The bridge to possible

Introduction to Infrastructure as Code

for Cisco DNA Center with Terraform

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Agenda

- Introduction
- Setting the Stage and deploying the First Terraform Configuration
- Deploy a Cisco SD-Access Fabric Site from scratch using Modules
- Test the Deployment with Thousandeyes Provider
- Conclusion

Introduction

Cisco Webex App

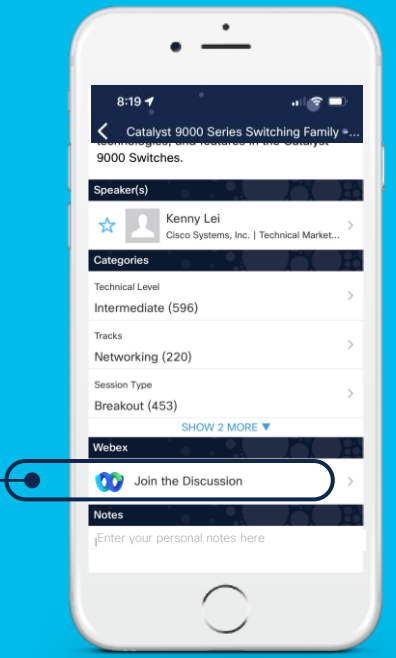
Questions?

Use Cisco Webex App to chat
with the speaker after the session

How

1. Find this session in the Cisco Live Mobile App
2. Click “Join the Discussion”
3. Install the Webex App or go directly to the Webex space
4. Enter messages/questions in the Webex space

Webex spaces will be moderated until February 24, 2023.



About Patrick...

3 Years as an End User
3 Years as a Partner
3 Years as a Competitor
7 Years at Cisco

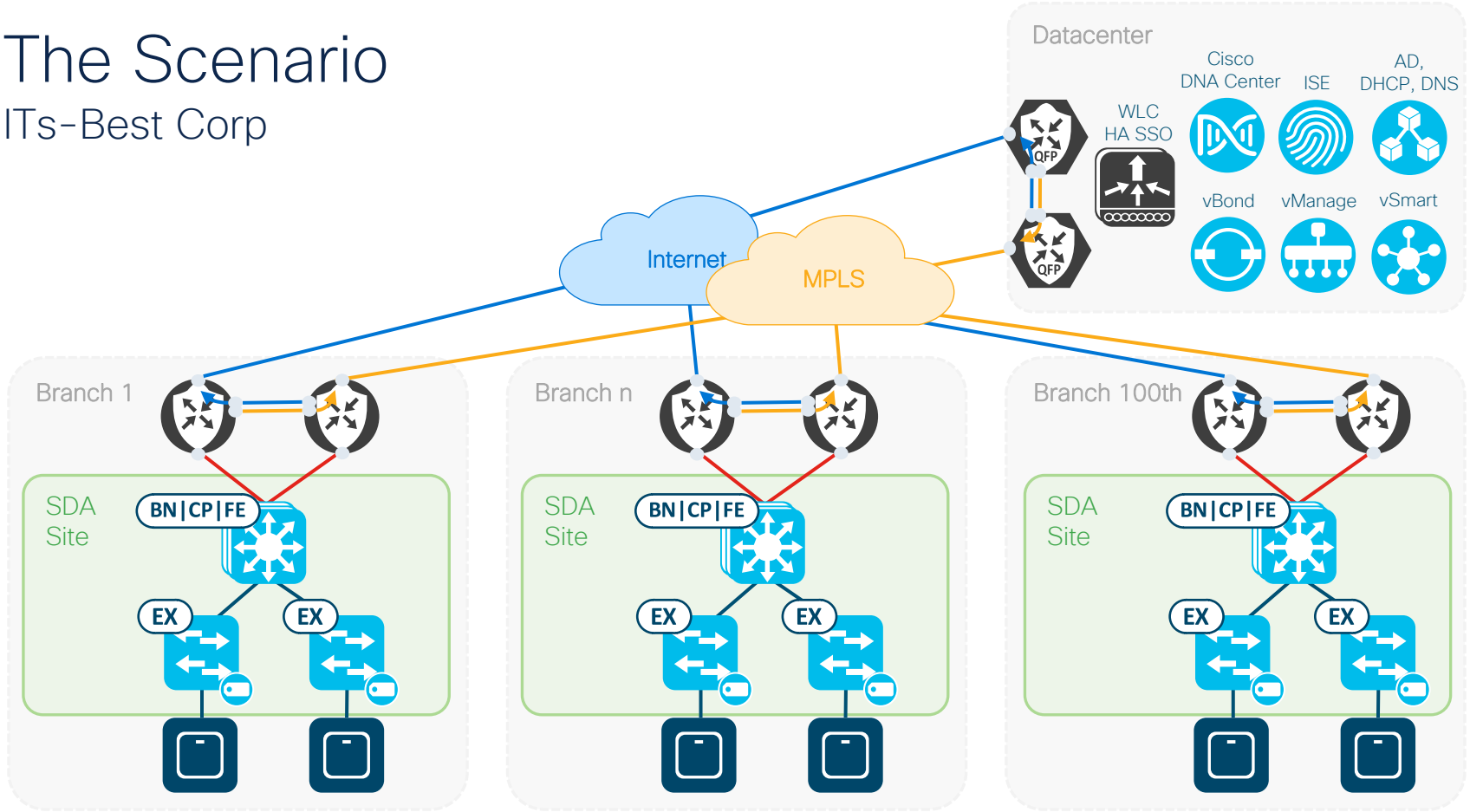
Besides work:

- Dad
- Cook
- Traveler
- Runner
- Mountain biking
- Photographer

So… Why This Session?

The Scenario

ITs-Best Corp



*Reduction of today's individual solutions & configurations by the use of **standardized** "Software Defined" technologies...*

Project Goals of ITs-Best Corp

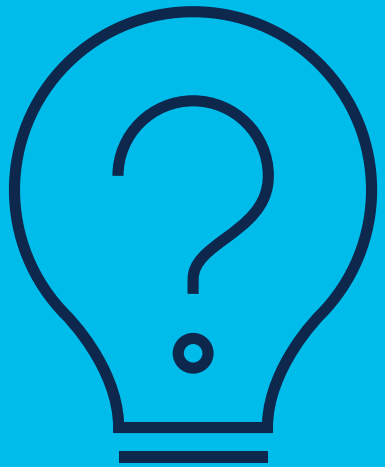
*...Increased efficiency through **automation***

Project Goals of ITs-Best Corp

With Terraform you can increase efficiency and get consistent outcomes!

Setting the Stage and deploying the First Terraform Configuration

Are You Ready?



- Infrastructure as Code (IaC)
- Terraform Terminology
  - Providers and provisioners
  - Resources and modules
  - Variables and values
- Terraform command line

What is Terraform?

