

The Cisco Live! logo, featuring the word "CISCO" in a dark blue, sans-serif font, followed by "Live!" in a dark blue, script font.

CISCO *Live!*

The text "Let's go" in a large, dark blue, sans-serif font, positioned to the left of a bright, multi-colored sunburst graphic that radiates from the right side of the image.

Let's go

#CiscoLiveAPJC



The bridge to possible

Deploying Cisco DNA Center in Seconds with CICD

Keith Baldwin – Technical Solutions Architect
CCIE (RS,W) #35439 CCDE #20170057
DEVNET-2176



#CiscoLiveAPJC



Cisco Webex App

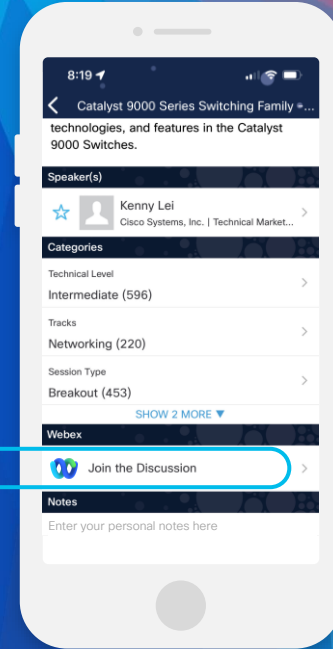
Questions?

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 by the speaker until December 22, 2023.



<https://ciscolive.ciscoevents.com/ciscolivebot/#DEVNET-2176>

Agenda

- Building Orchestration
- Building Blocks
 - Controller
 - REST API
 - Python
 - Automation/CICD Platforms
- LAB Overview
- Labs
- Conclusion

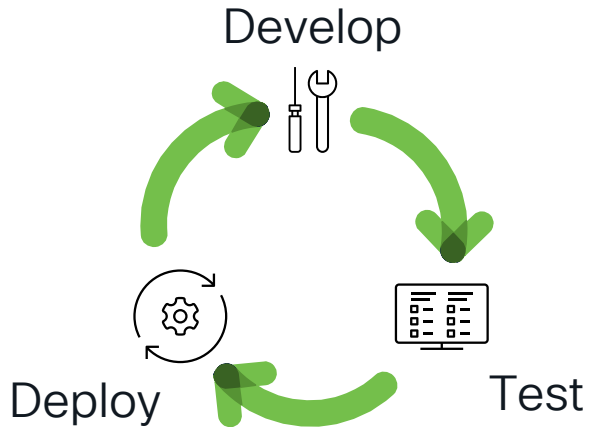
Building Orchestration

Advantages of Continuous Delivery

Increase Productivity

Automate Changes

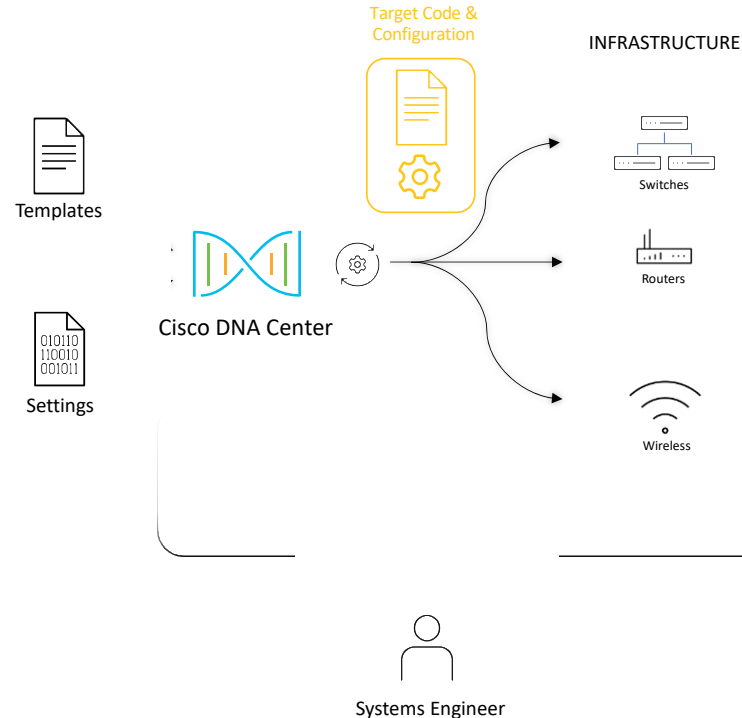
Fault Find Quickly



Cisco DNA Center with REST API towards CI/CD

BUILDING

DEPLOYING



Building Blocks

Controller

Cisco DNA Center Platform

IT and network system processes

servicenow	ITSM
Infoblox	IPAM
BLUECAT	
tableau	Reporting

Non-Cisco network devices

Map 3rd Party Network Devices to Data Model

Level 1 Operations support:

Discovery, Inventory, Topology, Availability, Command Runner

Business integration APIs

- Assurance
- Path Trace
- Command Runner
- Template Programmer
- Network Inventory / Discovery
- Topology
- Plug-n-Play
- Software Image Management (SWIM)

