Let's go

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

Cisco Webex App

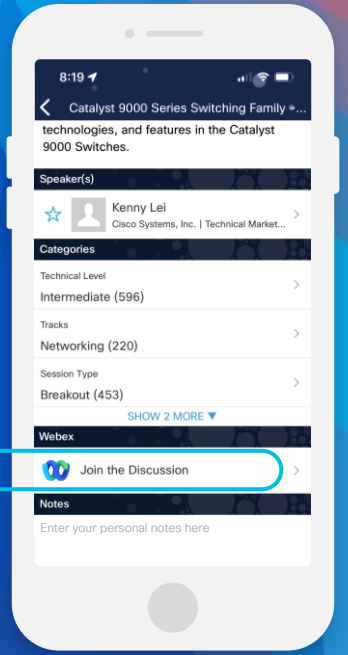
Questions?

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

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Agenda

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

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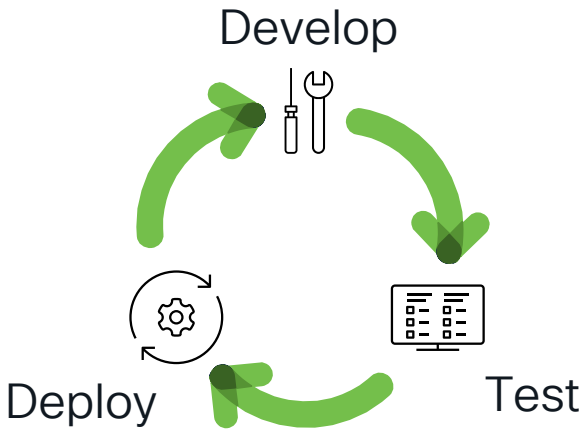
Building Orchestration

Advantages of Continuous Delivery

Increase Productivity

Automate Changes



Fault Find Quickly

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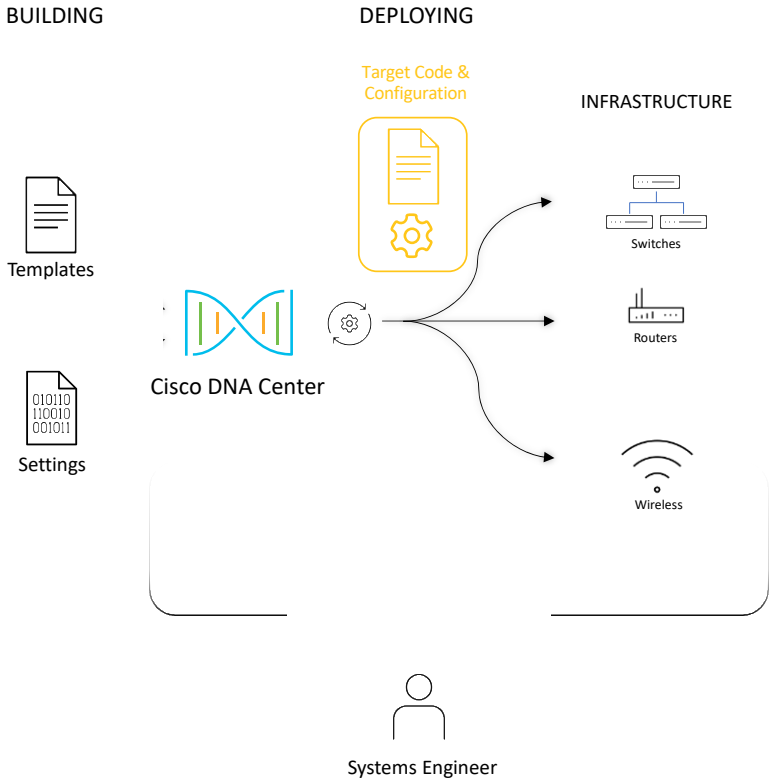
Cisco DNA Center with REST API towards CICD



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Building Blocks

Controller

Cisco DNA Center Platform

Business integration APIs

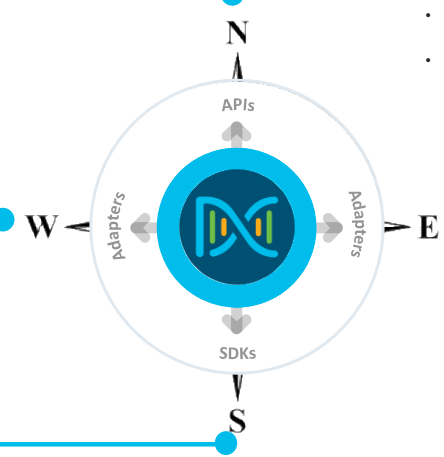
- Assurance
- Path Trace
- Command Runner
- Template Programmer
- Network Inventory / Discovery
- Topology
- Plug-n-Play
- Software Image Management (SWIM)

IT and network system processes

servicenow | ITSM

Infoblox / BLUECAT | IPAM

+ableau | Reporting



Multidomain integrations

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

Non-Cisco network devices

Map 3rd Party Network Devices to Data Model

Level 1 Operations support:
Discovery, Inventory, Topology, Availability, Command Runner

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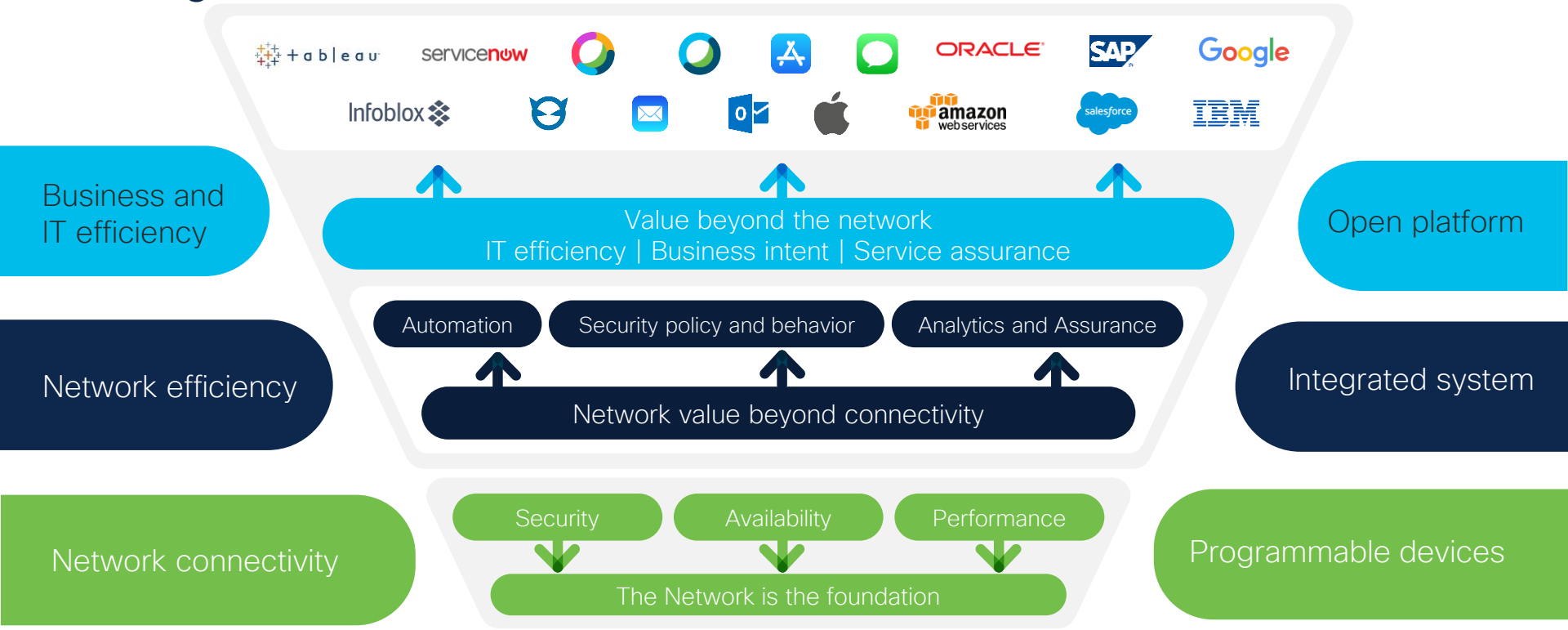
REST APIs

