CLOUD COMPUTING LAB
BSE (V-B)

Submitted By:

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Roll No:

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Submitted To:

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LAB 11

GH CLI Codespaces + AWS + Terraform: Variables, Collections, Sensitivity & EC2 Provisioning

Task 0 – Lab Setup (Codespace & GH CLI)

- Codespace Creation and Listing Output

```
PS C:\Users\Musfi\CC_MusfiraFarooq_0514_Lab11> gh codespace create --repo Musfira-0514/CC_MusfiraFarooq_0514_Lab11
  ✓ Codespaces usage for this repository is paid for by Musfira-0514
? Choose Machine Type: 2 cores, 8 GB RAM, 32 GB storage
didactic-rotary-phone-97gj757p4j5qc79v9
PS C:\Users\Musfi\CC_MusfiraFarooq_0514_Lab11> gh codespace list
NAME                          DISPLAY NAME          REPOSITORY            BRANCH  STATE      CREATED AT
effective-space-orbit-97gj757...  effective space orbit  Musfira-0514/lab-9    main*   Shutdown   about 2 days ago
didactic-rotary-phone-97gj757...  didactic rotary-phone  Musfira-0514/CC_Musf...  main    Available  about 2 minutes ago
PS C:\Users\Musfi\CC_MusfiraFarooq_0514_Lab11>
```

- Codespace SSH Connection Terminal

```
PS C:\Users\Musfi\CC_MusfiraFarooq_0514_Lab11> gh codespace ssh -c didactic-rotary-phone-97gj757p4j5qc79v9
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

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

@Musfira-0514 → /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $
```

Task 1 – Provider & Basic Variable (Variable Precedence)

- main.tf File Creation

```
@Musfira-0514 → /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ touch main.tf
@Musfira-0514 → /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $
```

- AWS Provider Block Added

```
@Musfira-0514 → /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ nano main.tf
@Musfira-0514 → /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ cat main.tf
provider "aws" {
  shared_config_files      = ["~/.aws/config"]
  shared_credentials_files = ["~/.aws/credentials"]
}
@Musfira-0514 → /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $
```

- Terraform Initialization Output

```
@Musfira-0514 → /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ terraform init
Initializing the backend...
Initializing provider plugins...
- Finding latest version of hashicorp/aws...
- Installing hashicorp/aws v6.27.0...
- Installed hashicorp/aws v6.27.0 (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!
```

- Variable and Output Blocks Added

```
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ nano main.tf
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ cat main.tf
provider "aws" {
  shared_config_files      = ["~/.aws/config"]
  shared_credentials_files = ["~/.aws/credentials"]
}

variable "subnet_cidr_block" {
  type = string
}

output "subnet_cidr_block_output" {
  value = var.subnet_cidr_block
}
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $
```

- Terraform Apply Prompting for Variable Input

```
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ terraform apply -auto-approve
# it will prompt for the value of subnet_cidr_block
var.subnet_cidr_block
  Enter a value: 10.0.10.0/24


Changes to Outputs:
  + subnet_cidr_block_output = "10.0.10.0/24"

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

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

Outputs:

subnet_cidr_block_output = "10.0.10.0/24"
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $
```

- Terraform Apply Using Default Value

```
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ nano main.tf
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ cat main.tf
provider "aws" {
  shared_config_files      = ["~/.aws/config"]
  shared_credentials_files = ["~/.aws/credentials"]
}

variable "subnet_cidr_block" {
  default = "10.0.0.0/24"
  type = string

}

output "subnet_cidr_block_output" {
  value = var.subnet_cidr_block
}
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ terraform apply -auto-approve

Changes to Outputs:
  ~ subnet_cidr_block_output = "10.0.10.0/24" -> "10.0.0.0/24"

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

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

Outputs:

subnet_cidr_block_output = "10.0.0.0/24"
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $
```

- Apply with Environment Variable TF_VAR

```
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ export TF_VAR_subnet_cidr_block=10.0.20.0/24
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ terraform apply -auto-approve

Changes to Outputs:
  ~ subnet_cidr_block_output = "10.0.0.0/24" -> "10.0.20.0/24"

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

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

Outputs:

subnet_cidr_block_output = "10.0.20.0/24"
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $
```

- Apply Using terraform.tfvars Values

```
subnet_cidr_block_output = "10.0.20.0/24"
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ touch terraform.tfvars
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ nano terraform.tfvars
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ cat terraform.tfvars
subnet_cidr_block = "10.0.30.0/24"
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ terraform apply -auto-approve

Changes to Outputs:
  ~ subnet_cidr_block_output = "10.0.20.0/24" -> "10.0.30.0/24"

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

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

Outputs:

subnet_cidr_block_output = "10.0.30.0/24"
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $
```

- Apply with -var Override

```
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ terraform apply -auto-approve -var "subnet_cidr_block=10.0.40.0/24"

Changes to Outputs:
  ~ subnet_cidr_block_output = "10.0.30.0/24" -> "10.0.40.0/24"

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

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

Outputs:

subnet_cidr_block_output = "10.0.40.0/24"
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $
```

- TF_VAR Environment Variable Before and After Unset

```
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ printenv | grep TF_VAR_
unset TF_VAR_subnet_cidr_block
printenv | grep TF_VAR_
TF_VAR_subnet_cidr_block=10.0.20.0/24
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $
```

Task 2 – Variable Validation & Sensitive/Ephemeral Variables

- Subnet CIDR Variable with Validation

```
  GNU nano 7.2
provider "aws" {
  shared_config_files      = ["~/.aws/config"]
  shared_credentials_files = ["~/.aws/credentials"]
}
variable "subnet_cidr_block" {
  type        = string
  default     = ""
  description = "CIDR block to assign to the application subnet"
  sensitive   = false
  nullable    = false
  ephemeral   = false

  validation {
    condition     = can(regex("^([0-9]{1,3}\\.){3}[0-9]{1,3}/[0-9]+$", var.subnet_cidr_block))
    error_message = "The subnet_cidr_block must be a valid CIDR notation string, such as 10.0.0.0/24."
  }
}
```

