Cisco Catalyst Center Platform:

APIs, Event Notifications, Integrations, and DevOps Resources

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@zapodeanu

DEVNET-1087

Webex App

Questions?

Use the Webex app to chat with the speaker after the session

How

1. Find this session in the Cisco Events 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 February 28, 2025.

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Agenda

- Catalyst Center Platform Overview
- REST APIs
- Event Notifications
- Integrations
- Developer Resources
- Summary

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Catalyst Center Platform Vision

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Catalyst Center Platform

Event Notifications

- Assurance Issues
- AI/ML Insights
- System Health
- Integration Connectivity
- License Management
- Webhooks
- PagerDuty
- Webex
- Syslog
- SNMP

Northbound REST APIs

- Network Inventory
- Network Topology
- Network Design
- Provisioning
- SWIM, PnP
- Compliance
- Assurance
- SDA
- Templates
- RMA
- Config Archive
- Sensors

IT Ecosystem Integrations

- IT Service Management
- IP Address Management
- Reporting
- Wireless Planning
- Alerting
- Network Insights

Developer Resources

- Sample Code, Videos
- Python SDK, Ansible, Terraform
- GenAI Use Cases
- Cisco DevNet
  - Sandboxes, Learning Labs
  - Developer Guides, Community

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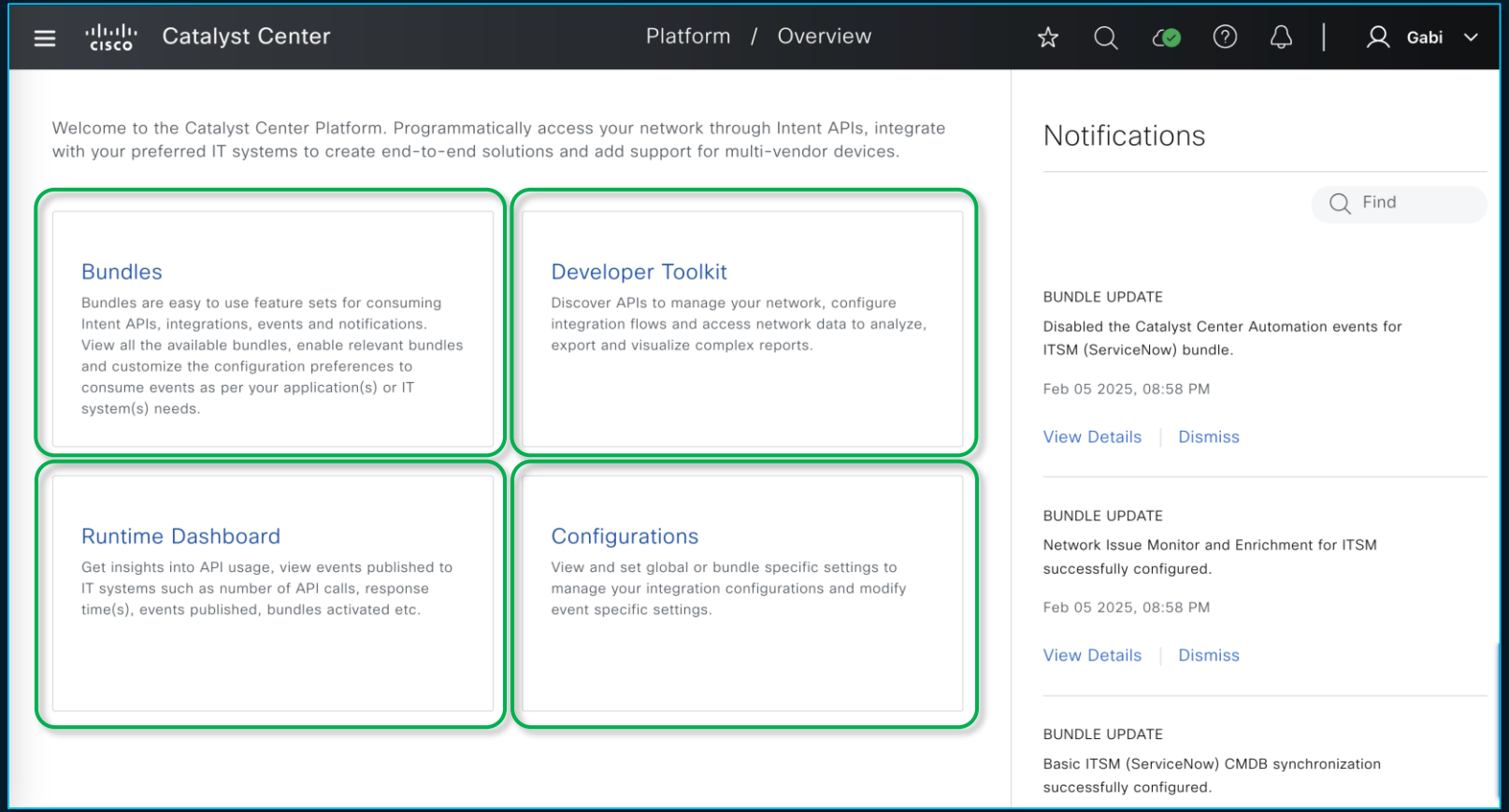
Catalyst Center Platform – Overview



