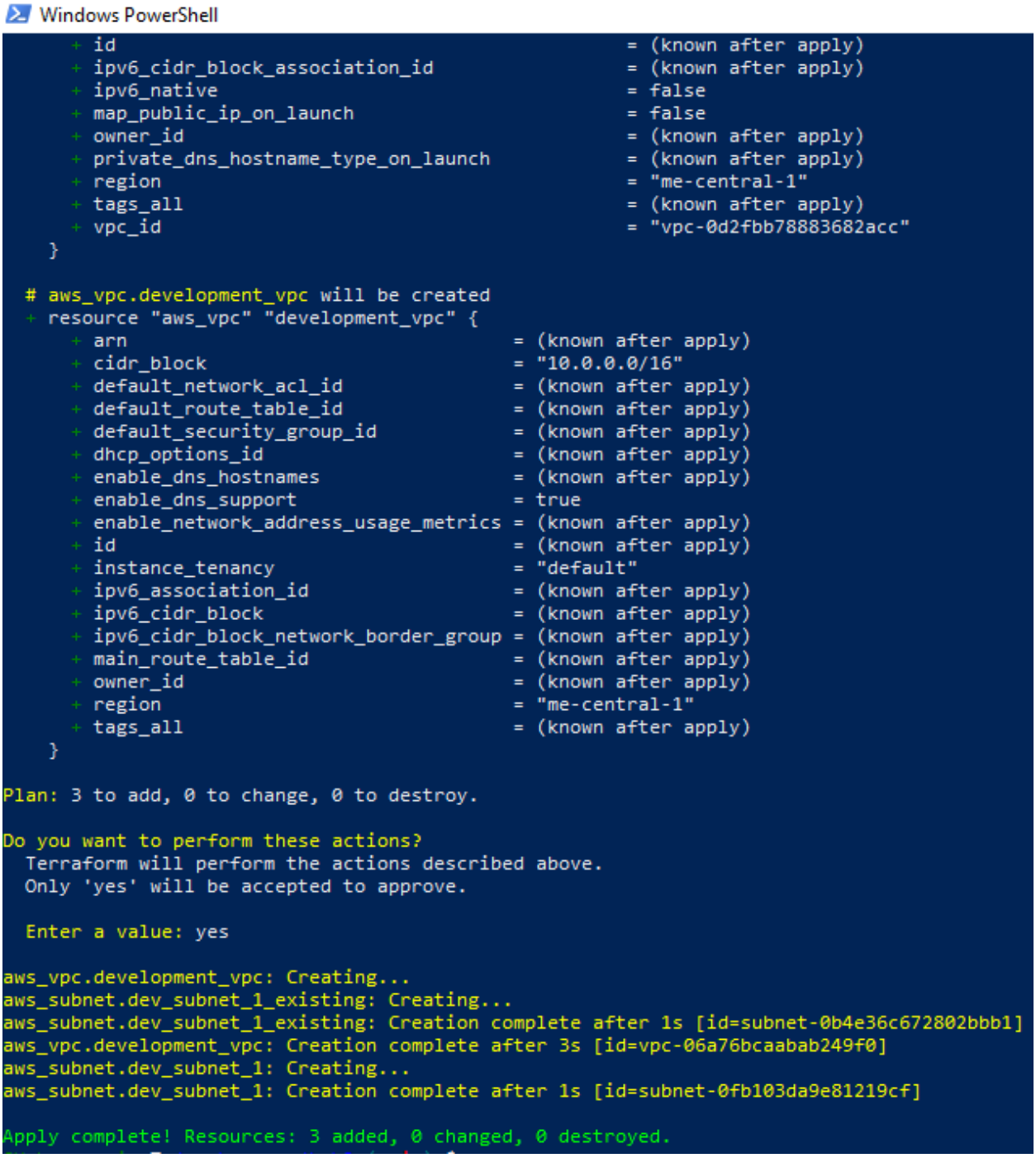
Windows PowerShell

```
  # aws_subnet.dev_subnet_1_existing will be created
  + resource "aws_subnet" "dev_subnet_1_existing" {
      + arn                                            = (known after apply)
      + assign_ipv6_address_on_creation                = false
      + availability_zone                              = "me-central-1a"
      + availability_zone_id                           = (known after apply)
      + cidr_block                                     = "172.31.48.0/24"
      + enable_dns64                                   = false
      + enable_resource_name_dns_a_record_on_launch    = false
      + enable_resource_name_dns_aaaa_record_on_launch = false
      + id                                             = (known after apply)
      + ipv6_cidr_block_association_id                 = (known after apply)
      + ipv6_native                                    = false
      + map_public_ip_on_launch                        = false
      + owner_id                                       = (known after apply)
      + private_dns_hostname_type_on_launch            = (known after apply)
      + region                                         = "me-central-1"
      + tags_all                                       = (known after apply)
      + vpc_id                                         = "vpc-0d2fbb78883682acc"
    }

  # aws_vpc.development_vpc will be created
  + resource "aws_vpc" "development_vpc" {
      + arn                                = (known after apply)
      + cidr_block                         = "10.0.0.0/16"
      + default_network_acl_id             = (known after apply)
      + default_route_table_id             = (known after apply)
      + default_security_group_id          = (known after apply)
      + dhcp_options_id                    = (known after apply)
      + enable_dns_hostnames               = (known after apply)
      + enable_dns_support                 = true
      + enable_network_address_usage_metrics = (known after apply)
      + id                                 = (known after apply)
      + instance_tenancy                   = "default"
      + ipv6_association_id                = (known after apply)
      + ipv6_cidr_block                    = (known after apply)
      + ipv6_cidr_block_network_border_group = (known after apply)
      + main_route_table_id                = (known after apply)
      + owner_id                           = (known after apply)
      + region                             = "me-central-1"
      + tags_all                           = (known after apply)
    }

Plan: 3 to add, 0 to change, 0 to destroy.

Note: You didn't use the -out option to save this plan, so Terraform can't guarantee to take exactly these actions if you run "terraform apply" now.
```