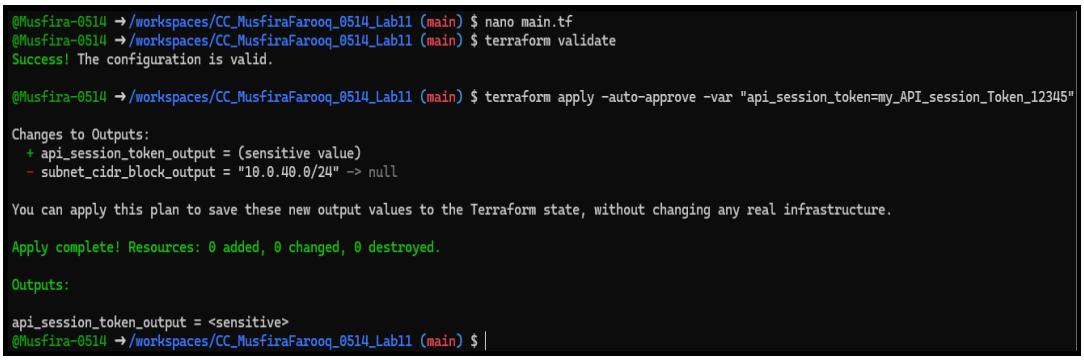
- Validation Error for Invalid Subnet CIDR

```
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ nano main.tf
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ terraform apply -auto-approve -var "subnet_cidr_block=10.0.0"

Error: Invalid value for variable

  on main.tf line 5:
   5: variable "subnet_cidr_block" {
    ├────────────────
    │ var.subnet_cidr_block is "10.0.0"

The subnet_cidr_block must be a valid CIDR notation string, such as 10.0.0.0/24.

This was checked by the validation rule at main.tf:13,3-13.

@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $
```

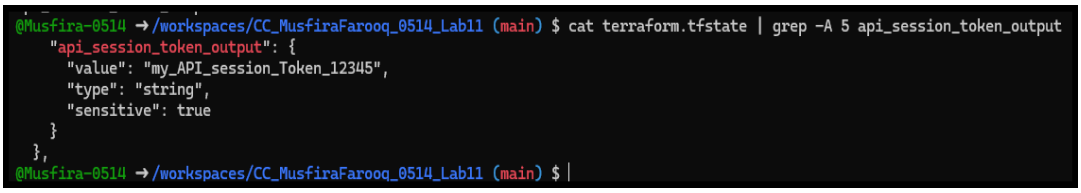
- Sensitive API Session Token Variable Added

```
  GNU nano 7.2                                                                main.tf *
provider "aws" {
  shared_config_files      = ["~/.aws/config"]
  shared_credentials_files = ["~/.aws/credentials"]
}
variable "subnet_cidr_block" {
  type        = string
  default     = ""
  description = "CIDR block to assign to the application subnet"
  sensitive   = false
  nullable    = false
  ephemeral   = false

  validation {
    condition     = can(regex("^([0-9]{1,3}\\.){3}[0-9]{1,3}/[0-9]+$", var.subnet_cidr_block))
    error_message = "The subnet_cidr_block must be a valid CIDR notation string, such as 10.0.0.0/24."
  }
}
variable "api_session_token" {
  type        = string
  default     = ""
  description = "Short-lived API session token used during apply operations"
  sensitive   = true
  nullable    = false
  ephemeral   = false

  validation {
    condition     = can(regex("^[A-Za-z0-9-_]{20,}$", var.api_session_token))
    error_message = "The API session token must be at least 20 characters and contain only letters, numbers, hyphens, or underscores."
  }
}

output "api_session_token_output" {
  value     = var.api_session_token
  sensitive = true
}
```

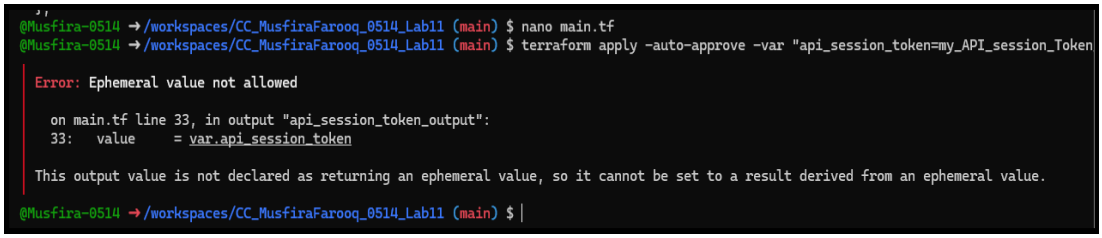
- Apply Output Masking Sensitive Variable



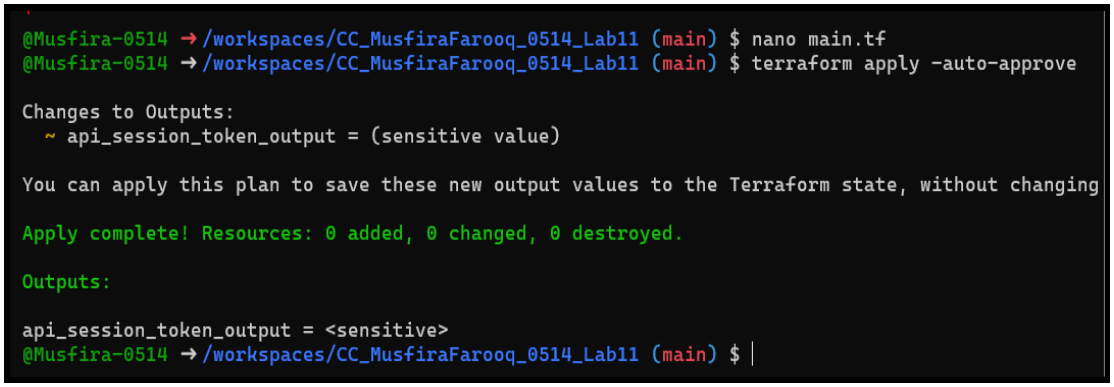
- Terraform State Showing Sensitive Output



- Behavior/Error with Ephemeral Variable



- Apply Output with Default Sensitive Value



Task 3 – Project-level Variables, Locals, and Outputs

- Project-level Variables Added

```
api_session_token_output = <sensitive>
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ nano main.tf
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ cat main.tf
provider "aws" {
  shared_config_files      = ["~/.aws/config"]
  shared_credentials_files = ["~/.aws/credentials"]
}
variable "environment" {}
variable "project_name" {}
variable "primary_subnet_id" {}
variable "subnet_count" {}
variable "monitoring" {}

variable "subnet_cidr_block" {
  type        = string
  default     = ""
  description = "CIDR block to assign to the application subnet"
  sensitive   = false
  nullable    = false
  ephemeral   = false

  validation {
    condition     = can(regex("^([0-9]{1,3}\\.){3}[0-9]{1,3}/[0-9]+$", var.subnet_cidr_block))
    error_message = "The subnet_cidr_block must be a valid CIDR notation string, such as 10.0.0.0/24."
  }
}
```

