

CISCO *Live!*

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#CiscoLiveAPJC



Deploying Catalyst Center in Seconds with CI/CD

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

Cisco Webex App

Questions?

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

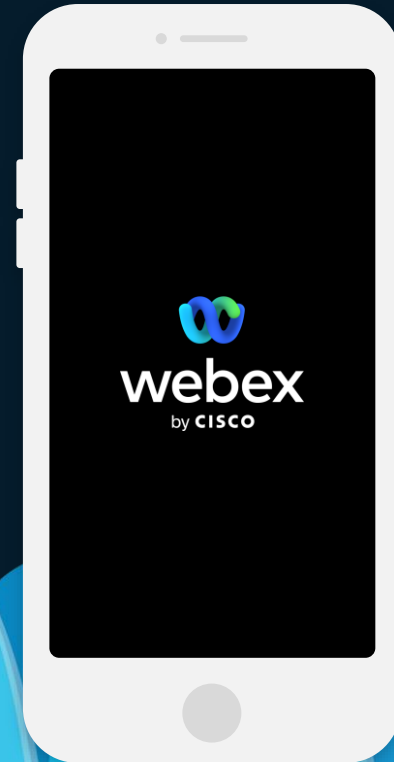
How

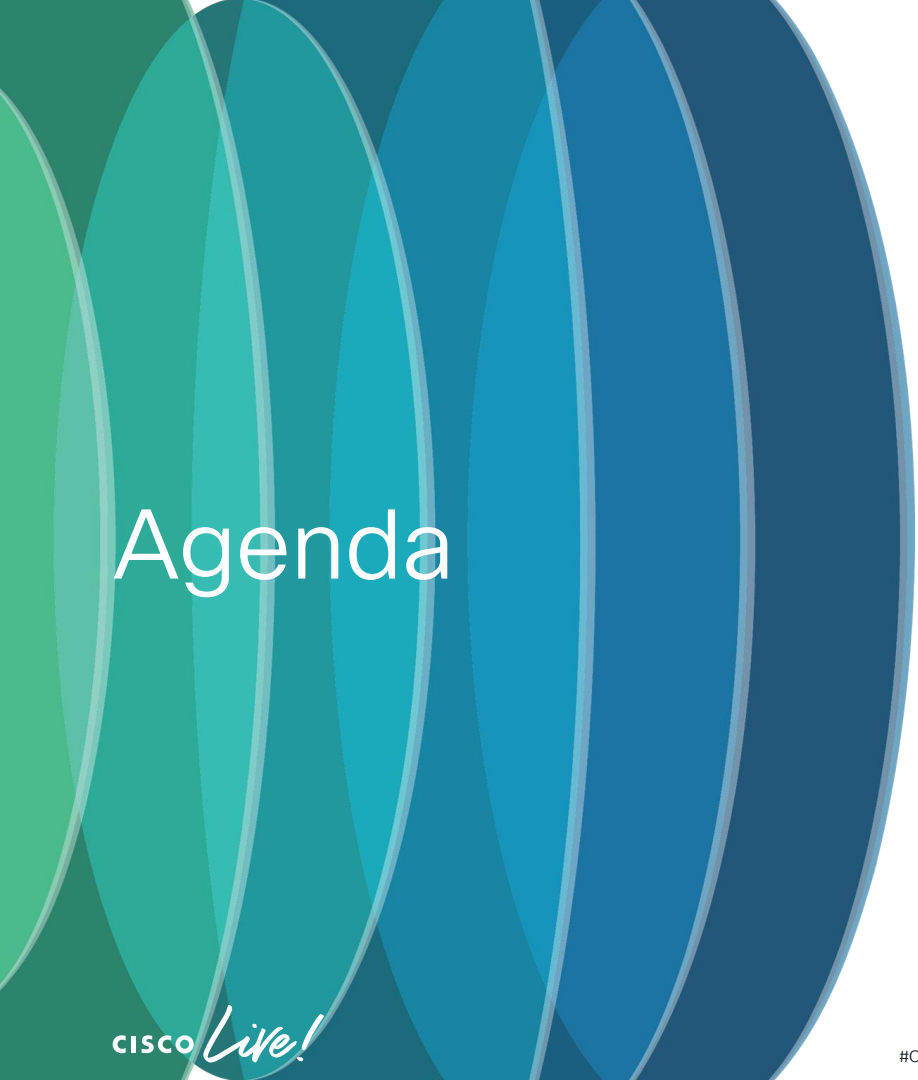
- 1 Find this session in the Cisco Live Mobile App
- 2 Click “Join the Discussion”
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- 4 Enter messages/questions in the Webex space

Webex spaces will be moderated by the speaker until November 15, 2024.