Part C — **Tagging Resources**

Windows PowerShell

```
provider "aws" {
  shared_config_files      = ["~/.aws/config"]
  shared_credentials_files = ["~/.aws/credentials"]
}
data "aws_vpc" "existing_vpc" {
  default = true
}
resource "aws_vpc" "development_vpc" {
  cidr_block = "10.0.0.0/16"
  tags = {
     Name = "development"
     vpc_env = "dev"
  }
}

resource "aws_subnet" "dev_subnet_1" {
  vpc_id     = aws_vpc.development_vpc.id
  cidr_block = "10.0.10.0/24"
  availability_zone = "me-central-1a"
  tags = {
     Name = "subnet-1-dev"
  }
}

resource "aws_subnet" "dev_subnet_1_existing" {
  vpc_id     = data.aws_vpc.existing_vpc.id
  cidr_block = "172.31.48.0/24"
  availability_zone = "me-central-1a"
  tags = {
     Name = "subnet-1-default"
  }
}
```

Windows PowerShell

```
Terraform will perform the following actions:

  # aws_subnet.dev_subnet_1 will be updated in-place
  ~ resource "aws_subnet" "dev_subnet_1" {
        id                                             = "subnet-0fb103da9e81219cf"
      ~ tags                                           = {
          + "Name" = "subnet-1-dev"
        }
      ~ tags_all                                       = {
          + "Name" = "subnet-1-dev"
        }
        # (20 unchanged attributes hidden)
    }

  # aws_subnet.dev_subnet_1_existing will be updated in-place
  ~ resource "aws_subnet" "dev_subnet_1_existing" {
        id                                             = "subnet-0b4e36c672802bbb1"
      ~ tags                                           = {
          + "Name" = "subnet-1-default"
        }
      ~ tags_all                                       = {
          + "Name" = "subnet-1-default"
        }
        # (20 unchanged attributes hidden)
    }

  # aws_vpc.development_vpc will be updated in-place
  ~ resource "aws_vpc" "development_vpc" {
        id                                   = "vpc-06a76bcaabab249f0"
      ~ tags                                 = {
          + "Name"    = "development"
          + "vpc_env" = "dev"
        }
      ~ tags_all                             = {
          + "Name"    = "development"
          + "vpc_env" = "dev"
        }
        # (19 unchanged attributes hidden)
    }

Plan: 0 to add, 3 to change, 0 to destroy.
aws_vpc.development_vpc: Modifying... [id=vpc-06a76bcaabab249f0]
aws_subnet.dev_subnet_1_existing: Modifying... [id=subnet-0b4e36c672802bbb1]
aws_subnet.dev_subnet_1_existing: Modifications complete after 1s [id=subnet-0b4e36c672802bbb1]
aws_vpc.development_vpc: Modifications complete after 1s [id=vpc-06a76bcaabab249f0]
aws_subnet.dev_subnet_1: Modifying... [id=subnet-0fb103da9e81219cf]
aws_subnet.dev_subnet_1: Modifications complete after 0s [id=subnet-0fb103da9e81219cf]

Apply complete! Resources: 0 added, 3 changed, 0 destroyed.
```