- terraform.tfvars Populated with Subnet ID and Other Values

```
Default output format [None]: json
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ aws ec2 describe-subnets \
  --filters "Name=availability-zone,Values=me-central-1a" \
  --query "Subnets[].SubnetId" \
  --output text
subnet-0fcf420e09b0ac86a
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ nano terraform.tfvars
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ cat terraform.tfvars
subnet_cidr_block = "10.0.30.0/24"
environment       = "dev"
project_name      = "lab_work"
primary_subnet_id = "subnet-0fcf420e09b0ac86a"
subnet_count      = 3
monitoring        = true
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $
```

- Locals.tf with Computed Values

```
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ touch locals.tf
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ nano locals.tf
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ cat locals.tf
locals {
  resource_name         = "${var.project_name}-${var.environment}"
  primary_public_subnet = var.primary_subnet_id
  subnet_count          = var.subnet_count
  is_production         = var.environment == "prod"
  monitoring_enabled    = var.monitoring || local.is_production
}
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $
```

- Terraform Apply Showing Outputs

```
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ nano main.tf
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ terraform apply -auto-approve

Changes to Outputs:
  + is_production            = false
  + monitoring_enabled       = true
  + primary_public_subnet    = "subnet-0fcf420e09b0ac86a"
  + resource_name            = "lab_work-dev"
  + subnet_count             = 3

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

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

Outputs:

api_session_token_output = <sensitive>
is_production = false
monitoring_enabled = true
primary_public_subnet = "subnet-0fcf420e09b0ac86a"
resource_name = "lab_work-dev"
subnet_count = 3
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $
```

Task 4 – Maps and Objects

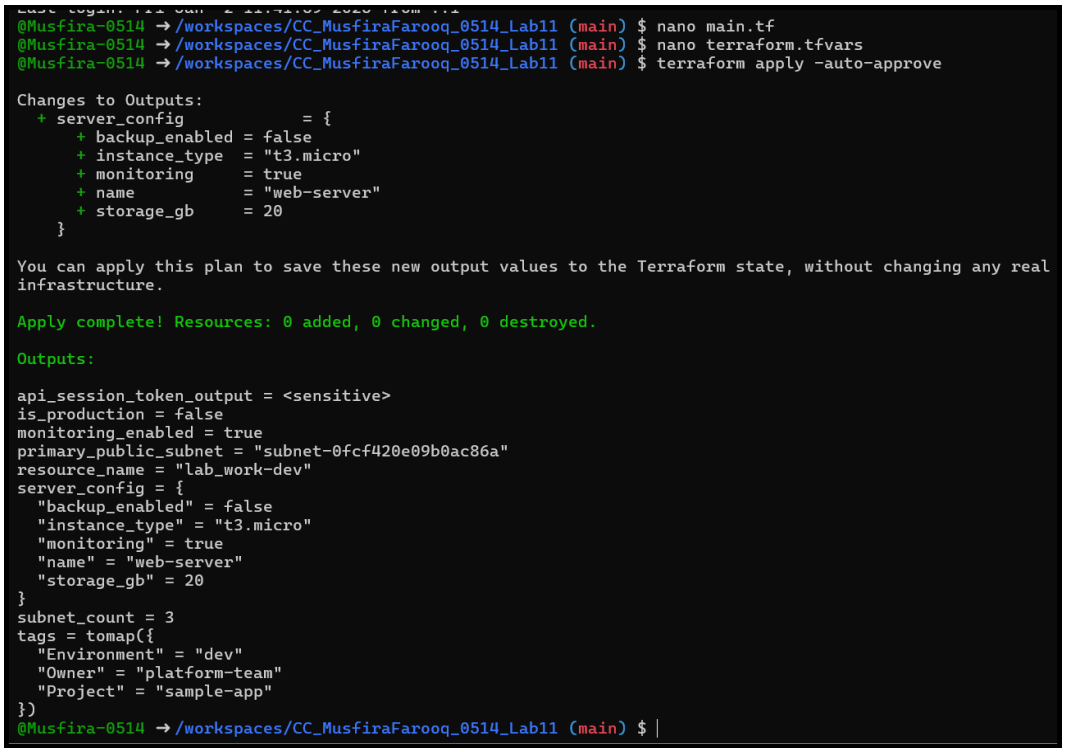
- Tags Map Variable and Output Added

```
output "monitoring_enabled" {
  value = local.monitoring_enabled
}

variable "tags" {
  type = map(string)
}

output "tags" {
  value = var.tags
}

^G Help          ^O Write Out      ^W
^X Exit          ^R Read File      ^\
```

- Terraform Apply Showing Tags Output

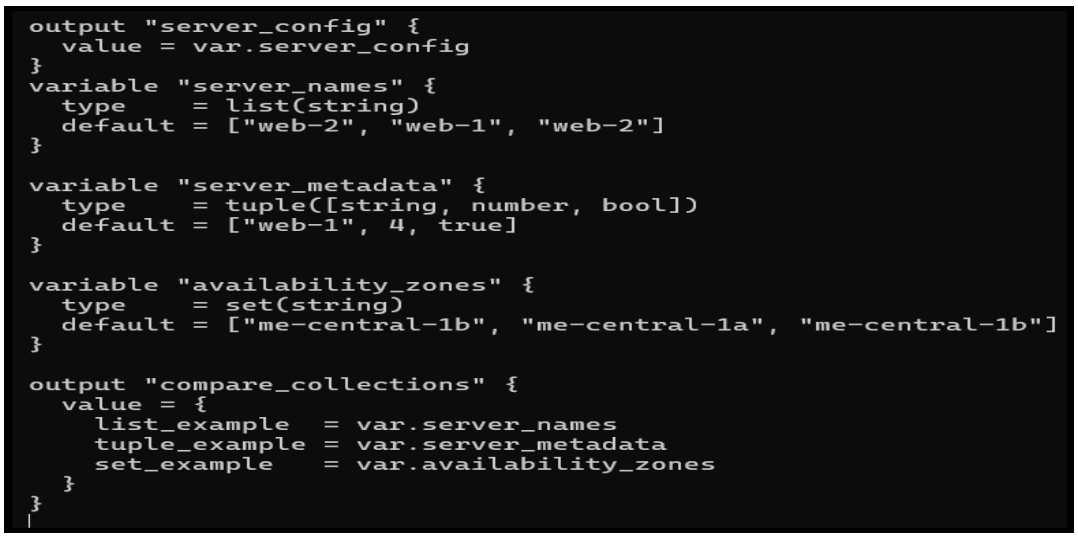
```
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ nano terraform.tfvars
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ terraform apply -auto-approve

Changes to Outputs:
  + tags                     = {
      + Environment = "dev"
      + Owner       = "platform-team"
      + Project     = "sample-app"
    }

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

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

Outputs:

api_session_token_output = <sensitive>
is_production = false
monitoring_enabled = true
primary_public_subnet = "subnet-0fcf420e09b0ac86a"
resource_name = "lab_work-dev"
subnet_count = 3
tags = tomap({
  "Environment" = "dev"
  "Owner" = "platform-team"
  "Project" = "sample-app"
})
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $
```