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

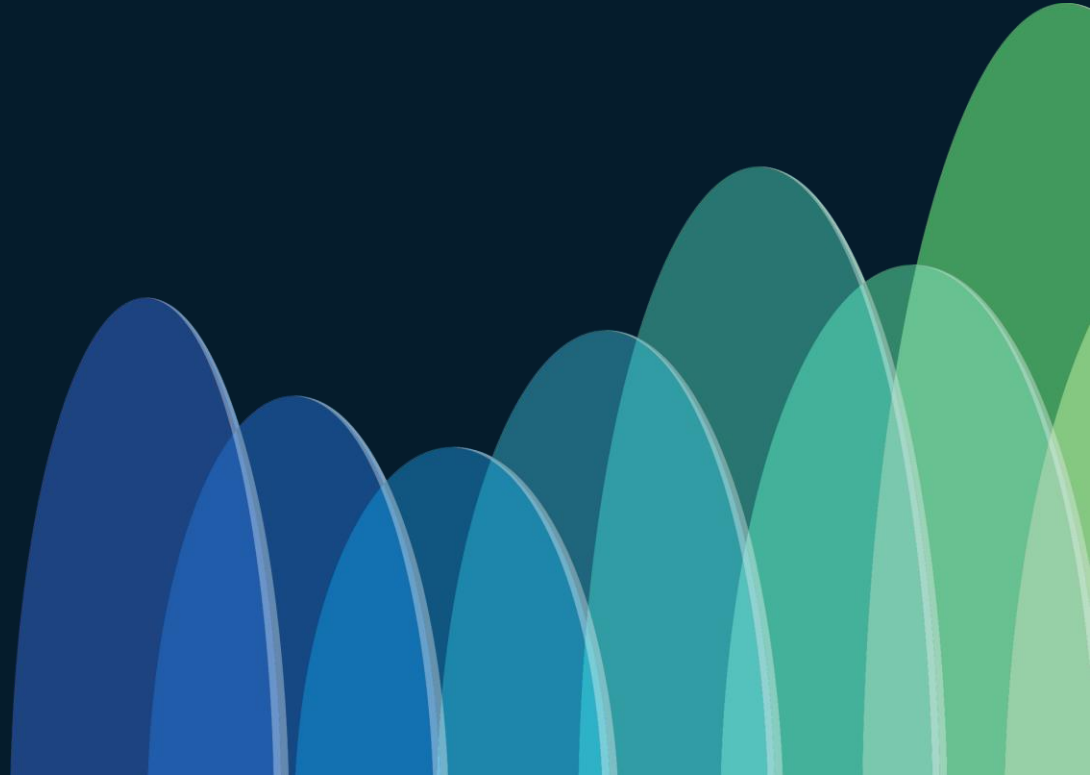




Agenda

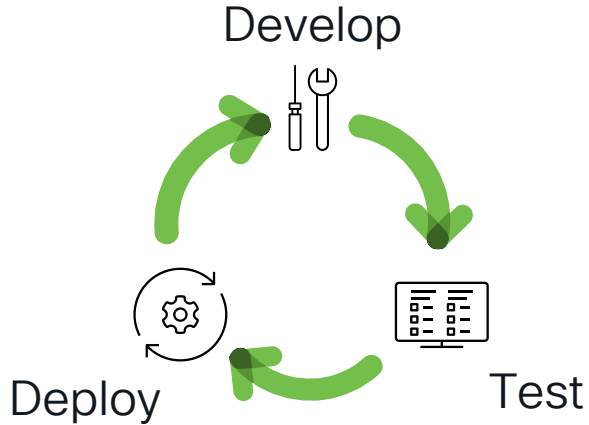
- Building Orchestration
- Building Blocks
 - Controller
 - REST API
 - Python
 - Automation/CICD Platforms
- LAB Overview
- Labs
- Conclusion

Building Orchestration



Advantages of Continuous Delivery

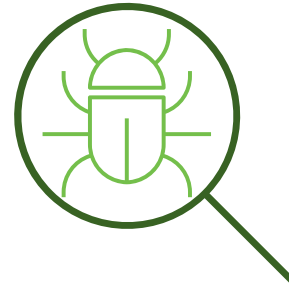
Automate Changes



Increase Productivity



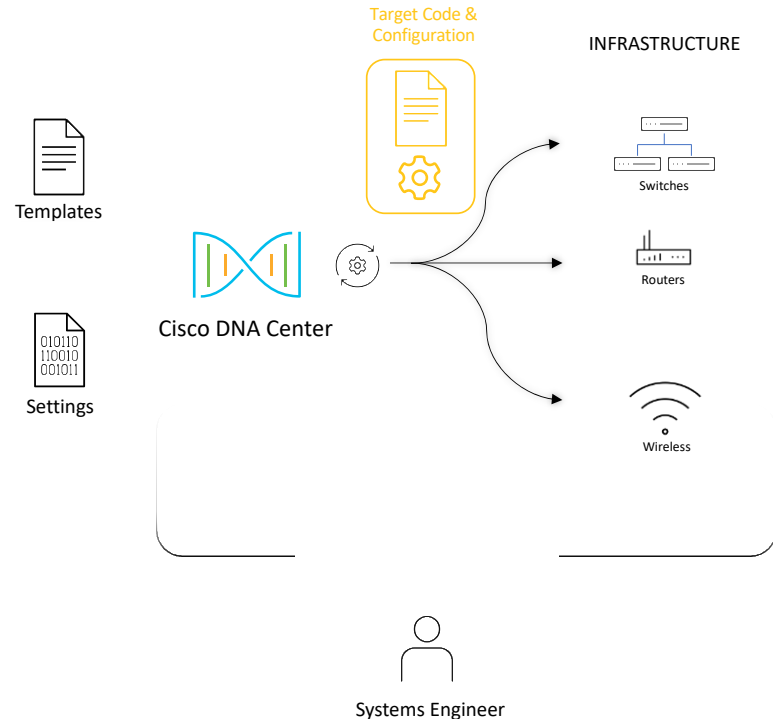
Fault Find Quickly



Catalyst Center with REST API towards CI/CD

BUILDING

DEPLOYING



Building Blocks



Controller

Catalyst Center Platform

IT and network system processes

servicenow	ITSM
Infoblox	IPAM
BLUECAT	IPAM
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