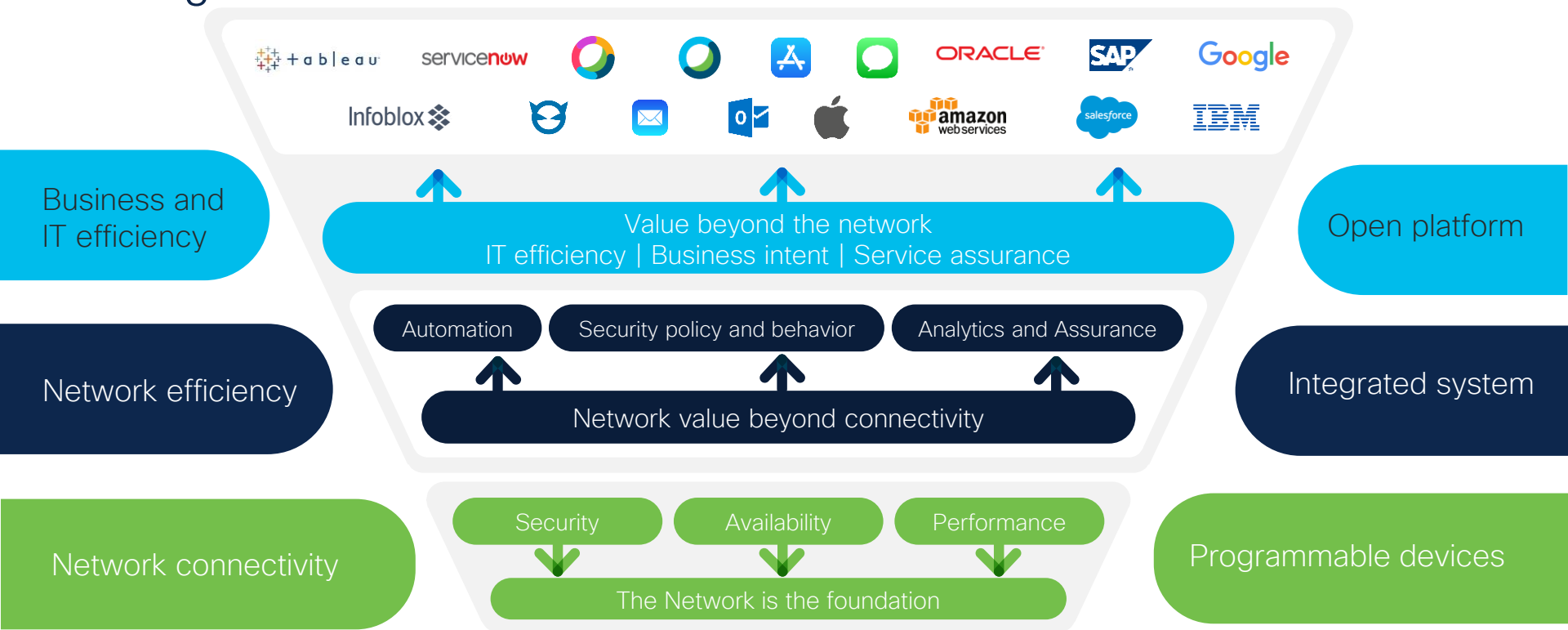
Multidomain integrations



- SD-WAN
- Meraki
- ISE
- ACI via ISE
- Spaces
- ThousandEyes
- Webex

REST APIs

Integrations



Scale (Vertical Axis)

Value (Horizontal Axis)

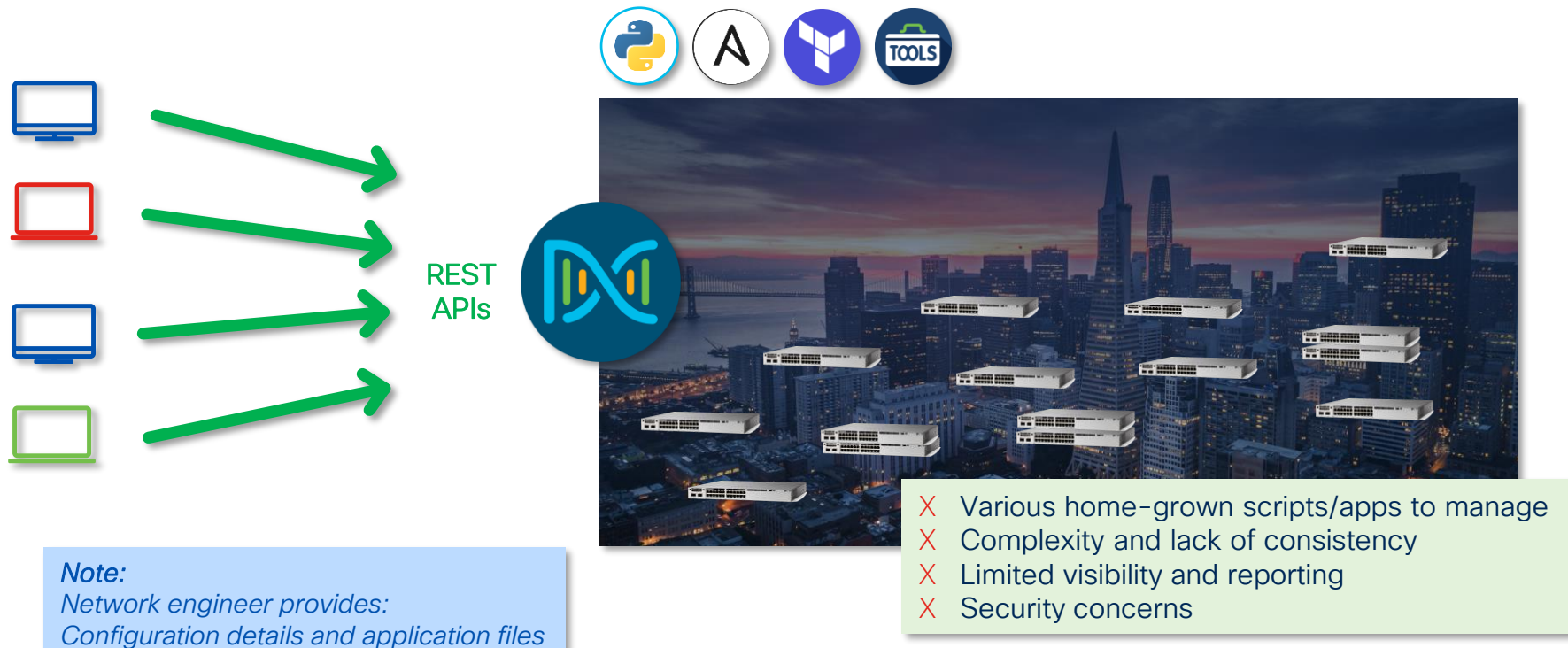
Ad-hoc Scripting
Engineers run scripts and tools using Cisco DNA Center APIs and device APIs

Re-usable Frameworks
Centrally managed repos and templates to accelerate service delivery, and workflow automations

Service Orchestration
Intent-based networks, automation in one place, across multiple domains, out-of-box integrations

Business-level intent
Business-level intent, executive dashboards, fully customizable integrations with ITSM, asset management and business applications

DevOps Tools Journey



Cisco DNA Center CI/CD Integrations

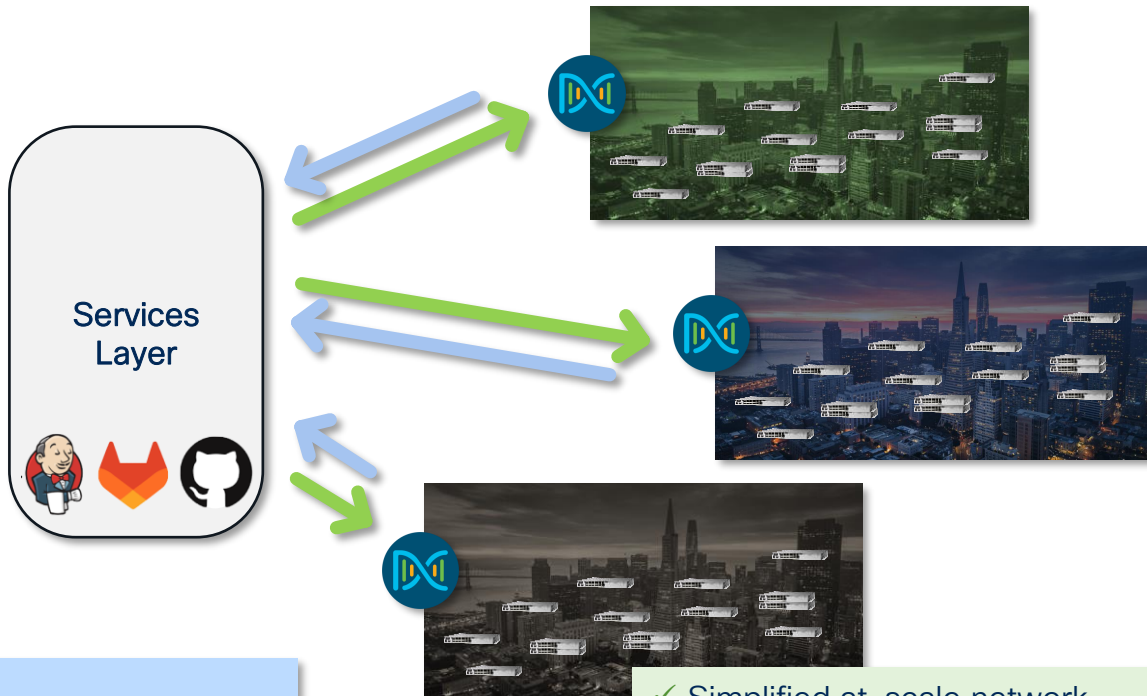


Note:
Network engineer provides:
Intent to be used by predefined automation workflows