Infrastructure configuration defined as code

Terraform ensures that the infrastructure is configured as defined

Infrastructure is configured exactly as defined

Terraform allows you to define Infrastructure as Code (IaC)

Imperative vs declarative

1. Prepare ingredients
2. Add meat sauce layer to dish
3. Add pasta layer to dish
4. Repeat step 2+3 several times
5. Top with cheese
6. Cook in oven at 190C for 25 minutes
7. Remove from oven and split up into portions

Imperative

Create a Lasagna

Declarative

Ansible vs Terraform?

~~VS~~

Ansible

Many generic options but can result in configuration drift

Terraform

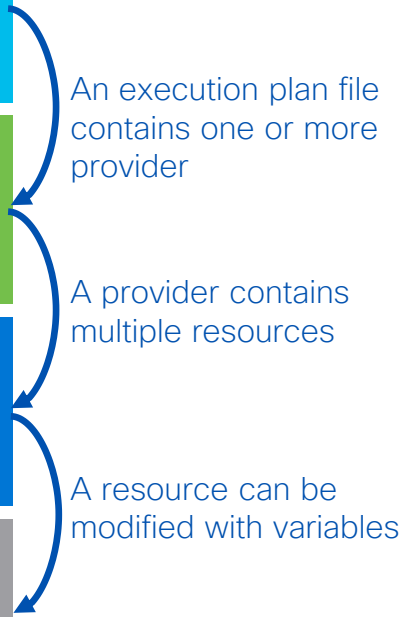
Requires a provider and creates immutable infrastructure

It is not either or, use a combination of both!

Ansible → send commands to provisioned systems
Terraform → provision immutable infrastructure

Terraform Terminology (1/2)

Execution Plan File	Defines the provider and resources. It is written in HashiCorp Configuration Language (HCL) *Examples: main.tf, variable.tf, …*
Providers	Describes a specific type of Infrastructure and allows us to interact with it *Examples: dnacenter, iosxe, …*
Resources	Describe one specific object on the system managed by the provider *Examples: Area/Building/Floor, SDA Fabric Site,…*
Variables	Separate data from logic to make the scripts reusable for multiple use cases *Examples: Name of Area is stored in variable*



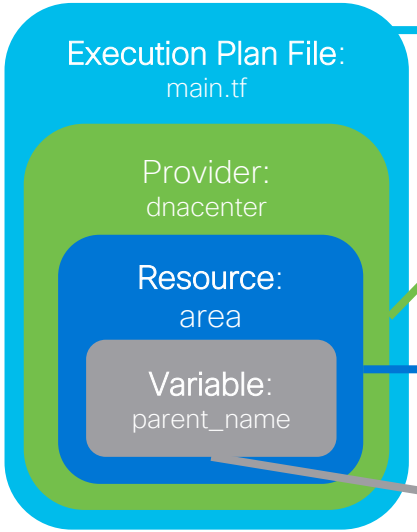
Terraform Terminology (1/2)

Execution Plan File

Providers

Resources

Variables



main.tf

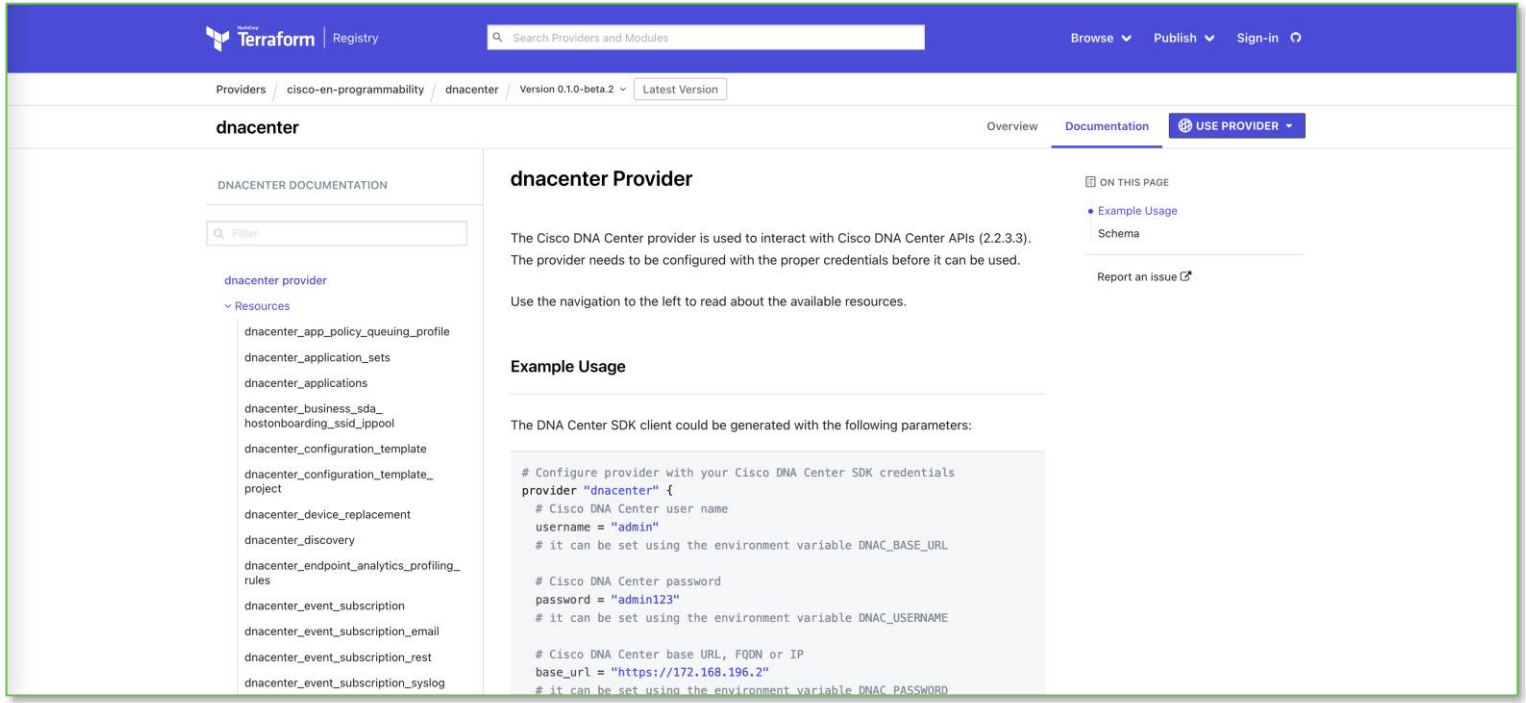
```
provider "dnacenter" {

    username = var.dnac_username
    password = var.dnac_password
    base_url = var.dnac_url
    debug = "true"
    ssl_verify = "false"
}

resource "dnacenter_site" "area_a" {
  provider = dnacenter
  parameters {
    site {
      area {
        name = "Area A"
        parent_name = var.parent_name
      }
    }
  type = "area"
  }
}
```