- Terraform Apply Showing Server Config Object



Task 5 – Collections: List, Tuple, Set & Mutation via Locals

- Collection Variables and Comparison Output Defined



- Terraform Apply Comparing Collections

```
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ nano main.tf
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ terraform apply -auto-approve

Changes to Outputs:
  + compare_collections      = {
      + list_example  = [
          + "web-2",
          + "web-1",
          + "web-2",
        ]
      + set_example   = [
          + "me-central-1a",
          + "me-central-1b",
        ]
      + tuple_example = [
          + "web-1",
          + 4,
          + true,
        ]
    }

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

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

Outputs:

api_session_token_output = <sensitive>
compare_collections = {
  "list_example" = tolist([
    "web-2",
    "web-1",
    "web-2",
  ])
  "set_example" = toset([
    "me-central-1a",
    "me-central-1b",
  ])
  "tuple_example" = [
    "web-1",
    4,
    true,
  ]
}
is_production = false
monitoring_enabled = true
primary_public_subnet = "subnet-0fcf420e09b0ac86a"
resource_name = "lab_work-dev"
server_config = {
  "backup_enabled" = false
  "instance_type" = "t3.micro"
  "monitoring" = true
  "name" = "web-server"
  "storage_gb" = 20
}
subnet_count = 3
tags = tomap({
  "Environment" = "dev"
  "Owner" = "platform-team"
  "Project" = "sample-app"
})
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $
```

- Locals.tf Showing Mutated List, Tuple, Set

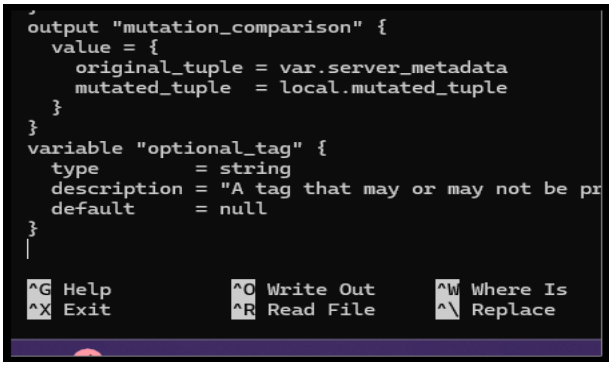
```
  GNU nano 7.2
locals {
  resource_name        = "${var.project_name}-${var.environment}"
  primary_public_subnet = var.primary_subnet_id
  subnet_count         = var.subnet_count
  is_production        = var.environment == "prod"
  monitoring_enabled   = var.monitoring || local.is_production
}
locals {
  mutated_list  = setunion(var.server_names, ["web-3"])
  mutated_tuple = setunion(var.server_metadata, ["web-2"])
  mutated_set   = setunion(var.availability_zones, ["me-central-1c"])
}
```

- Apply Output Comparing Original and Mutated Tuple

```
primary_public_subnet = "subnet-0fcf420e09b0ac86a"
resource_name = "lab_work-dev"
server_config = {
  "backup_enabled" = false
  "instance_type" = "t3.micro"
  "monitoring" = true
  "name" = "web-server"
  "storage_gb" = 20
}
subnet_count = 3
tags = tomap({
  "Environment" = "dev"
  "Owner" = "platform-team"
  "Project" = "sample-app"
})
@Musfira-0514 →/workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $
```

Task 6 – Null, Any Type & Dynamic Values

- Optional Tag Variable Added



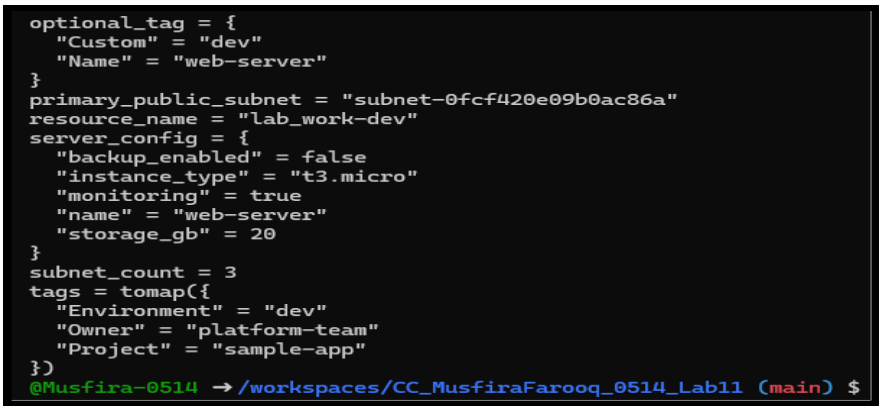
- Locals.tf Merge Logic

```
  GNU nano 7.2
locals {
  resource_name        = "${var.project_name}-${var.environment}"
  primary_public_subnet = var.primary_subnet_id
  subnet_count         = var.subnet_count
  is_production        = var.environment == "prod"
  monitoring_enabled   = var.monitoring || local.is_production
}
locals {
  mutated_list  = setunion(var.server_names, ["web-3"])
  mutated_tuple = setunion(var.server_metadata, ["web-2"])
  mutated_set   = setunion(var.availability_zones, ["me-central-1c"])
}
locals {
  server_tags = merge(
    { Name = "web-server" },
    var.optional_tag != null ? { Custom = var.optional_tag } : {}
  )
}
```

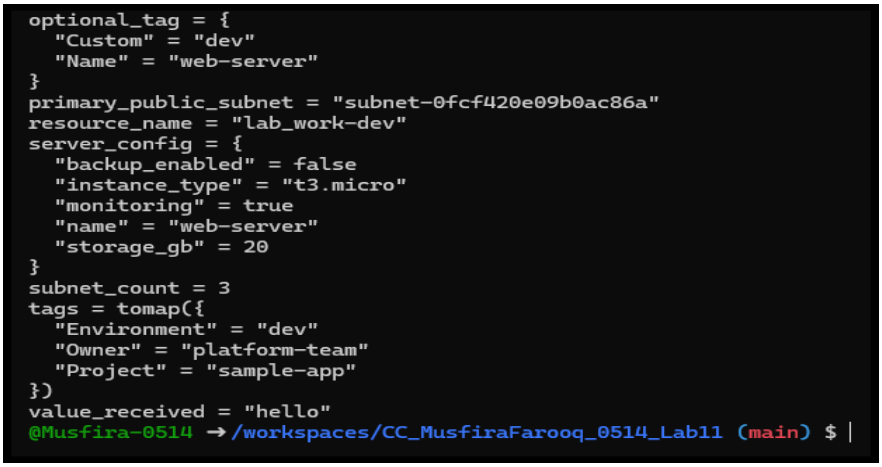
- Apply Output with No Optional Tag

```
optional_tag = {
  "Name" = "web-server"
}
primary_public_subnet = "subnet-0fcf420e09b0ac86a"
resource_name = "lab_work-dev"
server_config = {
  "backup_enabled" = false
  "instance_type" = "t3.micro"
  "monitoring" = true
  "name" = "web-server"
  "storage_gb" = 20
}
subnet_count = 3
tags = tomap({
  "Environment" = "dev"
  "Owner" = "platform-team"
  "Project" = "sample-app"
})
@Musfira-0514 →/workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $
```