Jenkins docs: <https://jenkins.io>

Git Configurations + Inventories

- CLI templates and profiles
- Network settings
- SDA-as-Code configurations
- Custom events notifications and subscriptions
- Reports and inventory
- Compliance

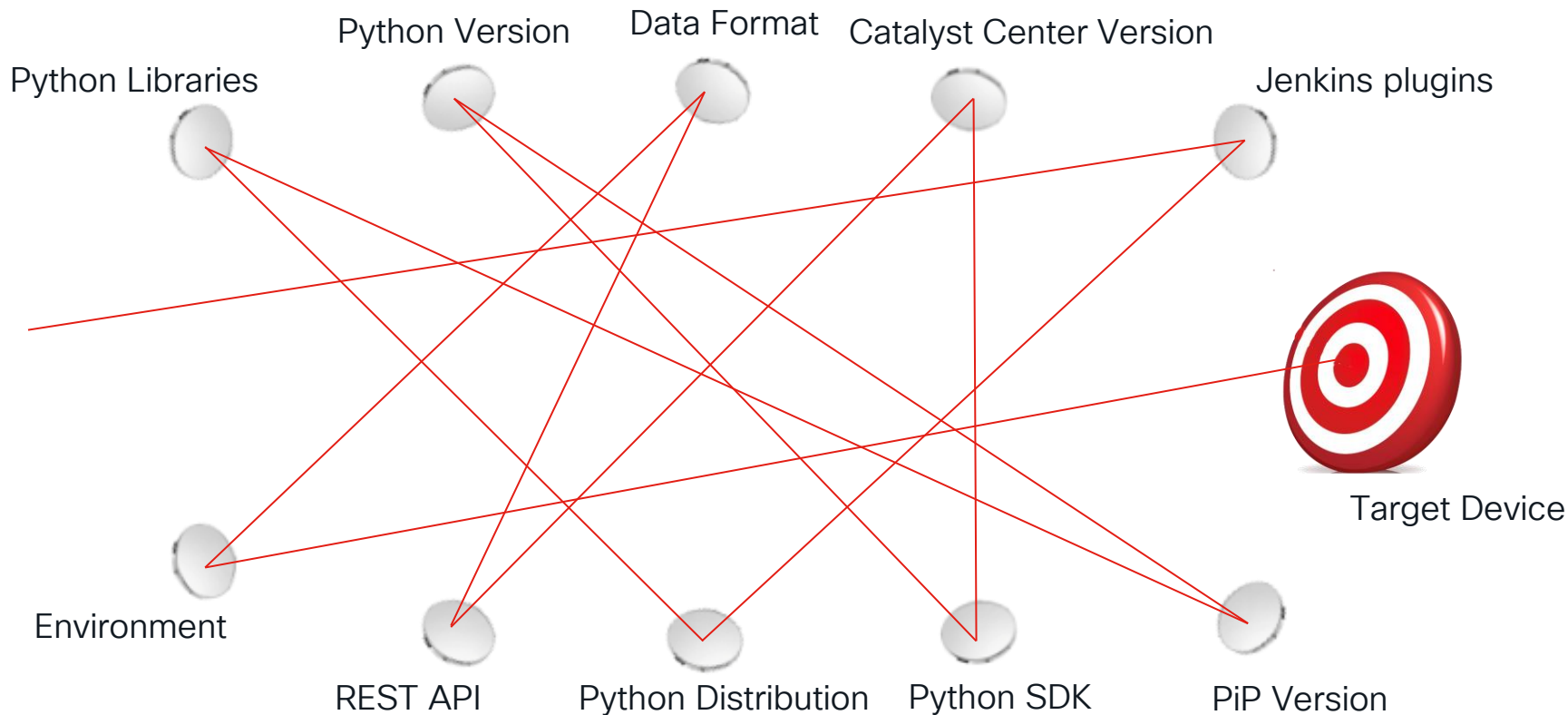


Notes:

*Configurations could be CLI templates, profiles, network settings or YAML/JSON intent configurations - SDA
Enables time travel, changes, reporting*

- ✓ Simplified at-scale network management
- ✓ Consistent and efficient service delivery across clusters

Like trying to hit a 'bullet' with a smaller bullet whilst wearing a blindfold, riding a horse...



Demonstration



Catalyst Center – REST-API

What do they mean?

How do I use them?