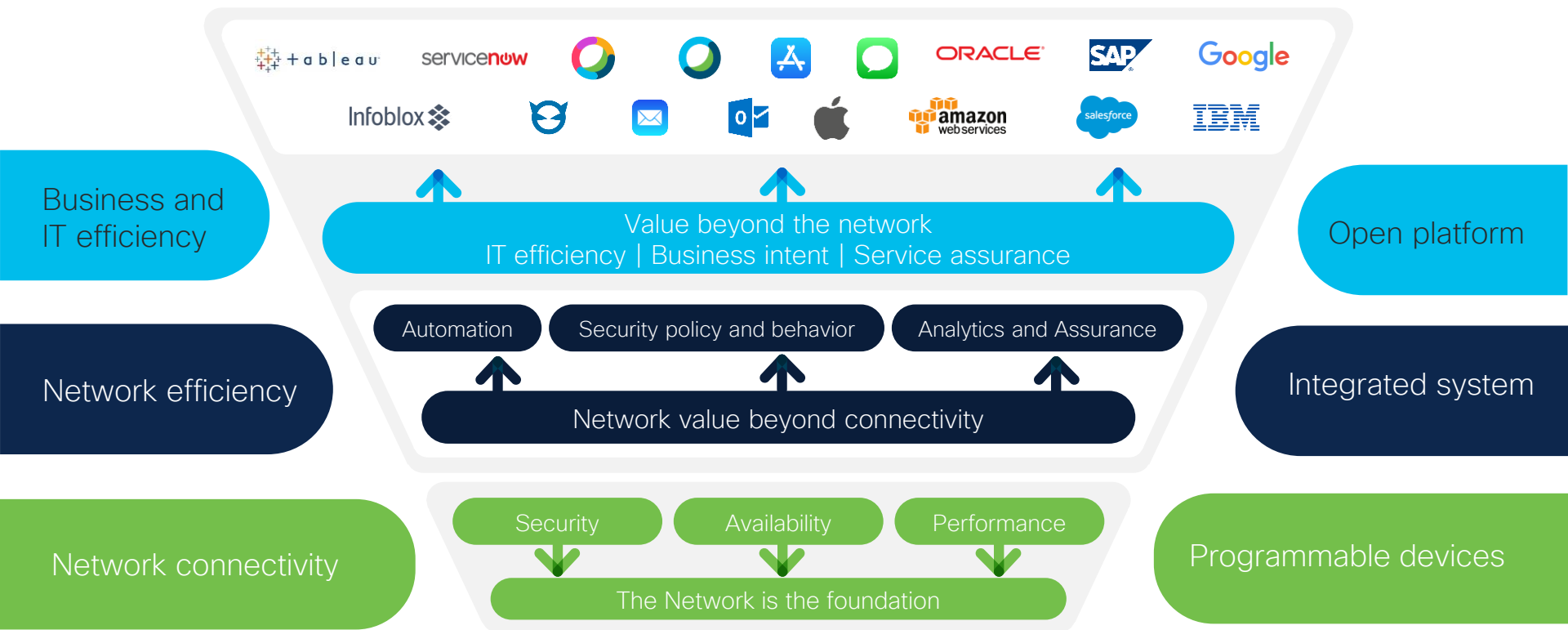
- Assurance
- Path Trace
- Command Runner
- Template Programmer
- Network Inventory / Discovery
- Topology
- Plug-n-Play
- Software Image Management (SWIM)