Windows PowerShell

```
provider "aws" {
  shared_config_files      = ["~/.aws/config"]
  shared_credentials_files = ["~/.aws/credentials"]
}
data "aws_vpc" "existing_vpc" {
  default = true
}
resource "aws_vpc" "development_vpc" {
  cidr_block = "10.0.0.0/16"
  tags = {
     Name = "development"
  }
}

resource "aws_subnet" "dev_subnet_1" {
  vpc_id     = aws_vpc.development_vpc.id
  cidr_block = "10.0.10.0/24"
  availability_zone = "me-central-1a"
  tags = {
     Name = "subnet-1-dev"
  }
}

resource "aws_subnet" "dev_subnet_1_existing" {
  vpc_id     = data.aws_vpc.existing_vpc.id
  cidr_block = "172.31.48.0/24"
  availability_zone = "me-central-1a"
  tags = {
     Name = "subnet-1-default"
  }
}
```

```
@Umber-qasim /workspaces/Labs (main) $ terraform plan
data.aws_vpc.existing_vpc: Reading...
aws_vpc.development_vpc: Refreshing state... [id=vpc-06a76bcaabab249f0]
data.aws_vpc.existing_vpc: Read complete after 1s [id=vpc-0d2fbb78883682acc]
aws_subnet.dev_subnet_1_existing: Refreshing state... [id=subnet-0b4e36c672802bbb1]
aws_subnet.dev_subnet_1: Refreshing state... [id=subnet-0fb103da9e81219cf]

Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the following symbols:
  ~ update in-place

Terraform will perform the following actions:

  # aws_vpc.development_vpc will be updated in-place
  ~ resource "aws_vpc" "development_vpc" {
        id                                   = "vpc-06a76bcaabab249f0"
      ~ tags                                 = {
            "Name"    = "development"
          - "vpc_env" = "dev" -> null
        }
      ~ tags_all                             = {
            "vpc_env" = "dev" -> null
            # (1 unchanged element hidden)
        }
        # (19 unchanged attributes hidden)
    }

Plan: 0 to add, 1 to change, 0 to destroy.

Note: You didn't use the -out option to save this plan, so Terraform can't guarantee to take exactly these actions if you run "terraform apply" now.
```

```
@Umber-qasim /workspaces/Lab9 (main) $ terraform apply -auto-approve
data.aws_vpc.existing_vpc: Reading...
aws_vpc.development_vpc: Refreshing state... [id=vpc-06a76bcaabab249f0]
data.aws_vpc.existing_vpc: Read complete after 1s [id=vpc-0d2fbb78883682acc]
aws_subnet.dev_subnet_1_existing: Refreshing state... [id=subnet-0b4e36c672802bbb1]
aws_subnet.dev_subnet_1: Refreshing state... [id=subnet-0fb103da9e81219cf]

Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the following symbols:
  ~ update in-place

Terraform will perform the following actions:

  # aws_vpc.development_vpc will be updated in-place
  ~ resource "aws_vpc" "development_vpc" {
        id                                   = "vpc-06a76bcaabab249f0"
      ~ tags                                 = {
            "Name"    = "development"
          - "vpc_env" = "dev" -> null
        }
      ~ tags_all                             = {
          - "vpc_env" = "dev" -> null
            # (1 unchanged element hidden)
        }
        # (19 unchanged attributes hidden)
    }

Plan: 0 to add, 1 to change, 0 to destroy.
aws_vpc.development_vpc: Modifying... [id=vpc-06a76bcaabab249f0]
aws_vpc.development_vpc: Modifications complete after 1s [id=vpc-06a76bcaabab249f0]

Apply complete! Resources: 0 added, 1 changed, 0 destroyed.
```

