

UNISYS

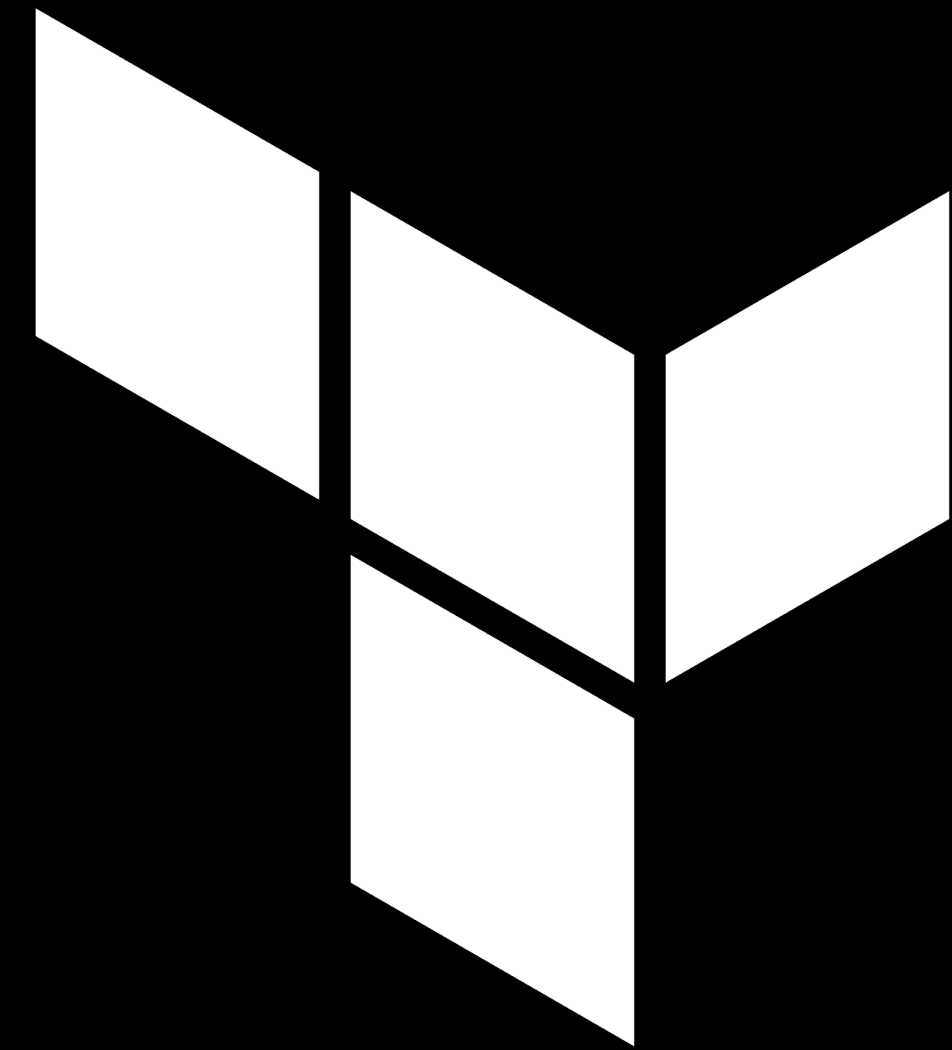


/bin/hatch

Terraform Course

UNISYS Training - First session

Basics



HashiCorp

Terraform

Láng Máté, binhatch.com

\$ whoami

- binhatch.com
- Previously
 - CTO, Welthee
 - Infra Director @ Connatix
 - CTO, SmartUp
- Experience
 - Java, Go
 - AWS
 - Kubernetes
 - Terraform



Why DevOps?

The anti frustration pill

- **Story about payment processor company**
- **The holy “Carlos” box**
 - **WebLogic**
 - **Databases**
 - **Certificates**
- **DevOps is best to avoid misalignment via code**

Why Terraform?

A young tool with lot of maturity

- First release: 2014 july
- Couple heavy breaking changes (not too many)
- I use it since 2016, for AWS infra management and many more
- Currently version 1.5 (1.6 beta)
- Scandal about OpenTofu

Training overview

Are we there yet?