Multidomain integrations

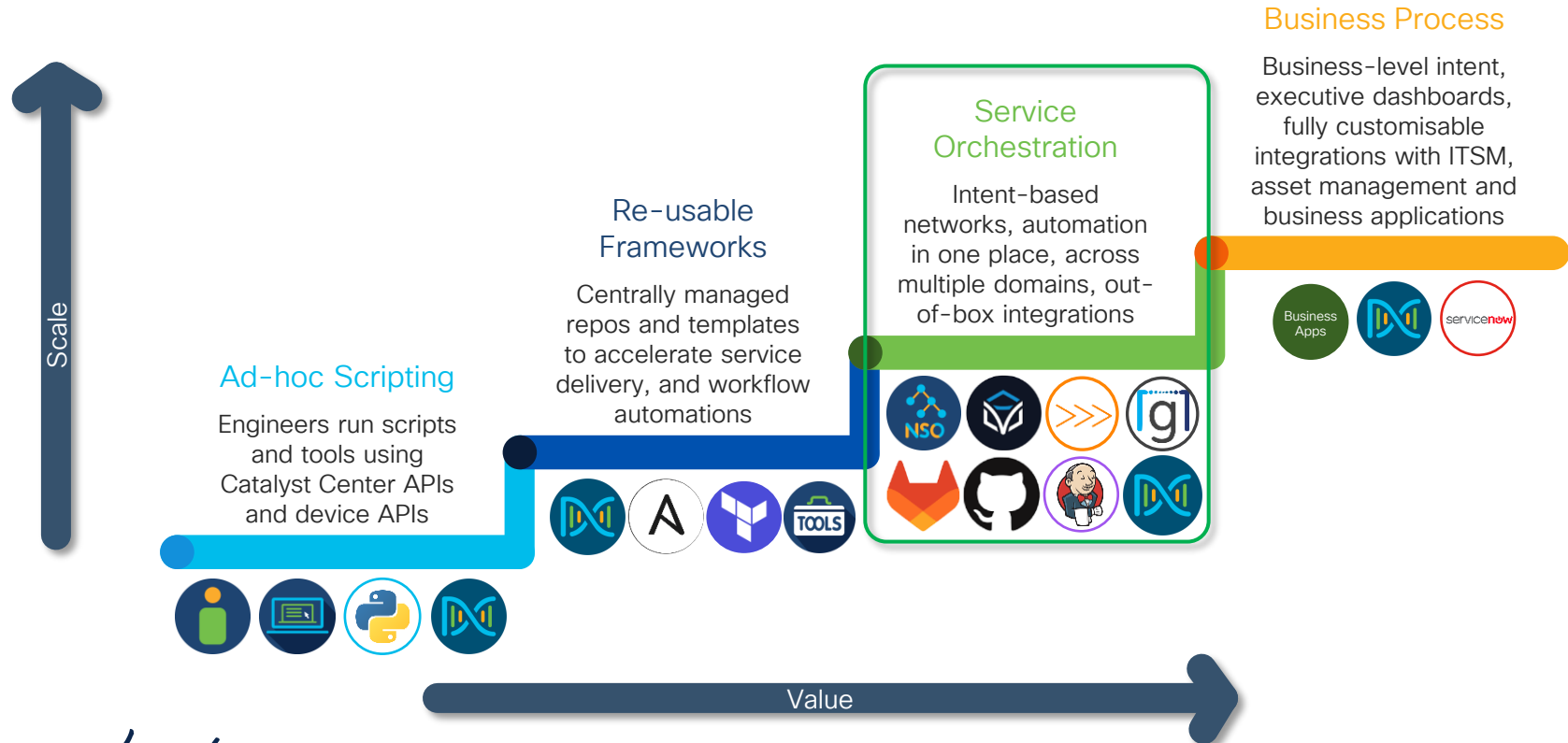


- SD-WAN
- Meraki
- ISE
- ACI via ISE
- Spaces
- ThousandEyes
- Webex

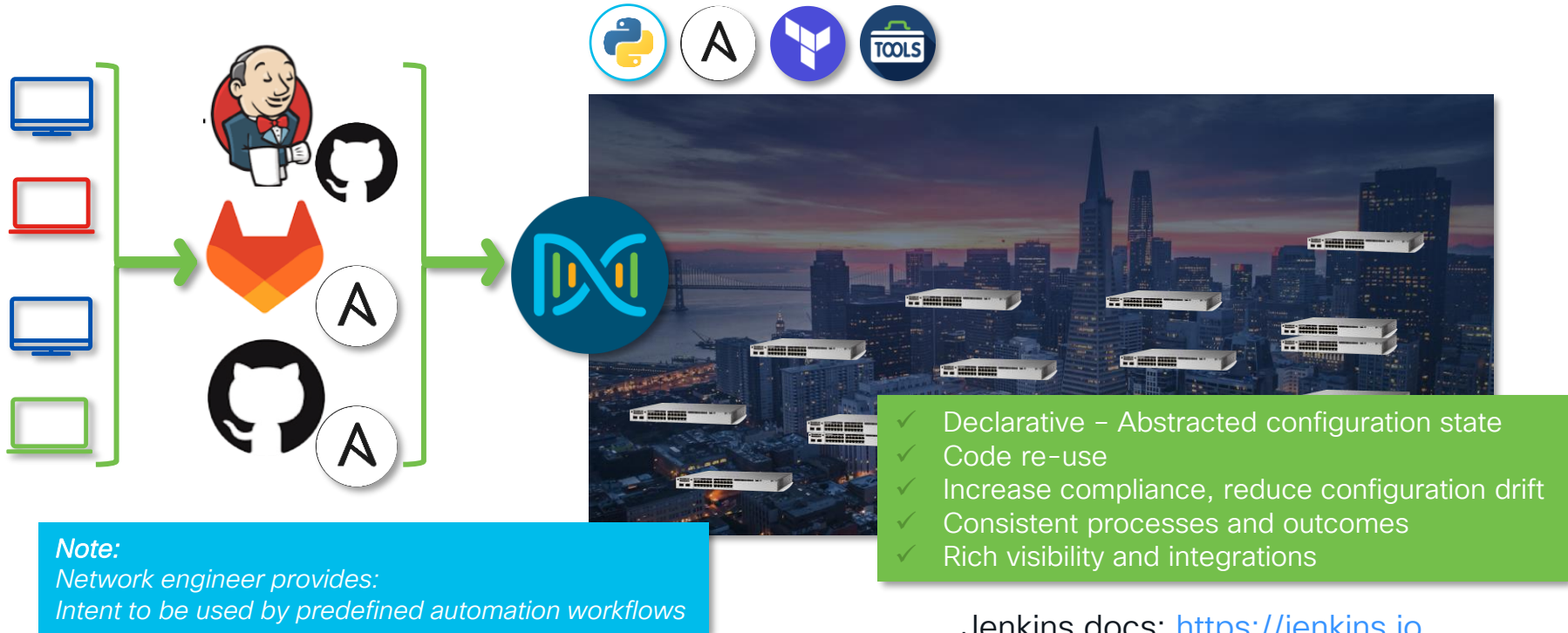
REST APIs Integrations



Catalyst Center and DevOps Journey

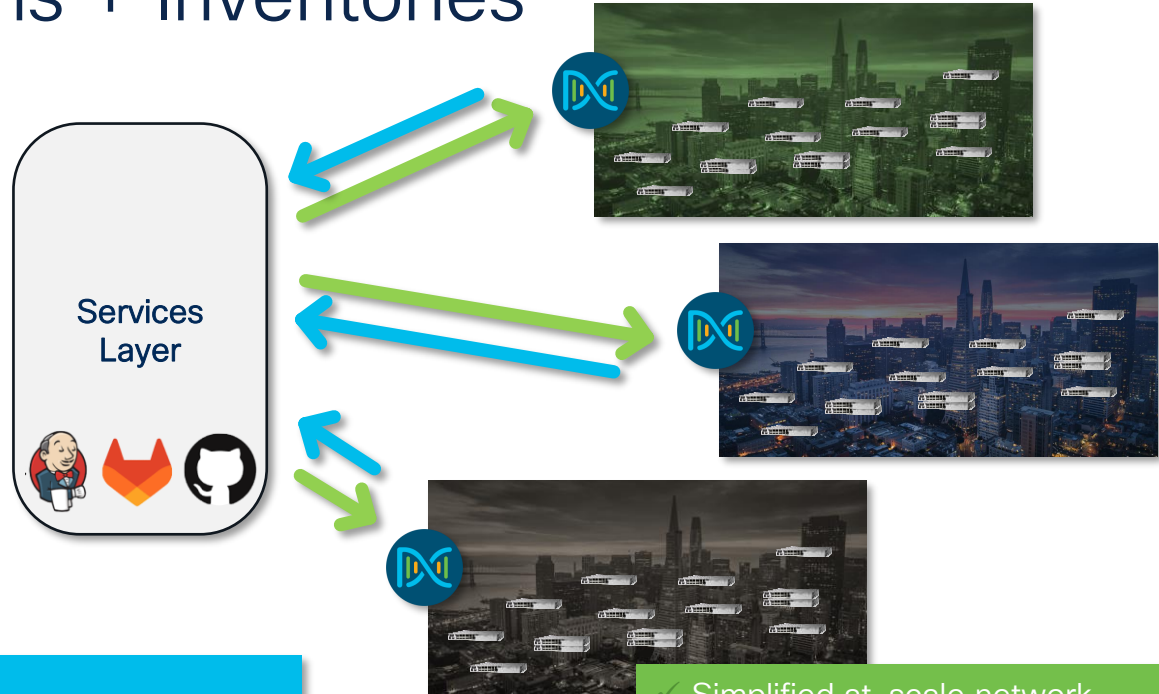


Catalyst Center CI/CD Integrations



Git Configurations + Inventories

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