Task#05: State File Inspection & Terraform State Commands

```
Windows PowerShell
      vpc_id                                 = "vpc-0d2fbb78883682acc" -> null
      # (4 unchanged attributes hidden)
  }

  # aws_vpc.development_vpc will be destroyed
  - resource "aws_vpc" "development_vpc" {
      - arn                                  = "arn:aws:ec2:me-central-1:458862189705:vpc/vpc-06a76bcaabab249f0" -> null
      - assign_generated_ipv6_cidr_block     = false -> null
      - cidr_block                           = "10.0.0.0/16" -> null
      - default_network_acl_id               = "acl-0212f0d973dc9d983" -> null
      - default_route_table_id               = "rtb-0e9858ae87fd69ae0" -> null
      - default_security_group_id            = "sg-083c2d754dd45b6bd" -> null
      - dhcp_options_id                      = "dopt-0f6507644ddf11aee" -> null
      - enable_dns_hostnames                 = false -> null
      - enable_dns_support                   = true -> null
      - enable_network_address_usage_metrics = false -> null
      - id                                   = "vpc-06a76bcaabab249f0" -> null
      - instance_tenancy                     = "default" -> null
      - ipv6_netmask_length                  = 0 -> null
      - main_route_table_id                  = "rtb-0e9858ae87fd69ae0" -> null
      - owner_id                             = "458862189705" -> null
      - region                               = "me-central-1" -> null
      - tags                                 = {
          - "Name" = "development"
        } -> null
      - tags_all                             = {
          - "Name" = "development"
        } -> null
        # (4 unchanged attributes hidden)
    }

Plan: 0 to add, 0 to change, 3 to destroy.

Do you really want to destroy all resources?
  Terraform will destroy all your managed infrastructure, as shown above.
  There is no undo. Only 'yes' will be accepted to confirm.

  Enter a value: yes

aws_subnet.dev_subnet_1: Destroying... [id=subnet-0fb103da9e81219cf]
aws_subnet.dev_subnet_1_existing: Destroying... [id=subnet-0b4e36c672802bbb1]
aws_subnet.dev_subnet_1_existing: Destruction complete after 1s
aws_subnet.dev_subnet_1: Destruction complete after 1s
aws_vpc.development_vpc: Destroying... [id=vpc-06a76bcaabab249f0]
aws_vpc.development_vpc: Destruction complete after 1s

Destroy complete! Resources: 3 destroyed.
@Umber-qasim /workspaces/Lab9 (main) $
```

```
@Umber-qasim /workspaces/Lab9 (main) $ cat terraform.tfstate
{
  "version": 4,
  "terraform_version": "1.14.2",
  "serial": 30,
  "lineage": "a672c5fb-df2a-83c6-d356-4c301462ad6b",
  "outputs": {},
  "resources": [],
  "check_results": null
}
```

Windows PowerShell


```
      "type": "aws_vpc",
      "name": "development_vpc",
      "provider": "provider[\"registry.terraform.io/hashicorp/aws\"]",
      "instances": [
        {
          "schema_version": 1,
          "attributes": {
            "arn": "arn:aws:ec2:me-central-1:458862189705:vpc/vpc-06a76bcaabab249f0",
            "assign_generated_ipv6_cidr_block": false,
            "cidr_block": "10.0.0.0/16",
            "default_network_acl_id": "acl-0212f0d973dc9d983",
            "default_route_table_id": "rtb-0e9858ae87fd69ae0",
            "default_security_group_id": "sg-083c2d754dd45b6bd",
            "dhcp_options_id": "dopt-0f6507644ddf11aee",
            "enable_dns_hostnames": false,
            "enable_dns_support": true,
            "enable_network_address_usage_metrics": false,
            "id": "vpc-06a76bcaabab249f0",
            "instance_tenancy": "default",
            "ipv4_ipam_pool_id": null,
            "ipv4_netmask_length": null,
            "ipv6_association_id": "",
            "ipv6_cidr_block": "",
            "ipv6_cidr_block_network_border_group": "",
            "ipv6_ipam_pool_id": "",
            "ipv6_netmask_length": 0,
            "main_route_table_id": "rtb-0e9858ae87fd69ae0",
            "owner_id": "458862189705",
            "region": "me-central-1",
            "tags": {
              "Name": "development"
            },
            "tags_all": {
              "Name": "development"
            }
          },
          "sensitive_attributes": [],
          "identity_schema_version": 0,
          "identity": {
            "account_id": "458862189705",
            "id": "vpc-06a76bcaabab249f0",
            "region": "me-central-1"
          },
          "private": "eyJzY2hlbWFfdmVyc2lvbiI6IjEifQ=="
        }
      ]
    }
  ],
  "check_results": null
}
```

