



# TURN IT UP

CISCO *Live!*

#CiscoLive



The bridge to possible

# Driving your Cisco Multi-Domain Intent-Based Network Using Infrastructure as Code

Configure Cisco ACI, SDWAN and SDA with CI/CD pipeline

Lionel Hercot, Technical Marketing Engineer  
@LHercot  
PSODCN-1002



#CiscoLive





# Agenda

- What is Infrastructure as Code
- Tools of the trade
- Demo
- Cisco IBN Providers and Collections

# Infrastructure as Code (IaC) – What/Why/How

- Automate the provisioning and management of the technology stack
- Translate manual tasks into reusable, robust, distributable code
- Rely on practices that have been successfully used for years in software development (version control, automated testing, release tagging, continuous delivery, etc.)
- Benefits: much higher delivery speed; significant reliability boost

# What is Ansible?



ANSIBLE

- Open-source Configuration Management Tool
- Commercial support from RedHat
- Declarative (when possible) and idempotent
- Can manage a wide range of systems:
  - VMs, network devices, cloud instances, etc.
- Agentless
- Python server-side dependencies

# What is Terraform?



- Open-source Infrastructure Provisioning Tool
- Commercial support from HashiCorp
- Declarative and idempotent
- Immutable infrastructure concept
- Can manage a wide range of systems:  
VMs, network devices, cloud instances, etc.
- Agentless, single binary file
- Zero server-side dependencies

# Ansible or Terraform?

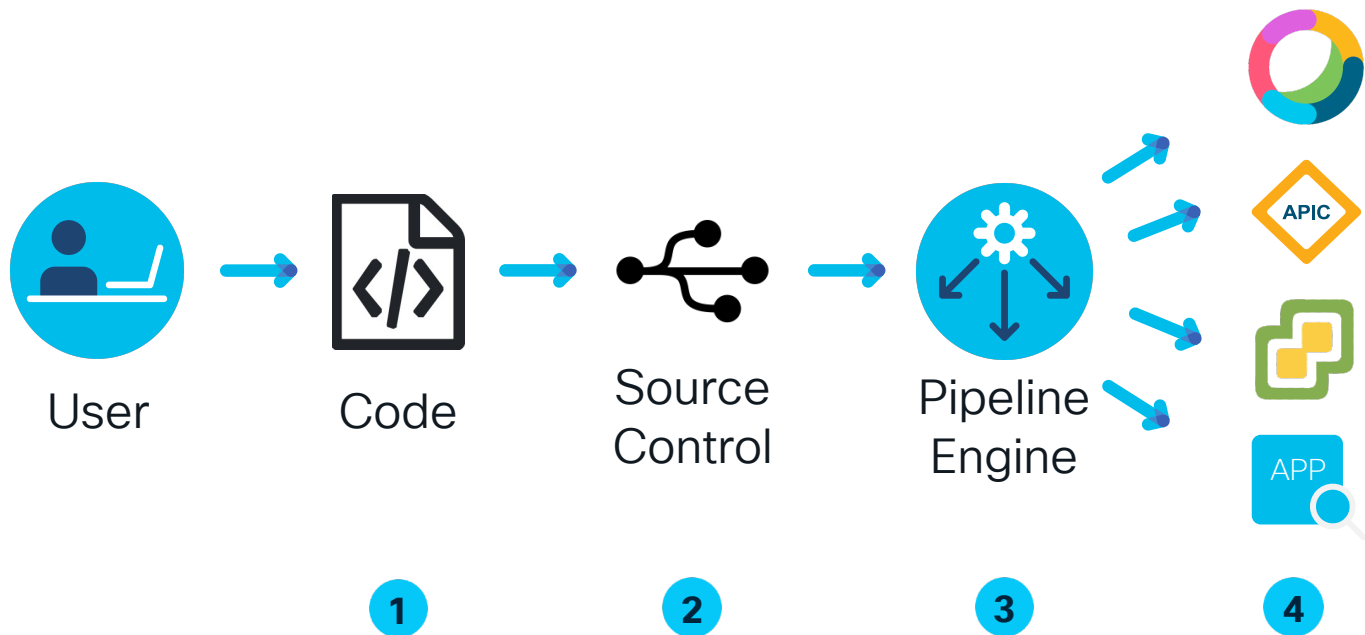
- Both Ansible and Terraform can coexist
  - It's not an either/or story
  - Terraform can call Ansible for ad-hoc tasks after deploying a VM
- Terraform keeps state locally
  - It knows what is configured vs desired end-state
  - Can automatically destroy / recreate resources
- Ansible mutate the infrastructure
  - Need to re-run everything
  - Might need to create advanced controls to avoid long running scripts

