TURN IT UP

cisco Live!

#CiscoLive

The bridge to possible

NetDevOps Journey:

Immutable Orchestration vs Config Management

François Caen, Programmability and Automation CoE Lead
Tony Dubiel, DevNet Developer Advocate

BRKDEV-2011

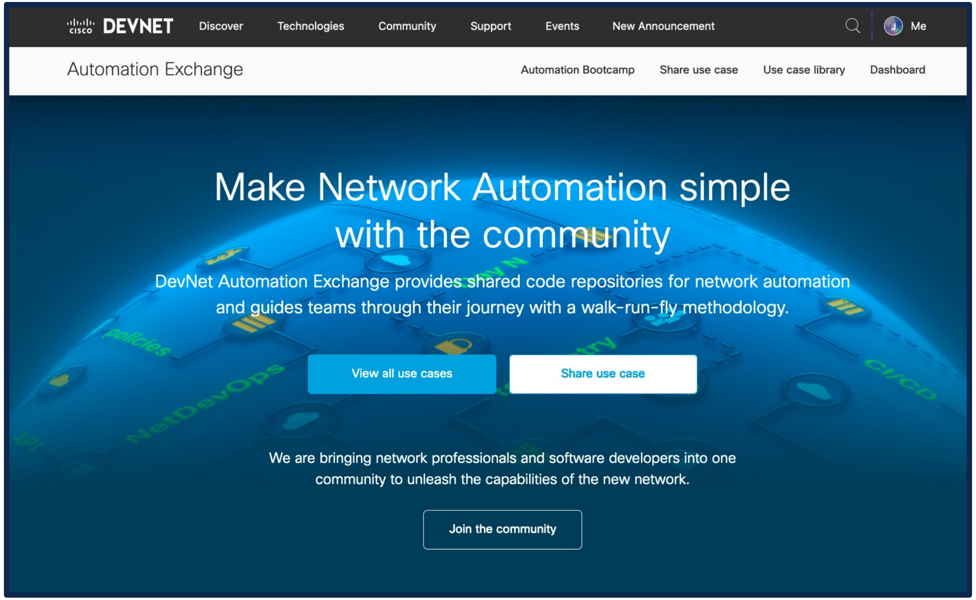
Why are we here?

- We understand config management
- We want to build automated architectures, not just configure routers
- This happens mostly in the (public) cloud, because:
  - Velocity
  - API-rich platform
  - Utility aaS pricing

Agenda

- Key Concepts
- Building Blocks
- Use Case Demo

Automation Exchange



Make Network Automation simple with the community

DevNet Automation Exchange provides shared code repositories for network automation and guides teams through their journey with a walk-run-fly methodology.

We are bringing network professionals and software developers into one community to unleash the capabilities of the new network.

Find my code on Code Exchange

Start your network automation journey with DevNet!

Walk
Get visibility and insights into your network

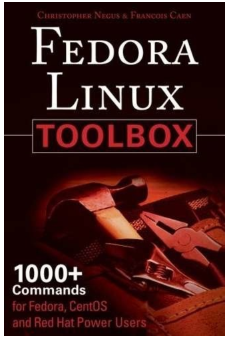
Run
Activate policy and intent across different network domains

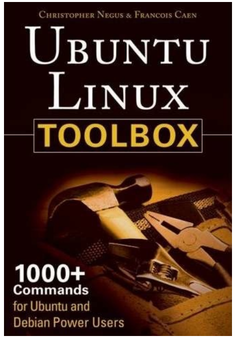
Fly
Proactively manage applications, users, devices with DevOps workflow

Who are these guys?

François Caen

- 1999 – Linux sysadmin
- 2001 – FLOSS advocate / author
- 2004 – Network Engineer
- 2015 – Cisco Systems Architect
- 2021 – Programmability and Automation Lead, Americas Systems Engineering


Christopher Negus & Francois Caen
Fedora Linux
TOOLBOX
1000+ Commands for Fedora, CentOS and Red Hat Power Users


Christopher Negus & Francois Caen
Ubuntu Linux
TOOLBOX
1000+ Commands for Ubuntu and Debian Power Users

Who are these guys?