Windows PowerShell

```
      + tags_all                                             = {
          + "Name" = "subnet-1-default"
        }
      + vpc_id                                               = "vpc-0d2fbb78883682acc"
    }

  # aws_vpc.development_vpc will be created
  + resource "aws_vpc" "development_vpc" {
      + arn                                  = (known after apply)
      + cidr_block                           = "10.0.0.0/16"
      + default_network_acl_id               = (known after apply)
      + default_route_table_id               = (known after apply)
      + default_security_group_id            = (known after apply)
      + dhcp_options_id                      = (known after apply)
      + enable_dns_hostnames                 = (known after apply)
      + enable_dns_support                   = true
      + enable_network_address_usage_metrics = (known after apply)
      + id                                   = (known after apply)
      + instance_tenancy                     = "default"
      + ipv6_association_id                  = (known after apply)
      + ipv6_cidr_block                      = (known after apply)
      + ipv6_cidr_block_network_border_group = (known after apply)
      + main_route_table_id                  = (known after apply)
      + owner_id                             = (known after apply)
      + region                               = "me-central-1"
      + tags                                 = {
          + "Name" = "development"
        }
      + tags_all                             = {
          + "Name" = "development"
        }
    }

Plan: 3 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: yes

aws_subnet.dev_subnet_1_existing: Creating...
aws_vpc.development_vpc: Creating...
aws_subnet.dev_subnet_1_existing: Creation complete after 1s [id=subnet-06e2640d0bb081093]
aws_vpc.development_vpc: Creation complete after 2s [id=vpc-0ce05585d66c2ce76]
aws_subnet.dev_subnet_1: Creating...
aws_subnet.dev_subnet_1: Creation complete after 0s [id=subnet-09ab173445bc41da0]

Apply complete! Resources: 3 added, 0 changed, 0 destroyed.
```