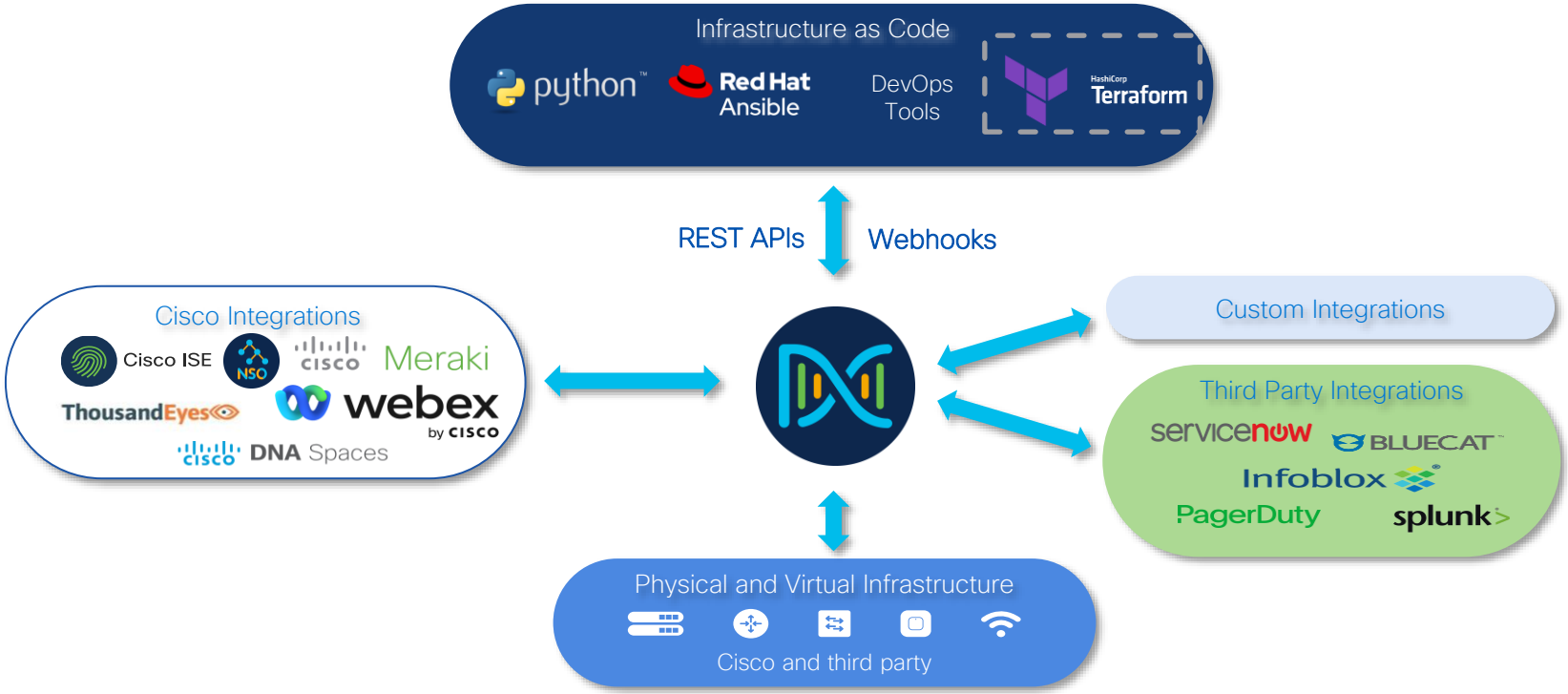
Terraform Provider: Cisco DNA Center (1/2)