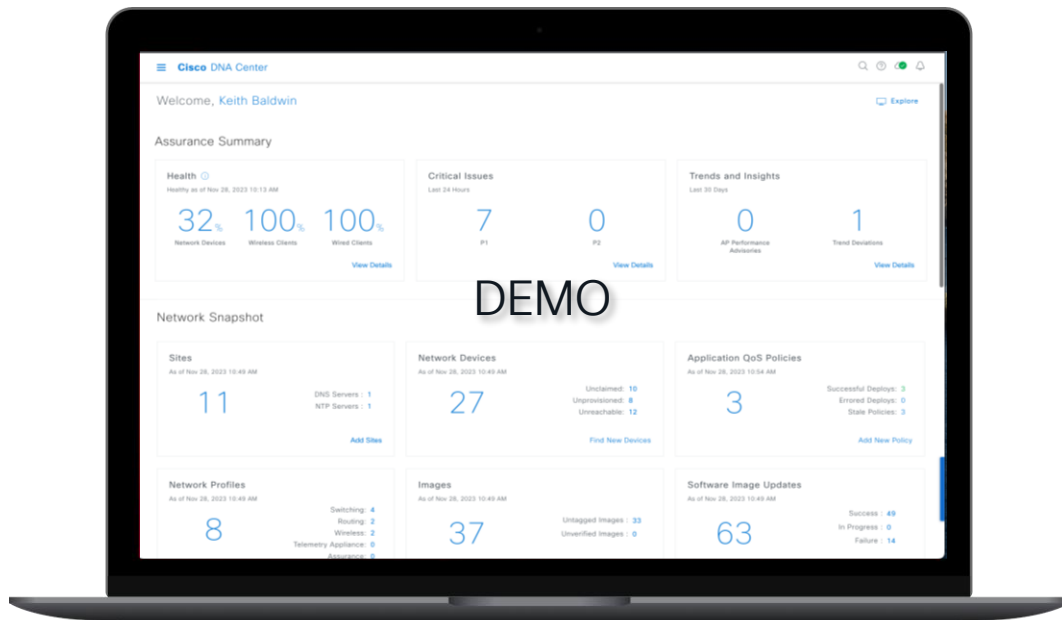
Documented vs

Undocumented

Published vs Unpublished

Supported vs Unsupported

External vs Internal



Welcome, Keith Baldwin

Explore

Assurance Summary

Health ⓘ

Healthy as of Nov 28, 2023 10:13 AM

32%

Network Devices

100%

Wireless Clients

100%

Wired Clients

View Details

Critical Issues

Last 24 Hours

7

P1

0

P2

View Details

Trends and Insights

Last 30 Days

0

AP Performance Advisories

1

Trend Deviations

View Details

Network Snapshot

Sites

As of Nov 28, 2023 10:26 AM

11

DNS Servers : 1

NTP Servers : 1

Add Sites

Network Devices

As of Nov 28, 2023 10:26 AM

27

Unclaimed: 10

Unprovisioned: 8

Unreachable: 12

Find New Devices

Application QoS Policies

As of Nov 28, 2023 10:26 AM

3

Successful Deploys: 3

Errored Deploys: 0

Stale Policies: 3

Add New Policy

Network Profiles

As of Nov 28, 2023 10:26 AM

Switching: 4

Routing: 2

Images

As of Nov 28, 2023 10:26 AM

Untagged Images : 33

Software Image Updates

As of Nov 28, 2023 10:26 AM

Success : 49



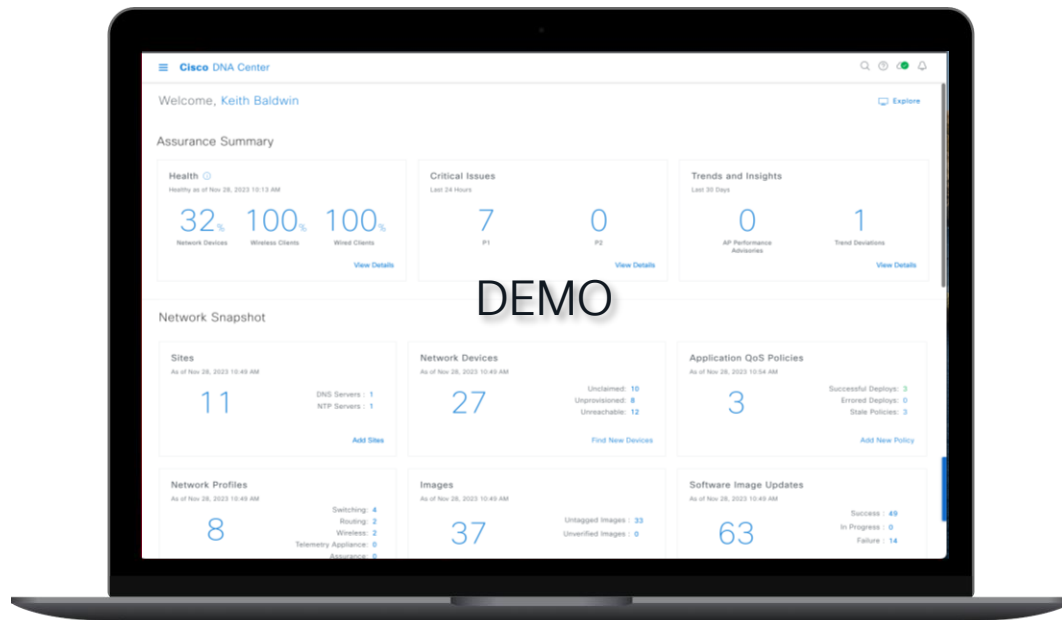
Catalyst Center – Python / Ansible

*Writing Python Programs using
the Developer Resources, and
the Python SDK?*

How do I use them?

When do I use them?

What does it look like?



Connections

Hardware

- 9300-3 Switch
- 9300-2 Switch
- 9300-1 Switch
- ISR-4331

Virtual Machines

- DNA Center
- ISE
- C9800
- SMC
- FCNF
- PI
- Script Server

Clients and AD

- AD
- Client 1

Search

Config

Display

Name Script Server
Description
Icon mRemoteNG
Panel General

Connection

Hostname/IP 198.18.134.28
Username root
Password

Protocol

Protocol SSH version 2
Port 22
PuTTY Session Default Settings

Miscellaneous

Name

This is the name that will be displayed in the connections tree.

Script Server

```
root@ubuntu:~#  
root@ubuntu:~#  
root@ubuntu:~# cat /var/lib/jenkins/config.xml | grep '<version>'  
<version>2.431</version>  
root@ubuntu:~# python --version  
Python 3.9.18  
root@ubuntu:~# pip3 --version  
pip 23.3.1 from /usr/local/lib/python3.9/site-packages/pip (python 3.9)  
root@ubuntu:~#
```



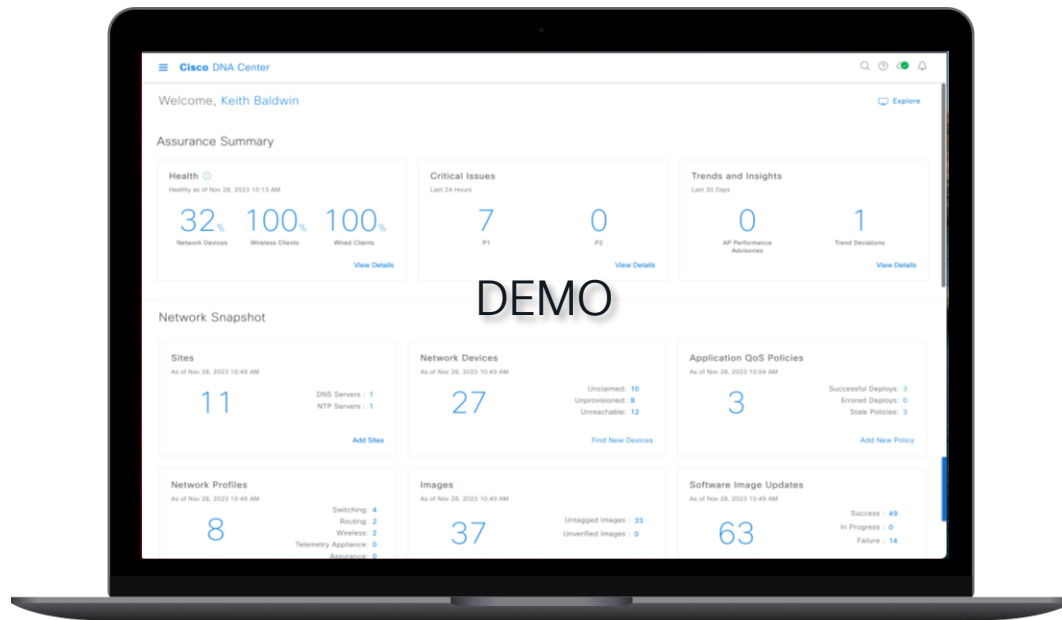
Catalyst Center and Orchestration

Writing Python Programs or Ansible using the Developer Resources, and the Python SDK?

How do I use them?

When do I use them?

What does it look like?