Windows PowerShell


```
      "name": "development_vpc",
      "provider": "provider[\"registry.terraform.io/hashicorp/aws\"]",
      "instances": [
        {
          "schema_version": 1,
          "attributes": {
            "arn": "arn:aws:ec2:me-central-1:458862189705:vpc/vpc-0ce05585d66c2ce76",
            "assign_generated_ipv6_cidr_block": false,
            "cidr_block": "10.0.0.0/16",
            "default_network_acl_id": "acl-079f916a2b2017be3",
            "default_route_table_id": "rtb-0451e25e743f06c3e",
            "default_security_group_id": "sg-0ebe46d7f357bb03a",
            "dhcp_options_id": "dopt-0f6507644ddf11aee",
            "enable_dns_hostnames": false,
            "enable_dns_support": true,
            "enable_network_address_usage_metrics": false,
            "id": "vpc-0ce05585d66c2ce76",
            "instance_tenancy": "default",
            "ipv4_ipam_pool_id": null,
            "ipv4_netmask_length": null,
            "ipv6_association_id": "",
            "ipv6_cidr_block": "",
            "ipv6_cidr_block_network_border_group": "",
            "ipv6_ipam_pool_id": "",
            "ipv6_netmask_length": 0,
            "main_route_table_id": "rtb-0451e25e743f06c3e",
            "owner_id": "458862189705",
            "region": "me-central-1",
            "tags": {
              "Name": "development"
            },
            "tags_all": {
              "Name": "development"
            }
          },
          "sensitive_attributes": [],
          "identity_schema_version": 0,
          "identity": {
            "account_id": "458862189705",
            "id": "vpc-0ce05585d66c2ce76",
            "region": "me-central-1"
          },
          "private": "eyJzY2hlbWFfdmVyc2lvbiI6IjEifQ=="
        }
      ]
    }
  ],
  "check_results": null
}
```


```
@Umber-qasim /workspaces/Lab9 (main) $ cat terraform.tfstate.backup
```


```
{
  "version": 4,
  "terraform_version": "1.14.2",
  "serial": 30,
  "lineage": "a672c5fb-df2a-83c6-d356-4c301462ad6b",
  "outputs": {},
  "resources": [],
  "check_results": null
}
```

```
@Umber-qasim /workspaces/Lab9 (main) $ terraform state list
data.aws_vpc.existing_vpc
aws_subnet.dev_subnet_1
aws_subnet.dev_subnet_1_existing
aws_vpc.development_vpc
```

```
@Umber-qasim /workspaces/Lab9 (main) $ terraform state show aws_vpc.development_vpc
# aws_vpc.development_vpc:
resource "aws_vpc" "development_vpc" {
    arn                                  = "arn:aws:ec2:me-central-1:458862189705:vpc/vpc-0ce05585d66c2ce76"
    assign_generated_ipv6_cidr_block     = false
    cidr_block                           = "10.0.0.0/16"
    default_network_acl_id               = "acl-079f916a2b2017be3"
    default_route_table_id               = "rtb-0451e25e743f06c3e"
    default_security_group_id            = "sg-0ebe46d7f357bb03a"
    dhcp_options_id                      = "dopt-0f6507644ddf11aee"
    enable_dns_hostnames                 = false
    enable_dns_support                   = true
    enable_network_address_usage_metrics = false
    id                                   = "vpc-0ce05585d66c2ce76"
    instance_tenancy                     = "default"
    ipv6_association_id                  = null
    ipv6_cidr_block                      = null
    ipv6_cidr_block_network_border_group = null
    ipv6_ipam_pool_id                    = null
    ipv6_netmask_length                  = 0
    main_route_table_id                  = "rtb-0451e25e743f06c3e"
    owner_id                             = "458862189705"
    region                               = "me-central-1"
    tags                                 = {
        "Name" = "development"
    }
    tags_all                             = {
        "Name" = "development"
    }
}
```

Task#06: Terraform Outputs & Attributes Reporting

Windows PowerShell

```
provider "aws" {
  shared_config_files      = ["~/.aws/config"]
  shared_credentials_files = ["~/.aws/credentials"]
}
data "aws_vpc" "existing_vpc" {
  default = true
}
resource "aws_vpc" "development_vpc" {
  cidr_block = "10.0.0.0/16"
  tags = {
     Name = "development"
  }
}

resource "aws_subnet" "dev_subnet_1" {
  vpc_id     = aws_vpc.development_vpc.id
  cidr_block = "10.0.10.0/24"
  availability_zone = "me-central-1a"
  tags = {
     Name = "subnet-1-dev"
  }
}

resource "aws_subnet" "dev_subnet_1_existing" {
  vpc_id     = data.aws_vpc.existing_vpc.id
  cidr_block = "172.31.48.0/24"
  availability_zone = "me-central-1a"
  tags = {
     Name = "subnet-1-default"
  }
}
output "dev-vpc-id" {
  value = aws_vpc.development_vpc.id
}

output "dev-subnet-id" {
  value = aws_subnet.dev_subnet_1.id
}

output "dev-vpc-arn" {
  value = aws_vpc.development_vpc.arn
}

output "dev-subnet-arn" {
  value = aws_subnet.dev_subnet_1.arn
}
```

```
@Umber-qasim /workspaces/Lab9 (main) $ vim main.tf
@Umber-qasim /workspaces/Lab9 (main) $ terraform apply
data.aws_vpc.existing_vpc: Reading...
aws_vpc.development_vpc: Refreshing state... [id=vpc-0ce05585d66c2ce76]
data.aws_vpc.existing_vpc: Read complete after 0s [id=vpc-0d2fbb78883682acc]
aws_subnet.dev_subnet_1_existing: Refreshing state... [id=subnet-06e2640d0bb081093]
aws_subnet.dev_subnet_1: Refreshing state... [id=subnet-09ab173445bc41da0]

Changes to Outputs:
  + dev-subnet-arn = "arn:aws:ec2:me-central-1:458862189705:subnet/subnet-09ab173445bc41da0"
  + dev-subnet-id  = "subnet-09ab173445bc41da0"
  + dev-vpc-arn    = "arn:aws:ec2:me-central-1:458862189705:vpc/vpc-0ce05585d66c2ce76"
  + dev-vpc-id     = "vpc-0ce05585d66c2ce76"

You can apply this plan to save these new output values to the Terraform state, without changing any real infrastructure.

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

  Enter a value: yes


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

Outputs:

dev-subnet-arn = "arn:aws:ec2:me-central-1:458862189705:subnet/subnet-09ab173445bc41da0"
dev-subnet-id = "subnet-09ab173445bc41da0"
dev-vpc-arn = "arn:aws:ec2:me-central-1:458862189705:vpc/vpc-0ce05585d66c2ce76"
dev-vpc-id = "vpc-0ce05585d66c2ce76"
```