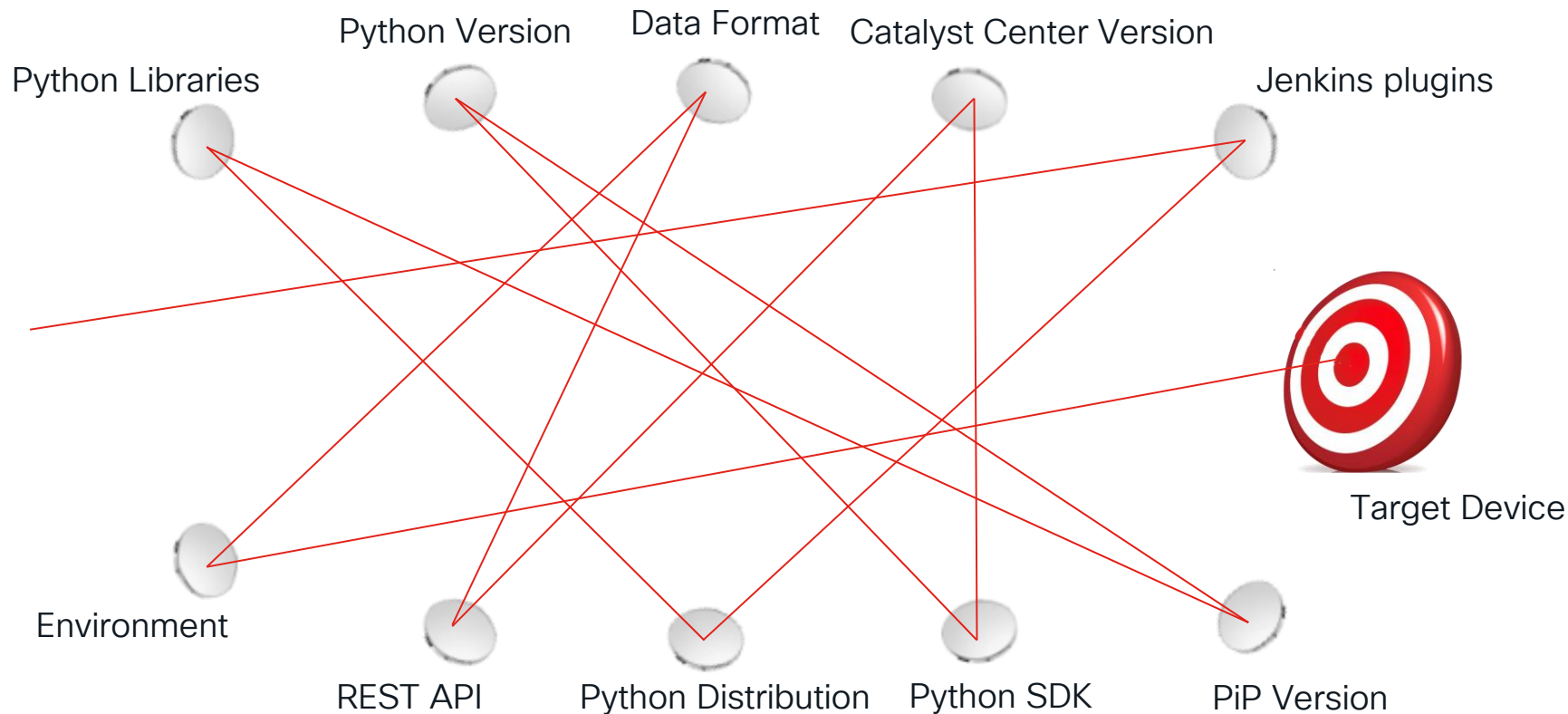


Notes:

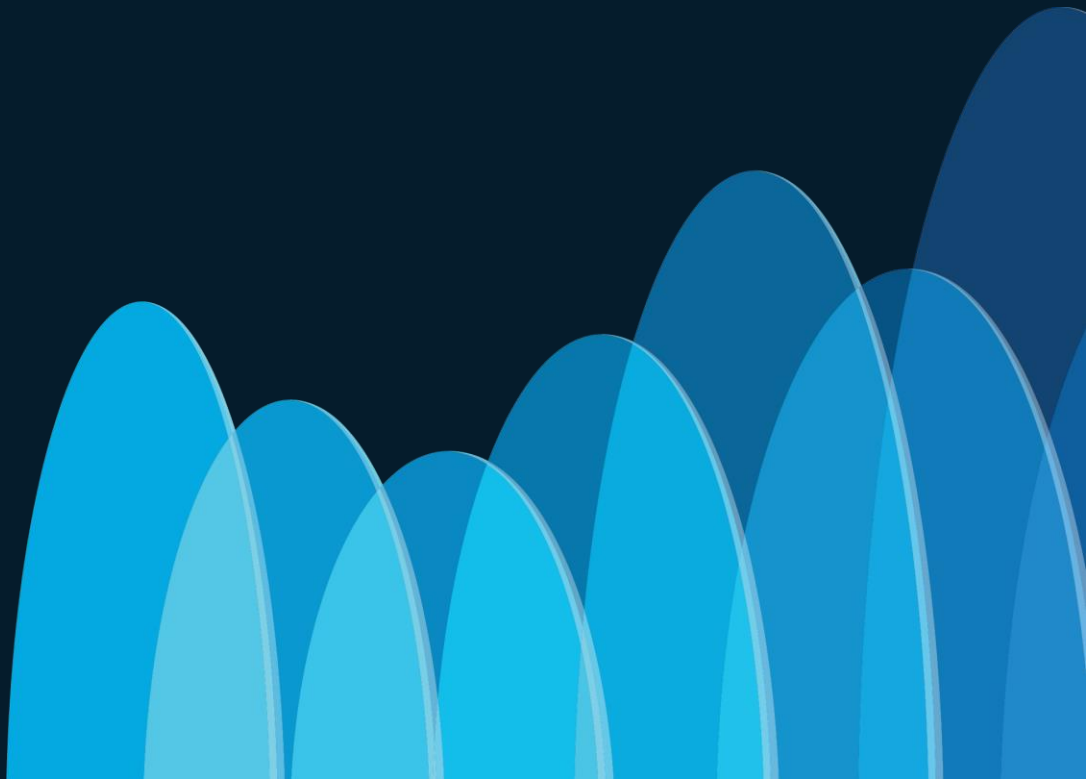
Configurations could be CLI templates, profiles, network settings or YAML/JSON intent configurations - SDA
Enables time travel, changes, reporting

- ✓ 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...” – Montgomery Scott, Star Trek



Demonstration



Catalyst Center – REST-API

What do they mean?