Dashboard >

- + New Item
- People
- Build History
- Manage Jenkins
- My Views
- Lockable Resources
- Build Queue**
- Build Executor Status**
- Cloud Statistics

All +

Add description

S	W	Name ↓	Last Success	Last Failure	Last Duration
⊗	☀	DNAC-Discovery	N/A	N/A	N/A
⊗	☀	DNAC-Hierarchy	N/A	N/A	N/A
⊗	☀	DNAC-Inventory	N/A	N/A	N/A
⊗	☀	DNAC-Templates	N/A	N/A	N/A

Icon: S M L

Icon legend Atom feed for all Atom feed for failures Atom feed for just latest builds

Google ChromeFileEditViewHistoryBookmarksPrPrTabWindowHelp

wkst1

dcloud-sjc-web-4.cisco.com/dCloudConnect/#/client/cGwtcmRwLWNvbm5lY3QAYwBub2F1dGg/target/5128304/cred/a2ViYWxkd2k6NDc3ZTVlZWVlZmQxYi00OGY1LWlxNDltZjZkMzgwYzI5ODBi?s=512...All Bookmarks

Cisco DNA CenterDashboard [Jenkins]

Not securehttp://198.18.134.28:8080

Web HW ConsoleDNA CenterISEC9800Cisco Prime Infrastr...Script ServerJenkinsInfluxDBGrafanaThousandEyes

Jenkins

Search (CTRL+K)

adminlog out

Dashboard

New Item

People

Build History

Manage Jenkins

My Views

Lockable Resources

Build Queue

Build Executor Status

Cloud Statistics

All

S	W	Name	Last Success	Last Failure	Last Duration
...	☀	DNAC-Discovery	N/A	N/A	N/A
...	☀	DNAC-Hierarchy	N/A	N/A	N/A
...	☀	DNAC-Inventory	N/A	N/A	N/A
...	☀	DNAC-Templates	N/A	N/A	N/A

Icon: SML

Icon legend

Atom feed for all

Atom feed for failures

Atom feed for just latest builds

REST APIJenkins 2.431

WindowsTaskbar

12:54 AM11/29/2023

Google Chrome

File Edit View History Bookmarks Profiles Tab Window Help

wkst1

← → ↺

dcloud-sjc-web-4.cisco.com/dCloudConnect/#/client/cGwtcmRwLWNvbm5lY3QAYwBub2F1dGg/target/5128304/cred/a2ViYWxkd2k6NDc3ZTVlZWElZmQxYi00OGY1LWlxNDltZjZkMzgWYzI5ODBI?s=512...

🔖 📄 ⚙️ 🌐 🏠

DNAC C2Expert Salesforce CLUS Devnet Express STUDY DOCS CAREER MERAKI Network Automati... Home Queensboro URL shortener - C... EN FY22 Q2 SEVT FY24Q1 NX SEVT All Bookmarks

Cisco DNA Center

Dashboard [Jenkins]

← → ↺

Not secure http://198.18.134.28:8080

★ 🖨️ 👤 ⋮

Web HW Console DNA Center ISE C9800 Cisco Prime Infrastr... Script Server Jenkins InfluxDB Grafana ThousandEyes

Jenkins

2

admin

log out

Dashboard >

+ New Item

People

Build History

Manage Jenkins

My Views

Lockable Resources

Build Queue

Build Executor Status

built-in node (0 of 2 executors busy)

Cloud Statistics

All

+

S	W	Name	Last Success	Last Failure	Last Duration
		DNAC-Discovery	N/A	N/A	N/A
		DNAC-Hierarchy	N/A	N/A	N/A
		DNAC-Inventory	N/A	N/A	N/A
		DNAC-Templates	N/A	N/A	N/A

Icon: S M L

Icon legend

Atom feed for all

Atom feed for failures

Atom feed for just latest builds

REST API

Jenkins 2.431

198.18.134.28:8080/manage

Windows Taskbar

12:59 AM 11/29/2023

Google Chrome

FileEditViewHistoryBookmarksProfilesTabWindowHelp

wkst1


←→↻dcloud-sjc-web-4.cisco.com/dCloudConnect/#/client/cGwtcmRwLWNvbm5lY3QAYwBub2F1dGg/target/5128304/cred/a2ViYWxkd2k6NDc3ZTVlZWElZmQxYi00OGY1LWlxNDltZjZkMzgwYzI5ODBI?s=512...

DNACC2ExpertSalesforceCLUSDevnet ExpressSTUDYDOCSCAREERMERAKINetwork Automati...HomeQueensboroURL shortener - C...EN FY22 Q2 SEVTFY24Q1 NX SEVTAll Bookmarks


Cisco DNA CenterDashboard [Jenkins]

←→↻Not securehttp://198.18.134.28:8080

Web HW ConsoleDNA CenterISEC9800Cisco Prime Infrastr...Script ServerJenkinsInfluxDBGrafanaThousandEyes

Jenkins

Search (CTRL+K)

2

admin

log out

Dashboard

+ New Item

People

Build History

Manage Jenkins

My Views

Lockable Resources

Build Queue

Build Executor Status

Cloud Statistics

All+

S	W	Name	Last Success	Last Failure	Last Duration
⊗	☀	DNAC-Discovery	N/A	N/A	N/A
⊗	☀	DNAC-Hierarchy	N/A	N/A	N/A
⋮	☀	DNAC-Inventory	N/A	N/A	N/A
⋮	☀	DNAC-Templates	N/A	N/A	N/A

Icon: SML

Icon legend

Atom feed for all

Atom feed for failures

Atom feed for just latest builds

REST APIJenkins 2.431

198.18.134.28:8080/manage

WindowsTaskbar

1:05 AM11/29/2023

Google Chrome

File Edit View History Bookmarks ProPr Tab Window Help

wkst1

Fine-grained Personal Access

New Tab

installing pygithub on ubuntu

+

← → ↺

dcloud-sjc-web-4.cisco.com/dCloudConnect/#/client/cGwtcmRwLWNvbm5lY3QAYwBub2F1dGg/target/5128304/cred/a2ViYWxkd2k6NDc3ZTVlZWElZmQxYi00OGY1LWlxNDltZjZkMzgWYzI5ODBI?s=512...

🔍 📄 ⭐

📁 DNAC 📄 C2Expert 🌐 Salesforce 📁 CLUS 📁 Devnet Express 📁 STUDY 📁 DOCS 📁 CAREER 📁 MERAKI 🌐 Network Automati... 📁 Home 🏠 Queensboro 📄 URL shortener - C... 📄 EN FY22 Q2 SEVT 📄 FY24Q1 NX SEVT » 📁 All Bookmarks

📄 Cisco DNA Center

Dashboard [Jenkins]


+

← → ↺


⚠ Not secure http://198.18.134.28:8080


★ 🖨 👤 ⋮


🖥 Web HW Console 📄 DNA Center 🌐 ISE 📄 C9800 📄 Cisco Prime Infrastr... 📄 Script Server 👤 Jenkins 🌐 InfluxDB 📄 Grafana 📄 ThousandEyes

 **Jenkins**

🔍 Search (CTRL+K) ?