Windows PowerShell

```
}
output "dev-vpc-id" {
  value = aws_vpc.development_vpc.id
}

output "dev-subnet-id" {
  value = aws_subnet.dev_subnet_1.id
}

output "dev-vpc-arn" {
  value = aws_vpc.development_vpc.arn
}

output "dev-subnet-arn" {
  value = aws_subnet.dev_subnet_1.arn
}

output "dev-vpc-cidr_block" {
  value = aws_vpc.development_vpc.cidr_block
}

output "dev-vpc-region" {
  value = aws_vpc.development_vpc.region
}

output "dev-vpc-tags_name" {
  value = aws_vpc.development_vpc.tags["Name"]
}

output "dev-vpc-tags_all" {
  value = aws_vpc.development_vpc.tags_all
}

output "dev-subnet-cidr_block" {
  value = aws_subnet.dev_subnet_1.cidr_block
}

output "dev-subnet-region" {
  value = aws_subnet.dev_subnet_1.availability_zone
}

output "dev-subnet-tags_name" {
  value = aws_subnet.dev_subnet_1.tags["Name"]
}

output "dev-subnet-tags_all" {
  value = aws_subnet.dev_subnet_1.tags_all
}
```

Windows PowerShell

```
data.aws_vpc.existing_vpc: Reading...
aws_vpc.development_vpc: Refreshing state... [id=vpc-0ce05585d66c2ce76]
data.aws_vpc.existing_vpc: Read complete after 0s [id=vpc-0d2fbb78883682acc]
aws_subnet.dev_subnet_1_existing: Refreshing state... [id=subnet-06e2640d0bb081093]
aws_subnet.dev_subnet_1: Refreshing state... [id=subnet-09ab173445bc41da0]

Changes to Outputs:
  + dev-subnet-cidr_block = "10.0.10.0/24"
  + dev-subnet-region     = "me-central-1a"
  + dev-subnet-tags_all   = {
      + Name = "subnet-1-dev"
    }
  + dev-subnet-tags_name  = "subnet-1-dev"
  + dev-vpc-cidr_block    = "10.0.0.0/16"
  + dev-vpc-region        = "me-central-1"
  + dev-vpc-tags_all      = {
      + Name = "development"
    }
  + dev-vpc-tags_name     = "development"

You can apply this plan to save these new output values to the Terraform state, without changing any real infrastructure.

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

  Enter a value: yes


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

Outputs:

dev-subnet-arn = "arn:aws:ec2:me-central-1:458862189705:subnet/subnet-09ab173445bc41da0"
dev-subnet-cidr_block = "10.0.10.0/24"
dev-subnet-id = "subnet-09ab173445bc41da0"
dev-subnet-region = "me-central-1a"
dev-subnet-tags_all = tomap({
  "Name" = "subnet-1-dev"
})
dev-subnet-tags_name = "subnet-1-dev"
dev-vpc-arn = "arn:aws:ec2:me-central-1:458862189705:vpc/vpc-0ce05585d66c2ce76"
dev-vpc-cidr_block = "10.0.0.0/16"
dev-vpc-id = "vpc-0ce05585d66c2ce76"
dev-vpc-region = "me-central-1"
dev-vpc-tags_all = tomap({
  "Name" = "development"
})
dev-vpc-tags_name = "development"
```