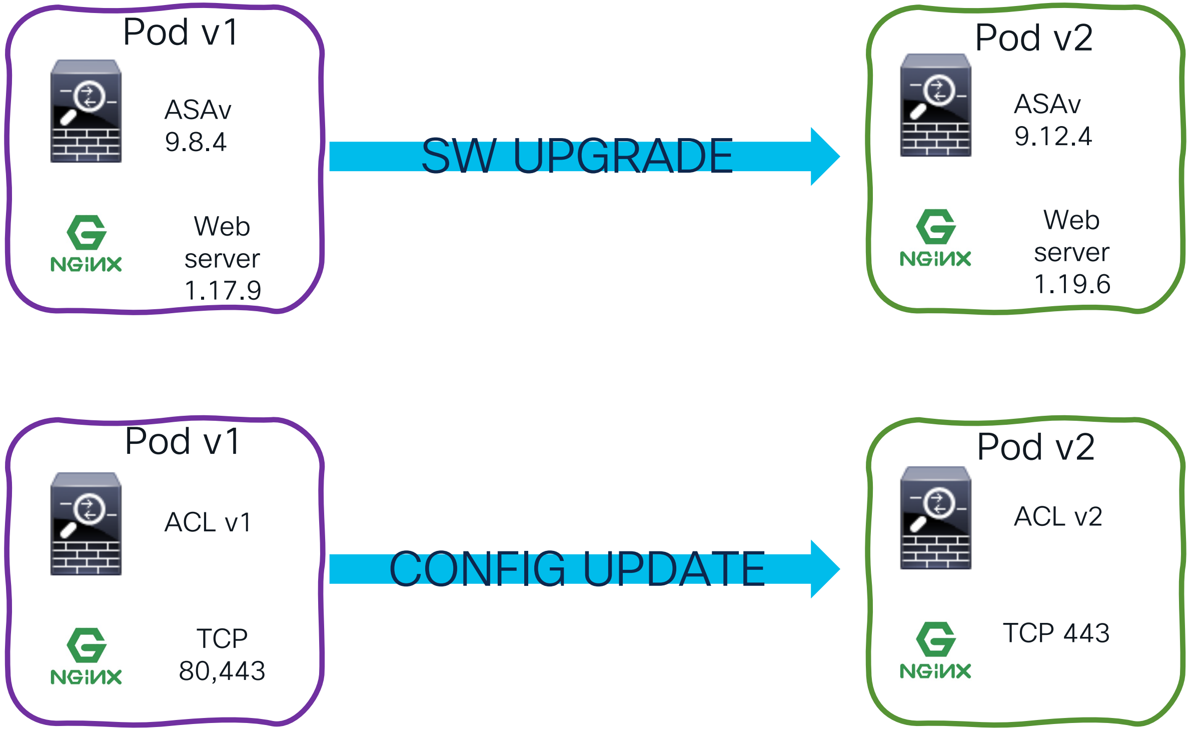
Tony Dubiel

- 1995 USAF (Telecom)
- 2000 Network Engineer
- 2002 CCIE 10844
- 2006 Collaboration Engineer
- 2010 Data Center Engineer
- 2014 Openstack and Programmability
- 2021 DevNet...