Integrations



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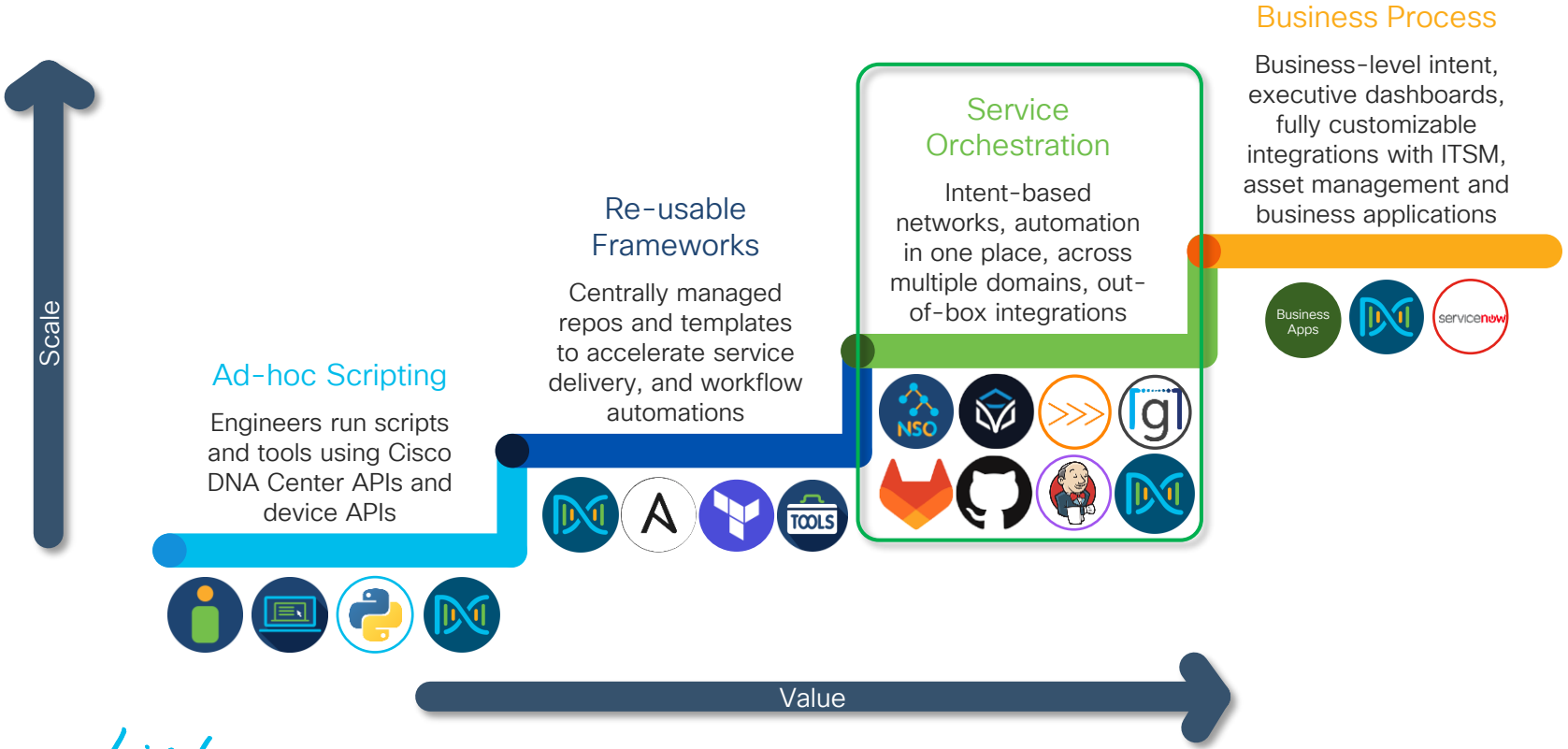
Cisco DNA Center and DevOps Journey



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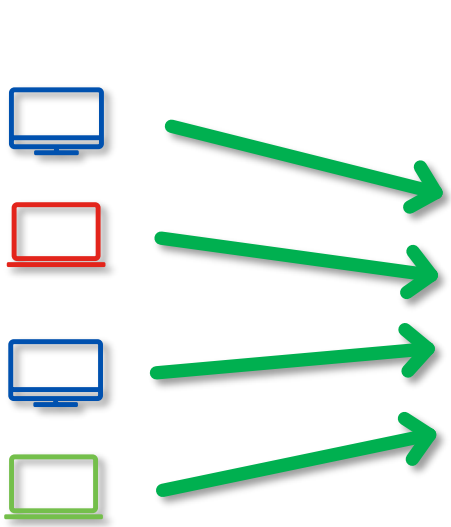
DevOps Tools Journey



REST APIs

- X Various home-grown scripts/apps to manage
- X Complexity and lack of consistency
- X Limited visibility and reporting
- X Security concerns

Note:
Network engineer provides:
Configuration details and application files

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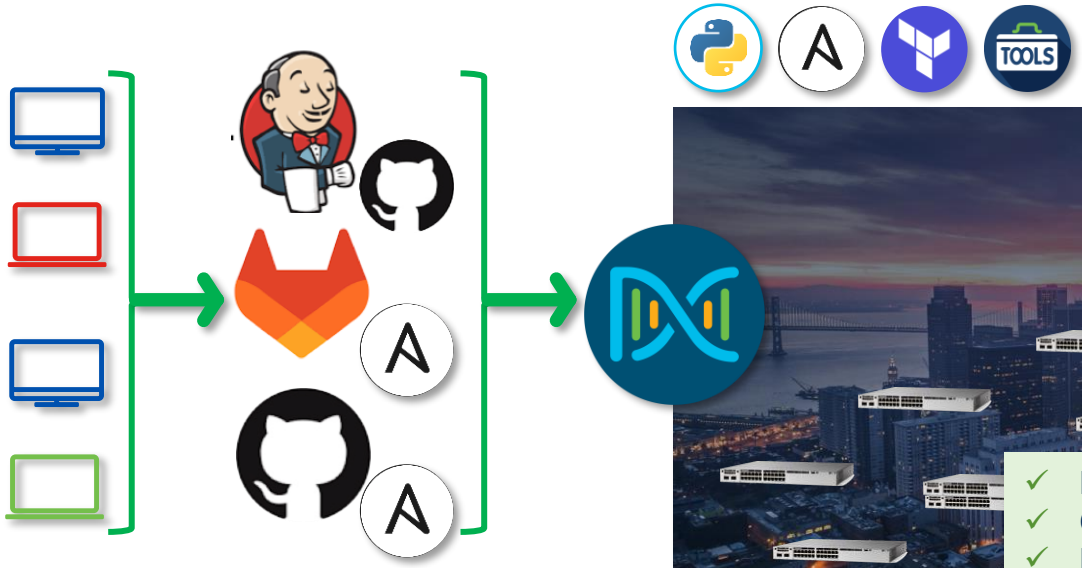
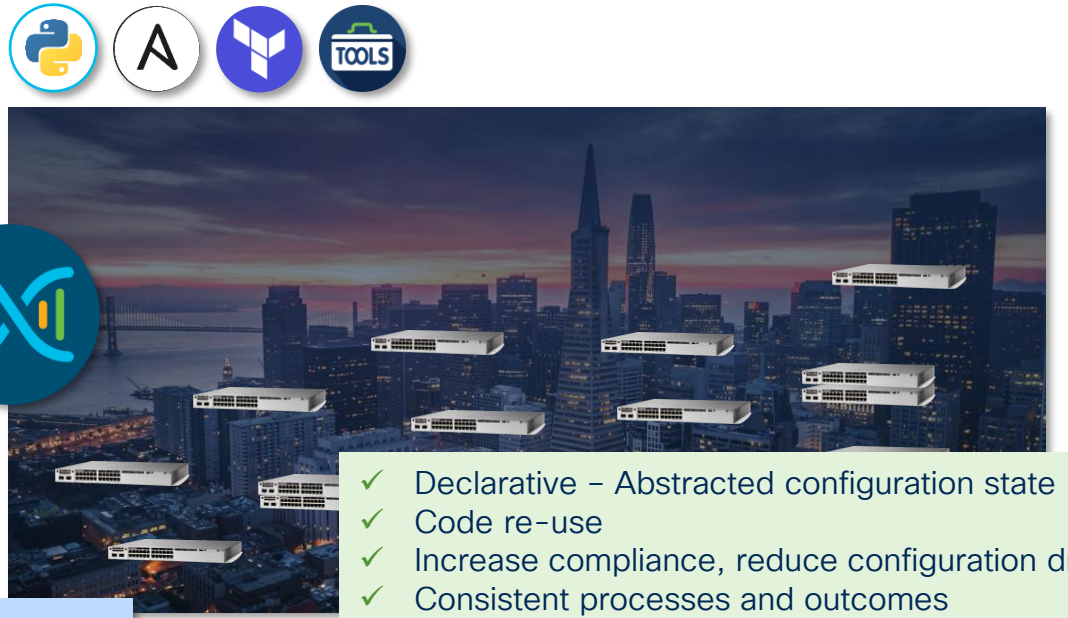
Cisco DNA Center CICD Integrations





- ✓ Declarative – Abstracted configuration state
- ✓ Code re-use
- ✓ Increase compliance, reduce configuration drift
- ✓ Consistent processes and outcomes
- ✓ Rich visibility and integrations