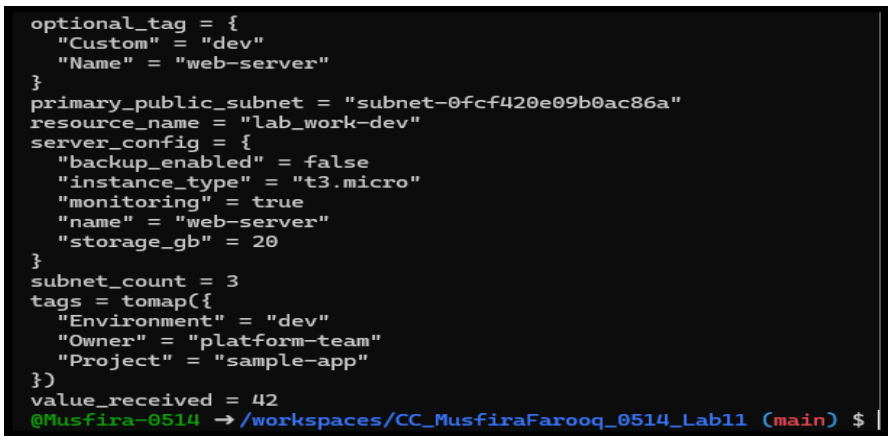
- Apply Output with Optional Tag Set



- Dynamic Value as String



- Dynamic Value as Number



- Dynamic Value as List

```
optional_tag = {
  "Custom" = "dev"
  "Name" = "web-server"
}
primary_public_subnet = "subnet-0fcf420e09b0ac86a"
resource_name = "lab_work-dev"
server_config = {
  "backup_enabled" = false
  "instance_type" = "t3.micro"
  "monitoring" = true
  "name" = "web-server"
  "storage_gb" = 20
}
subnet_count = 3
tags = tomap({
  "Environment" = "dev"
  "Owner" = "platform-team"
  "Project" = "sample-app"
})
value_received = [
  "a",
  "b",
  "c",
]
@Musfira-0514 →/workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $
```

- Dynamic Value as Map/Object

```
optional_tag = {
  "Custom" = "dev"
  "Name" = "web-server"
}
primary_public_subnet = "subnet-0fcf420e09b0ac86a"
resource_name = "lab_work-dev"
server_config = {
  "backup_enabled" = false
  "instance_type" = "t3.micro"
  "monitoring" = true
  "name" = "web-server"
  "storage_gb" = 20
}
subnet_count = 3
tags = tomap({
  "Environment" = "dev"
  "Owner" = "platform-team"
  "Project" = "sample-app"
})
value_received = {
  "cpu" = 4
  "name" = "server"
}
@Musfira-0514 →/workspaces/CC_MusfiraFarooq_0514_Lab11 (main)
```

- Dynamic Value as Null

```
optional_tag = {
  "Custom" = "dev"
  "Name" = "web-server"
}
primary_public_subnet = "subnet-0fcf420e09b0ac86a"
resource_name = "lab_work-dev"
server_config = {
  "backup_enabled" = false
  "instance_type" = "t3.micro"
  "monitoring" = true
  "name" = "web-server"
  "storage_gb" = 20
}
subnet_count = 3
tags = tomap({
  "Environment" = "dev"
  "Owner" = "platform-team"
  "Project" = "sample-app"
})
@Musfira-0514 →/workspaces/CC_MusfiraFarooq_0514_Lab11 (main)
```

Task 7 – Git Ignore

- .gitignore File Created with Terraform and PEM Exclusions

```
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ touch .gitignore
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ nano .gitignore
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ cat .gitignore
.terraform/*
*.tfstate
*.tfstate.*
*.tfvars
*.pem
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $
```

Task 8 – Clean-up then Build Real Infra (VPC, Subnet, IGW, Routing, Default Route Table)

- Cleaned terraform.tfvars, locals.tf, and main.tf

```
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ > terraform.tfvars
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ > locals.tf
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ nano main.tf
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ cat main.tf
provider "aws" {
  shared_config_files      = ["~/.aws/config"]
  shared_credentials_files = ["~/.aws/credentials"]
}
```

- Variables Recreated for VPC and Subnet

```
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ nano main.tf
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ cat main.tf
provider "aws" {
  shared_config_files      = ["~/.aws/config"]
  shared_credentials_files = ["~/.aws/credentials"]
}
variable "vpc_cidr_block" {}
variable "subnet_cidr_block" {}
variable "availability_zone" {}
variable "env_prefix" {}

@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $
```

- AWS VPC Resource Added

```
  GNU nano 7.2
provider "aws" {
  shared_config_files      = ["~/.aws/config"]
  shared_credentials_files = ["~/.aws/credentials"]
}
variable "vpc_cidr_block" {}
variable "subnet_cidr_block" {}
variable "availability_zone" {}
variable "env_prefix" {}

resource "aws_vpc" "myapp_vpc" {
  cidr_block = var.vpc_cidr_block
  tags = {
    Name = "${var.env_prefix}-vpc"
  }
}
```

- AWS Subnet Resource Added

```
resource "aws_subnet" "myapp_subnet_1" {
  vpc_id            = aws_vpc.myapp_vpc.id
  cidr_block        = var.subnet_cidr_block
  availability_zone = var.availability_zone
  tags = {
    Name = "${var.env_prefix}-subnet-1"
  }
}

^G Help          ^O Write Out    ^W Where Is
^X Exit          ^R Read File    ^\ Replace
```

- terraform.tfvars with VPC and Subnet Values

```
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ cat terraform.tfvars
vpc_cidr_block     = "10.0.0.0/16"
subnet_cidr_block  = "10.0.10.0/24"
availability_zone  = "me-central-1a"
env_prefix         = "dev"
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $
```

- Apply Output Showing VPC and Subnet Creation

```
aws_vpc.myapp_vpc: Creating...
aws_vpc.myapp_vpc: Creation complete after 2s [id=vpc-082dc18f7f537a050]
aws_subnet.myapp_subnet_1: Creating...
aws_subnet.myapp_subnet_1: Creation complete after 1s [id=subnet-0e87c5ddcc5ce0bd0]

Apply complete! Resources: 2 added, 0 changed, 0 destroyed.
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $
```