Cisco DevNet Automation Bootcamp

Key Concepts

Key Concepts: Mutable Infrastructure



Pod v1

ASAv 9.8.4

Web server 1.17.9

SW UPGRADE

Pod v2

ASAv 9.12.4

Web server 1.19.6

Pod v1

ACL v1

TCP 80,443

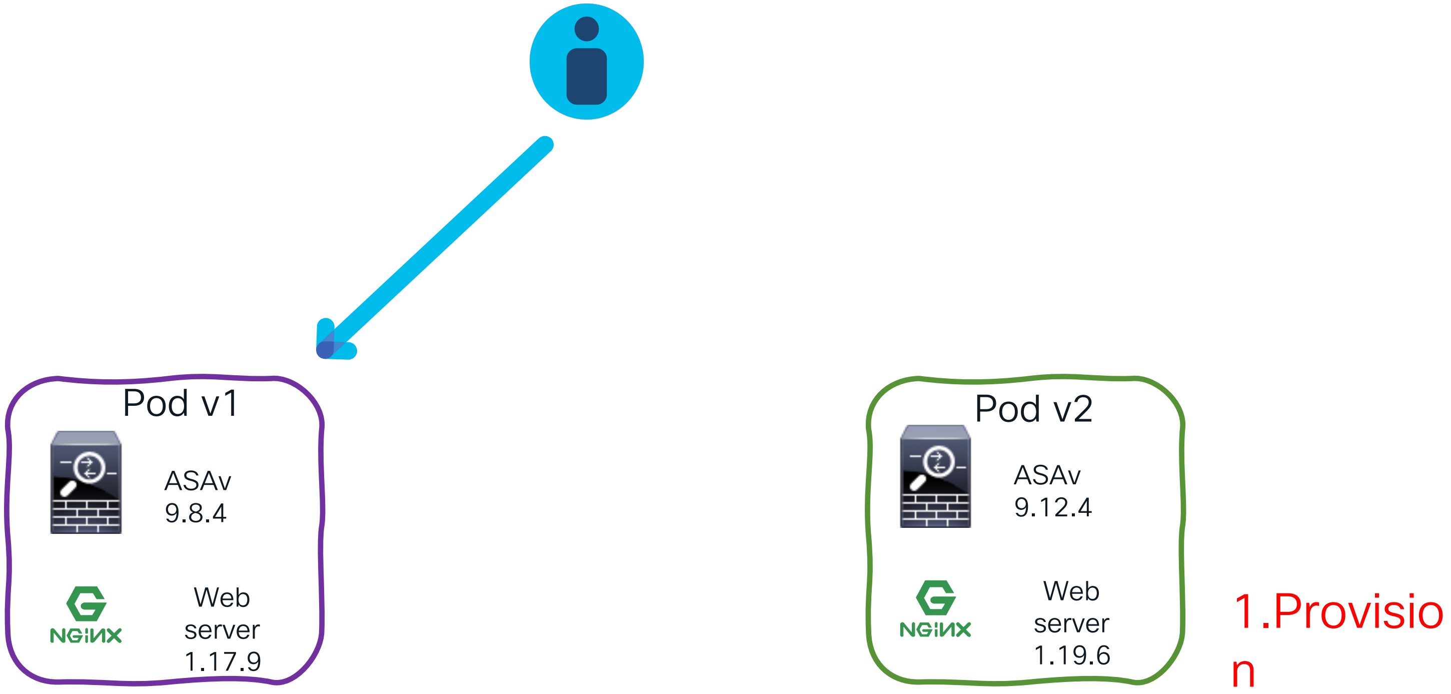
CONFIG UPDATE

Pod v2

ACL v2

TCP 443

Key Concepts: Immutable Infrastructure



Pod v1

ASAv 9.8.4

Web server 1.17.9

Pod v2

ASAv 9.12.4

Web server 1.19.6

1.Provisio
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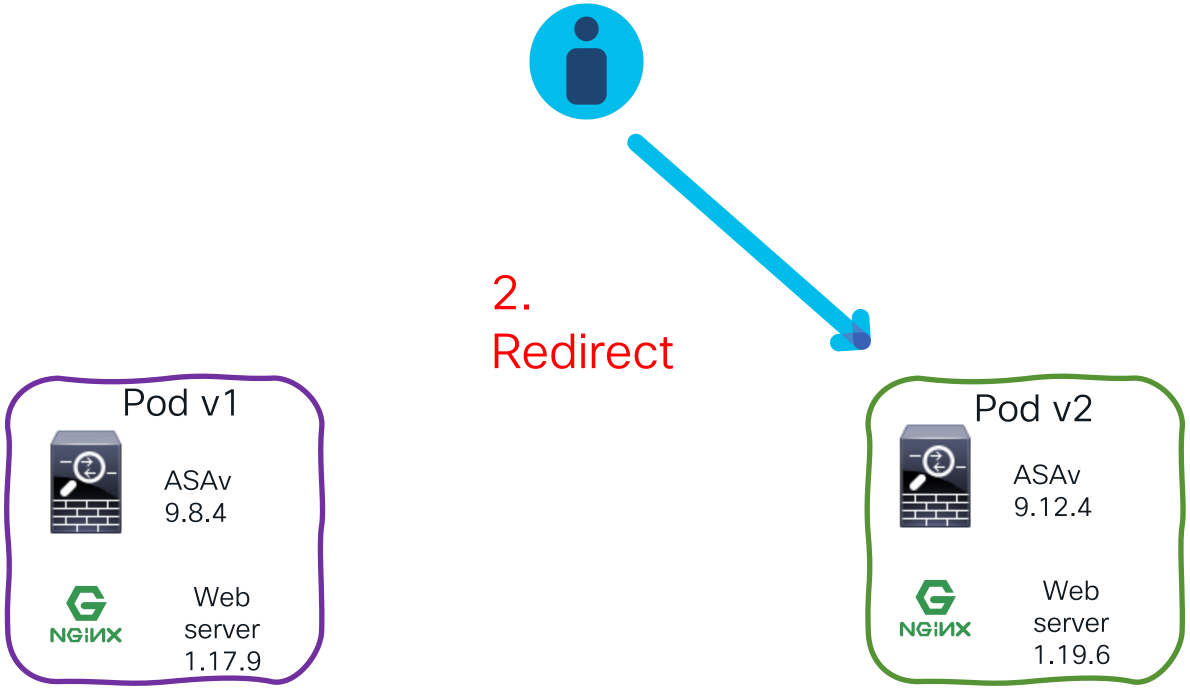
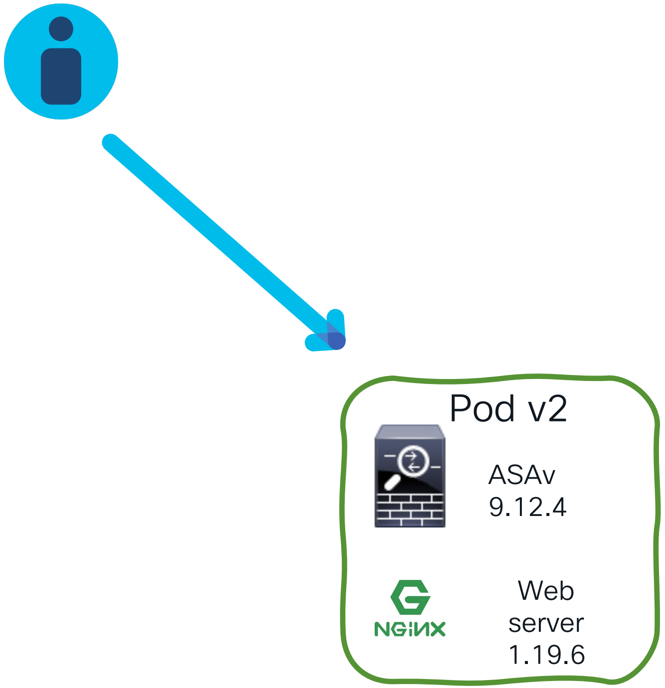
Key Concepts: Immutable Infrastructure