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

Jenkins docs: https://jenkins.io

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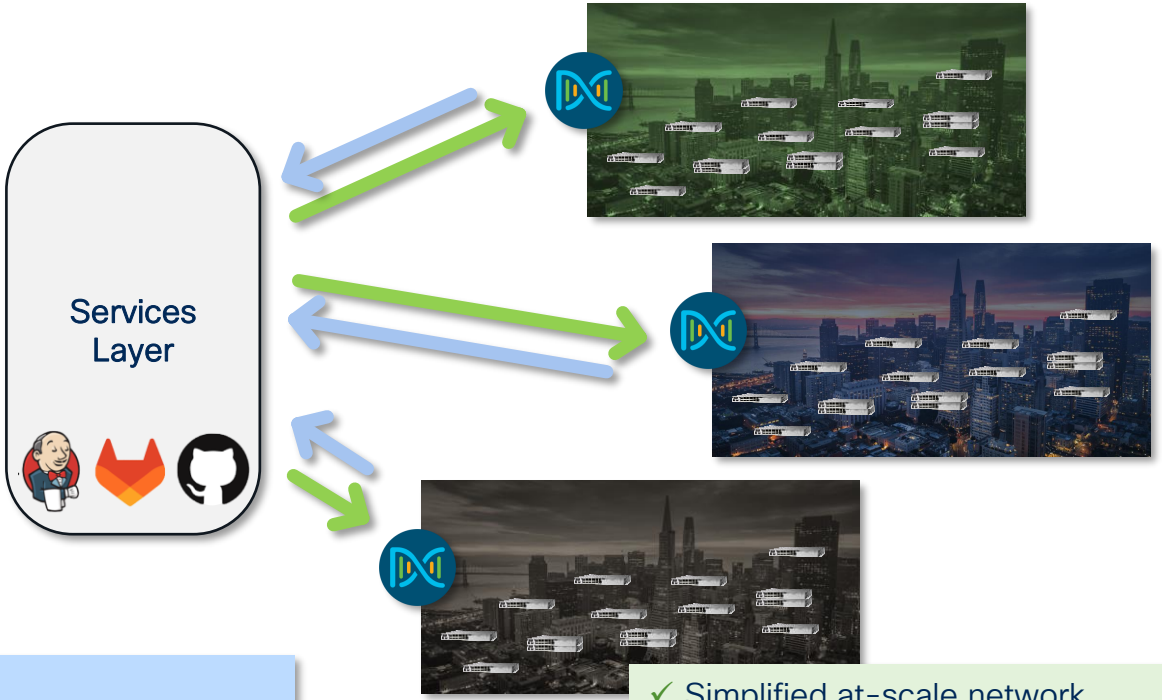
Git Configurations + Inventories

- 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

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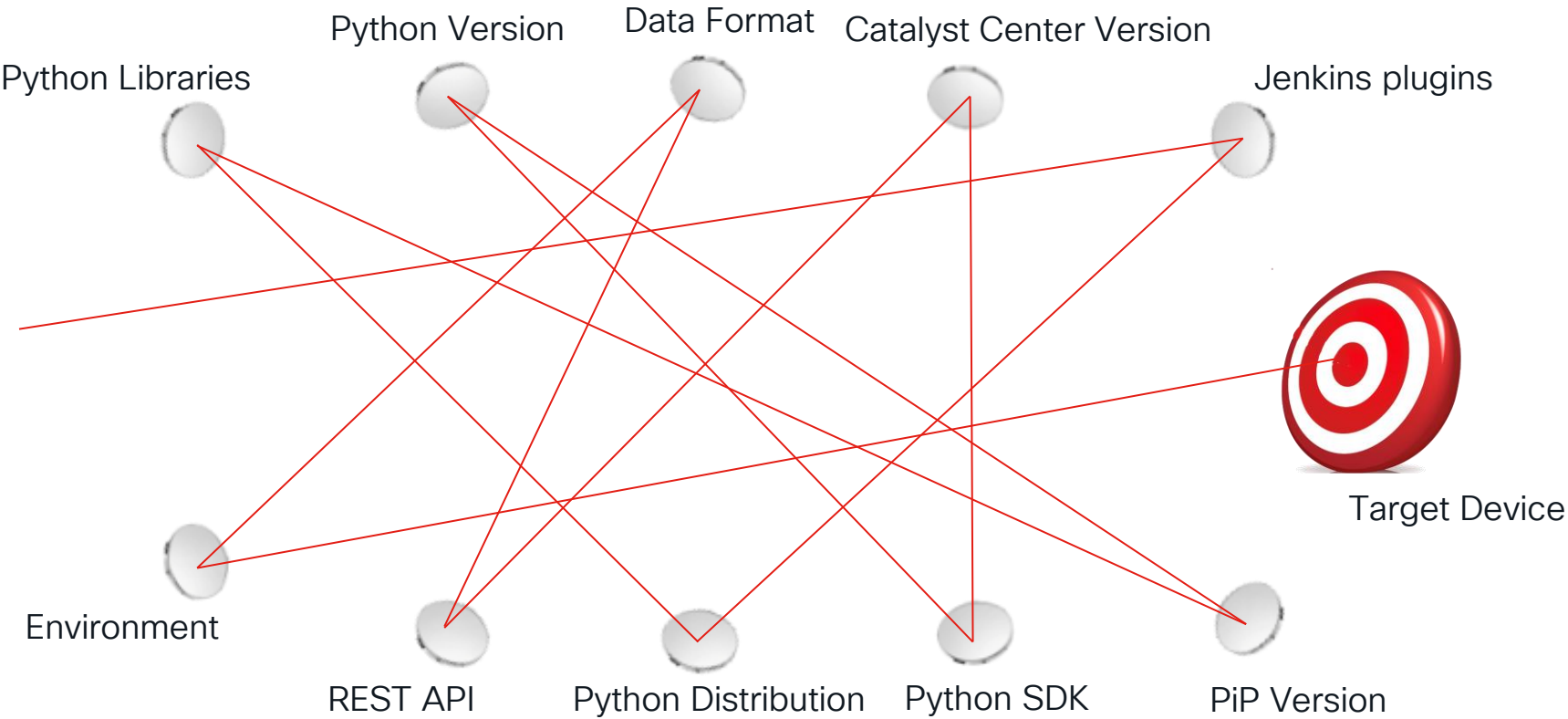
Like trying to hit a 'bullet' with a smaller bullet whilst wearing a blindfold, riding a horse...



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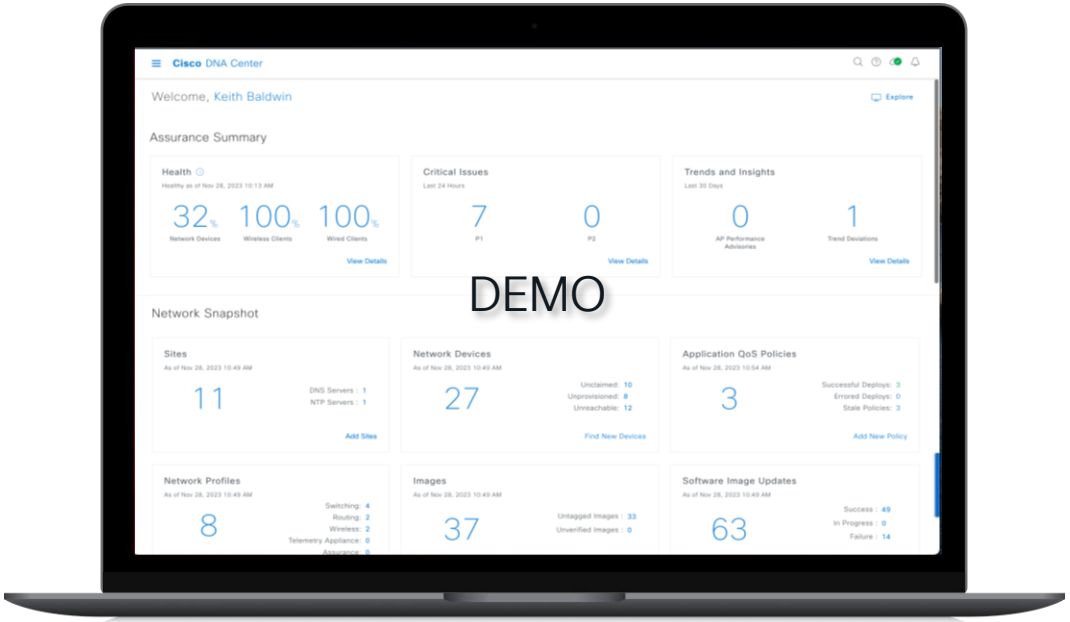
Demonstration