Reference

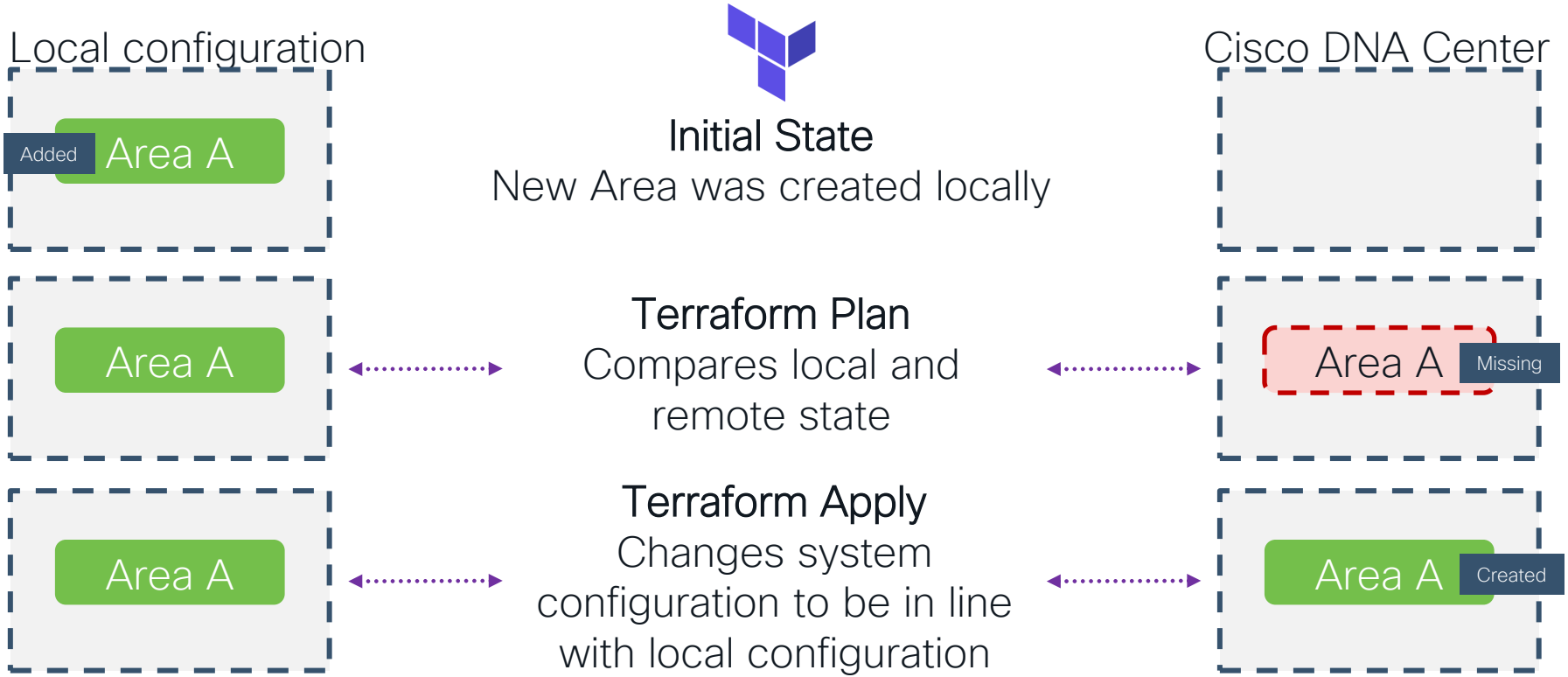


https://registry.terraform.io/providers/cisco-en-programmability/dnacenter

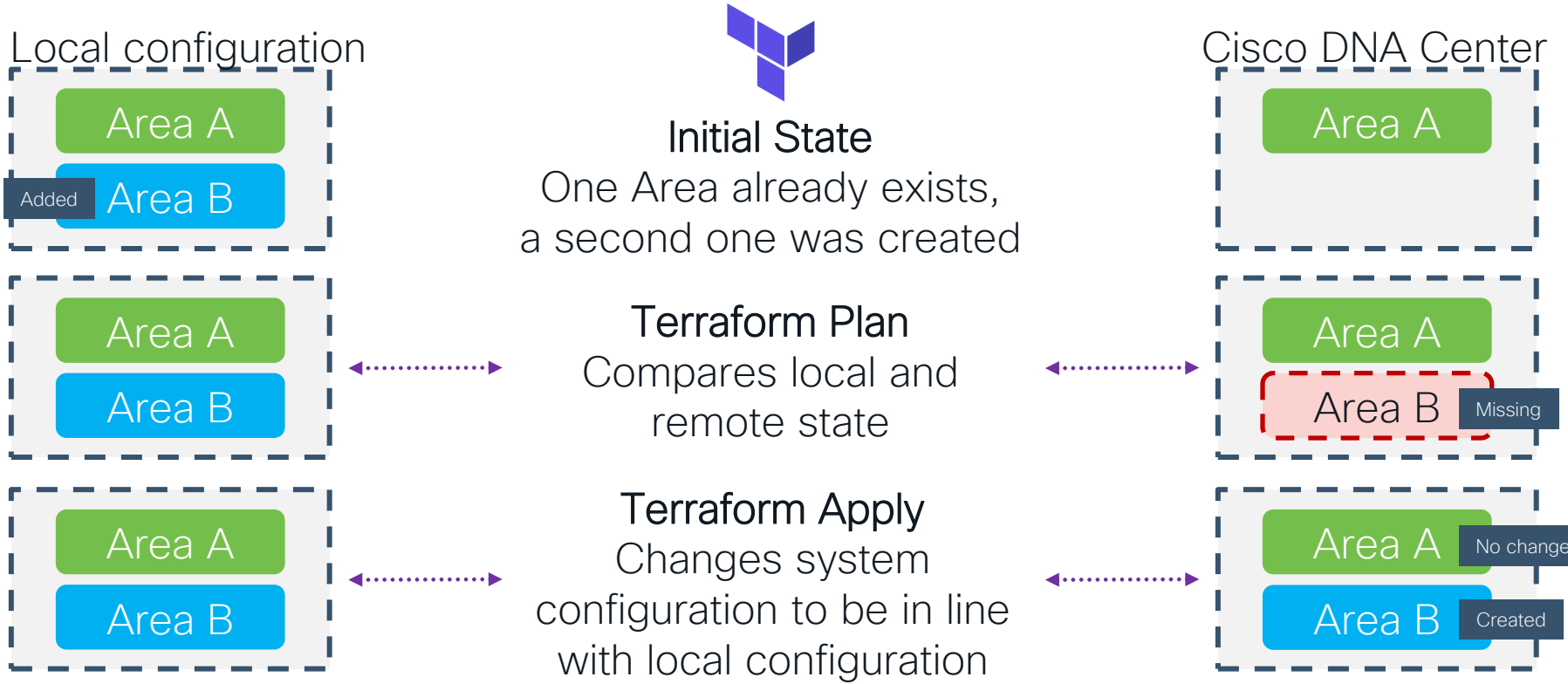
Terraform Provider: Cisco DNA Center (2/2)



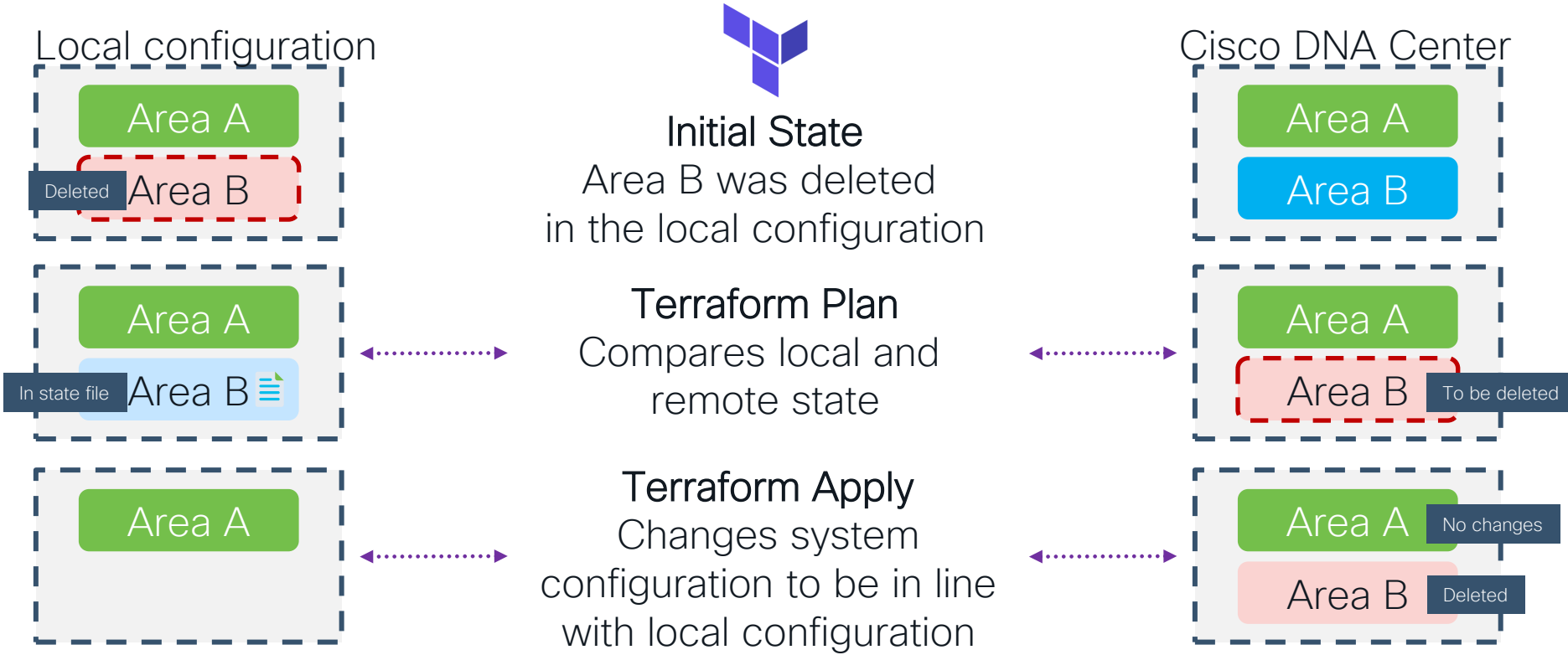
Terraform command line (1/4)