Key Concepts: Immutable Infrastructure

3.Destroy



Key Concepts - continued

- Disposable
- Single source of truth
- Stateful

Building Blocks

Ansible

Open Source

Agentless

Simple

Wide Adoption

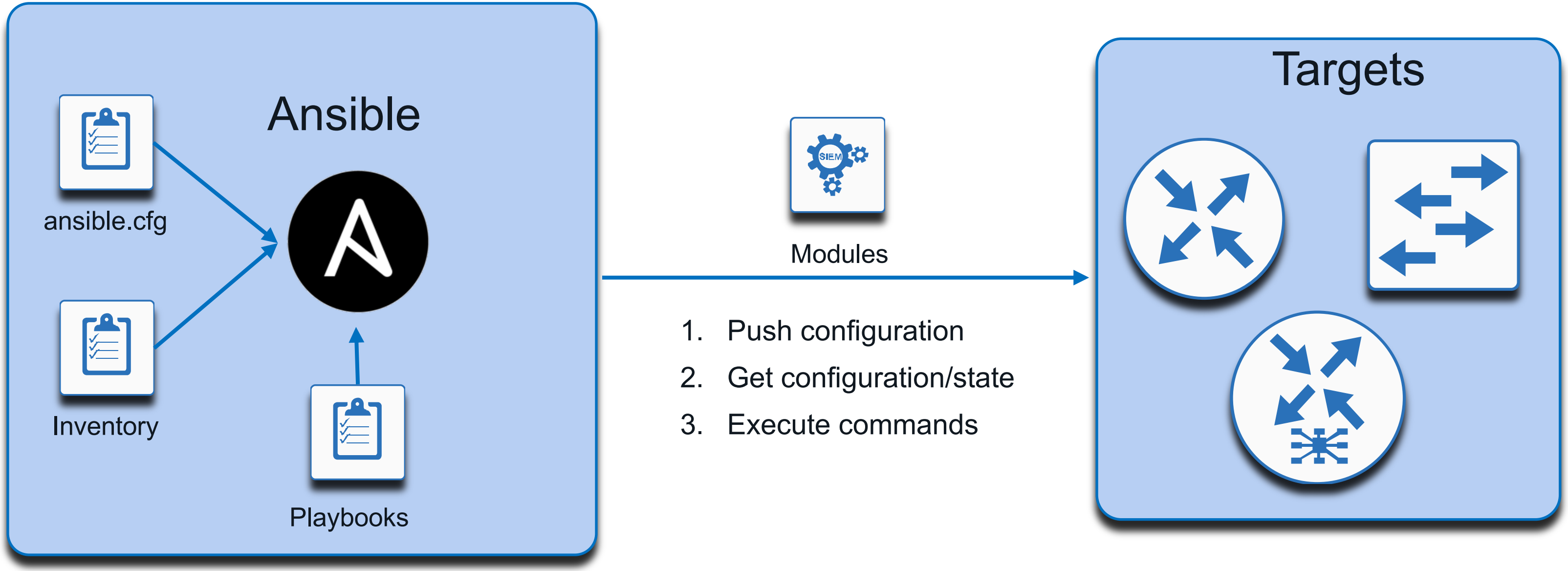
ANSIBLE

Configuration Management

Orchestration

Deployment

Ansible in a nutshell

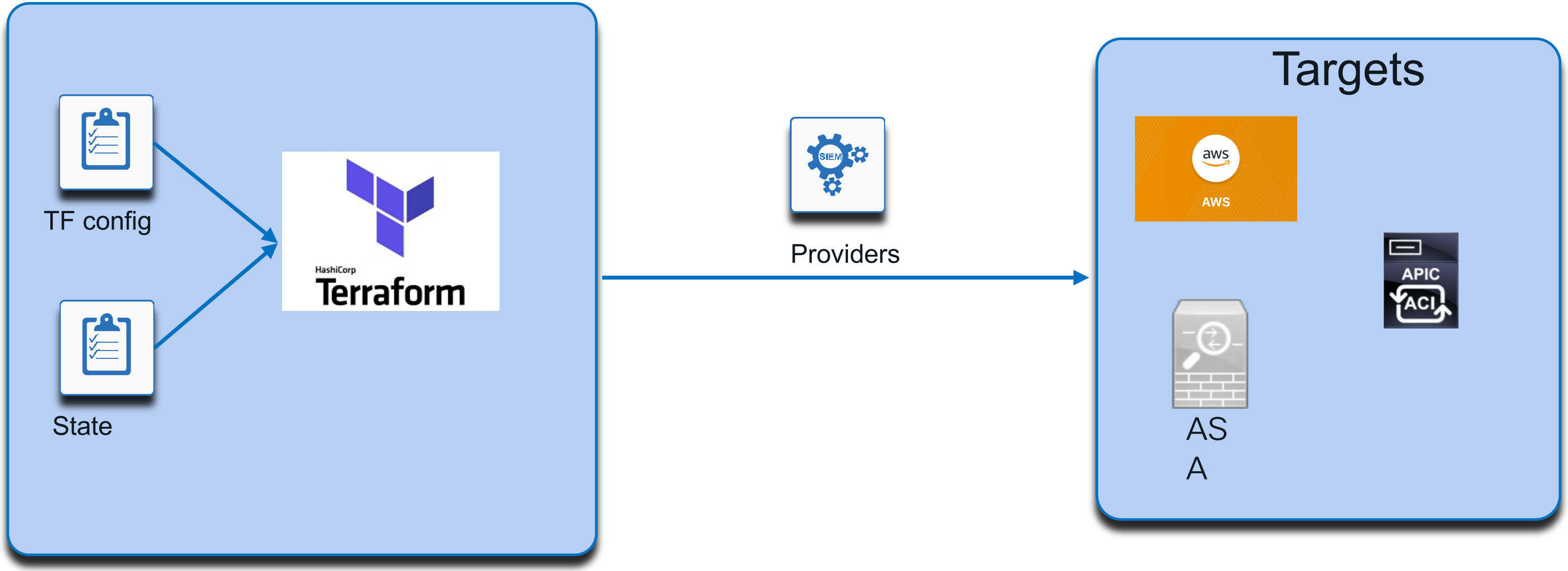


1. Push configuration
2. Get configuration/state
3. Execute commands

Terraform – what is it?

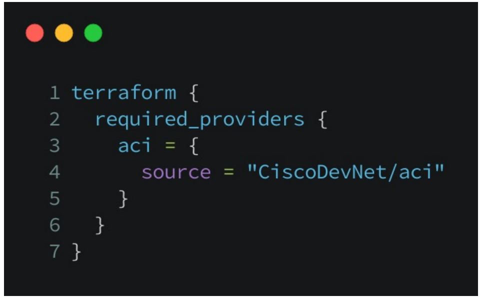
- Developed by HashiCorp
- Initial release in July 2014
- Designed to be a full Infrastructure as Code (IaC) management tool for datacenters
- Completely written in Go, creating a single binary file
- Fully declarative leveraging HashiCorp Configuration Language (HCL)

Terraform in a nutshell



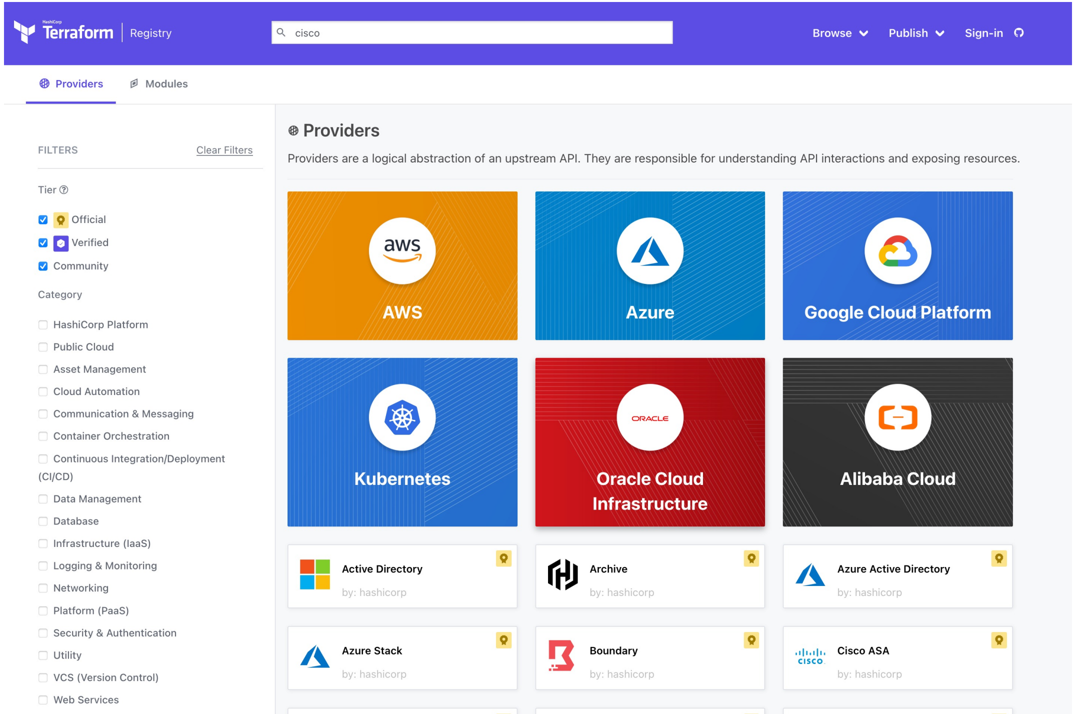
Terraform Providers

- Providers allow TF to communicate with desired resources
- Downloaded and installed at time of project `init` using declarations
- Signed for security



```
terraform {
  required_providers {
    aci = {
      source = "CiscoDevNet/aci"
    }
  }
}
```

Terraform Provider Registry



Terraform | Registry

cisco

Browse Publish Sign-in

Providers Modules

FILTERS Clear Filters

Tier

☑ Official
☑ Verified
☑ Community

Category

□ HashiCorp Platform
□ Public Cloud
□ Asset Management
□ Cloud Automation
□ Communication & Messaging
□ Container Orchestration
□ Continuous Integration/Deployment (CI/CD)
□ Data Management
□ Database
□ Infrastructure (IaaS)
□ Logging & Monitoring
□ Networking
□ Platform (PaaS)
□ Security & Authentication
□ Utility
□ VCS (Version Control)
□ Web Services

Providers

Providers are a logical abstraction of an upstream API. They are responsible for understanding API interactions and exposing resources.