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



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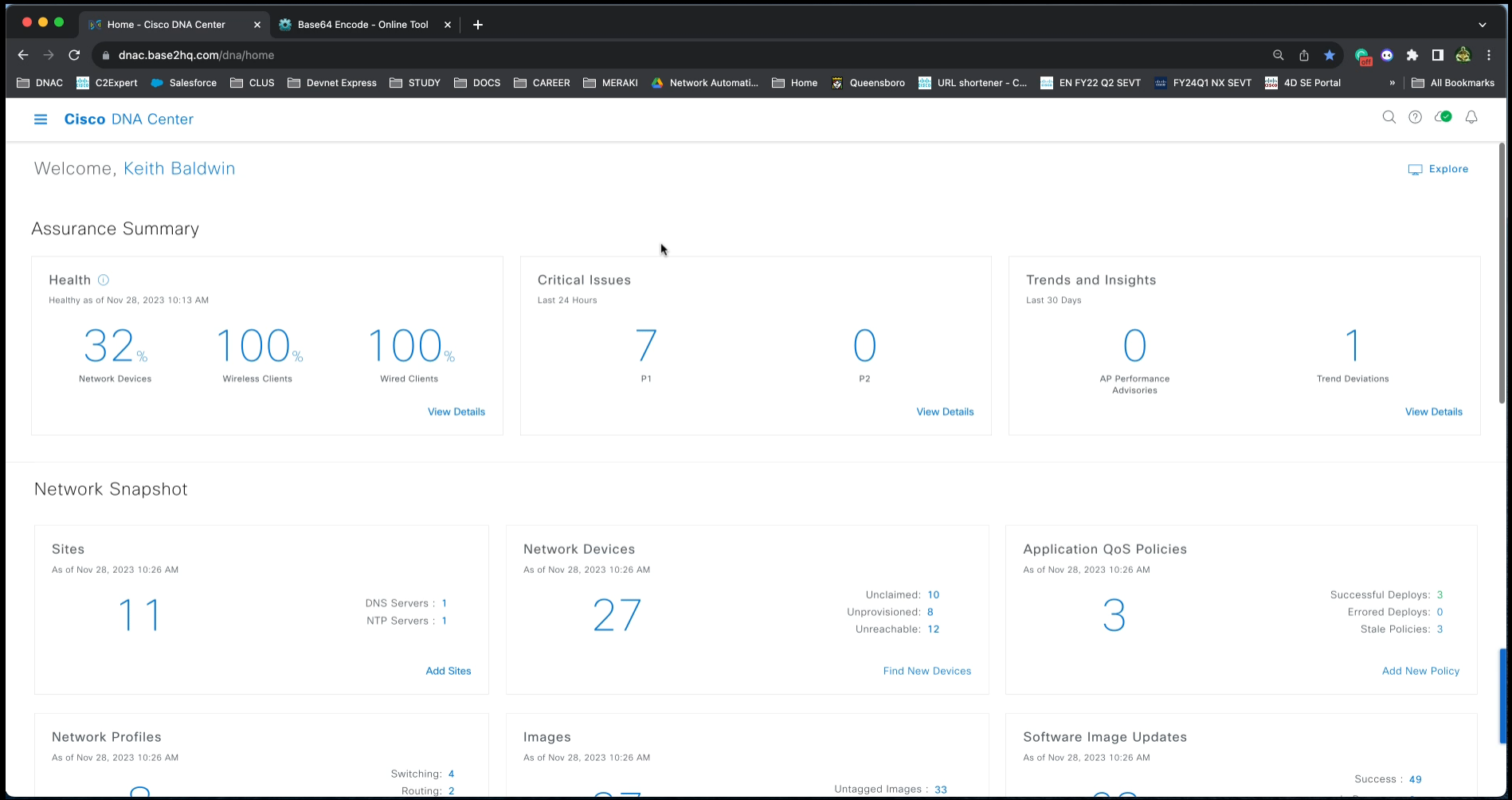
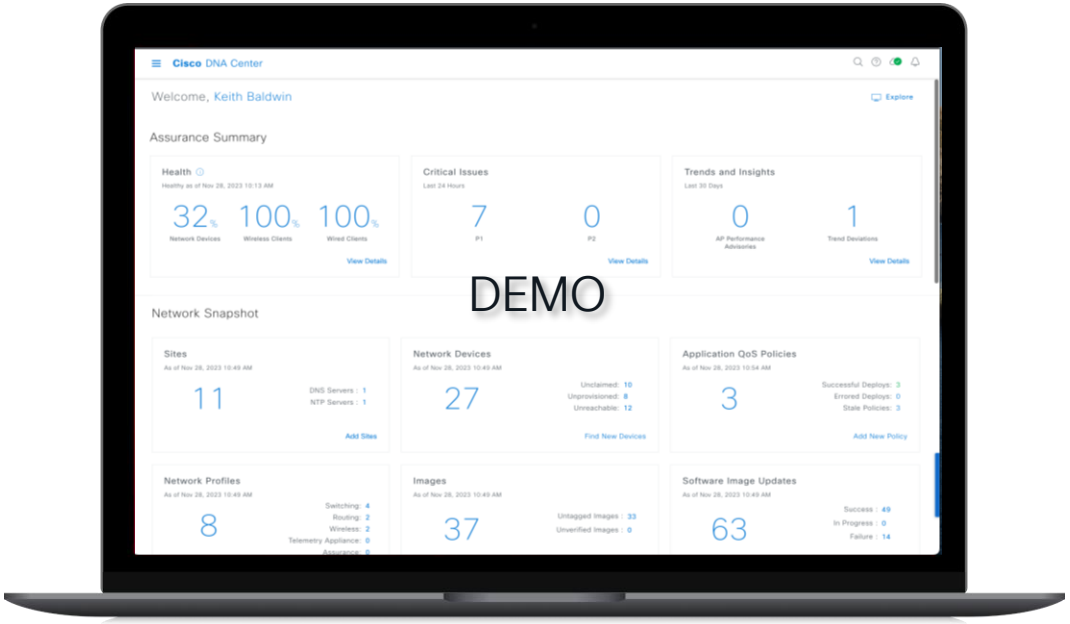

Home - Cisco DNA Center
Base64 Encode - Online Tool
dnac.base2hq.com/dna/home
DNAC
C2Expert
Salesforce
CLUS
Devnet Express
STUDY
DOCS
CAREER
MERAKI
Network Automati...
Home
Queensboro
URL shortener - C...
EN FY22 Q2 SEVT
FY24Q1 NX SEVT
4D SE Portal
All Bookmarks
Cisco DNA Center
Welcome, Keith Baldwin
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?



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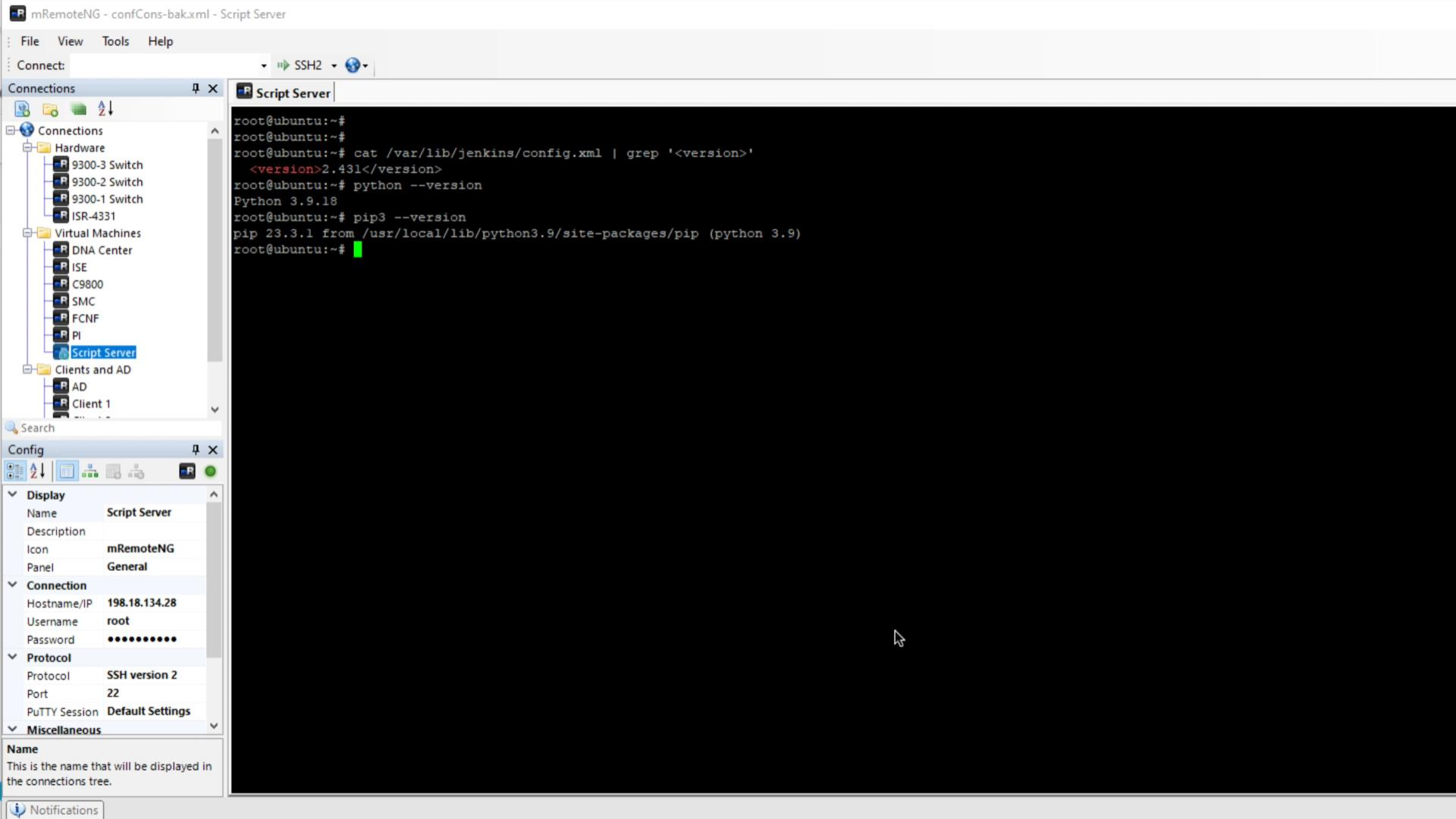
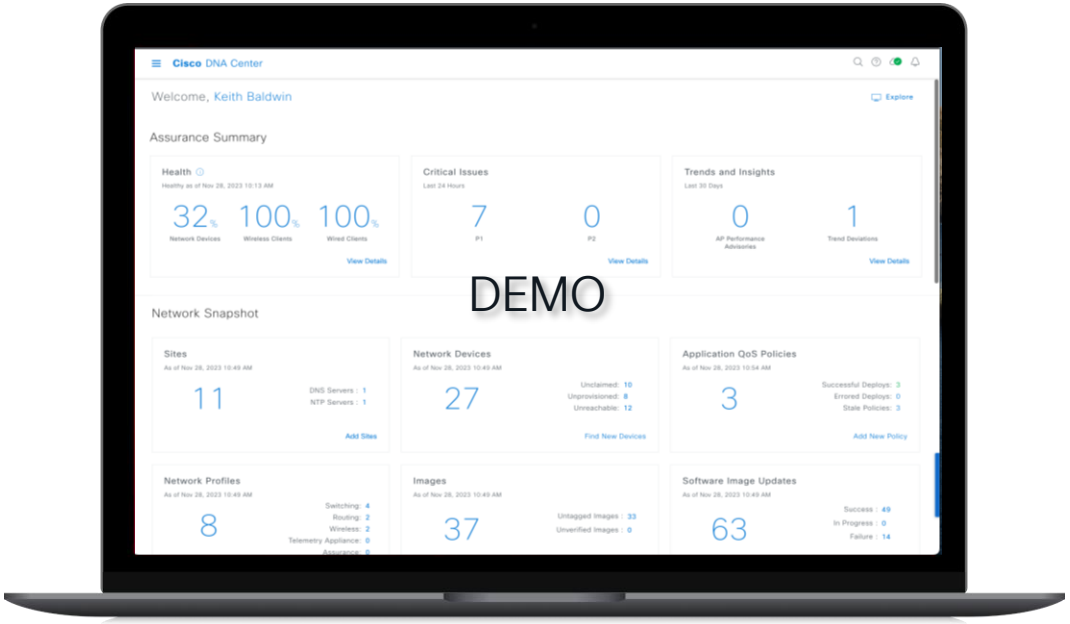

