



The bridge to possible

Terraform with IOS XE

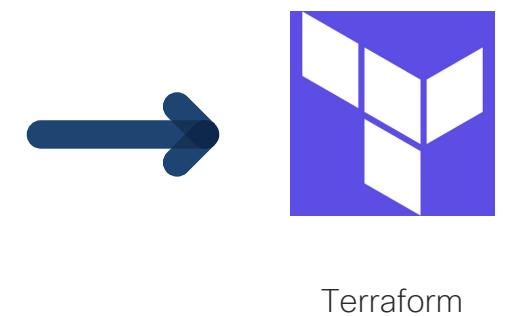
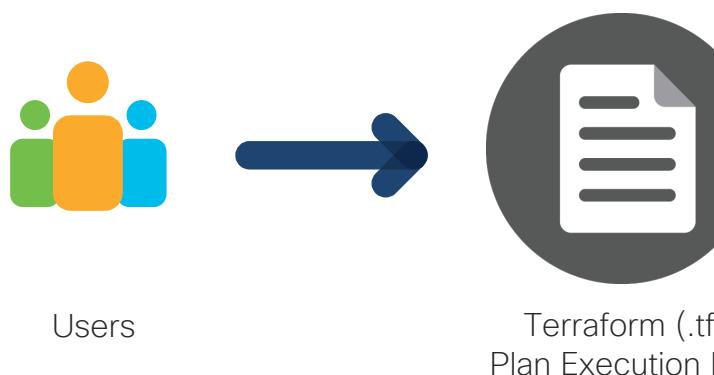
Story DeWeese
Technical Marketing Engineer (TME)
February, 2022

Overview

- What is Terraform?
- How does it work?
- What is now available?
 - Imperative provider abstracting RESTCONF + YANG
 - Example resources for top features
- Demo

Why Terraform ?

Terraform is a single tool that is used to configure networks and applications
Now support for Terraform with IOS XE is being introduced



Cisco Catalyst 9300X IOS XE
RESTCONF / YANG



IPSEC crypto tunnel configuration



Cisco
vManage



TLS



Cisco DNA
Center

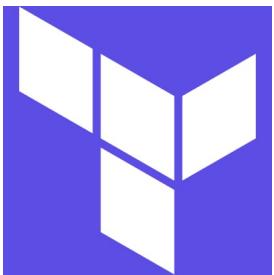


Google Cloud



Compute and VPC, application,
network configuration, transit
gateway

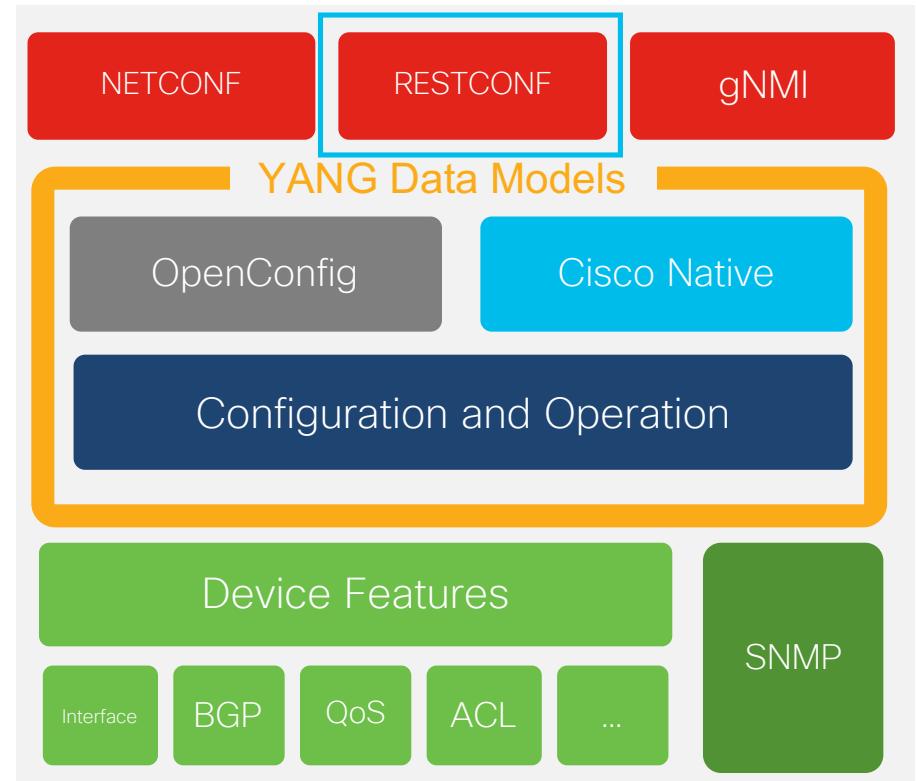
Terraform is...