AWS

Azure

Google Cloud Platform

Kubernetes

Oracle Cloud Infrastructure

Alibaba Cloud

Active Directory
by: hashicorp

Archive
by: hashicorp

Azure Active Directory
by: hashicorp

Azure Stack
by: hashicorp

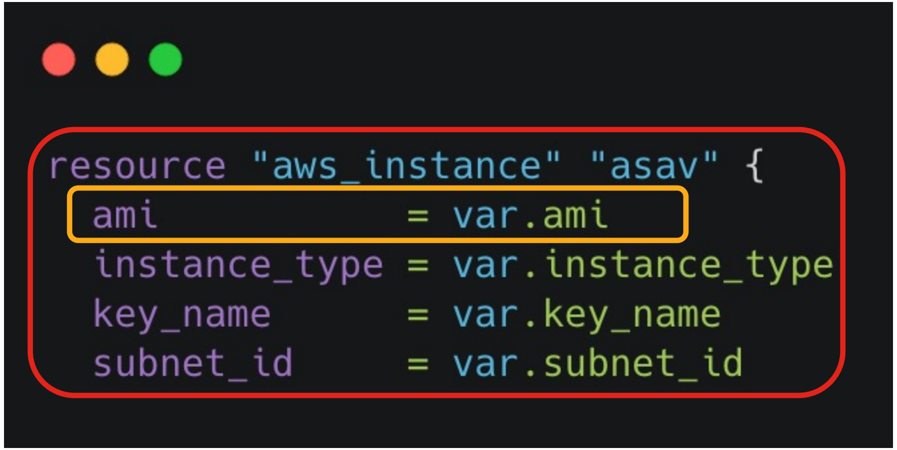
Boundary
by: hashicorp

Cisco ASA
by: hashicorp

https://registry.terraform.io/browse/providers

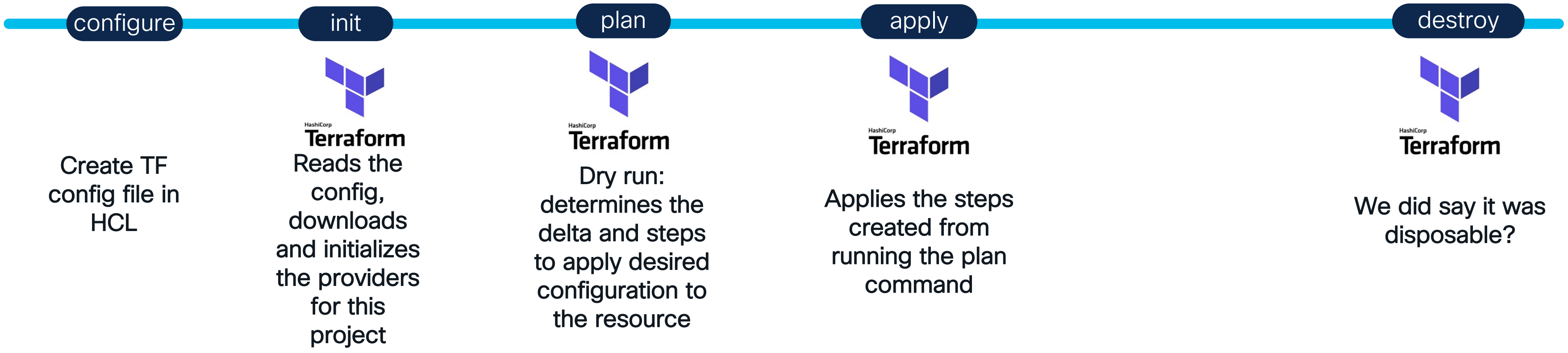
HashiCorp Configuration Language (HCL)

- JSON-like in structure
- Composed of arguments and blocks
  - Arguments assign values to variables/attributes
  - Blocks serve as containers for other values and/or blocks (think: YANG style “containers”)
- Assignments for arguments can be static or set using variables



```
resource "aws_instance" "asav" {
  ami           = var.ami
  instance_type = var.instance_type
  key_name      = var.key_name
  subnet_id     = var.subnet_id
```

Automation Workflow



configure

Create TF config file in HCL

init

Reads the config, downloads and initializes the providers for this project

plan

Dry run: determines the delta and steps to apply desired configuration to the resource

apply

Applies the steps created from running the plan command

destroy

We did say it was disposable?