- AWS Console Showing IGW and Route Table Before Apply

```
resource "aws_subnet" "myapp_subnet_1" {
  vpc_id            = aws_vpc.myapp_vpc.id
  cidr_block        = var.subnet_cidr_block
  availability_zone = var.availability_zone
  tags = {
    Name = "${var.env_prefix}-subnet-1"
  }
}
resource "aws_internet_gateway" "myapp_igw" {
  vpc_id = aws_vpc.myapp_vpc.id
  tags = {
    Name = "${var.env_prefix}-igw"
  }
}

resource "aws_route_table" "myapp_route_table" {
  vpc_id = aws_vpc.myapp_vpc.id

  route {
    cidr_block = "0.0.0.0/0"
    gateway_id = aws_internet_gateway.myapp_igw.id
  }

  tags = {
    Name = "${var.env_prefix}-rt"
  }
}
```

- Terraform Apply Showing IGW and Route Table Creation

```
# aws_route_table.myapp_route_table will be created
+ resource "aws_route_table" "myapp_route_table" {
    + arn              = (known after apply)
    + id               = (known after apply)
    + owner_id         = (known after apply)
    + propagating_vgws = (known after apply)
    + region           = "me-central-1"
    + route            = [
        + {
            + cidr_block                = "0.0.0.0/0"
            + gateway_id                = (known after apply)
              # (11 unchanged attributes hidden)
          },
      ]
    + tags             = {
        + "Name" = "dev-rt"
      }
    + tags_all         = {
        + "Name" = "dev-rt"
      }
    + vpc_id           = "vpc-082dc18f7f537a050"
  }

Plan: 2 to add, 0 to change, 0 to destroy.
aws_internet_gateway.myapp_igw: Creating...
aws_internet_gateway.myapp_igw: Creation complete after 0s [id=igw-016d88f21585120fd]
aws_route_table.myapp_route_table: Creating...
aws_route_table.myapp_route_table: Creation complete after 1s [id=rtb-0f9e2408cab225b1d]

Apply complete! Resources: 2 added, 0 changed, 0 destroyed.
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $
```

- Default Route Table Resource Added

```
  GNU nano 7.2
provider "aws" {
  shared_config_files      = ["~/.aws/config"]
  shared_credentials_files = ["~/.aws/credentials"]
}
variable "vpc_cidr_block" {}
variable "subnet_cidr_block" {}
variable "availability_zone" {}
variable "env_prefix" {}

resource "aws_vpc" "myapp_vpc" {
  cidr_block = var.vpc_cidr_block
  tags = {
    Name = "${var.env_prefix}-vpc"
  }
}
resource "aws_subnet" "myapp_subnet_1" {
  vpc_id            = aws_vpc.myapp_vpc.id
  cidr_block        = var.subnet_cidr_block
  availability_zone = var.availability_zone
  tags = {
    Name = "${var.env_prefix}-subnet-1"
  }
}
resource "aws_internet_gateway" "myapp_igw" {
  vpc_id = aws_vpc.myapp_vpc.id
  tags = {
    Name = "${var.env_prefix}-igw"
  }
}
resource "aws_default_route_table" "main_rt" {
  default_route_table_id = aws_vpc.myapp_vpc.default_route_table_id

  route {
    cidr_block = "0.0.0.0/0"
    gateway_id = aws_internet_gateway.myapp_igw.id
  }

  tags = {
    Name = "${var.env_prefix}-rt"
  }
}
```

- Apply Output Showing Default Route Table Updated

```
  # aws_route_table.myapp_route_table will be destroyed
  # (because aws_route_table.myapp_route_table is not in configuration)
  - resource "aws_route_table" "myapp_route_table" {
      - arn              = "arn:aws:ec2:me-central-1:383704034224:route-table/rtb-0f9e2408cab225b1d" -> null
      - id               = "rtb-0f9e2408cab225b1d" -> null
      - owner_id         = "383704034224" -> null
      - propagating_vgws = [] -> null
      - region           = "me-central-1" -> null
      - route            = [
          - {
              - cidr_block                = "0.0.0.0/0"
              - gateway_id                = "igw-016d88f21585120fd"
                # (11 unchanged attributes hidden)
            },
        ] -> null
      - tags             = {
          - "Name" = "dev-rt"
        } -> null
      - tags_all         = {
          - "Name" = "dev-rt"
        } -> null
      - vpc_id           = "vpc-082dc18f7f537a050" -> null
    }

Plan: 1 to add, 0 to change, 1 to destroy.
aws_route_table.myapp_route_table: Destroying... [id=rtb-0f9e2408cab225b1d]
aws_default_route_table.main_rt: Creating...
aws_route_table.myapp_route_table: Destruction complete after 0s
aws_default_route_table.main_rt: Creation complete after 1s [id=rtb-0ea44ef35aa004bc8]

Apply complete! Resources: 1 added, 0 changed, 1 destroyed.
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $
```

Task 9 – Security Group, Key Pair, EC2 Instance, user_data & Nginx

- my_ip Variable Added

```
  GNU nano 7.2
my_ip = "20.192.21.52/32"
instance_type = "t3.micro"
vpc_cidr_block = "10.0.0.0/16"
subnet_cidr_block = "10.0.10.0/24"
availability_zone = "me-central-1a"
env_prefix = "dev"
```

- Public IP Retrieved via curl and terraform.tfvars Updated

```
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ nano main.tf
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ terraform apply -auto-approve
aws_vpc.myapp_vpc: Refreshing state... [id=vpc-082dc18f7f537a050]
aws_internet_gateway.myapp_igw: Refreshing state... [id=igw-016d88f21585120fd]
aws_subnet.myapp_subnet_1: Refreshing state... [id=subnet-0e87c5ddcc5ce0bd0]
aws_default_route_table.main_rt: Refreshing state... [id=rtb-0ea44ef35aa004bc8]

No changes. Your infrastructure matches the configuration.

Terraform has compared your real infrastructure against your configuration and found no differences, so no changes are needed.

Apply complete! Resources: 0 added, 0 changed, 0 destroyed.
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $
```