 2

 admin ▾

 log out

Dashboard >

+ New Item

👤 People

📄 Build History

⚙ Manage Jenkins

📄 My Views

🔒 Lockable Resources

Build Queue

^

Build Executor Status

^

Cloud Statistics

▾


📄 Add description


All +


S	W	Name ↱	Last Success	Last Failure	Last Duration	
⊗	☀	DNAC-Discovery	N/A	N/A	N/A	▶
⊗	☀	DNAC-Hierarchy	N/A	N/A	N/A	▶
⋮	☀	DNAC-Inventry	N/A	N/A	N/A	▶
⊗	☀	DNAC-Templates	N/A	N/A	N/A	▶

Icon: S M L

Icon legend

 Atom feed for all

 Atom feed for failures

 Atom feed for just latest builds

REST API

Jenkins 2.431

Windows Taskbar

1:44 AM 11/29/2023

Cisco dCloud wkst1

dcloud-sjc-web-4.cisco.com/dCloudConnect/#/client/cGwtcmRwLWNvbW5lY3QAYwBub2F1dGg/target/5128304/cred/a2ViYXxkd2k6ZTNmMTcxYTYtMjdjZC00ZDgyLTk4MmUtNjRkZDgxNGZhZjdl?s=51... All Bookmarks

DNAC C2Expert Salesforce CLUS Devnet Express STUDY DOCS CAREER MERAKI Network Automati... Home Queensboro URL shortener - C... EN FY22 Q2 SEVT FY24Q1 NX SEVT

Home - Cisco DNA Center

https://198.18.129.100/dna/home

Web HW Console DNA Center ISE C9800 Cisco Prime Infrastr... Script Server Jenkins InfluxDB Grafana ThousandEyes

Cisco DNA Center

Welcome, admin [Take a Tour](#) [Explore](#)

Some of your license compliance requirements have not been met. [Learn More](#)

Assurance Summary

Health ⓘ

Healthy as of Nov 29, 2023 9:50 PM

100%

Network Devices

Wireless Clients

Wired Clients

[View Details](#)

Critical Issues

Last 24 Hours

0

P1

0

P2

[View Details](#)

Trends and Insights

AP Performance Advisories

Trend Deviations

[View Details](#)

Network Snapshot

Sites

As of Nov 29, 2023 10:00 PM

7

DNS Servers : 1

NTP Servers : 1

[Add Sites](#)

Network Devices

As of Nov 29, 2023 10:00 PM

3

Unclaimed: 2

Unprovisioned: 0

Unreachable: 0

[Find New Devices](#)

Application QoS Policies

As of Nov 29, 2023 10:05 PM

0

Successful Deploys: 0

Errored Deploys: 0

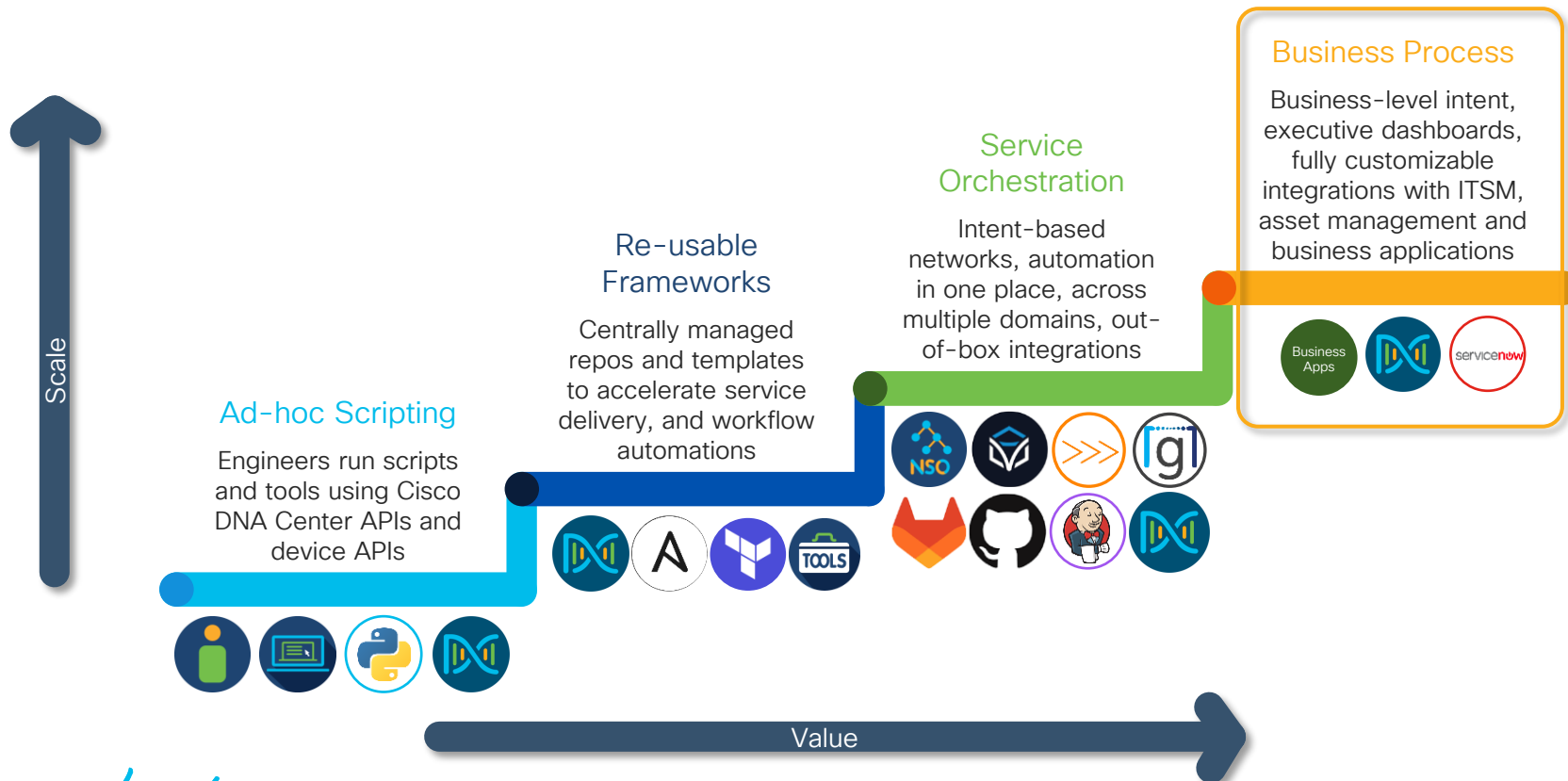
Stale Policies: 0

[Add New Policy](#)

10:05 PM 11/29/2023

But now what?

Cisco DNA Center and DevOps Journey

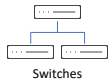


Just one more thing!!!

We dealt with:

Who?

INFRASTRUCTURE



What?

GIT REPOSITORY



Composite



Vlans



OSPF



Interfaces



Settings

How?



Python



Ansible



Jenkins



GitHub



GitLab

Now deal with:

When?