mRemoteNG - confCons-bak.xml - Script Server
File View Tools Help
Connect: SSH2
Connections
Connections
Hardware
9300-3 Switch
9300-2 Switch
9300-1 Switch
ISR-4331
Virtual Machines
DNA Center
ISE
C9800
SMC
FCNF
PI
Script Server
Clients and AD
AD
Client 1
Search
Config
Display
Name Script Server
Description
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:~#
Notifications

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?



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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

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-Inventory	N/A	N/A	N/A
⊗	☼	DNAC-Templates	N/A	N/A	N/A

Build Queue

Build Executor Status

built-in node (0 of 2 executors busy)

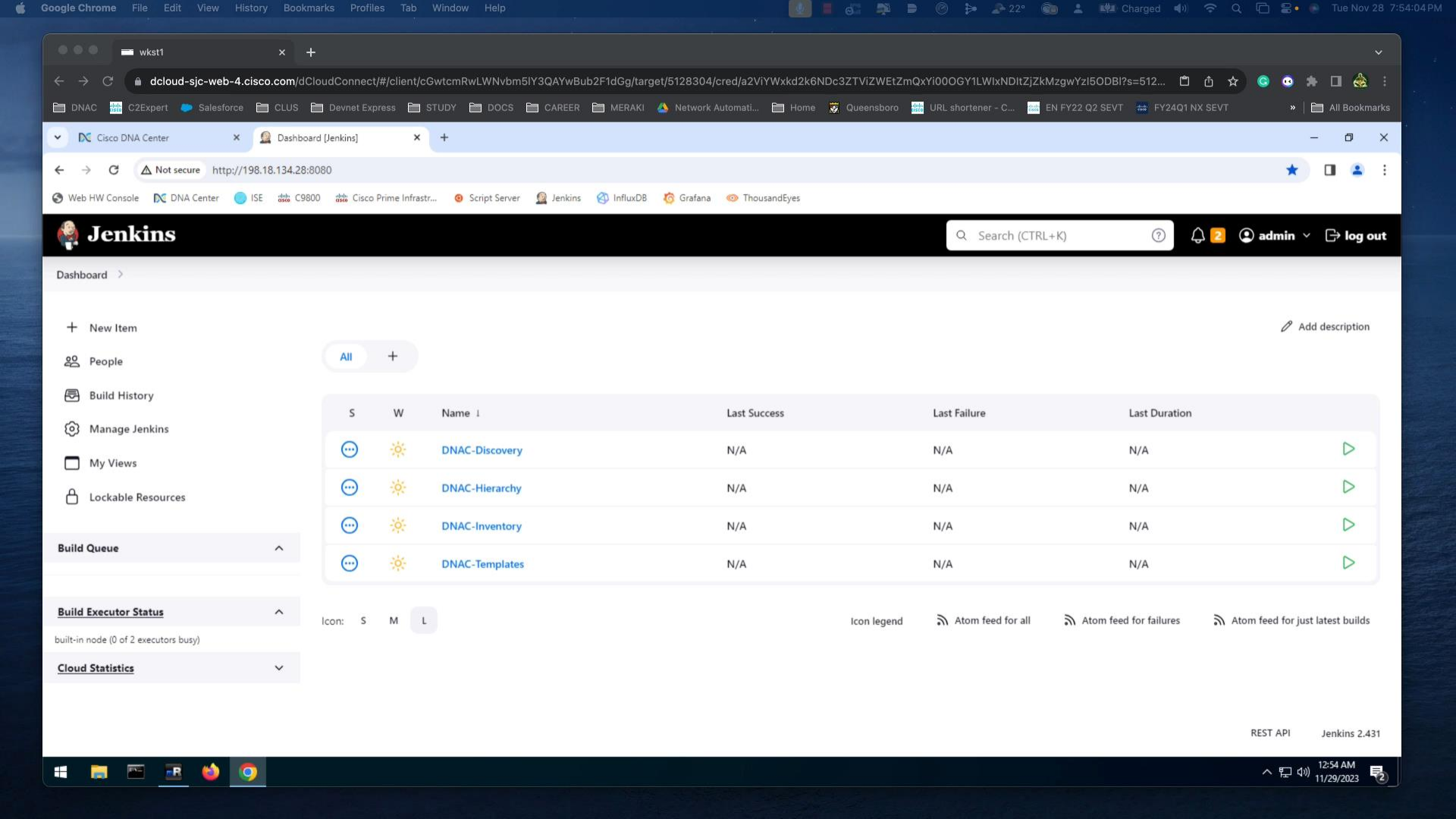
Cloud Statistics

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

1:45 AM 11/29/2023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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
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Jenkins
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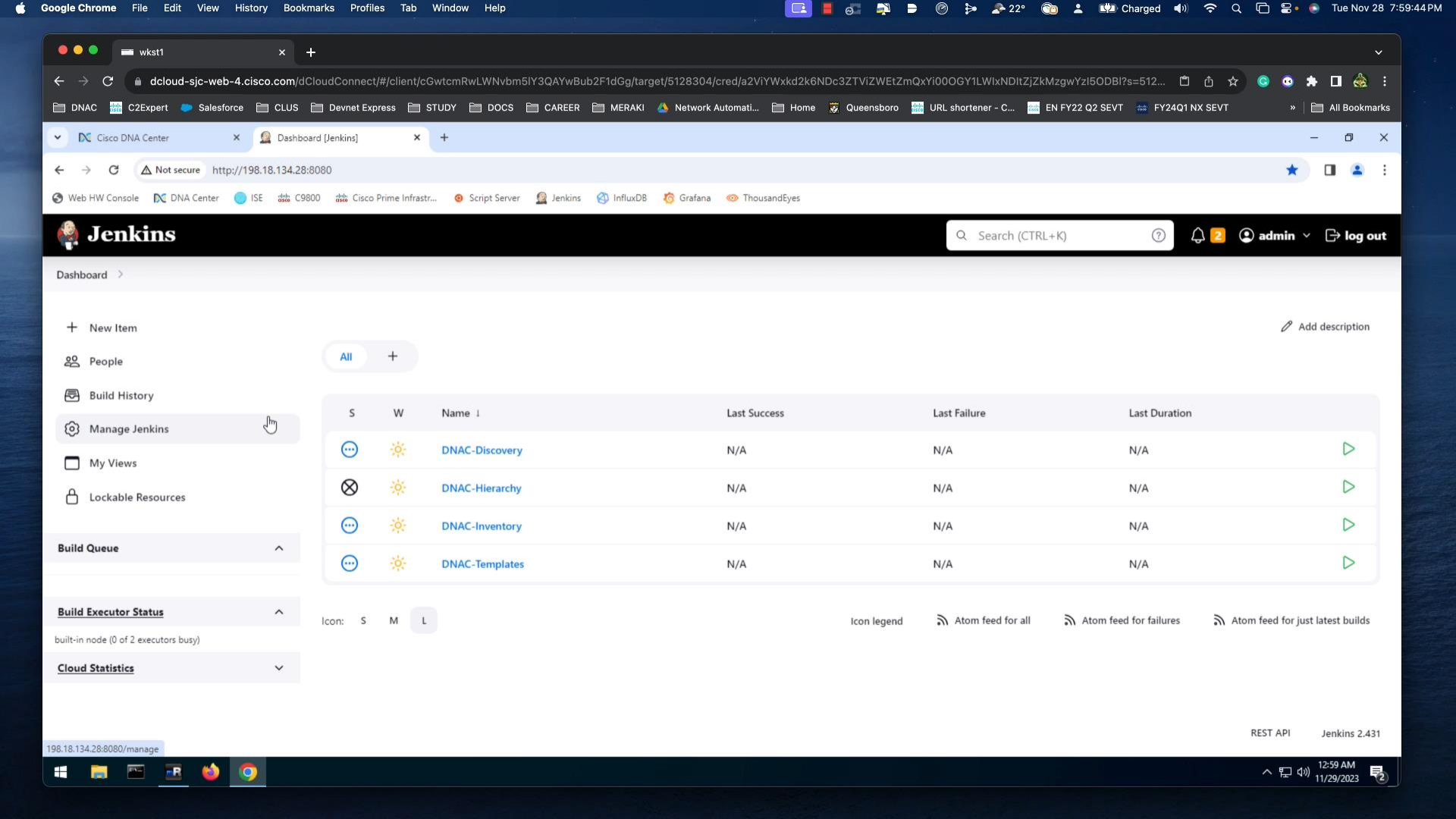
admin
log out
Dashboard
New Item
People
Build History
Manage Jenkins
My Views
Lockable Resources
Build Queue