How do I use them?

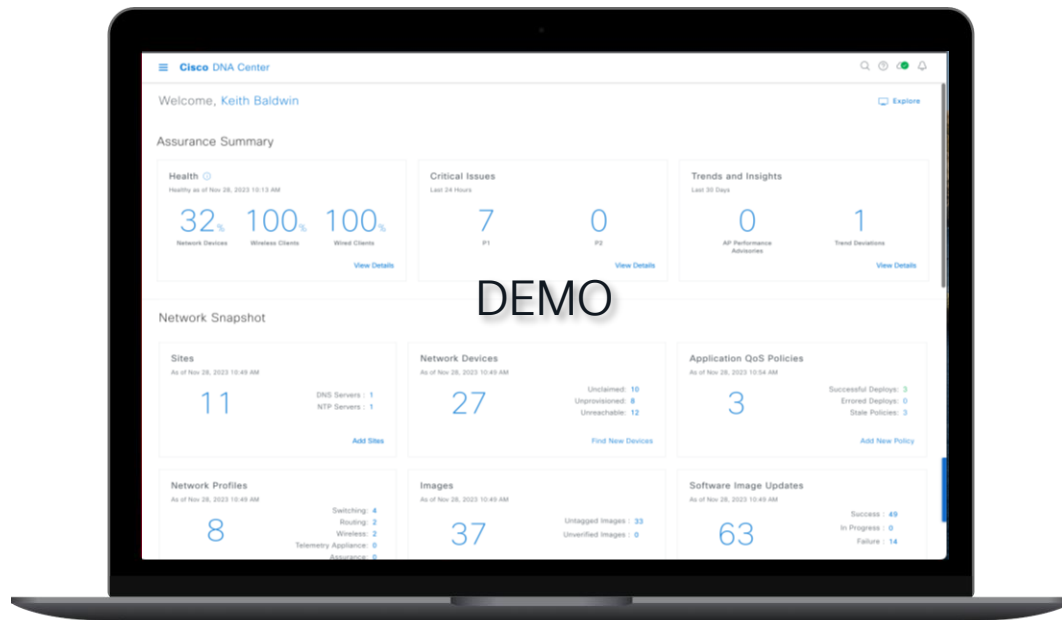
Documented vs

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

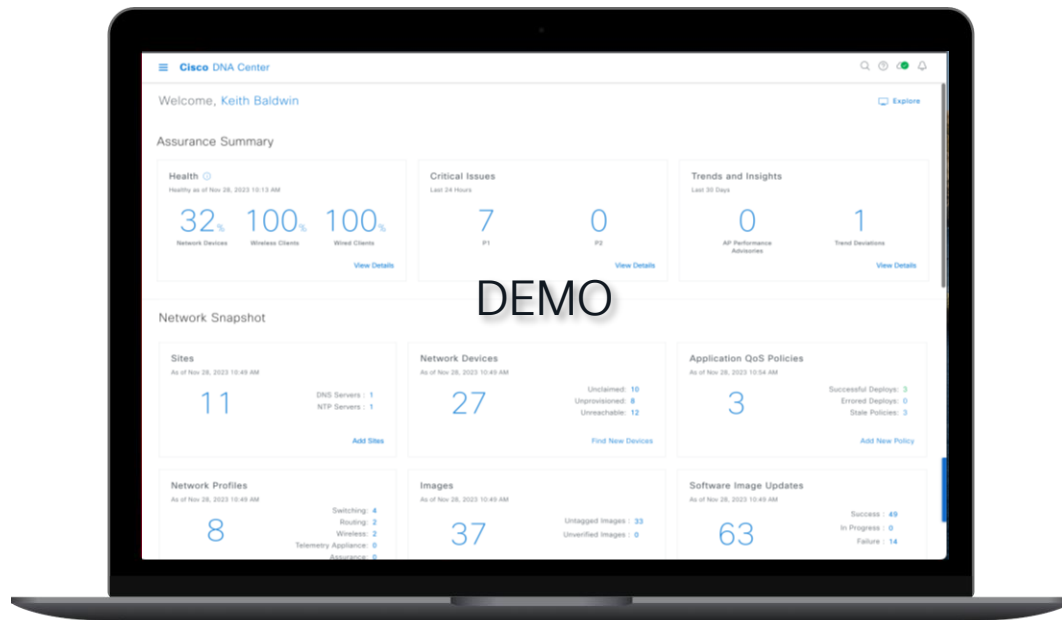
Success : 49

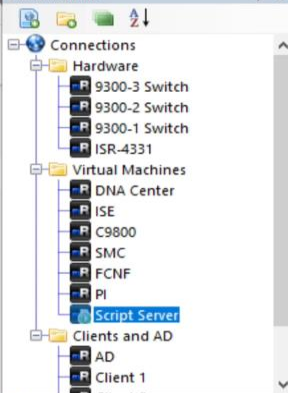


Catalyst Center – Python / Ansible

*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?*





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	

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

```
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:~#
```