- First session - Basics
- Second Session - SPA + API Instance in AWS, simplistic way
- Third Session - Terraform Cloud, Decomposition of Session 2 Infrastructure Into Modules
- Fourth Session - Advanced topics, testing, writing your own provider

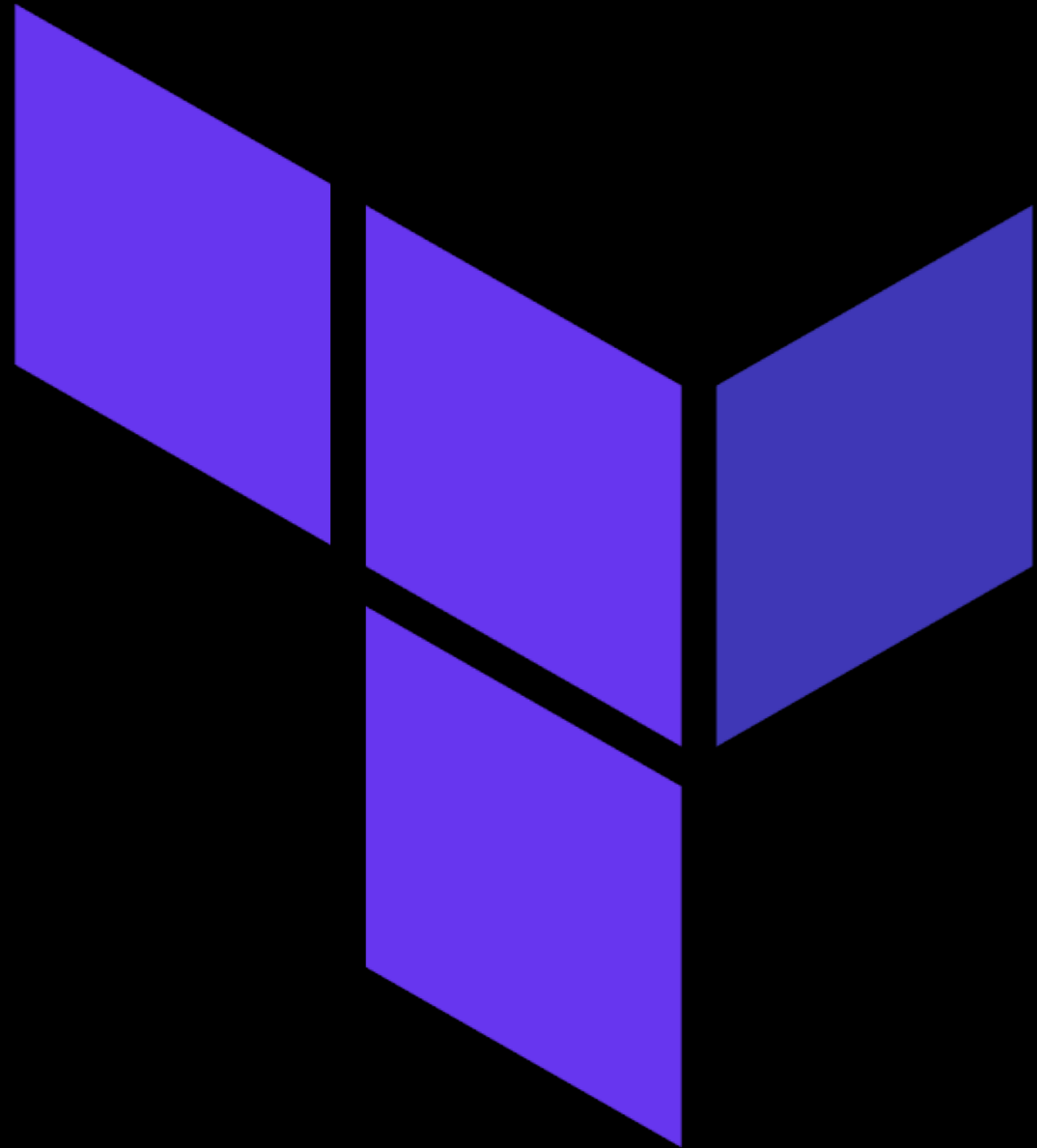


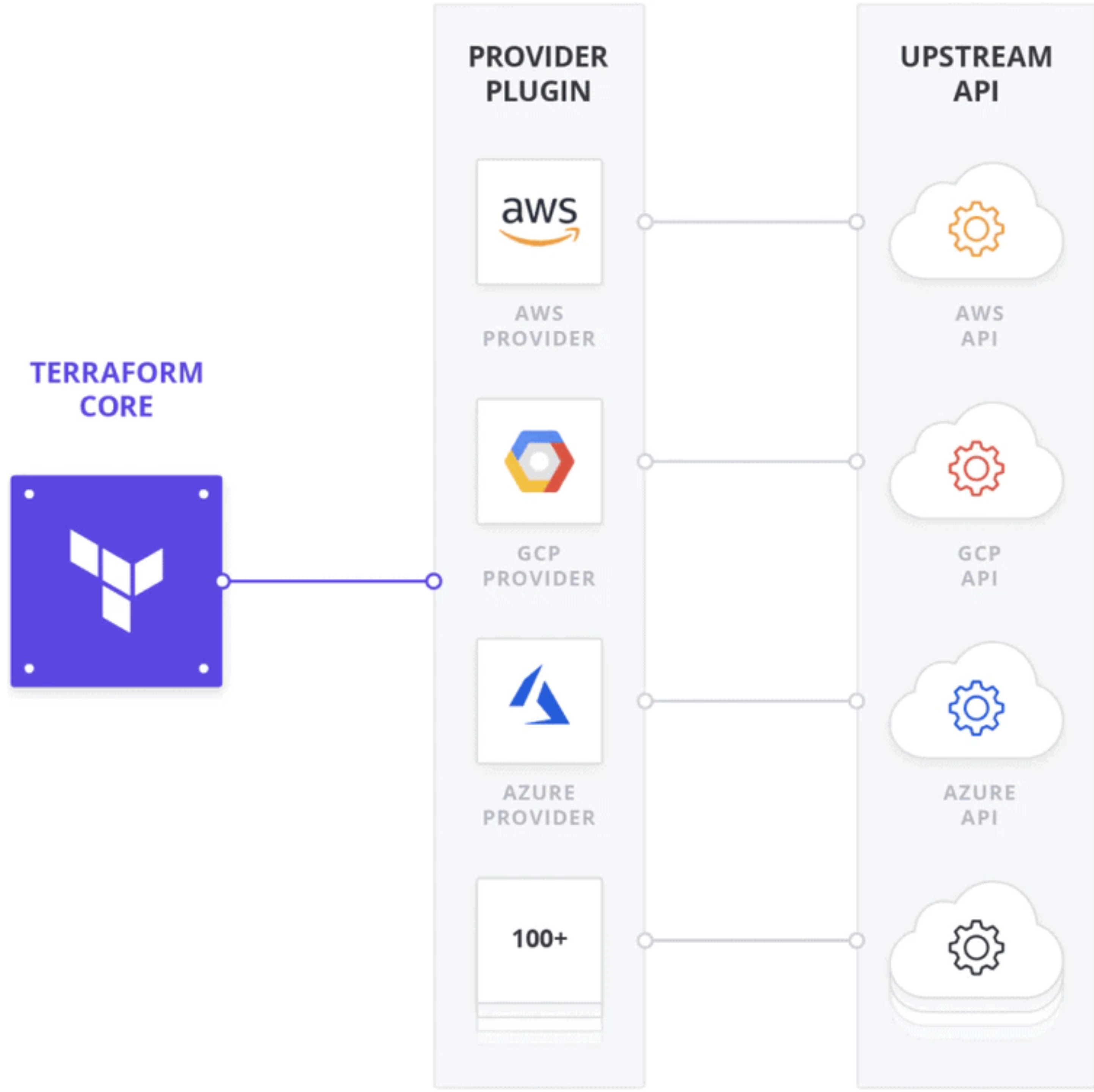
IT'S SHOW TIME

Hello Terraform!

Swiss Army knife of infrastructure

- Versioned
- Declarative
- Friendly descriptor language (HCL)
- Loads of providers (& extensible)
- Built in dry run
- Interpolation
- Written in GoLang





BIG BANG THEORY

METRIC EXPANSION OF SPACE

The Big Bang theory is an effort to explain what happened at the very beginning of our universe. Discoveries in astronomy and physics have shown beyond a reasonable doubt that our universe did in fact have a beginning. Prior to that moment there was nothing; during and after that moment there was something: our universe. The big bang theory is an effort to explain what happened during and after that moment.



Big Bang. The universe burst open, expanding faster than the speed of light and flinging all the matter and energy in the universe apart in all directions.

13,6 billion years ago

First stars formed. Nuclear fusion lights up the stars.

13,2 billion years ago

First galaxies formed. Dense gas clouds collapse under their own gravity to eventually form galaxies.