Build Executor Status
built-in node (0 of 2 executors busy)
Cloud Statistics
Add description
All
S W Name ↓ Last Success Last Failure Last Duration
DNAC-Discovery N/A N/A N/A
DNAC-Hierarchy N/A N/A N/A
DNAC-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
12:54 AM
11/29/2023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Jenkins
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Build Executor Status
built-in node (0 of 2 executors busy)
Cloud Statistics
Add description
All
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DNAC-Templates N/A N/A N/A
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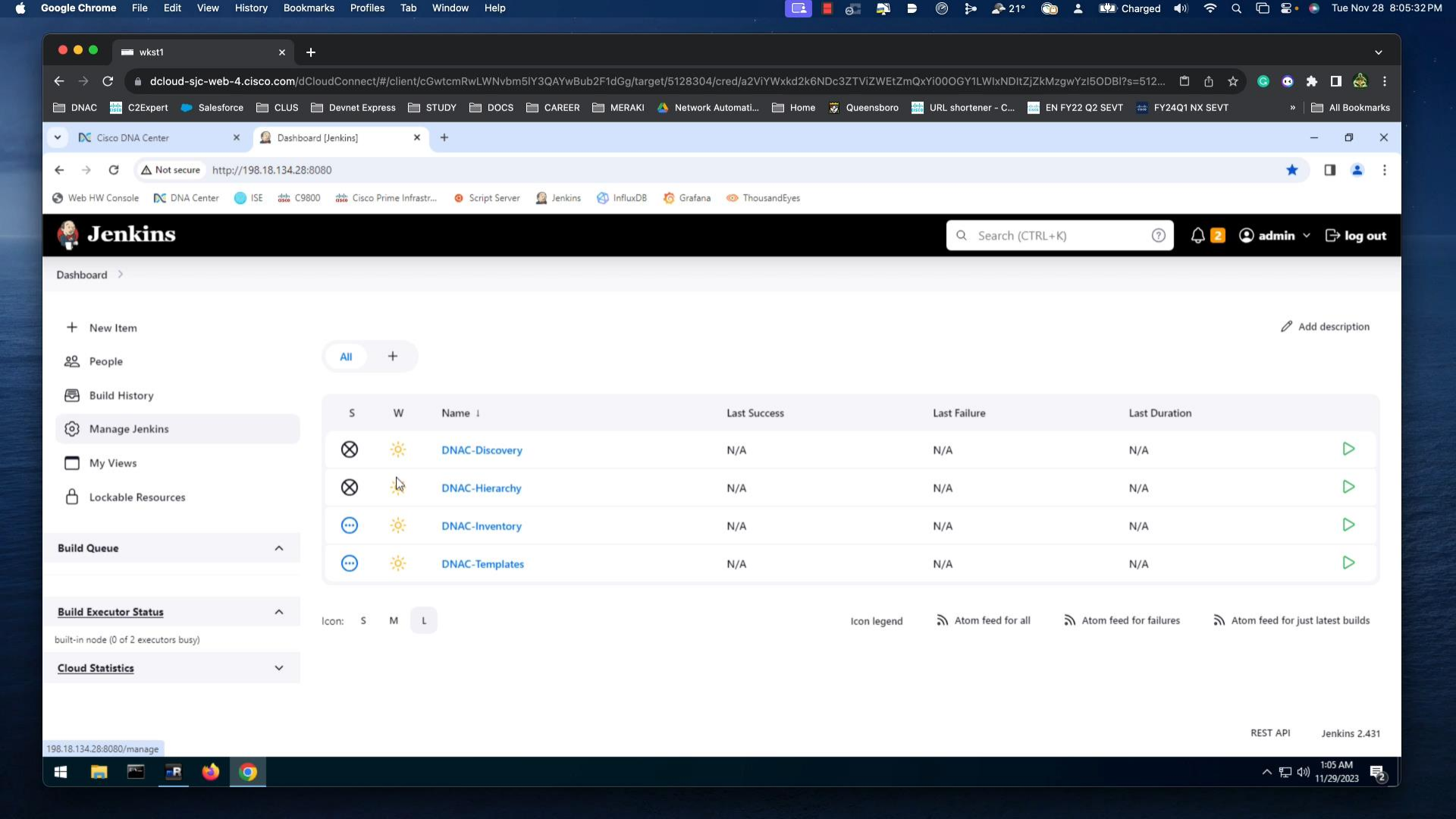
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DNAC-Inventory N/A N/A N/A
DNAC-Templates N/A N/A N/A
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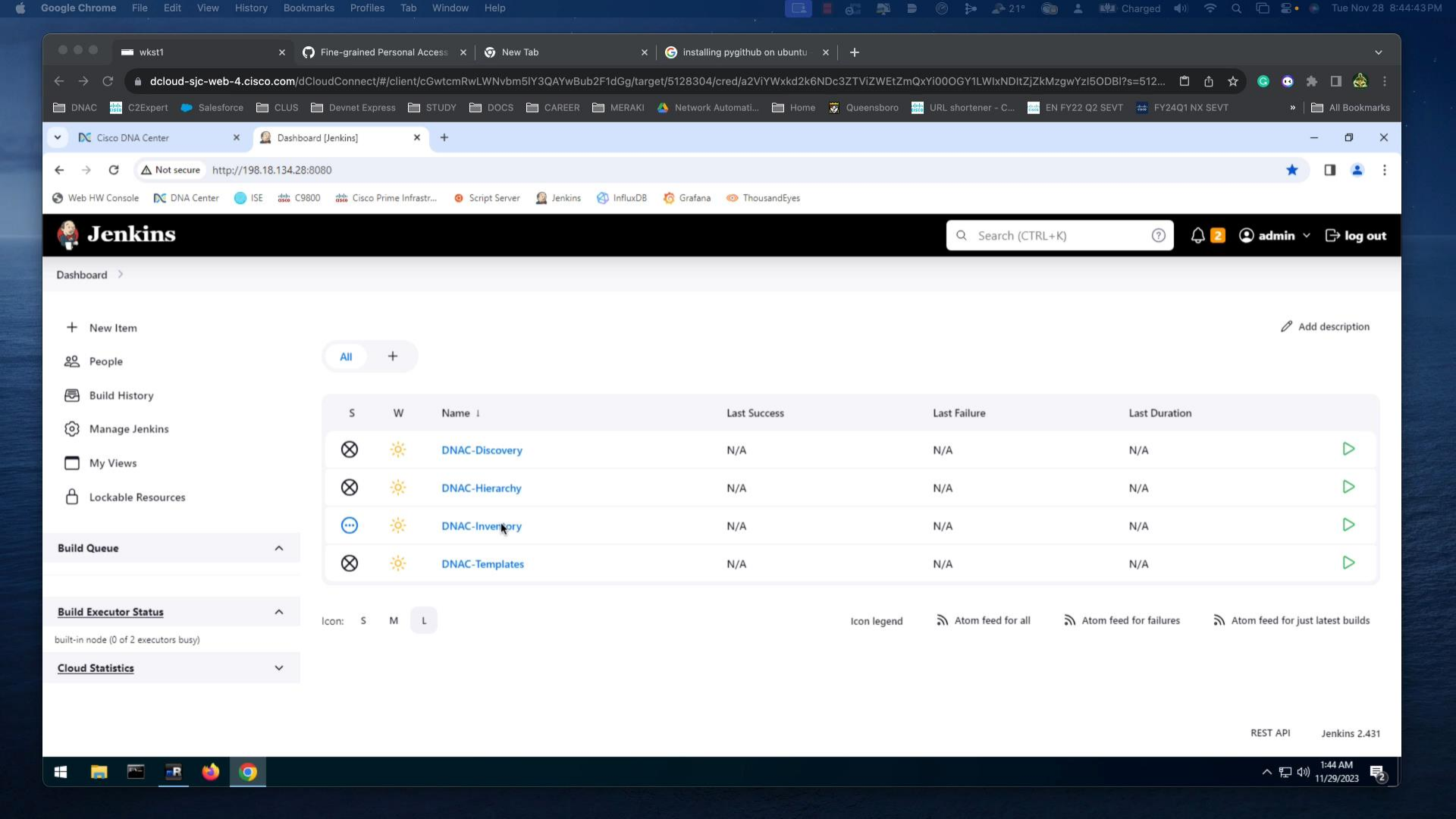
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Fine-grained Personal Access
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DNAC-Inventory N/A N/A N/A
DNAC-Templates N/A N/A N/A
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REST API
Jenkins 2.431
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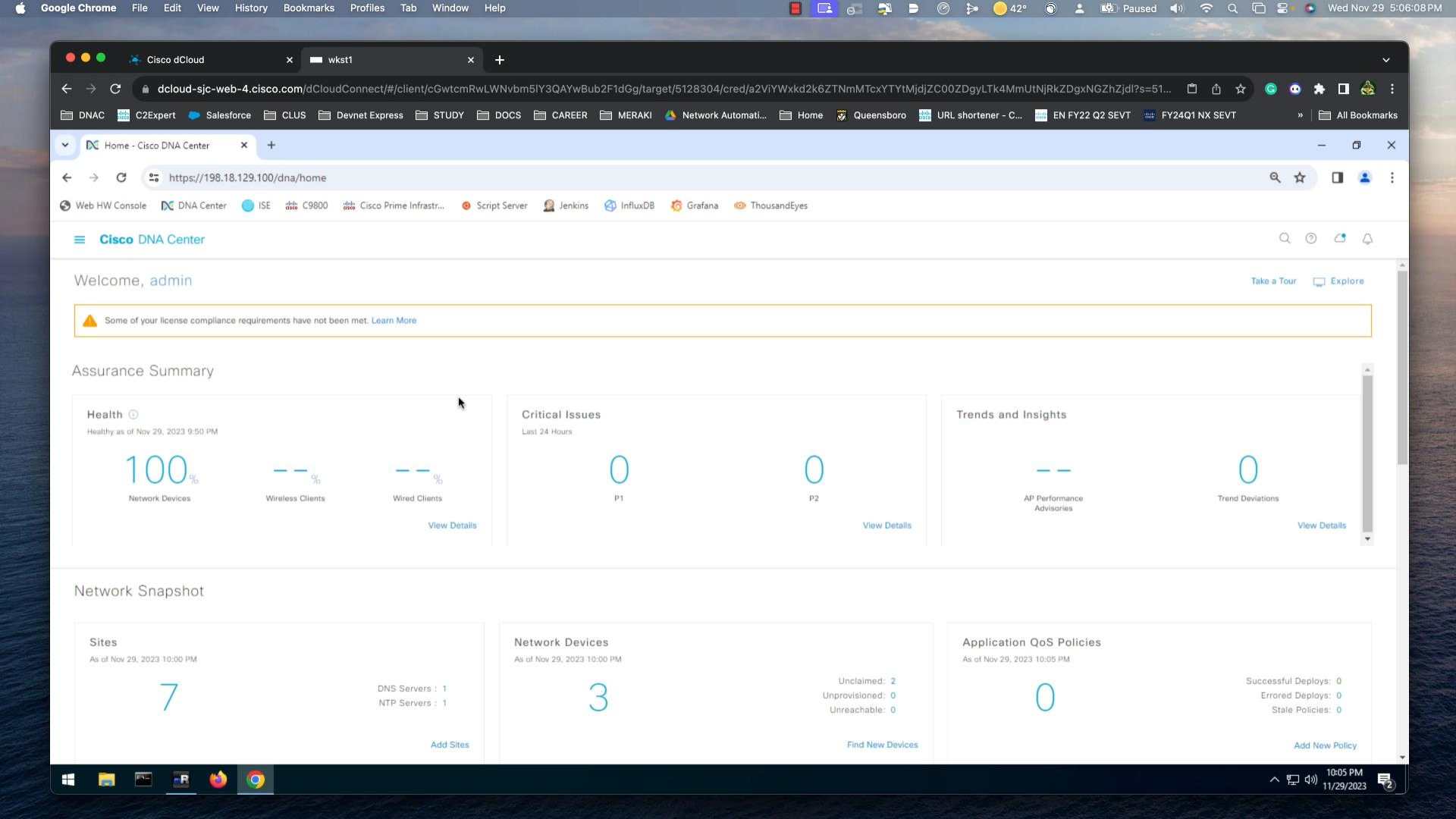
11/29/2023