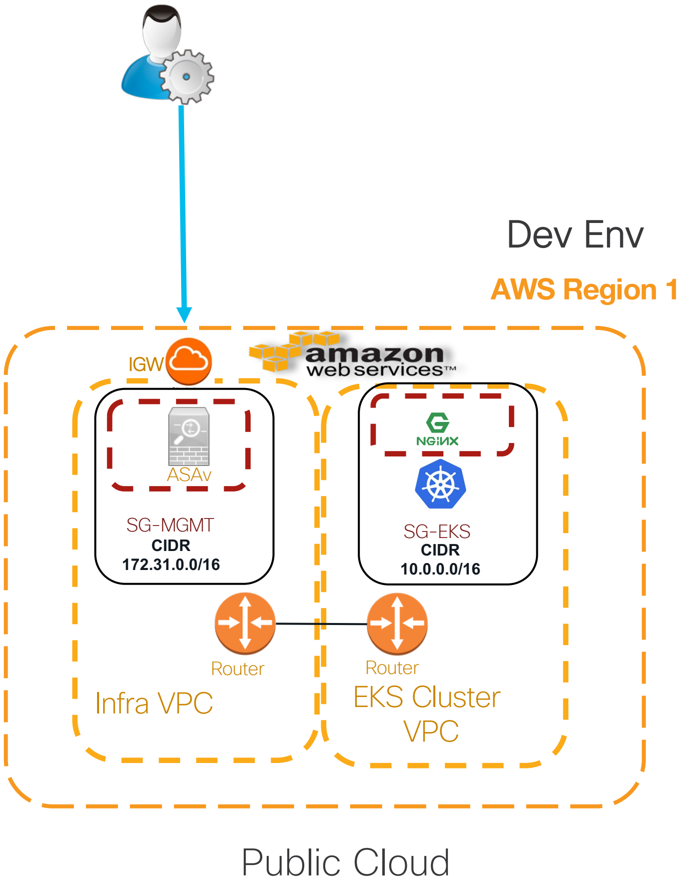
Kubernetes

- Container management platform
- Containers live on worker Nodes, organized in Clusters
- In the context if this presentation: this is where applications live

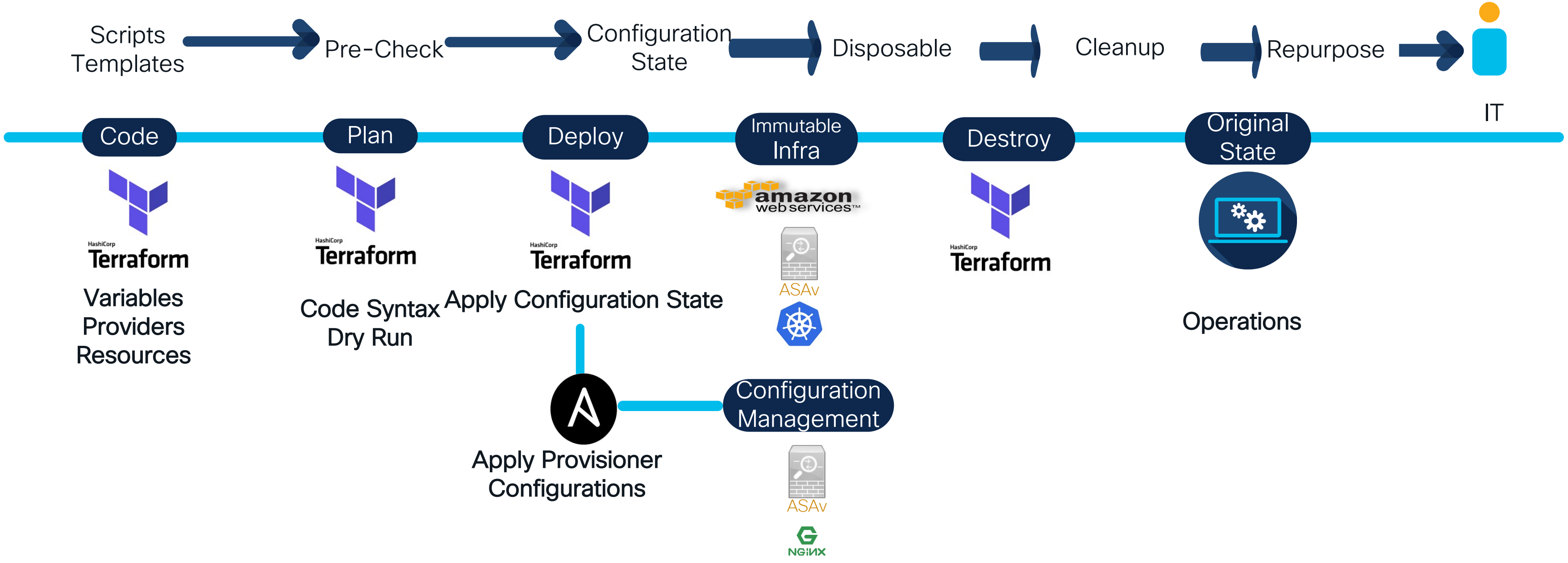
Use Case Demo

Immutable Demo

- AWS Dev Environment
- AWS EKS (Kubernetes)
- NGINX Web Service
- Web/SSL Remote Access (Cisco ASAv)