Open-source Infrastructure as Code (IaC) Software Tool providing a consistent CLI workflow to manage hundreds of cloud services. Terraform codifies cloud APIs into declarative configuration files.

- Cloud Native Tooling circa 2014 from HashiCorp
- Agentless, single binary file
- Zero server-side dependencies

Terraform uses the RESTCONF API



IOS XE Programmability integration with Terraform

Terraform is supported on all IOS XE platforms

Phase I: imperative for 100% feature coverage (available today) The following features are delivered:

- This Terraform provider is a generic REST resource for IOS XE RESTCONF YANG
- Hashicorp Config Language (HCL) support for management of IOS XE
- RESTCONF operations for PUT/PATCH/POST etc still must be followed for iterative management
- Examples and JSON mappings for top features are shared in GitHub
- Any feature supported by RESTCONF/YANG is supported iteratively by this Terraform provider

L3 subinterface	Authorization AAA	IGMP Proxy
VLAN	Authentication AAA	IGMP
Voice VLAN Trunk	MDT	NAT
VLAN	SPAN and RSPAN	NTP
VTP	SNMP	HSRP
Line	CDP	DHCP
ACL	EtherChannel	Ethernet Management
RADIUS	OSPF	Port
Accounting AAA	BGP	POE

The screenshot shows a GitHub repository interface for the `terraform-provider-iosxe` provider. The repository has 4 authors and 5 commits. It contains three main files: `aaa-accounting.tf`, `aaa-authentication.tf`, and `aaa-authorization.tf`. The commit history shows a recent update from `d497acf`.

Resources:

GitHub Provider Examples: <https://github.com/CiscoDevNet/terraform-provider-iosxe/>
Provider Binary: <https://registry.terraform.io/search/providers?namespace=CiscoDevNet>
Go Client: <https://github.com/CiscoDevNet/iosxe-go-client>
Blogs at <https://blogs.cisco.com/tag/terraform>