Google Chrome File Edit View History Bookmarks Profiles Tab Window Help
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Cisco dCloud
wkst1
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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
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
10:05 PM
11/29/2023

But now what?

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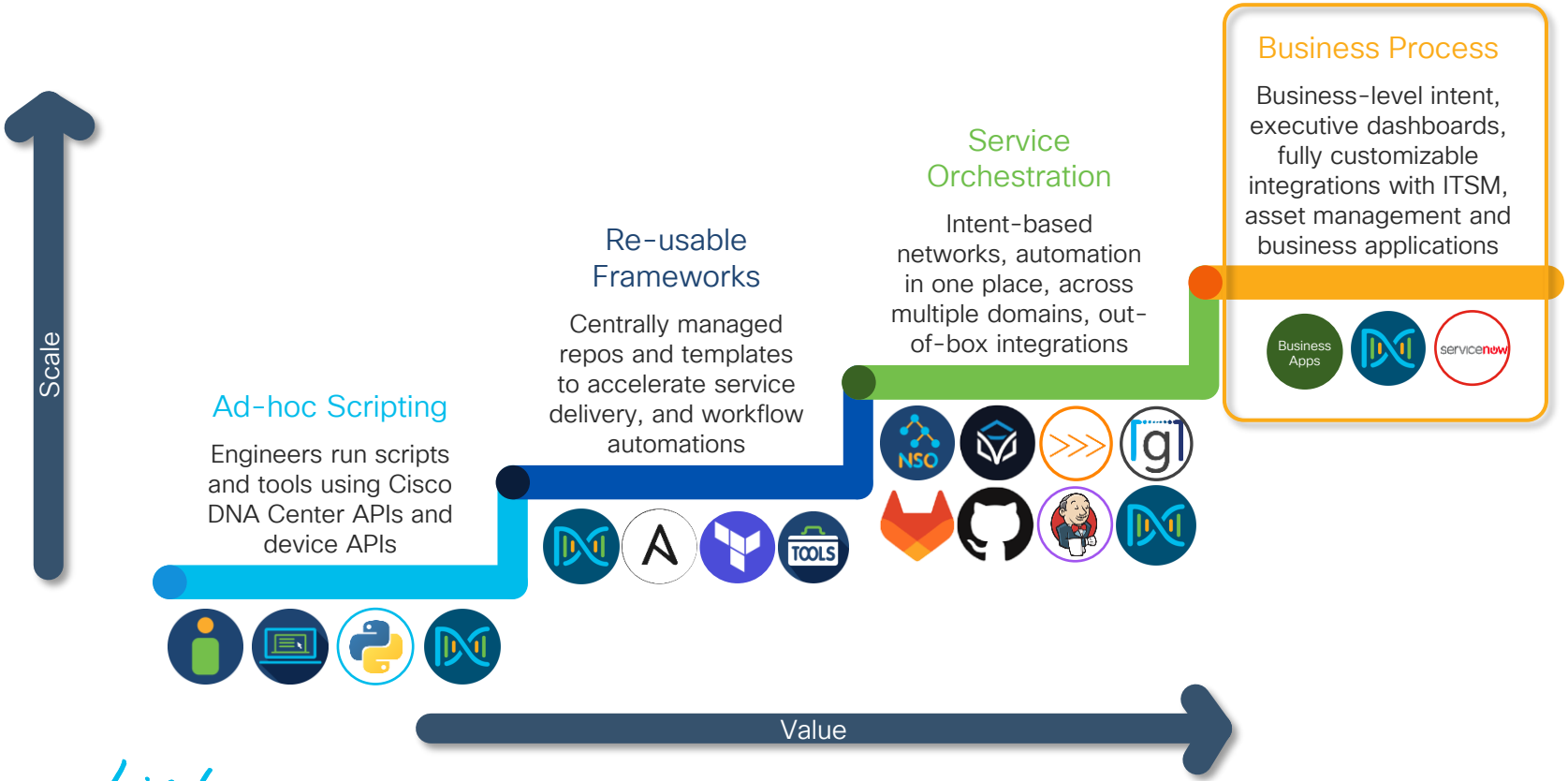
Cisco DNA Center and DevOps Journey



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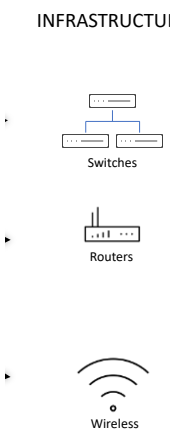
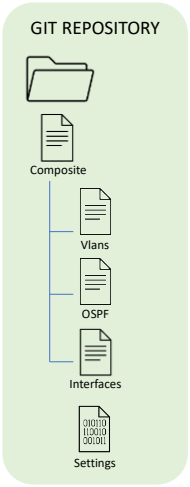
Just one more thing!!!