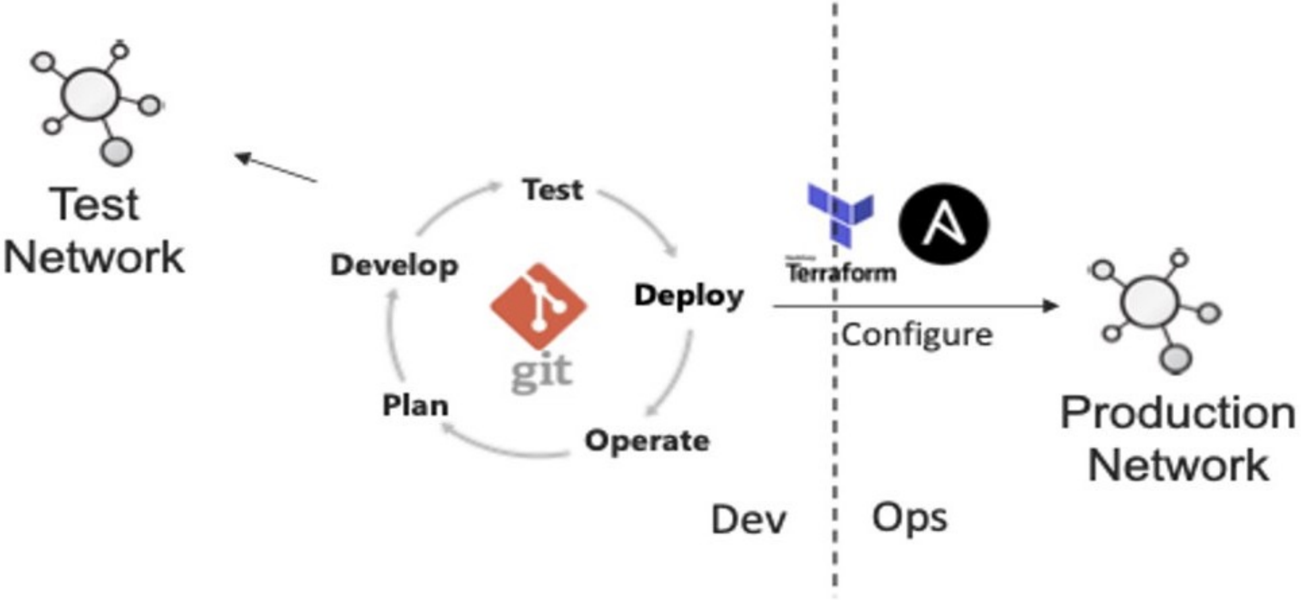


Automation Workflow



What’s next

- CI/CD pipeline

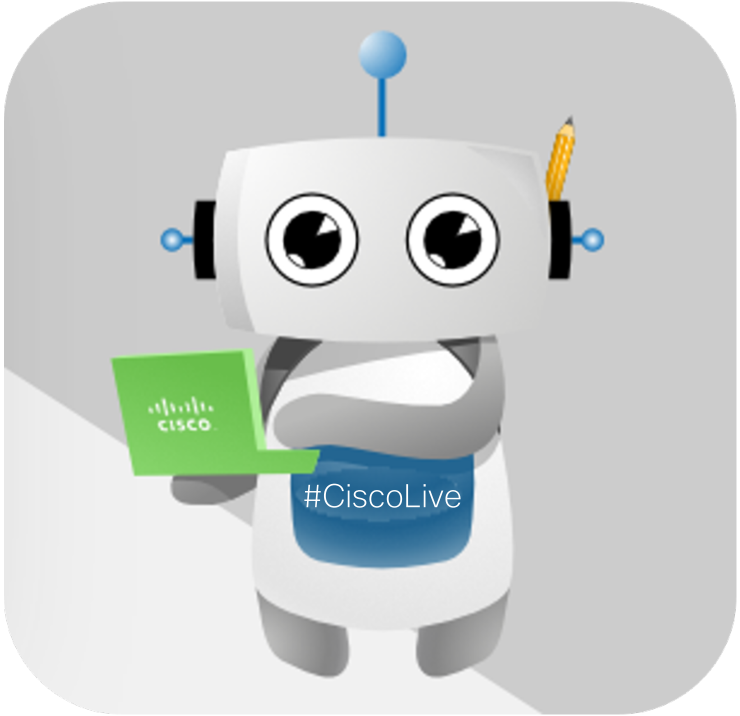


DevNet Resources

- Terraform Getting Started

https://developer.cisco.com/docs/terraform-workshop/#getting-started

- CML 2.0:
  - ASAv image available
    - https://www.cisco.com/c/en/us/products/cloud-systems-management/modeling-labs/index.html
- Kubernetes on AWS
  - https://developer.cisco.com/aws/
- Don’t miss special Cisco Live DevNet offers cs.co/devnetoffers



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Thank you

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