- Security Group Resource Added and Applied

```
resource "aws_default_route_table" "main_rt" {
  default_route_table_id = aws_vpc.myapp_vpc.default_route_table_

  route {
    cidr_block = "0.0.0.0/0"
    gateway_id = aws_internet_gateway.myapp_igw.id
  }

  tags = {
     Name = "${var.env_prefix}-rt"
  }
}
resource "aws_default_security_group" "myapp_sg" {
  vpc_id      = aws_vpc.myapp_vpc.id

  ingress {
    from_port   = 22
    to_port     = 22
    protocol    = "tcp"
    cidr_blocks = [var.my_ip]
  }

  ingress {
    from_port   = 80
    to_port     = 80
    protocol    = "tcp"
    cidr_blocks = ["0.0.0.0/0"]
  }

  egress {
    from_port       = 0
    to_port         = 0
    protocol        = "-1"
    cidr_blocks     = ["0.0.0.0/0"]
    prefix_list_ids = []
  }

  tags = {
    Name = "${var.env_prefix}-sg"
  }
}

^G Help          ^O Write Out      ^W Where Is       ^K Cut
^X Exit          ^R Read File      ^\ Replace        ^U Paste
```

```
      ]
    + id                     = (known after apply)
    + ingress                = [
        + {
            + cidr_blocks      = [
                + "0.0.0.0/0",
              ]
            + from_port        = 80
            + ipv6_cidr_blocks = []
            + prefix_list_ids  = []
            + protocol         = "tcp"
            + security_groups  = []
            + self             = false
            + to_port          = 80
              # (1 unchanged attribute hidden)
          },
        + {
            + cidr_blocks      = [
                + "20.192.21.51/32",
              ]
            + from_port        = 22
            + ipv6_cidr_blocks = []
            + prefix_list_ids  = []
            + protocol         = "tcp"
            + security_groups  = []
            + self             = false
            + to_port          = 22
              # (1 unchanged attribute hidden)
          },
      ]
    + name                   = (known after apply)
    + name_prefix            = (known after apply)
    + owner_id               = (known after apply)
    + region                 = "me-central-1"
    + revoke_rules_on_delete = false
    + tags                   = {
        + "Name" = "dev-sg"
      }
    + tags_all               = {
        + "Name" = "dev-sg"
      }
    + vpc_id                 = "vpc-082dc18f7f537a050"
  }

Plan: 1 to add, 0 to change, 0 to destroy.
aws_default_security_group.myapp_sg: Creating...
aws_default_security_group.myapp_sg: Creation complete after 2s [id=sg-0d41aa246bf067cb0]

Apply complete! Resources: 1 added, 0 changed, 0 destroyed.
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $
```

- Key Pair Created and Saved Locally

```
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ aws ec2 create-key-pair \
  --key-name MyED25519Key \
  --key-type ed25519 \
  --key-format pem \
  --query 'KeyMaterial' \
  --output text > MyED25519Key.pem
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ chmod 600 MyED25519Key.pem
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ ls -l MyED25519Key.pem
-rw------- 1 codespace codespace 388 Jan  2 15:55 MyED25519Key.pem
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $
```

```
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ cat .gitignore
.terraform/*
*.tfstate
*.tfstate.*
*.tfvars
*.pem
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $
```

- EC2 Instance Resource Defined with Instance Type

```
}
resource "aws_instance" "myapp-server" {
  ami                         = "ami-05524d6658fcf35b6"
  instance_type               = var.instance_type
  subnet_id                   = aws_subnet.myapp_subnet_1.id
  vpc_security_group_ids      = [aws_default_security_group.myapp_sg.id]
  availability_zone           = var.availability_zone
  associate_public_ip_address = true
  key_name                    = "MyED25519Key"

  tags = {
    Name = "${var.env_prefix}-ec2-instance"
  }
}

output "aws_instance_public_ip" {
  value = aws_instance.myapp-server.public_ip
}
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $
```

- EC2 Instance Applied and Public IP Shown

```
    }

Plan: 0 to add, 1 to change, 0 to destroy.
aws_default_security_group.myapp_sg: Modifying... [id=sg-0d41aa246bf067cb0]
aws_default_security_group.myapp_sg: Modifications complete after 1s [id=sg-0d41aa246bf067cb0]

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

Outputs:

aws_instance_public_ip = "3.29.124.105"
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $
```

- SSH into EC2 Instance

```
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ chmod 400 MyED25519Key.pem
ssh -i MyED25519Key.pem ec2-user@3.29.124.105
The authenticity of host '3.29.124.105 (3.29.124.105)' can't be established.
ED25519 key fingerprint is SHA256:EsujscEAgOyDccJtWDgovRa69TG5UBwueqkM81mtSVw.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '3.29.124.105' (ED25519) to the list of known hosts.
   ,     #_
   ~\_  ####_        Amazon Linux 2023
  ~~  \_#####\
  ~~     \###|
  ~~       \#/ ___   https://aws.amazon.com/linux/amazon-linux-2023
   ~~       V~' '->
    ~~~         /
      ~~._.   _/
         _/ _/
       _/m/'
[ec2-user@ip-10-0-10-84 ~]$
```

- Terraform-Managed SSH Key Pair Applied and SSH Verified

```
[ec2-user@ip-10-0-10-84 ~]$ ssh-keygen -t ed25519 -f ~/.ssh/id_ed25519 -N ""
Generating public/private ed25519 key pair.
Your identification has been saved in /home/ec2-user/.ssh/id_ed25519
Your public key has been saved in /home/ec2-user/.ssh/id_ed25519.pub
The key fingerprint is:
SHA256:6Msf+cWf6KBAKXBlSQH+vRFI2II8hs4fbnRas6yWQmw ec2-user@ip-10-0-10-84.me-central-1.compute.internal
The key's randomart image is:
+--[ED25519 256]--+
| o ..=*o         |
|. =.o+o.         |
|o...o.. .        |
| o = = + .       |
|. + B B S        |
| E = *   + .     |
|o . o o + . o    |
| . + . o + o o . |
|  o   o.o ..o o  |
+----[SHA256]-----+
[ec2-user@ip-10-0-10-84 ~]$ ls -l ~/.ssh
total 12
-rw-------. 1 ec2-user ec2-user  94 Jan  2 15:59 authorized_keys
-rw-------. 1 ec2-user ec2-user 452 Jan  2 16:28 id_ed25519
-rw-r--r--. 1 ec2-user ec2-user 134 Jan  2 16:28 id_ed25519.pub
[ec2-user@ip-10-0-10-84 ~]$
```

```
resource "aws_instance" "myapp-server" {
  ami                         = "ami-05524d6658fcf35b6"
  instance_type               = var.instance_type
  subnet_id                   = aws_subnet.myapp_subnet_1.id
  vpc_security_group_ids      = [aws_default_security_group.myapp_sg.id]
  availability_zone           = var.availability_zone
  associate_public_ip_address = true
  key_name                    = aws_key_pair.ssh_key.key_name

  tags = {
    Name = "${var.env_prefix}-ec2-instance"
  }
}

output "aws_instance_public_ip" {
  value = aws_instance.myapp-server.public_ip
}
resource "aws_key_pair" "ssh_key" {
  key_name   = "serverkey"
  public_key = file("~/.ssh/id_ed25519.pub")
}
```

```
Plan: 2 to add, 0 to change, 1 to destroy.

Changes to Outputs:
  ~ aws_instance_public_ip = "3.29.124.105" -> (known after apply)
aws_instance.myapp-server: Destroying... [id=i-00fb0c1b08cee194f]
aws_instance.myapp-server: Still destroying... [id=i-00fb0c1b08cee194f, 00m10s elapsed]
aws_instance.myapp-server: Still destroying... [id=i-00fb0c1b08cee194f, 00m20s elapsed]
aws_instance.myapp-server: Still destroying... [id=i-00fb0c1b08cee194f, 00m30s elapsed]
aws_instance.myapp-server: Still destroying... [id=i-00fb0c1b08cee194f, 00m40s elapsed]
aws_instance.myapp-server: Still destroying... [id=i-00fb0c1b08cee194f, 00m50s elapsed]
aws_instance.myapp-server: Destruction complete after 50s
aws_key_pair.ssh_key: Creating...
aws_key_pair.ssh_key: Creation complete after 0s [id=serverkey]
aws_instance.myapp-server: Creating...
aws_instance.myapp-server: Still creating... [00m10s elapsed]
aws_instance.myapp-server: Creation complete after 13s [id=i-0e41cf81084aef74e]

Apply complete! Resources: 2 added, 0 changed, 1 destroyed.

Outputs:

aws_instance_public_ip = "51.112.167.246"
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $
```