# CI/CD Pipeline

- Continuous Integration (CI)
  - Practice of merging all developer changes to a shared repo several times a day
  - It main include the creation and test of artifacts (executable, app, ...)
- Continuous Deployment (CD)
  - Approach to deliver new software functionalities frequently through automated deployments
  - Rely on Continuous Integration for tracking changes



# What a CI/CD workflow looks like



# Common components of a CI/CD Pipeline

Code



Source Control



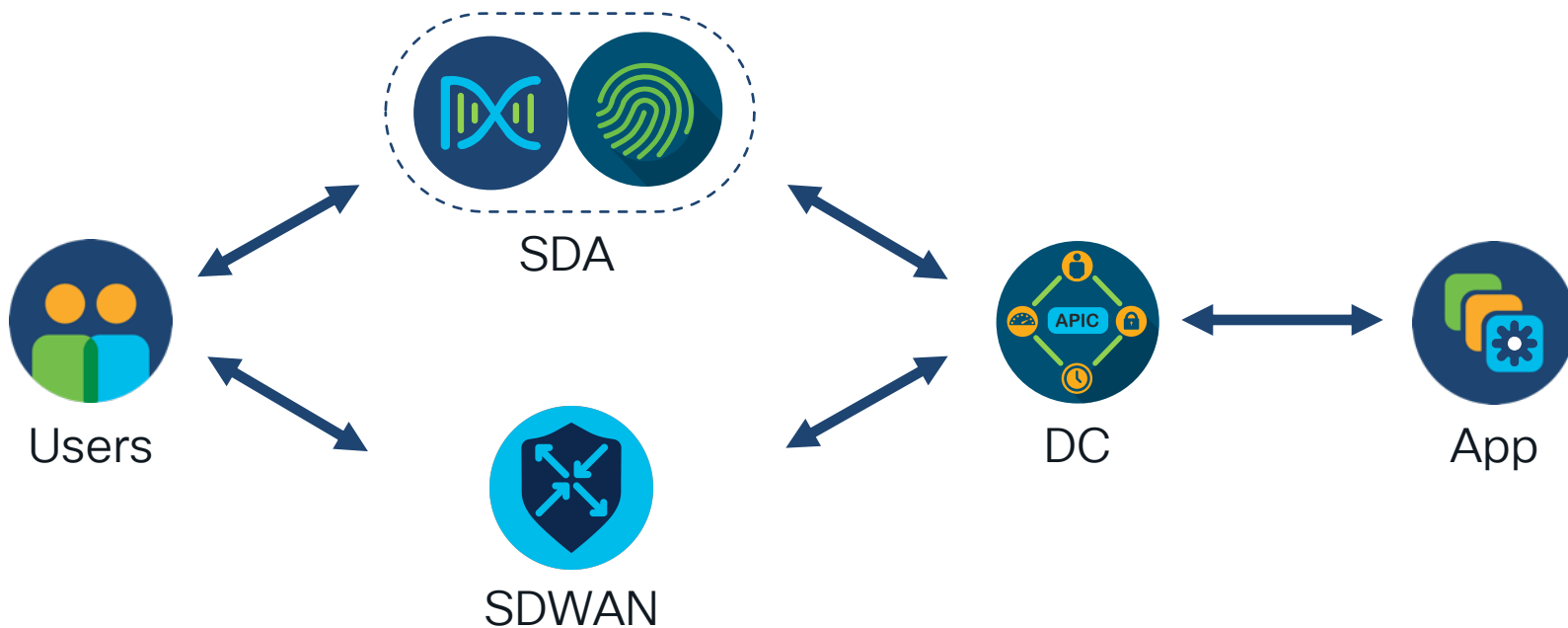
Pipeline / Orchestrator



Let's see it in action!