Approvals

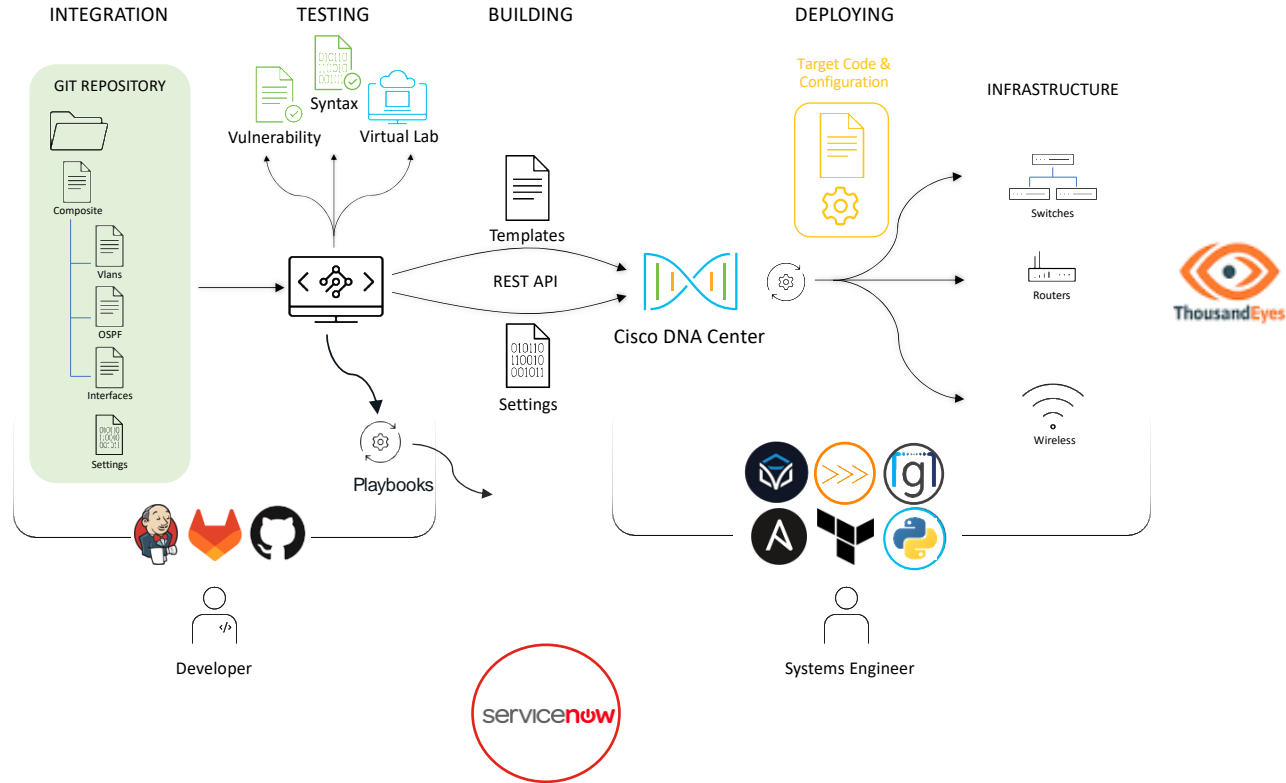


Change Control



Incident Control

Cisco DNA Center with REST API towards CI/CD



Key Takeaways:

- Orchestration Overview
- Building Blocks:
 - Controller
 - REST APIs
 - Python
 - Automation/CICD Platforms
- LAB where you got to try some simple concepts

Summary



Continue Learning

- Cisco Certification Learning platform.
- developer.cisco.com



Develop Your Skills

- DevNet Sandbox
- Cisco dCloud
- Tools GitHub, Postman, Python



Certify

- DevNet Certifications

Where to learn:

Developer.cisco.com

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Develop 2022:
Lessons Learned from Cloud-Native Developers

October 18, 2022 | Virtual [Register now >](#)

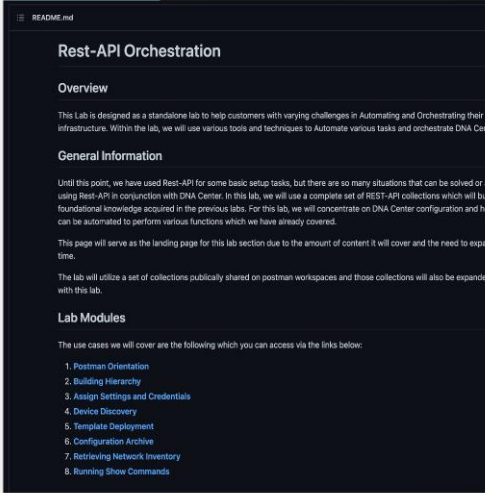
Cloud-native developers: This one's just for you. [Register](#)

Cisco.com

cs.co/DNAC-Templates

**GitHub cs.co/DNAC-Templates**
2500 views over 14 day periods

GitHub has a wealth of information. Please visit and use the resources located at <https://cs.co/DNAC-Templates>. This content has a lab specific to working with DNA Center with use-case based Rest-API Collections.



Rest-API Orchestration

Overview

This lab is designed as a standalone lab to help customers with varying challenges in Automating and Orchestrating their network infrastructure. Within the lab, we will use various tools and techniques to Automate various tasks and orchestrate DNA Center.

General Information

Until this point, we have used Rest-API for some basic setup tasks, but there are so many situations that can be solved or at least simplified by using Rest-API in conjunction with DNA Center. In this lab, we will use a complete set of REST-API collections which will build foundational knowledge acquired in the previous labs. For this lab, we will concentrate on DNA Center configuration and how it can be automated to perform various functions which we have already covered.

This page will serve as the landing page for this lab section due to the amount of content it will cover and the need to expand on time.

The lab will utilize a set of collections publicly shared on postman workspaces and those collections will also be expanded to with this lab.

Lab Modules



The use cases we will cover are the following which you can access via the links below:

1. Postman Orientation
2. Building Hierarchy
3. Assign Settings and Credentials
4. Device Discovery
5. Template Deployment
6. Configuration Archive
7. Retrieving Network Inventory
8. Running Show Commands

Cloud-native developers: This one's just for you. [Register](#)

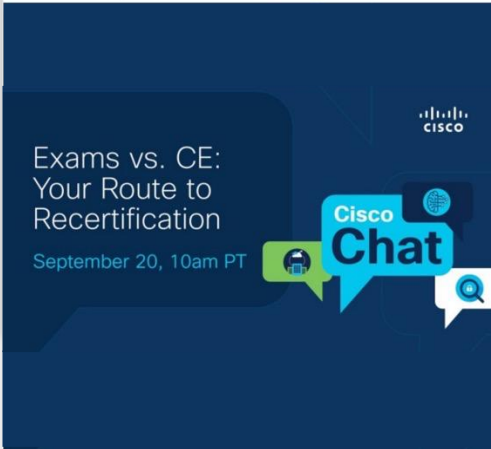
Cisco.com

Cisco Digital Learning

**Cisco Training and Certification**
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Exams vs. CE:
Your Route to Recertification

September 20, 10am PT

Cisco Certification Exams vs. CE: Your Route to Recertification

youtube.com

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Visit Meet the Expert in The HUB
to meet, greet, whiteboard & gain
insights about your unique questions
with the best of the best.