- Nginx Installed via user_data, curl localhost Response

```
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ cat > entry-script.sh <<'EOF'
#!/bin/bash
yum update -y
yum install -y nginx
systemctl start nginx
systemctl enable nginx
EOF
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ ls -l entry-script.sh
-rw-rw-rw- 1 codespace codespace 92 Jan  2 16:42 entry-script.sh
```

```
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ ssh -i ~/.ssh/id_ed25519 ec2-user@51.112.167.246
The authenticity of host '51.112.167.246 (51.112.167.246)' can't be established.
ED25519 key fingerprint is SHA256:umzoYZtXKo9YpsrFEyf5n1xfKaaxwKiUJC9+GGtD9WE.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '51.112.167.246' (ED25519) to the list of known hosts.
   ,     #_
   ~\_  ####_        Amazon Linux 2023
  ~~  \_#####\
  ~~     \###|
  ~~       \#/ ___   https://aws.amazon.com/linux/amazon-linux-2023
   ~~       V~' '->
    ~~~         /
      ~~._.   _/
         _/ _/
       _/m/'
[ec2-user@ip-10-0-10-138 ~]$ curl localhost
<!DOCTYPE html>
<html>
<head>
<title>Welcome to nginx!</title>
<style>
html { color-scheme: light dark; }
body { width: 35em; margin: 0 auto;
font-family: Tahoma, Verdana, Arial, sans-serif; }
</style>
</head>
<body>
<h1>Welcome to nginx!</h1>
<p>If you see this page, the nginx web server is successfully installed and
working. Further configuration is required.</p>

<p>For online documentation and support please refer to
<a href="http://nginx.org/">nginx.org</a>.<br/>
Commercial support is available at
<a href="http://nginx.com/">nginx.com</a>.</p>

<p><em>Thank you for using nginx.</em></p>
</body>
</html>
[ec2-user@ip-10-0-10-138 ~]$
```

- Nginx Default Page Shown in Browser

Cleanup

- Terraform Destroy Output

```
Plan: 0 to add, 0 to change, 7 to destroy.

Changes to Outputs:
  - aws_instance_public_ip = "51.112.167.246" -> null
aws_default_route_table.main_rt: Destroying... [id=rtb-0ea44ef35aa004bc8]
aws_default_route_table.main_rt: Destruction complete after 0s
aws_instance.myapp-server: Destroying... [id=i-0e41cf81084aef74e]
aws_internet_gateway.myapp_igw: Destroying... [id=igw-016d88f21585120fd]
aws_instance.myapp-server: Still destroying... [id=i-0e41cf81084aef74e, 00m10s elapsed]
aws_internet_gateway.myapp_igw: Still destroying... [id=igw-016d88f21585120fd, 00m10s elapsed]
aws_instance.myapp-server: Still destroying... [id=i-0e41cf81084aef74e, 00m20s elapsed]
aws_internet_gateway.myapp_igw: Still destroying... [id=igw-016d88f21585120fd, 00m20s elapsed]
aws_instance.myapp-server: Still destroying... [id=i-0e41cf81084aef74e, 00m30s elapsed]
aws_internet_gateway.myapp_igw: Still destroying... [id=igw-016d88f21585120fd, 00m30s elapsed]
aws_internet_gateway.myapp_igw: Destruction complete after 37s
aws_instance.myapp-server: Still destroying... [id=i-0e41cf81084aef74e, 00m40s elapsed]
aws_instance.myapp-server: Destruction complete after 40s
aws_key_pair.ssh_key: Destroying... [id=serverkey]
aws_subnet.myapp_subnet_1: Destroying... [id=subnet-0e87c5ddcc5ce0bd0]
aws_default_security_group.myapp_sg: Destroying... [id=sg-0d41aa246bf067cb0]
aws_default_security_group.myapp_sg: Destruction complete after 0s
aws_key_pair.ssh_key: Destruction complete after 1s
aws_subnet.myapp_subnet_1: Destruction complete after 1s
aws_vpc.myapp_vpc: Destroying... [id=vpc-082dc18f7f537a050]
aws_vpc.myapp_vpc: Destruction complete after 1s

Destroy complete! Resources: 7 destroyed.
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $
```

- State Files After Cleanup

```
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ terraform state list
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ head -n 20 terraform.tfstate
{
  "version": 4,
  "terraform_version": "1.14.3",
  "serial": 48,
  "lineage": "1958014a-75b6-b700-8ac6-0b19d173aef0",
  "outputs": {},
  "resources": [],
  "check_results": null
}
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $
```

- Git Status and .gitignore Confirming No Secrets Staged

```
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $ git status
cat .gitignore
On branch main
Your branch is up to date with 'origin/main'.

Untracked files:
  (use "git add <file>..." to include in what will be committed)
        .gitignore
        .terraform.lock.hcl
        aws/
        awscliv2.zip
        entry-script.sh
        locals.tf
        main.tf
        main.tf.save

nothing added to commit but untracked files present (use "git add" to track)
.terraform/*
*.tfstate
*.tfstate.*
*.tfvars
*.pem
@Musfira-0514 ➜ /workspaces/CC_MusfiraFarooq_0514_Lab11 (main) $
```