Today

Stellar era. Dark energy prevails, the universe expands, becoming ever less dense.

after 10^{11} billion years

Under the influence of dark energy all galaxies outside the local group will pass behind the cosmological horizon.

after 10^{14} billion years

Star formation ends, leaving all stellar objects in the form of degenerate remnants. Black holes dominate the universe.

after 10^{60} billion years

The only organized units are black holes, but even black holes are unstable and evaporate into electrons and positrons.



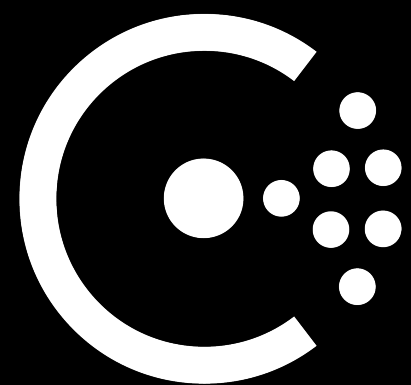
Terraform Providers



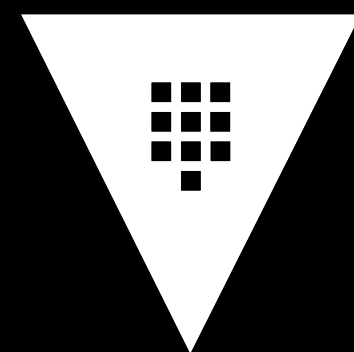
vmware®



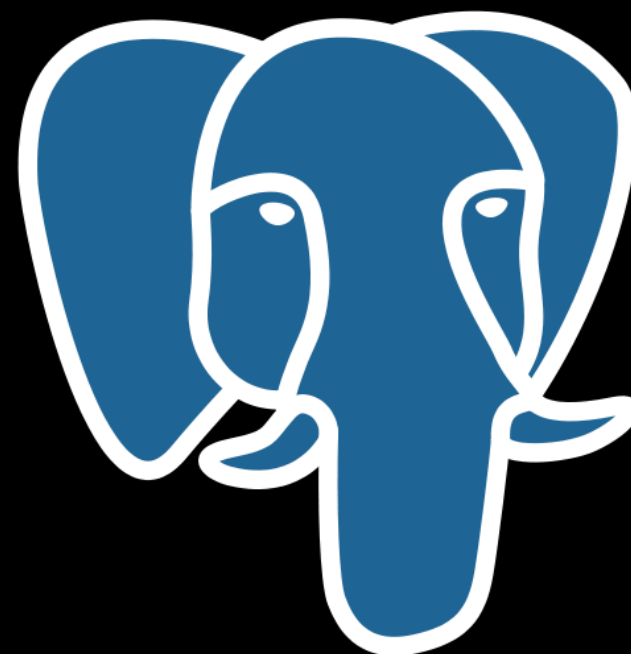
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HashiCorp
Consul



HashiCorp
Vault



Terraform resources

The building block of TF

- A resource managed by a resource provider
- Assigned Identifier
- Variables support
- Language can reference fields of other resources
- Implicit dependency relationship / graph
- Strongly typed

```
resource "aws_instance" "iac_in_action" {
  ami            = var.ami_id
  instance_type  = var.instance_type
  availability_zone = var.availability_zone

  // dynamically retrieve SSH Key Name
  key_name = aws_key_pair.iac_in_action.key_name

  // dynamically set Security Group ID (firewall)
  vpc_security_group_ids = [aws_security_group.iac_in_action.id]

  tags = {
    Name = "Terraform-managed EC2 Instance for IaC in Action"
  }
}
```