Meet the Expert Opening Hours:

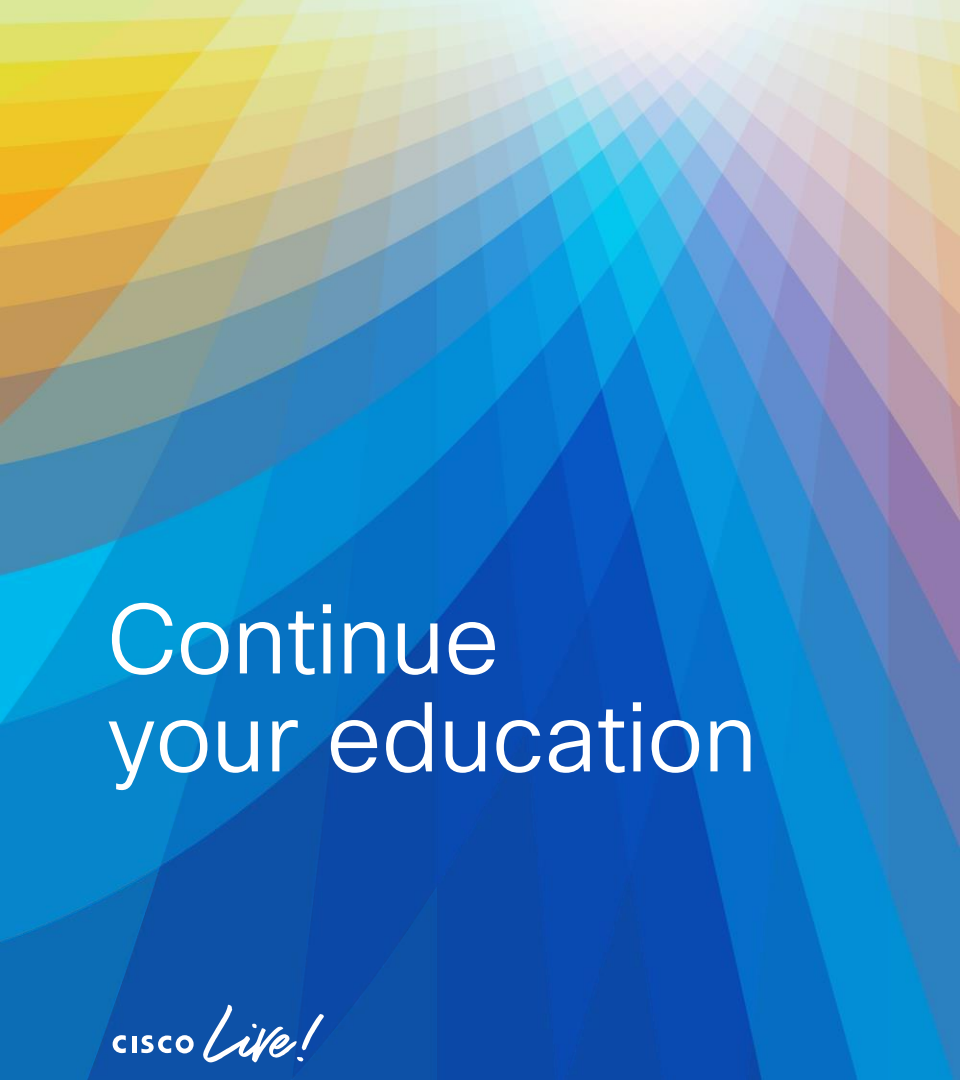
Tuesday	3:00pm – 7:00pm
Wednesday	11:15am – 7:00pm
Thursday	9:30am – 4:00pm
Friday	10:30am – 1:30pm

Session Surveys

We would love to know your feedback on this session!

- Complete a minimum of four session surveys and the overall event surveys to claim a Cisco Live T-Shirt





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- Book your one-on-one Meet the Expert meeting
- Attend the interactive education with DevNet, Capture the Flag, and Walk-in Labs
- Visit the On-Demand Library for more sessions at www.CiscoLive.com/on-demand

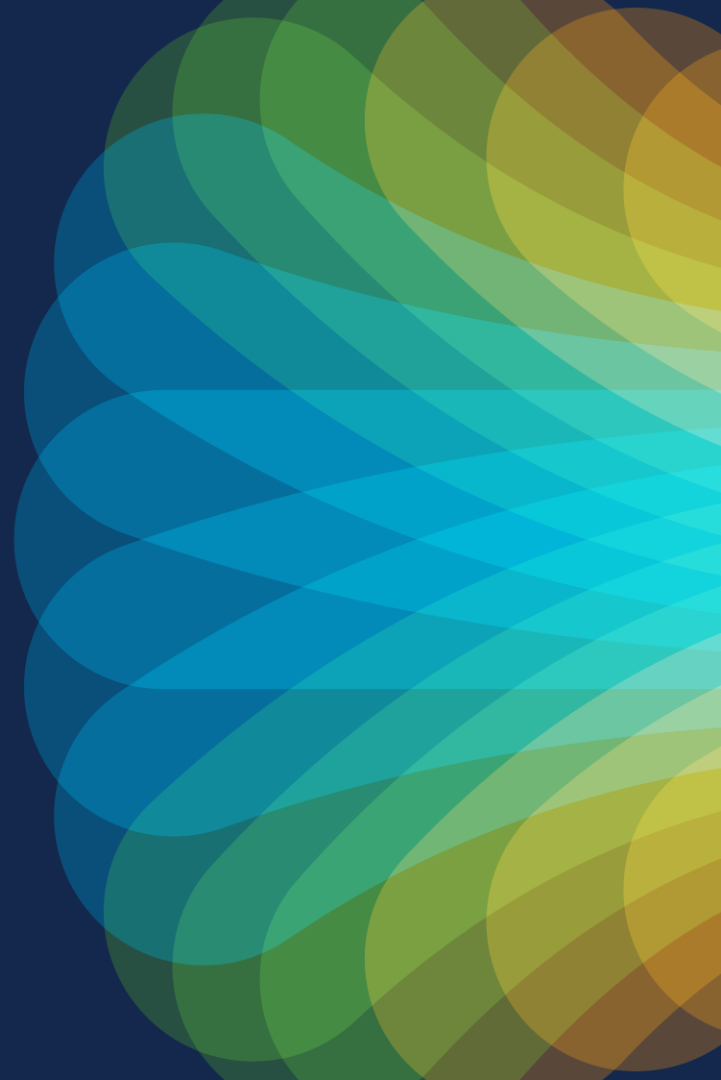


The bridge to possible

Thank you



#CiscoLiveAPJC



The background is a vibrant, abstract graphic featuring a rainbow color palette. On the left, there are soft, overlapping cloud-like shapes in shades of red, orange, and yellow. On the right, a bright white light source emits a series of sharp, radiating lines in various shades of blue and green, creating a sunburst effect. The overall composition is dynamic and colorful.

cisco *Live!*

Let's go

#CiscoLiveAPJC