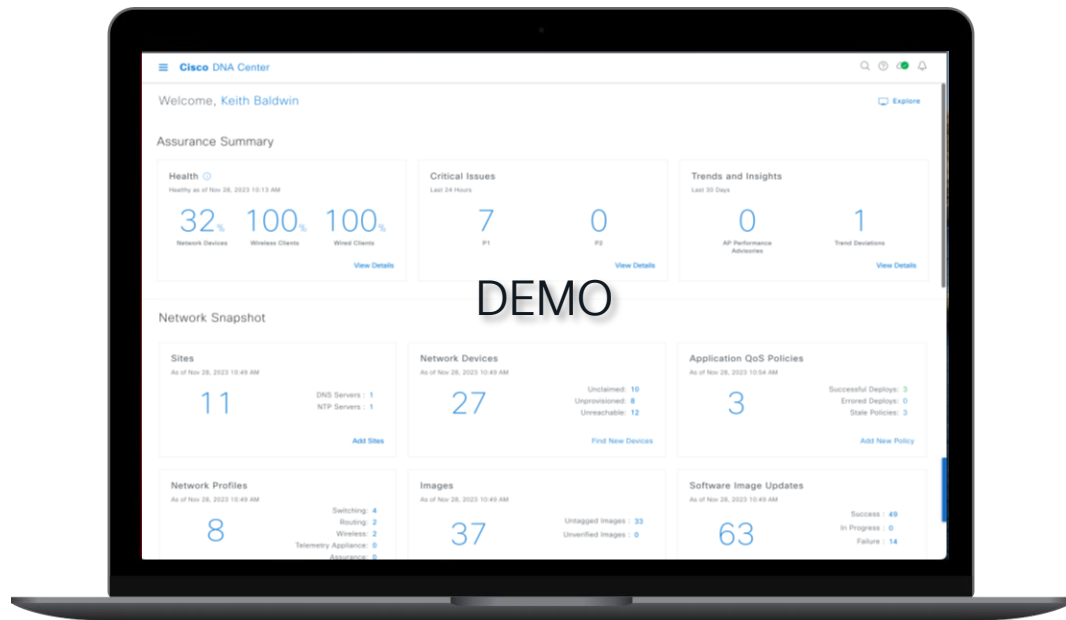
Catalyst Center and Orchestration

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?



Cisco DNA Center

Dashboard [Jenkins]

Not secure http://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:

S

M

L

Icon legend

 Atom feed for all

 Atom feed for failures

 Atom feed for just latest builds

REST API

Jenkins 2.431



1:45 AM
11/29/2023

Google Chrome File Edit View History Bookmarks ProPr Tab Window Help

wkst1

dcloud-sjc-web-4.cisco.com/dCloudConnect/#/client/cGwtcmRwLWNvbm5lY3QAYwBub2F1dGg/target/5128304/cred/a2VIYWxkd2k6NDc3ZTVlZWVtZmQxYi00OGY1LWlxNDltZjZkMzgwYzI5ODBl?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

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) admin log out

Dashboard >

+ New Item Add description

People

Build History

Manage Jenkins

My Views

Lockable Resources

Build Queue

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

Build Executor Status

built-in node (0 of 2 executors busy)

Cloud Statistics

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

Google Chrome File Edit View History Bookmarks Profiles Tab Window Help

wkst1

dcloud-sjc-web-4.cisco.com/dCloudConnect/#/client/cGwtcmRwLWNvbm5lY3QAYwBub2F1dGg/target/5128304/cred/a2VIYWxkd2k6NDc3ZTVlZWetZmQxYi00OGY1LWlXNDItZjZkMzgWYzI5ODBl?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

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) admin log out

Dashboard

+ New Item Add description

People All +

Build History

Manage Jenkins

My Views

Lockable Resources

Build Queue

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

Build Executor Status

built-in node (0 of 2 executors busy)

Cloud Statistics

198.18.134.28:8080/manage

REST API Jenkins 2.431

The screenshot shows the Jenkins Dashboard interface. The top navigation bar includes a search bar and user information. The left sidebar contains navigation links. The main content area displays a table of build jobs.

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

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

Google Chrome | File | Edit | View | History | Bookmarks | Print | 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/a2ViYWxkd2k6NDc3ZTVlZWVetZmQxYi00OGY1LWlxNDltZjZkMzgWYzI5ODBl?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) | admin | log out

Dashboard >

+ New Item | Add description

People | Build History | Manage Jenkins | My Views | Lockable Resources

Build Queue

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

Build Executor Status

built-in node (0 of 2 executors busy)

Cloud Statistics

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

Cisco dCloud
wkst1
+

dcloud-sjc-web-4.cisco.com/dCloudConnect/#/client/cGwtcmRwLWNvbm5lY3QAYwBub2F1dGg/target/5128304/cred/a2ViYWxkd2k6ZTNmMTcxYTtMjdjZC00ZDgyLTk4MmUtNjRkZDgxNGZhZjd?sa=51...