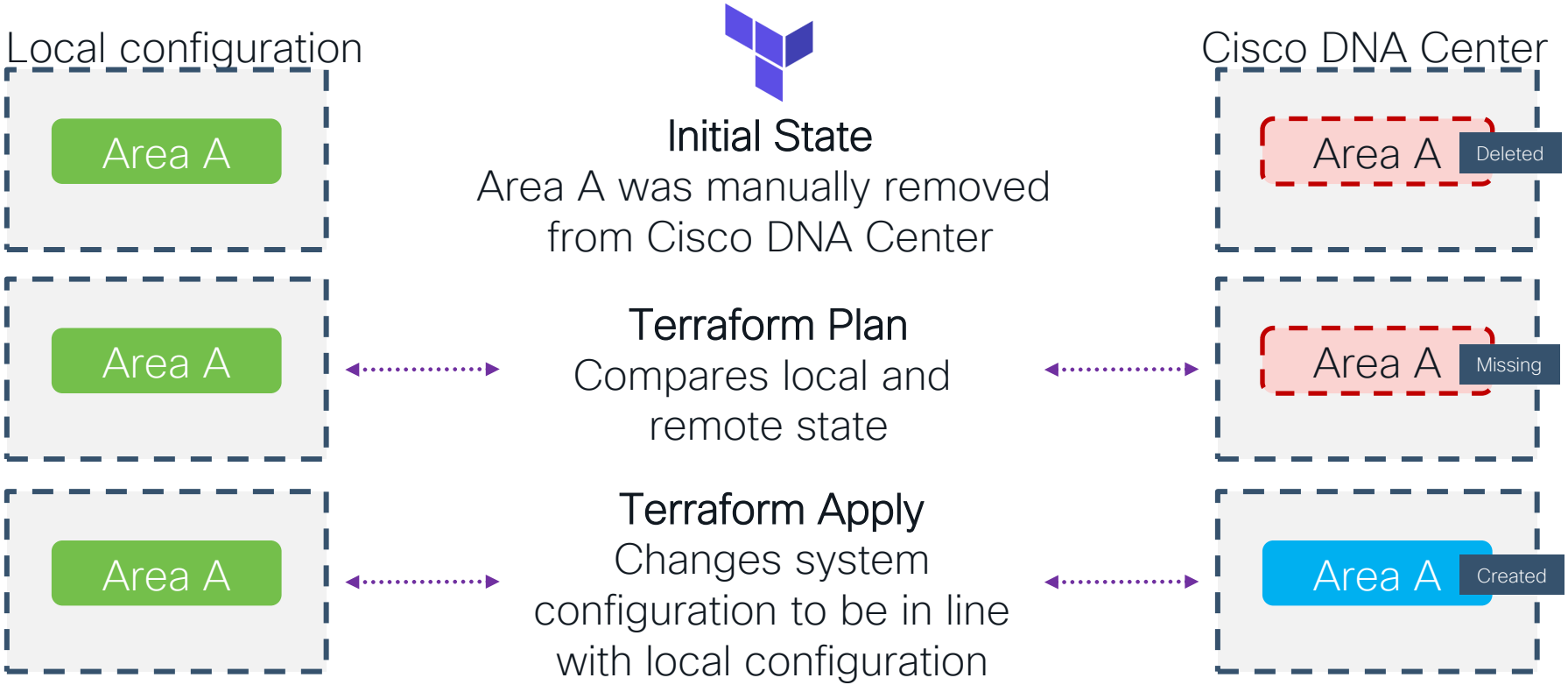
Terraform command line (2/4)



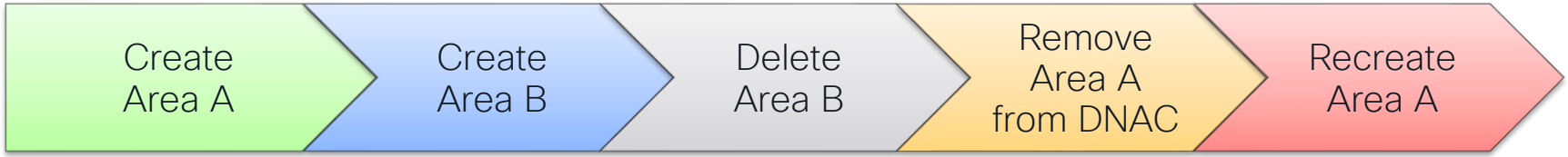
Terraform command line (3/4)



Terraform command line (4/4)



Scenario



Demo

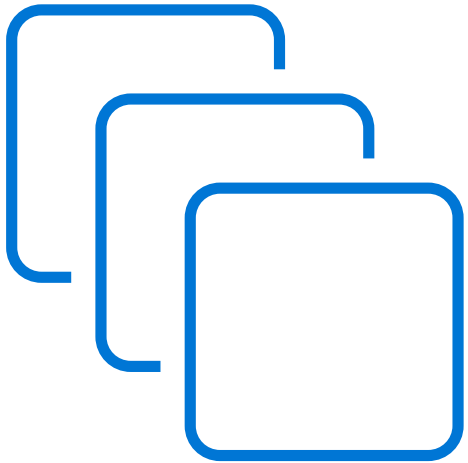
Deploy a Cisco SD-Access Fabric Site from scratch using Modules

Terraform Modules

- Code reuse
- Remote or local source
  - Terraform Registry
- Multiple instances
- Versioning
- Provider inheritance

Module Components

Input variables



Resources

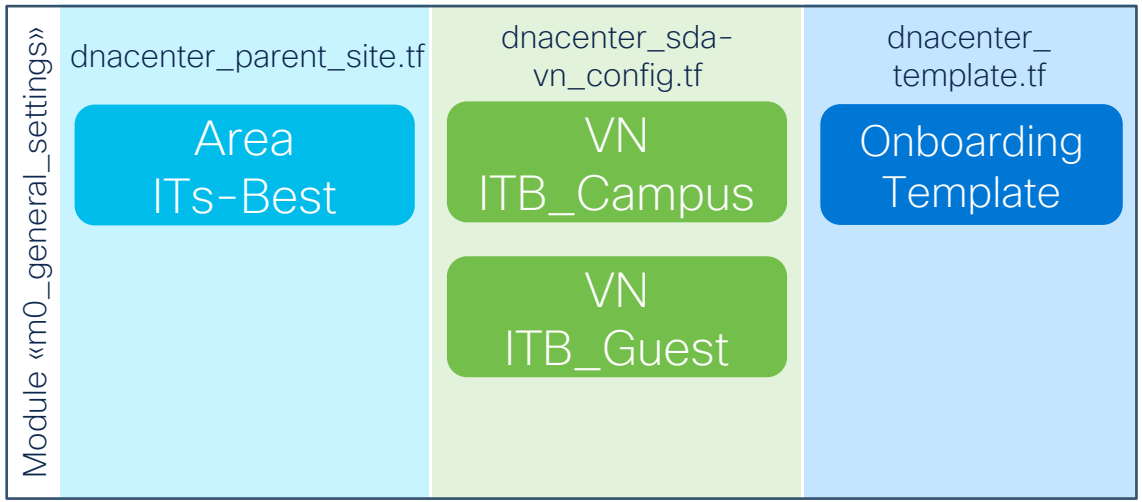
Output values

Demo

Scenario

Scenario Step 1/5: Configure General Settings

Instance «General»