# Use Case

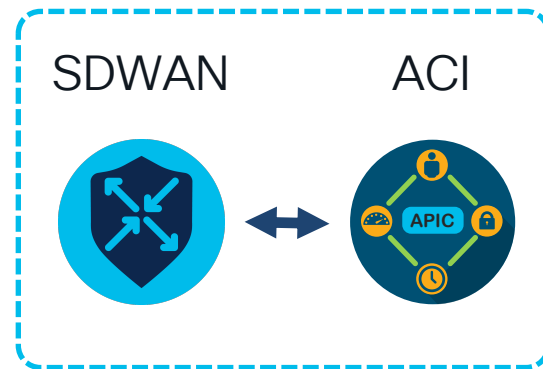
User want to access a new App in the DC from either SDA or SDWAN



# Cisco Pairwise Integrations



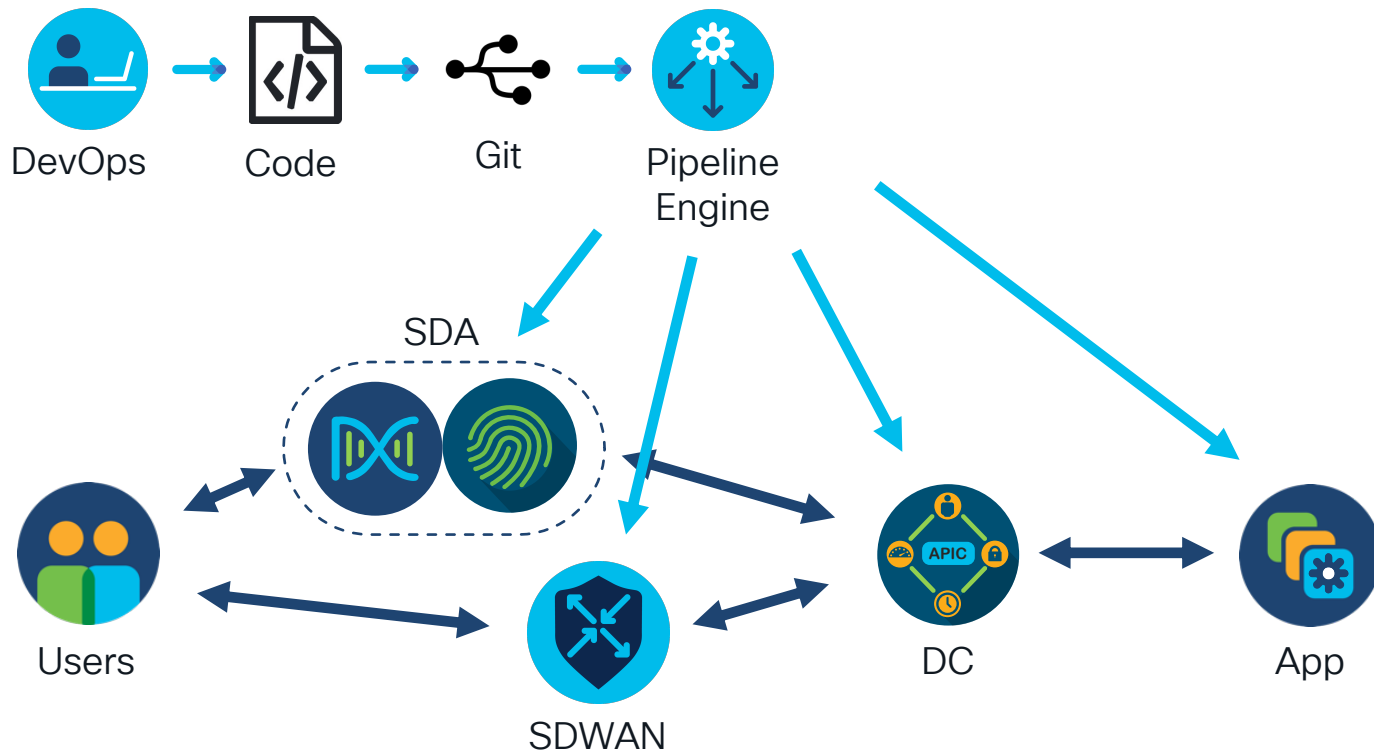
Security Group Mapping / Routing



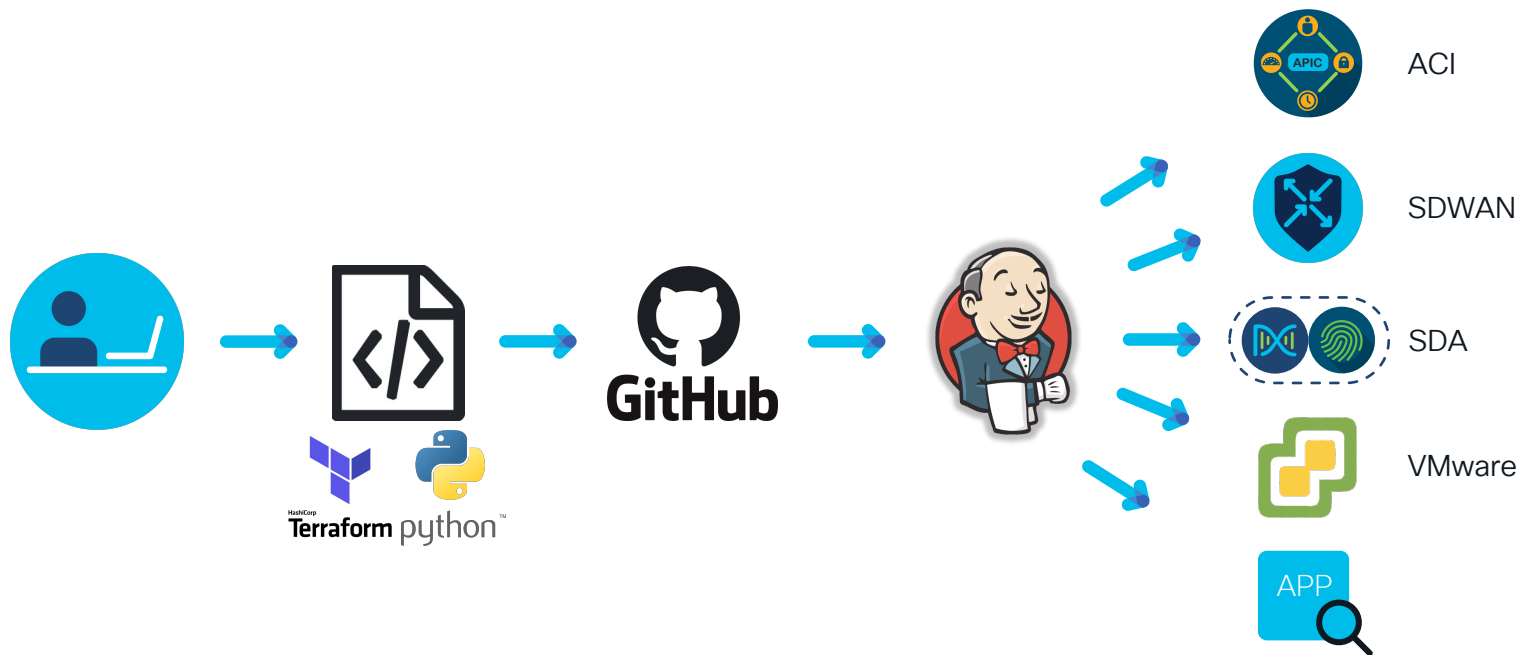
Quality of Services

# Use Case

Single button to deploy all configurations using CI/CD pipeline



# Our Multi-Domain CI/CD pipeline



# Cisco Intent-based Networking Collections



Cisco NXOS

ACI  
Cloud / Onprem

Multi Site  
Orchestrator

Network  
Assurance  
Engine

Data Center  
Network  
Manager

DNA Center

Cisco IOS



80+ modules  
in  
cisco.nxos

80+ modules  
in  
cisco.aci

45+ modules  
in  
cisco.mso

6+ modules  
in  
cisco.nae

5+ modules  
in  
cisco.dcnm

100+ modules  
in  
cisco.dnac

34+ modules  
in  
cisco.ios

Available Today



# Cisco Intent-based Networking Providers



HashiCorp

**Terraform**

ACI  
Cloud / Onprem



Multi Site  
Orchestrator



Data Center  
Network  
Manager



DNA Center



Available Today

# New DevNet Resources available!

New MSO Sandbox



New Terraform Learning Labs



[More Info on DevNet: https://developer.cisco.com/nexusapi/](https://developer.cisco.com/nexusapi/)