Destroy all resources

Windows PowerShell

```
      - id                                  = "vpc-0ce05585d66c2ce76" -> null
      - instance_tenancy                    = "default" -> null
      - ipv6_netmask_length                 = 0 -> null
      - main_route_table_id                 = "rtb-0451e25e743f06c3e" -> null
      - owner_id                            = "458862189705" -> null
      - region                              = "me-central-1" -> null
      - tags                                = {
          - "Name" = "development"
        } -> null
      - tags_all                            = {
          - "Name" = "development"
        } -> null
        # (4 unchanged attributes hidden)
    }

Plan: 0 to add, 0 to change, 3 to destroy.

Changes to Outputs:
  - dev-subnet-arn        = "arn:aws:ec2:me-central-1:458862189705:subnet/subnet-09ab173445bc41da0" -> null
  - dev-subnet-cidr_block = "10.0.10.0/24" -> null
  - dev-subnet-id         = "subnet-09ab173445bc41da0" -> null
  - dev-subnet-region     = "me-central-1a" -> null
  - dev-subnet-tags_all   = {
      - Name = "subnet-1-dev"
    } -> null
  - dev-subnet-tags_name  = "subnet-1-dev" -> null
  - dev-vpc-arn           = "arn:aws:ec2:me-central-1:458862189705:vpc/vpc-0ce05585d66c2ce76" -> null
  - dev-vpc-cidr_block    = "10.0.0.0/16" -> null
  - dev-vpc-id            = "vpc-0ce05585d66c2ce76" -> null
  - dev-vpc-region        = "me-central-1" -> null
  - dev-vpc-tags_all      = {
      - Name = "development"
    } -> null
  - dev-vpc-tags_name     = "development" -> null

Do you really want to destroy all resources?
  Terraform will destroy all your managed infrastructure, as shown above.
  There is no undo. Only 'yes' will be accepted to confirm.

  Enter a value: yes

aws_subnet.dev_subnet_1_existing: Destroying... [id=subnet-06e2640d0bb081093]
aws_subnet.dev_subnet_1: Destroying... [id=subnet-09ab173445bc41da0]
aws_subnet.dev_subnet_1: Destruction complete after 1s
aws_subnet.dev_subnet_1_existing: Destruction complete after 1s
aws_vpc.development_vpc: Destroying... [id=vpc-0ce05585d66c2ce76]
aws_vpc.development_vpc: Destruction complete after 1s

Destroy complete! Resources: 3 destroyed.
```

Inspect state files

Windows PowerShell


```
      "name": "development_vpc",
      "provider": "provider[\"registry.terraform.io/hashicorp/aws\"]",
      "instances": [
        {
          "schema_version": 1,
          "attributes": {
            "arn": "arn:aws:ec2:me-central-1:458862189705:vpc/vpc-0ce05585d66c2ce76",
            "assign_generated_ipv6_cidr_block": false,
            "cidr_block": "10.0.0.0/16",
            "default_network_acl_id": "acl-079f916a2b2017be3",
            "default_route_table_id": "rtb-0451e25e743f06c3e",
            "default_security_group_id": "sg-0ebe46d7f357bb03a",
            "dhcp_options_id": "dopt-0f6507644ddf11aee",
            "enable_dns_hostnames": false,
            "enable_dns_support": true,
            "enable_network_address_usage_metrics": false,
            "id": "vpc-0ce05585d66c2ce76",
            "instance_tenancy": "default",
            "ipv4_ipam_pool_id": null,
            "ipv4_netmask_length": null,
            "ipv6_association_id": "",
            "ipv6_cidr_block": "",
            "ipv6_cidr_block_network_border_group": "",
            "ipv6_ipam_pool_id": "",
            "ipv6_netmask_length": 0,
            "main_route_table_id": "rtb-0451e25e743f06c3e",
            "owner_id": "458862189705",
            "region": "me-central-1",
            "tags": {
              "Name": "development"
            },
            "tags_all": {
              "Name": "development"
            }
          },
          "sensitive_attributes": [],
          "identity_schema_version": 0,
          "identity": {
            "account_id": "458862189705",
            "id": "vpc-0ce05585d66c2ce76",
            "region": "me-central-1"
          },
          "private": "eyJzY2hlbWFfdmVyc2lvbiI6IjEifQ=="
        }
      ]
    }
  ],
  "check_results": null
}
```