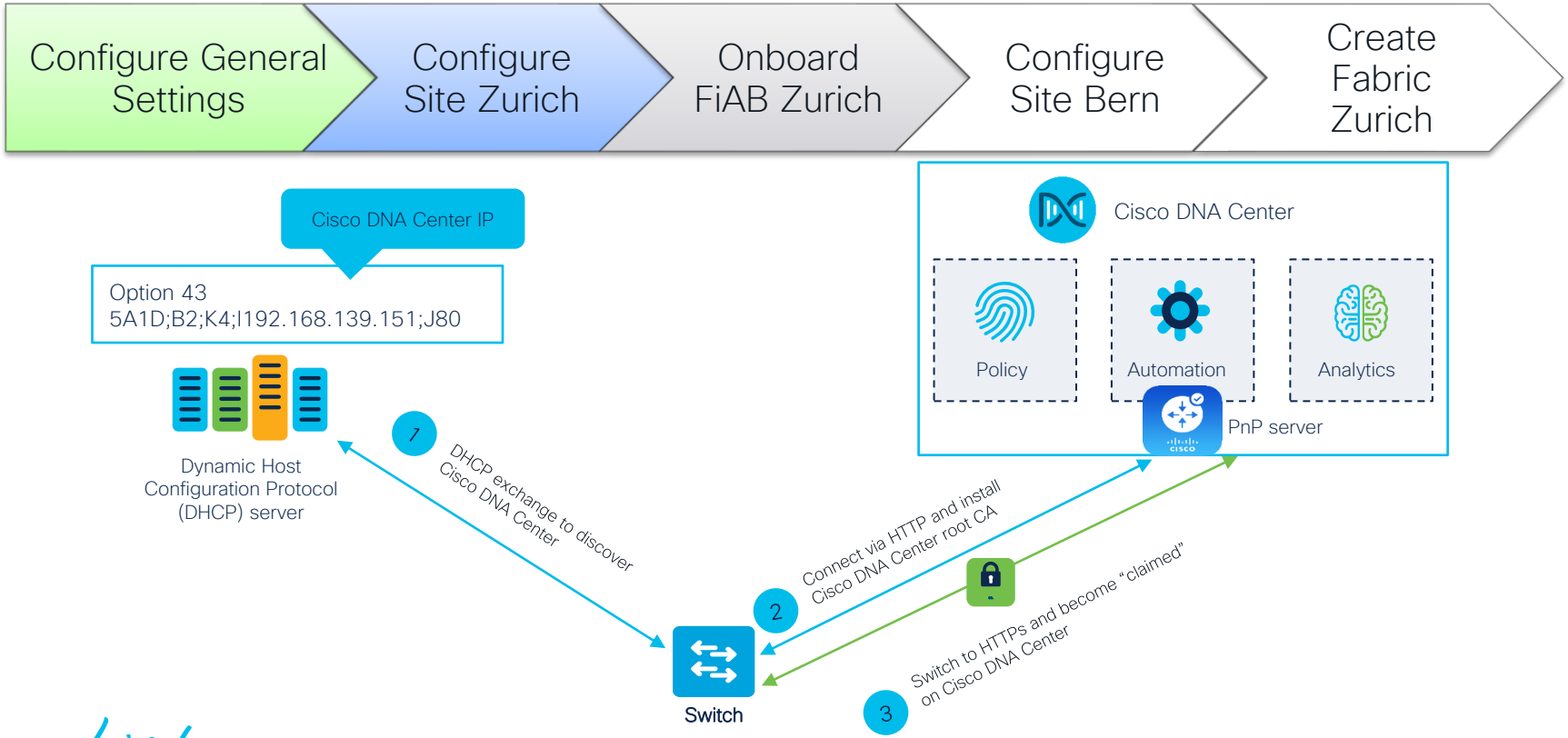
Scenario Step 2/5: Configure Site Zurich

Instance «Zurich»

Module «m1_site_settings»

dnacenter_site.tf	dnacenter_ip-pools.tf		dnacenter_pnp.tf	dnacenter_sda-fabric_config.tf
Area Name	IP-Pool Campus	IP-Pool Transit	PnP Template	Fabric Site
Building Name	IP-Pool Guest	IP-Pool LAN-Auto	PnP Device	Fabric VNs
Floor Name	IP-Pool AP			Fabric IP-Pools

Scenario Step 3/5: Onboard FiAB Zurich



Scenario Step 4/5: Configure Site Bern

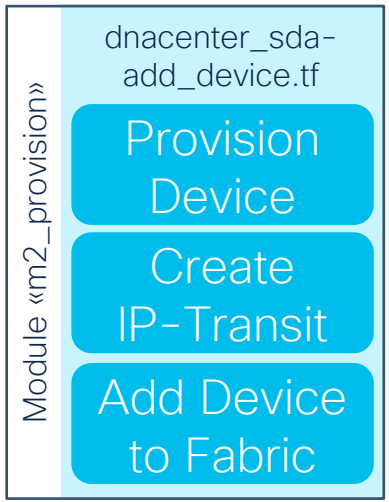
Instance «Bern»

Module «m1_site_settings»

dnacenter_site.tf	dnacenter_ip-pools.tf		dnacenter_pnp.tf	dnacenter_sda-fabric_config.tf
Area Name	IP-Pool Campus	IP-Pool Transit	PnP Template	Fabric Site
Building Name	IP-Pool Guest	IP-Pool LAN-Auto	PnP Device	Fabric VNs
Floor Name	IP-Pool AP			Fabric IP-Pools