We dealt with:

Who?



What?



How?

- Python
- Ansible
- Jenkins
- GitHub
- GitLab

Now deal with:

When?

- Approvals
- Change Control
- Incident Control

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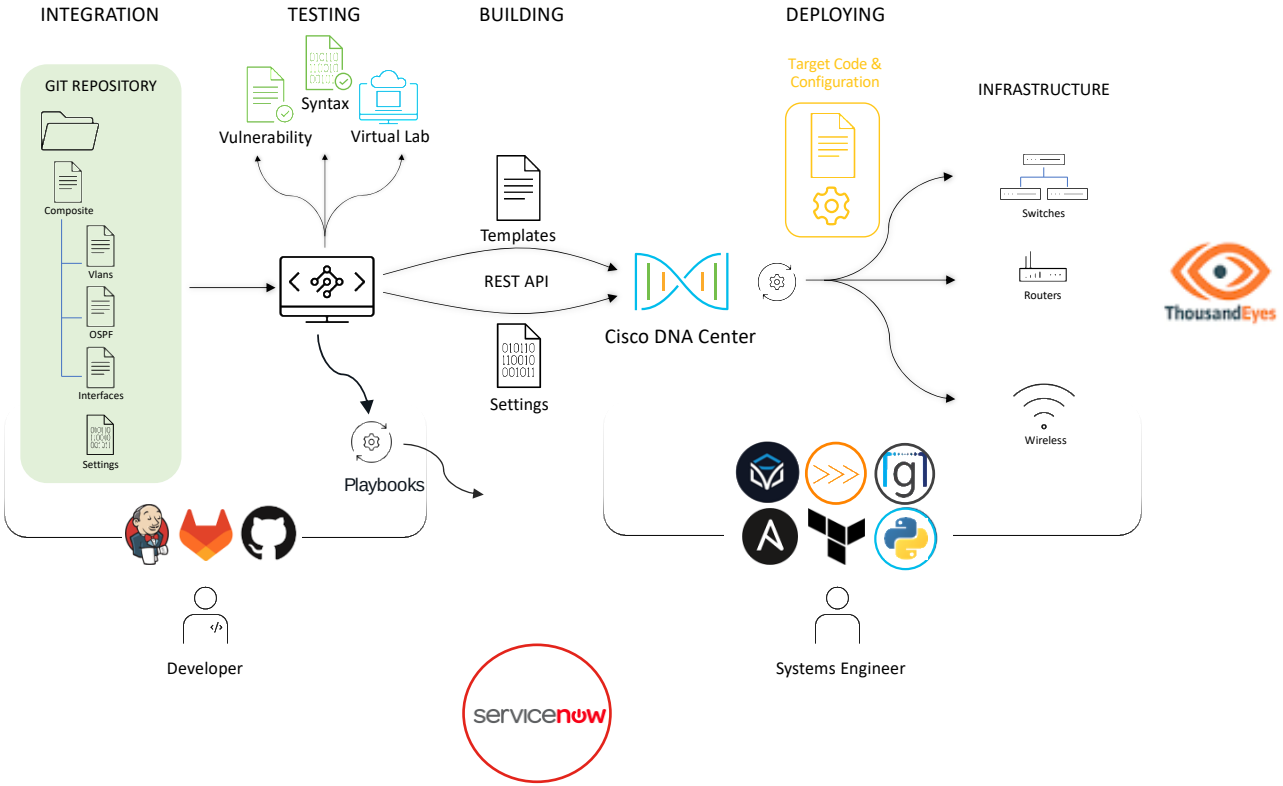
Cisco DNA Center with REST API towards CICD



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Key Takeaways:

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

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Summary

Continue Learning

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

Develop Your Skills

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

Certify

- DevNet Certifications

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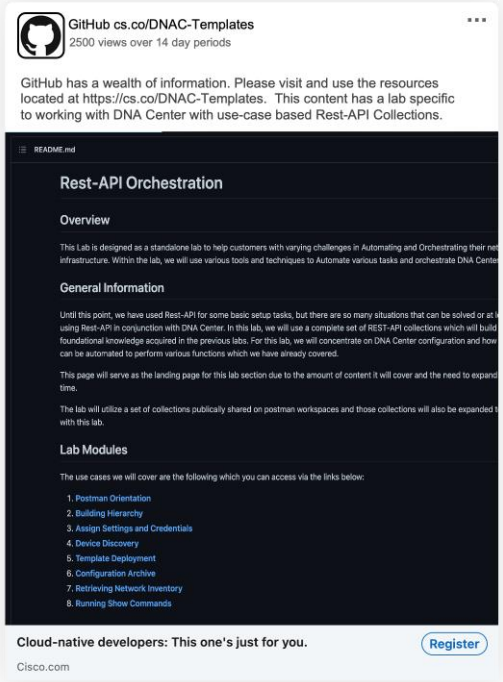
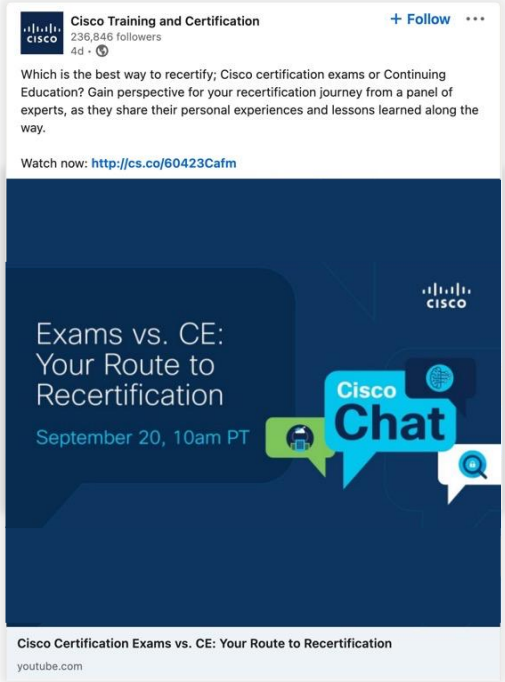
Where to learn:

Developer.cisco.com

cs.co/DNAC-Templates



Cisco Digital Learning



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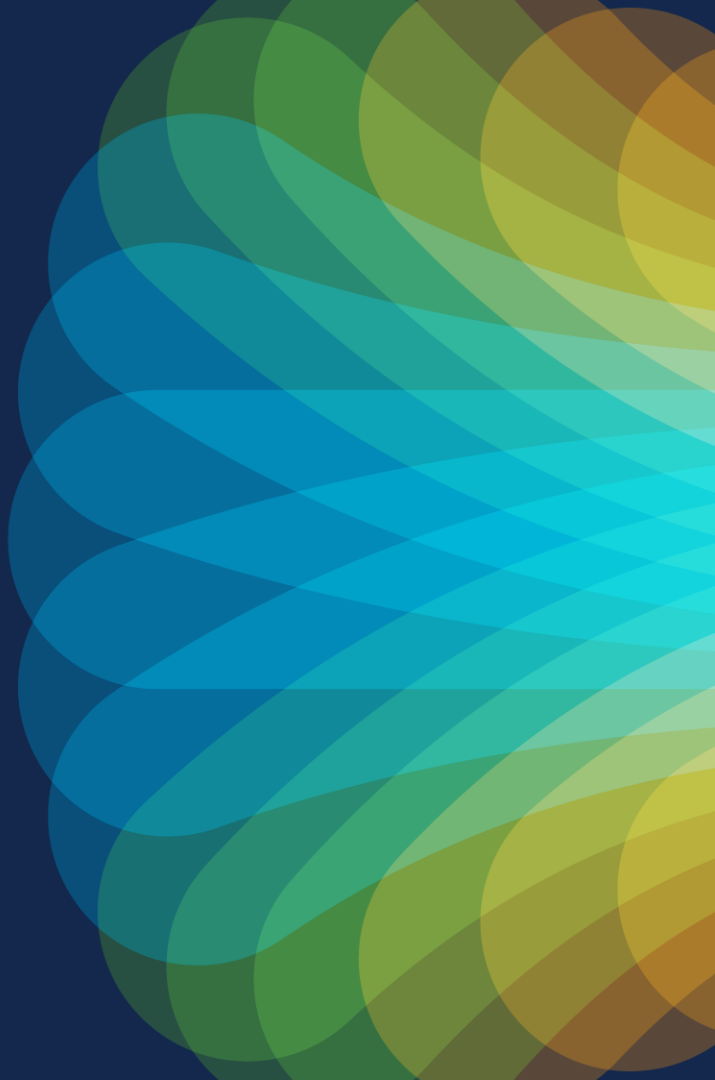
The bridge to possible

Thank you



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Let's go

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