Phase II: new declarative features

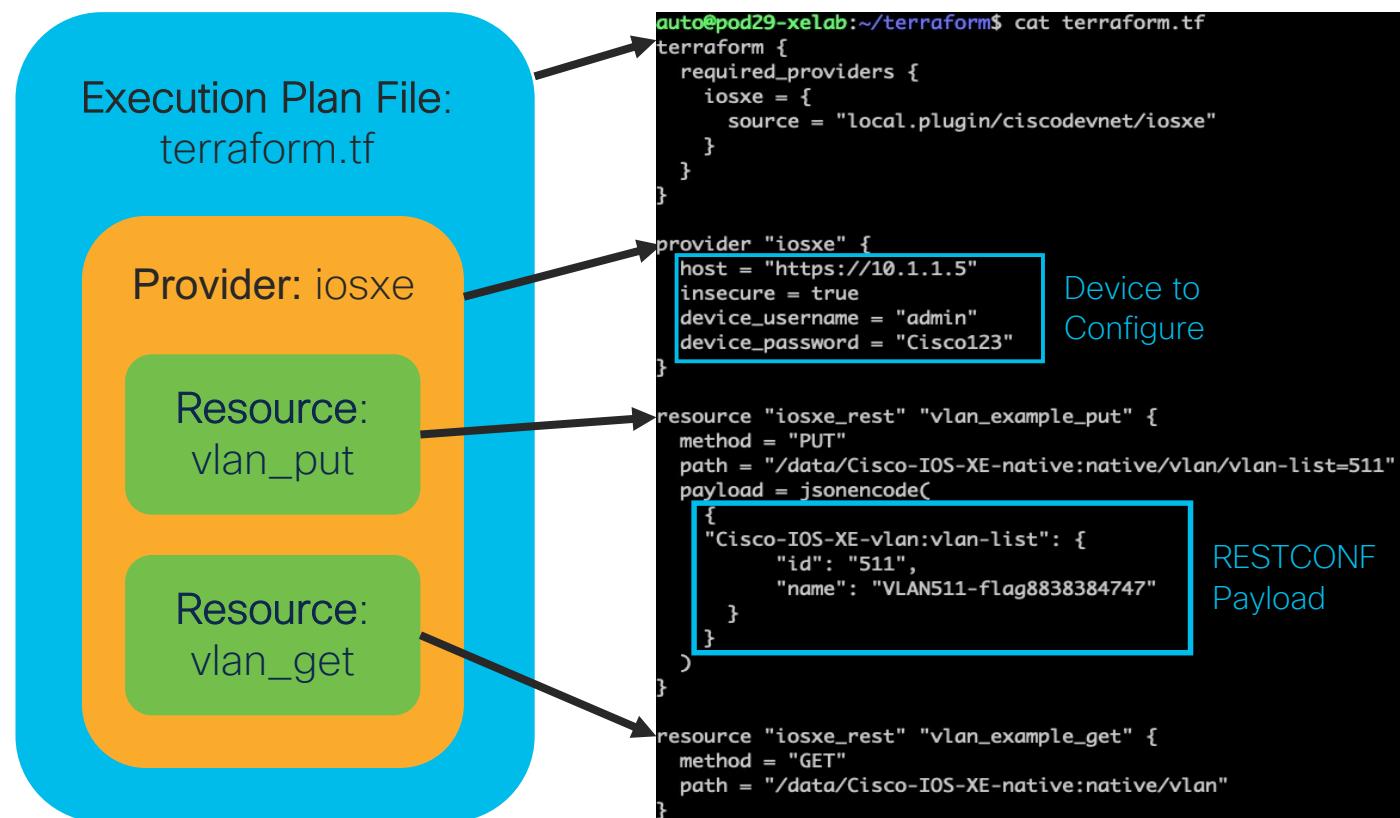
Terraform Terminology

Terraform uses an execution plan file with a provider and resource definitions

An execution plan file defines the provider and resources. It is written in HashiCorp Configuration Language (HCL), similar to JSON, and stored with a .tf extension

A provider is a plugin to make a collection of resources accessible

A resource (or infrastructure resource) describes one or more infrastructure objects managed by Terraform. With the IOS XE Terraform provider, resources can be considered the same as a configurable feature



Getting Started with Terraform + IOS XE Provider

1. Enabling the RESTCONF API on the switch

```
Switch# conf t  
Switch(config) # restconf
```

2. Install [Terraform](#)

```
$ apt-get install terraform
```

3. Clone the [IOS XE Terraform Provider](#) GitHub repository

```
$ git clone https://github.com/CiscoDevNet/terraform-provider-iosxe
```

4. Apply Terraform VLAN example

```
$ terraform apply acl_and_vlan.tf
```

Terraform Demo

Cisco DEVNET



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developer.cisco.com

<https://github.com/CiscoDevNet/terraform-provider-iosxe/>

Episode Rewind



What is Terraform?



How does it work?



What is now available ?

- Imperative provider abstracting RESTCONF + YANG
- Example resources for top features



Demo



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