Terraform data providers

For querying

- Query data from externally managed resources (not by Terraform)
- Filter opportunities

```
data "aws_ami" "example" {
  executable_users = ["self"]
  most_recent      = true
  name_regex       = "^myami-\\d{3}"
  owners           = ["self"]

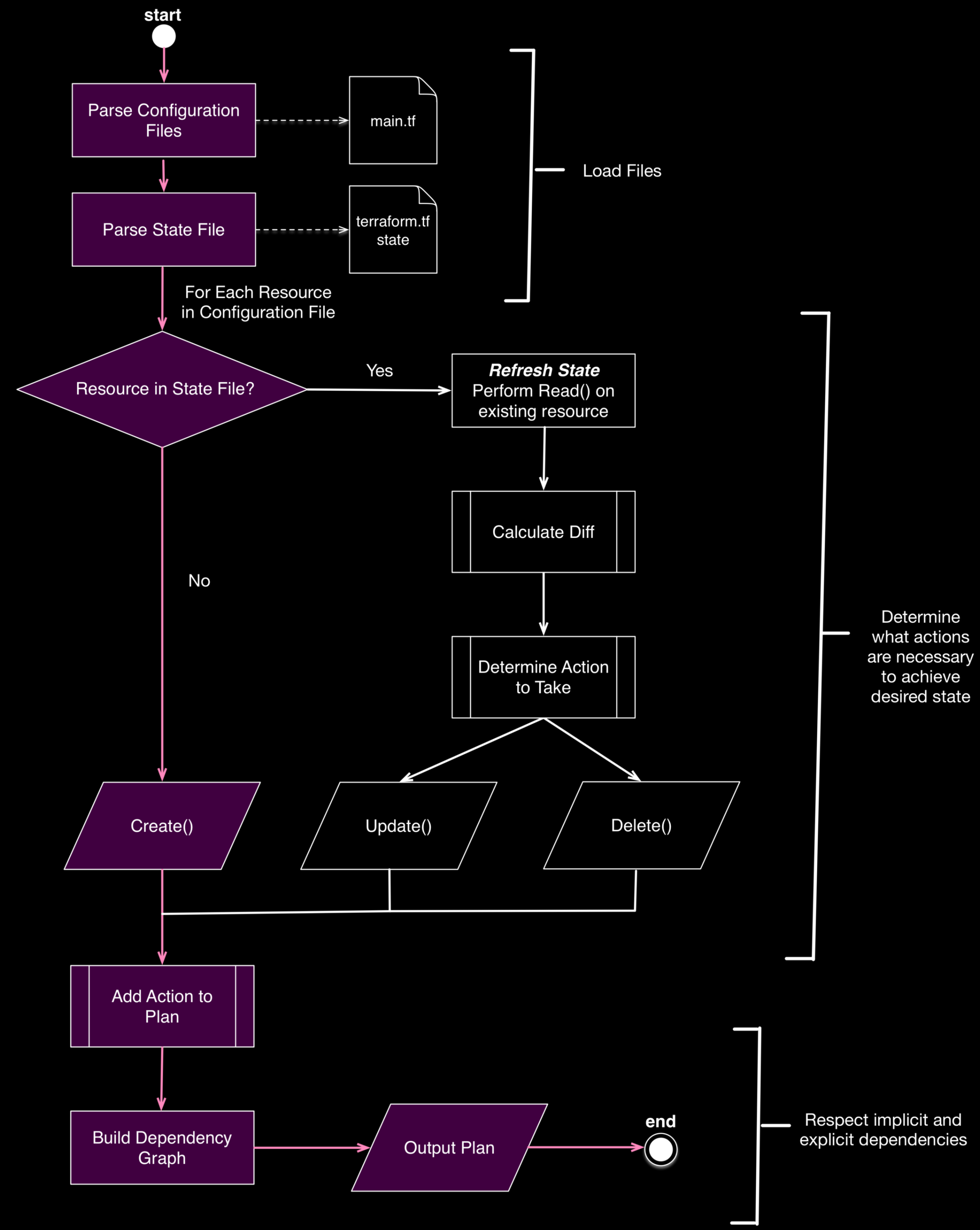
  filter {
    name   = "name"
    values = ["myami-*"]
  }

  filter {
    name   = "root-device-type"
    values = ["ebs"]
  }

  filter {
    name   = "virtualization-type"
    values = ["hvm"]
  }
}
```

Terraform - State

- Terraform needs a state file
 - It's like an inventory, a mapping of the resources between Terraform and “real” resources
 - Refreshed on each run
- Stored in terraform.tfstate file (disk by default)
- Remote storage (remote backend)
 - Collaboration support, parallel development
 - Backends: s3, consul, gcs, azurerm, artifactory, http
 - For parallel runs you need a provider with lock support
Pl: Consul out-of-the box support, S3+DynamoDB locking



Regular workflow

- init
- validate
- plan
- apply
- destroy



Applicant



Identifying
Information



Public Key



Private Key
(Applicant)



1. Generate CSR

Certificate Authority (CA)



2. Validate Identity



3. Generate Signed
Certificate and Send
to Applicant



Private Key (CA)