Scenario Step 5/5: Create Fabric Zurich

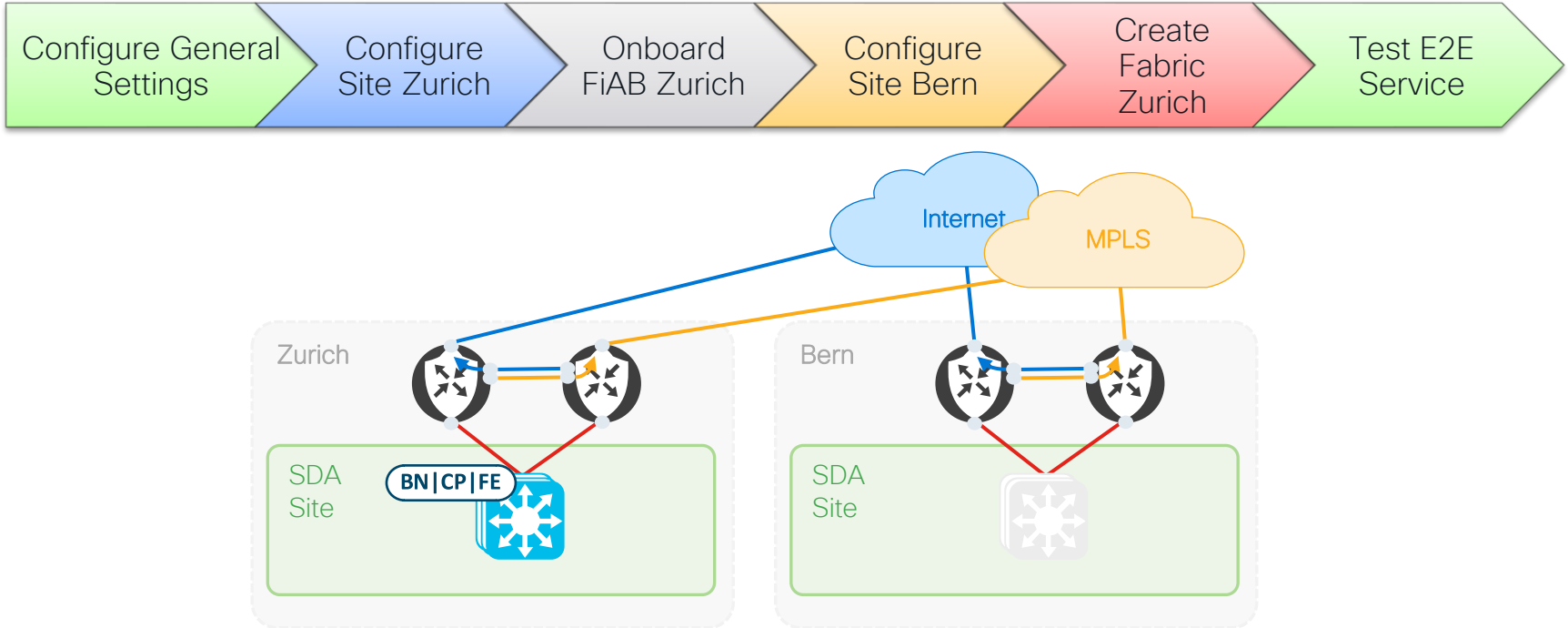
Instance «Zurich»



With Terraform you can increase efficiency and get consistent outcomes!

Test the Deployment with Thousandeyes Provider

Scenario



Scenario

Deploy TE agent on FiAB → Create TE test → Attach FiAB to TE test → Trigger TE test to run

Instance «Zurich»

Module «m3_testing»

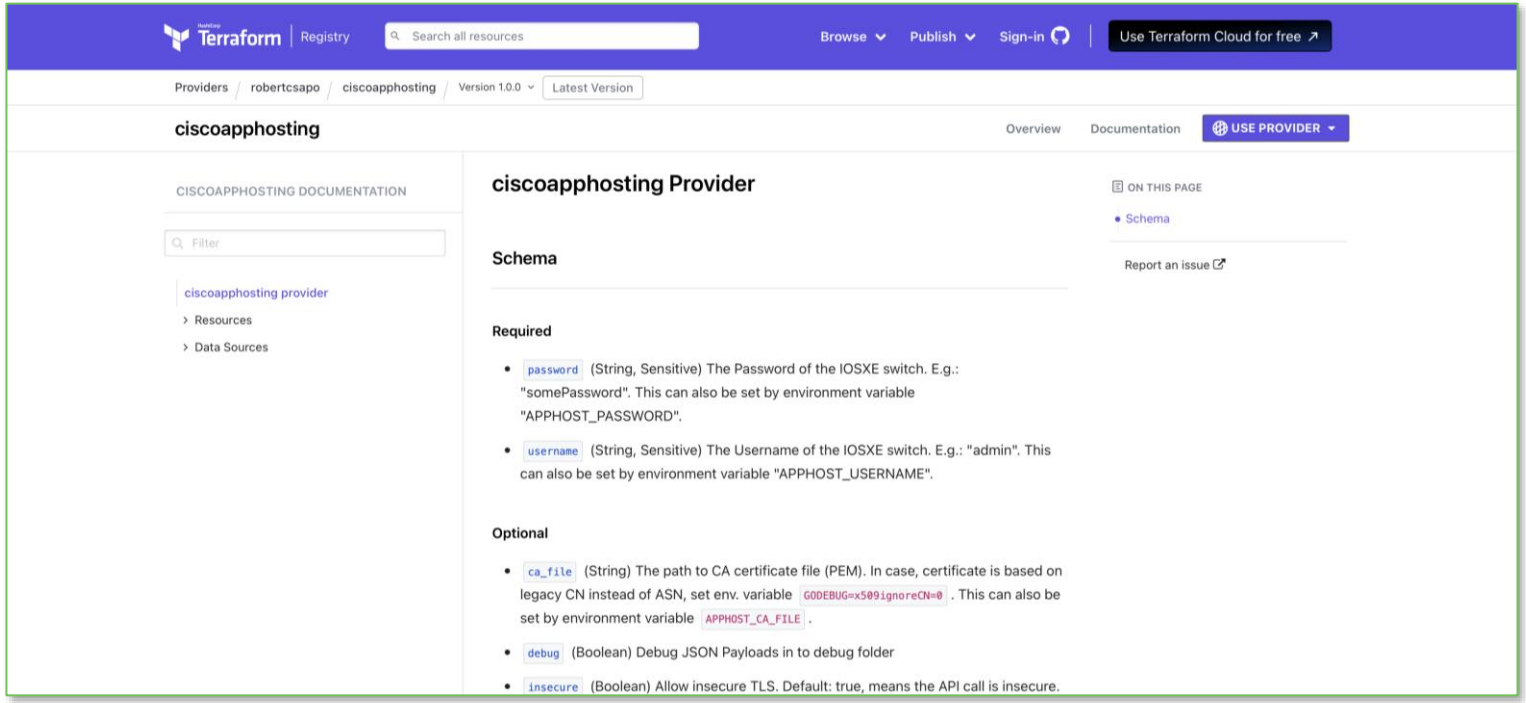
ciscoapphosting.tf	thousandeyes.tf
Enable IOx	Create TE Test
Install TE Agent	