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

0
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

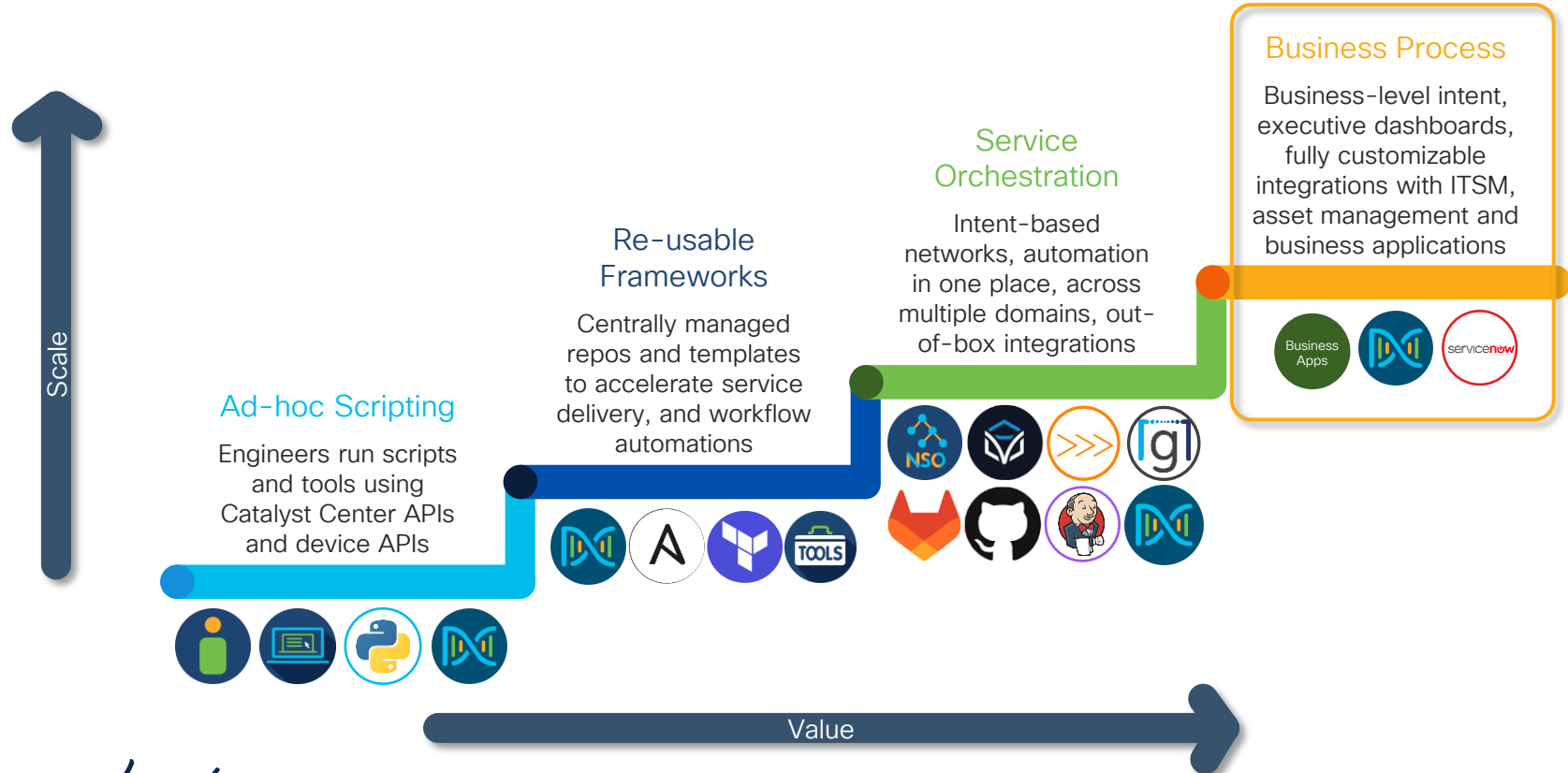
0

Successful Deploys : 0
Errored Deploys : 0
Stale Policies : 0

[Add New Policy](#)

But now **what?**

Catalyst Center and DevOps Journey

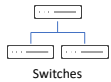


Just one more thing!!!

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
- Compliance

Key Takeaways:

- Orchestration Overview
- Building Blocks:
 - Controller
 - REST APIs
 - Python
 - Automation/CICD Platforms
- LAB where you go 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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Cisco Developer

**Develop 2022:
Lessons
Learned from
Cloud-Native Developers**

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

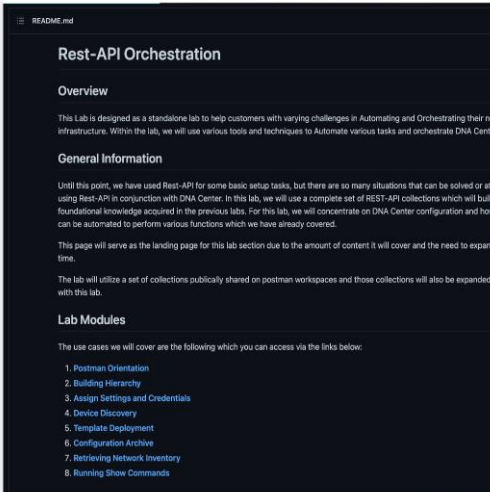
Cloud-native developers: This one's just for you. [Register](#)

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](#)

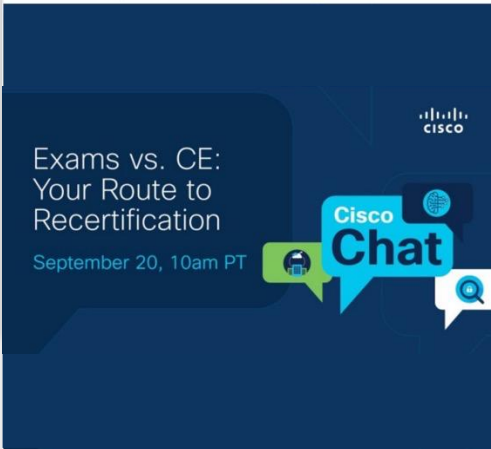
Cisco.com

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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

Keynote Deep Dives

Wednesday
10:30am – 11:30am



Experiences Amplified:
How AI Can Fuel
Better Employee
and Customer
Experiences

Level 1
Room 106



Smart, Secure,
Seamless:
Transforming
Experiences with
Next-Generation
Networking

Level 2
Room 204



Harness a Bold
New Era:
Transform Data
Centre and
Service Provider
Connectivity

Level 2
Room 203



Securing User to
Application and
Everything in
Between

Level 2
Melbourne Room 2



Unlocking
Digital Resilience
through Unified
Observability

The HUB
Centre Stage

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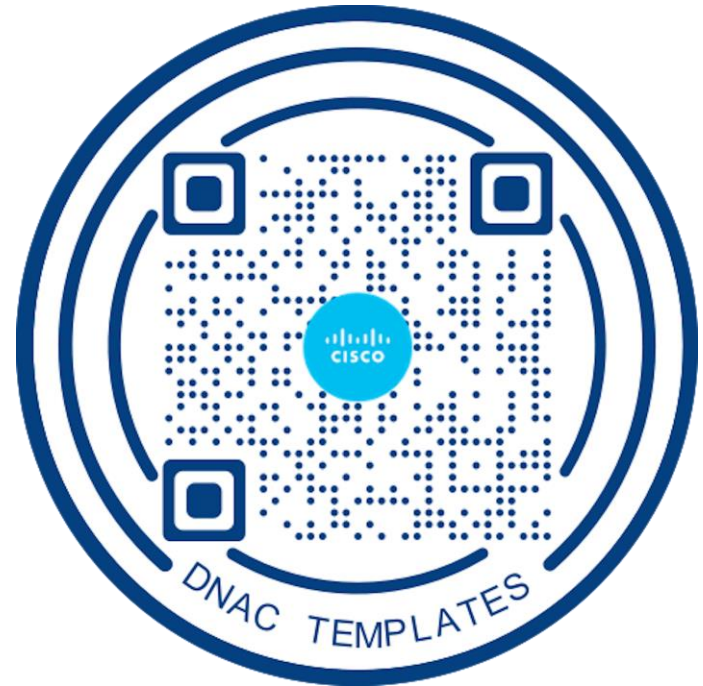
Continue
your education

CISCO *Live!*

DNAC-TEMPLATES Repository

For more programmability with Catalyst
Center visit:

<https://cs.co/DNAC-TEMPLATES>



Contact me at: kebaldwi@cisco.com

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- Visit the Cisco Stand for related demos
- 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



Thank you

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