

Terraform



HashiCorp

Terraform

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Overview

What is Terraform? 🤔

- ▶ automate and manage your infrastructure
- ▶ your platform
- ▶ and services that run on that platform



✓ open source

✓ declarative

Declarative = define **WHAT** end result you want

Imperative = define exact steps - **HOW**

Difference Ansible and Terraform?



Which one to use? 🤔



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Terraform

Both: Infrastructure as a Code

Mainly a configuration tool

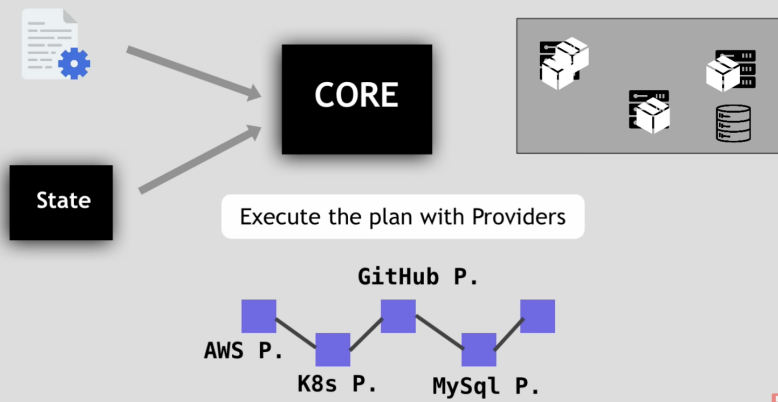
more mature

Mainly infrastructure
provisioning tool

relatively new

more advanced in
orchestration

Terraform Architecture



Example Configuration Files

```
# Configure the Kubernetes Provider
provider "kubernetes" {
  config_context_auth_info = "ops"
  config_context_cluster   = "mycluster"
}

resource "kubernetes_namespace" "example" {
  metadata {
    name = "my-first-namespace"
  }
}
```

Declarative vs Imperative

What does declarative mean exactly?

You define the **end state** in your config file:

- 5 servers with following network config
- AWS user with following permissions



Declarative vs Imperative

Benefits when updating the infrastructure

current state:



desired state:



DECLARATIVE config file

- 7 servers
- this firewall config
- User with following permissions

figure out yourself what needs to be done

Declarative vs Imperative

Benefits when updating the infrastructure

current state:



desired state:



DECLARATIVE config file

- ✓ adjust old config file and re-execute
- ✓ clean and small config file
- ✓ always know the current setup

Terraform commands for different stages

desired state

```
# Configure the AWS Provider
provider "aws" {
  version = "~> 2.0"
  region  = "us-east-1"
}

# Create a VPC
resource "aws_vpc" "example" {
  cidr_block = "10.0.0.0/16"
}
```

refresh

query infrastructure provider to get current state

State

plan

create an execution plan



apply

execute the plan

destroy

destroy the resources/infrastructure

```
brew install terraform
```

Example

<https://gist.github.com/ivaravko/501b4e8e5f1bc1bf5fec149186b99b9>

Sample: main.tf

mail.tf

```
# Configure Kubernetes provider and connect to the Kubernetes API server
provider "kubernetes" {
  config_path    = "~/.kube/config"
  config_context = "docker-desktop"
}

# Create an Nginx pod
resource "kubernetes_pod" "nginx" {
  metadata {
    name = "terraform-example"
    labels = {
      app = "nginx"
    }
  }

  spec {
    container {
      image = "nginx:1.23.2"
      name  = "example"
    }
  }
}

# Create an service
resource "kubernetes_service" "nginx" {
  metadata {
    name = "terraform-example"
  }
  spec {
    selector = {
      app = kubernetes_pod.nginx.metadata.0.labels.app
    }
    port {
      port = 80
    }

    type = "NodePort"
  }

  depends_on = [
    kubernetes_pod.nginx
  ]
}
```

Initialize

```
terraform init
```

Run plan to check for errors

```
terraform plan
```

Apply changes

```
terraform apply
```

Destroy changes applied

```
terraform destroy
```

References

Reference	URL
Terraform Home	https://www.terraform.io
Terraform explained in 15 mins Terraform Tutorial for Beginners	https://www.youtube.com/watch?v=l5k1ai_GBDE
Complete Terraform Course - From BEGINNER to PRO! (Learn Infrastructure as Code)	https://www.youtube.com/watch?v=7xngnjfIlK4