docker

ThousandEyes Enterprise Agent on Catalyst® 9000

Terraform Provider: App Hosting

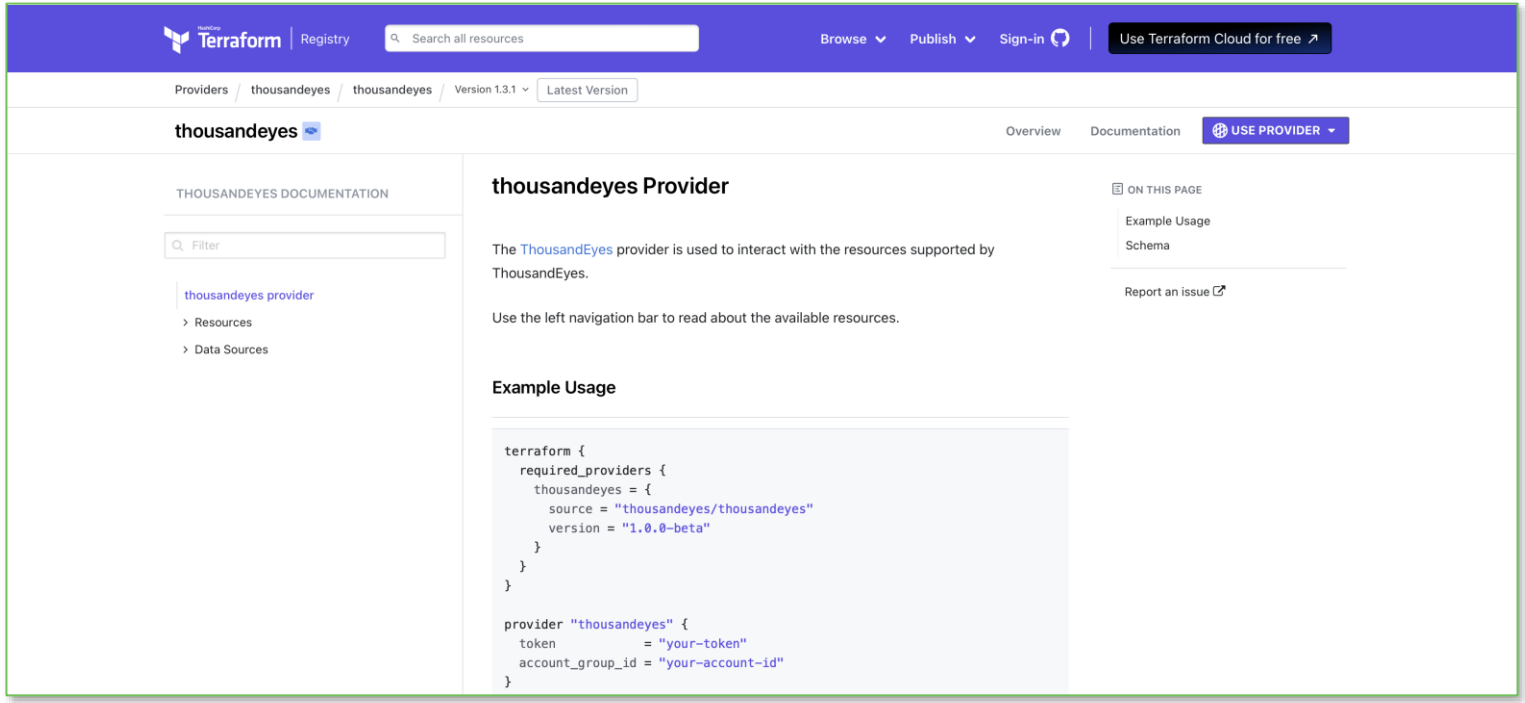
Reference



https://registry.terraform.io/providers/robertcsapo/ciscoapphosting/

Terraform Provider: ThousandEyes

Reference

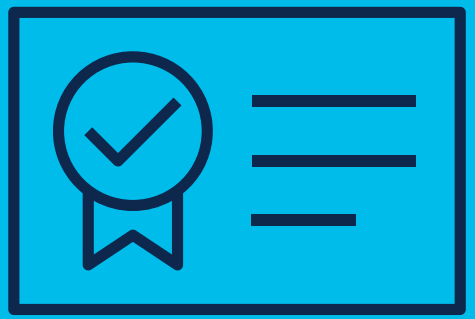


https://registry.terraform.io/providers/thousandeyes/thousandeyes/

Demo

Conclusion

Summary



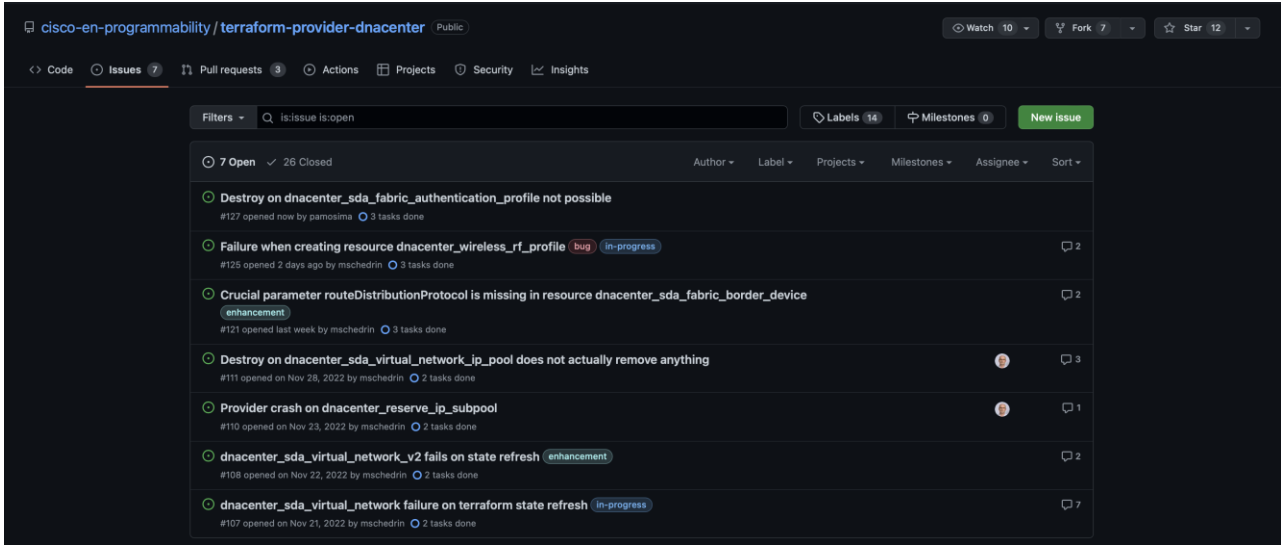
- Infrastructure as Code (IaC)
- Terraform Terminology
- Terraform command line
- Terraform Modules
- Deployed a Cisco SD-Access fabric
- Tested the Deployment with ThousandEyes Agent

Resources

- Demo Example Files
  - https://github.com/pamosima/BRKOPS-1183_TF-Demo/
- Terraform Providers
  - https://registry.terraform.io/providers/cisco-en-programmability/dnacenter
  - https://registry.terraform.io/providers/robertcsapo/ciscoapphosting/
  - https://registry.terraform.io/providers/thousandeyes/thousandeyes/
- General
  - https://developer.cisco.com/dnacenter/
  - https://developer.thousandeyes.com/

Open Terraform Provider Issues

- Destroy on dnacenter_sda_virtual_network_ip_pool not working
- Destroy on dnacenter_sda_fabric_authentication_profile not working



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Complete your Session Survey

- Please complete your session survey after each session. Your feedback is very important.
- Complete a minimum of 4 session surveys and the Overall Conference survey (open from Thursday) to receive your Cisco Live t-shirt.

- All surveys can be taken in the Cisco Events Mobile App or by logging in to the Session Catalog and clicking the "Attendee Dashboard" at https://www.ciscolive.com/emea/learn/sessions/session-catalog.html

Continue Your Education

Download and test my Terrform examples files from GitHub

Visit the On-Demand Library for Real World Use Cases for Deploying and Operating Cisco SD-Access Using Cisco DNA Center - BRKOPS-2035


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ALL IN