# Key Takeaways



- Infrastructure as Code is a journey. Start it today!
- Cisco products are designed to be automated
- Ansible and Terraform can work together
- Go learn with our DEVNET learning labs

# Continue your education



Demos in the Cisco campus



Meet the engineer 1:1 meetings



Walk-in labs



Related sessions



# References

- ACI Ansible Modules Documentation Guide  
[https://docs.ansible.com/ansible/latest/scenario\\_guides/guide\\_aci.html](https://docs.ansible.com/ansible/latest/scenario_guides/guide_aci.html)
- Cisco DevNet Learning Labs  
<https://developer.cisco.com/learning/modules/ansible-aci-intro>  
<https://developer.cisco.com/learning/modules/terraform-aci-intro>  
<https://developer.cisco.com/learning/modules/ansible-mso-intro>  
<https://developer.cisco.com/learning/modules/terraform-mso-intro>
- Cisco DCN Collection / Providers GitHub Repos  
<https://github.com/CiscoDevNet/ansible-aci>  
<https://github.com/CiscoDevNet/ansible-mso>  
<https://github.com/CiscoDevNet/ansible-nae>  
<https://github.com/CiscoDevNet/ansible-dcnm>  
<https://github.com/CiscoDevNet/terraform-provider-aci>  
<https://github.com/CiscoDevNet/terraform-provider-mso>  
<https://github.com/CiscoDevNet/terraform-provider-dcnm>
- Cisco Collections on Ansible Galaxy  
<https://galaxy.ansible.com/cisco>
- Cisco Providers on Terraform  
<https://registry.terraform.io/namespaces/CiscoDevNet>
- Demo Code GitHub Repository  
<https://github.com/lhercot/>  
<https://github.com/ciscoecosystem/terraform-aci-community-samples>

# References (continued)



- Demo Videos
  - All things Ansible for ACI  
<https://www.youtube.com/watch?v=XQtqwZfiBMg>
  - Composable Infrastructure with ACI and Terraform  
<https://youtu.be/5OJN4sOAQ2g>
  - Deconstructing DCN CI/CD Pipelines  
[https://youtu.be/\\_-Fe9\\_0nE6s](https://youtu.be/_-Fe9_0nE6s)
  - Ansible for ACI and NAE in a pipeline  
<https://www.ciscolive.com/global/on-demand-library.html?search=camillo#/session/1564528256105001e9zi>
  - Making you network cloud native with Cisco ACI and GitOps  
<https://youtu.be/VzYXCC4ExWE>
  - Codify Security in K8s w/ Terraform, GitOps & ACI  
<https://www.youtube.com/watch?v=VH1QWP1oxYg>
  - In-Fabric Auto-Scaling with Consul and Cisco ACI  
<https://www.youtube.com/watch?v=htNWDOChIXk>
  - Mind the Gap, Bridging Cloud and On-Prem Infrastructures  
<https://www.youtube.com/watch?v=r2GhTKAHWCw>
  - Enabling Hybrid Network-as-Code with Cisco ACI and HashiCorp Terraform  
<https://www.youtube.com/watch?v=f8VBVp7LKSxw>

# References (continued)

- What's new and exciting on Cisco ACI with Red Hat Ansible Collections  
<https://blogs.cisco.com/datacenter/whats-new-and-exciting-on-cisco-aci-with-red-hat-ansible-collections>
- Why Cisco ACI with HashiCorp Terraform really matters  
<https://blogs.cisco.com/datacenter/why-cisco-aci-with-hashicorp-terraform-really-matters>
- Plenty of Cisco Live recorded sessions
- Webinars
  - [Building an automated hybrid multicloud with Cisco ACI and HashiCorp Terraform](#)
  - [Cisco ACI with HashiCorp Terraform](#)
  - [Introduction to Terraform and ACI](#)
  - [Redefining the Intelligent Network with Cisco ACI and HashiCorp Consul](#)



The bridge to possible

# Thank you

CISCO *Live!*

#CiscoLive







# TURN IT UP

CISCO *Live!*

#CiscoLive