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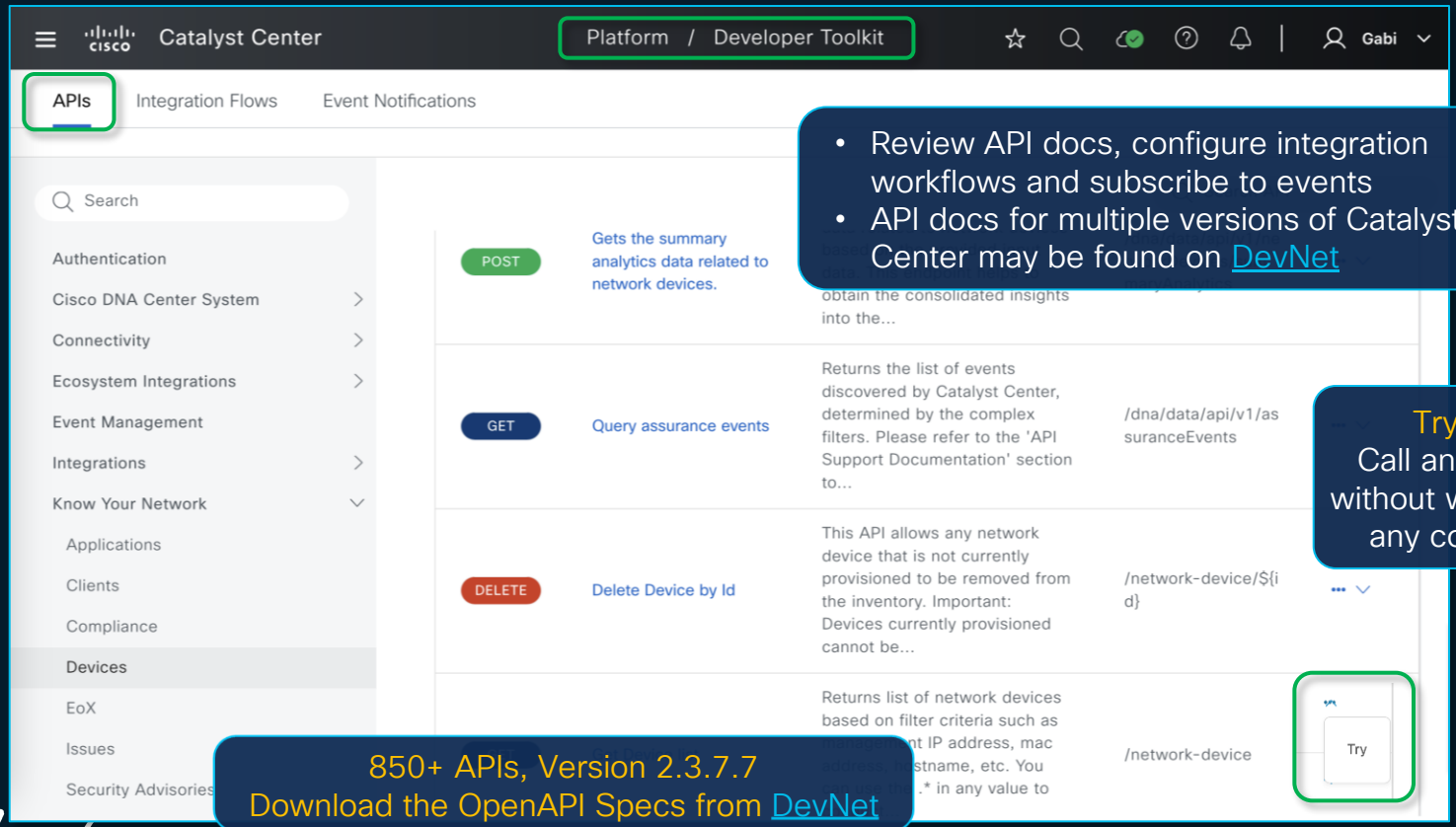
Catalyst Center Platform – Developer Toolkit



- Review API docs, configure integration workflows and subscribe to events
- API docs for multiple versions of Catalyst Center may be found on DevNet

Try
Call an API without writing any code

850+ APIs, Version 2.3.7.7
Download the OpenAPI Specs from DevNet

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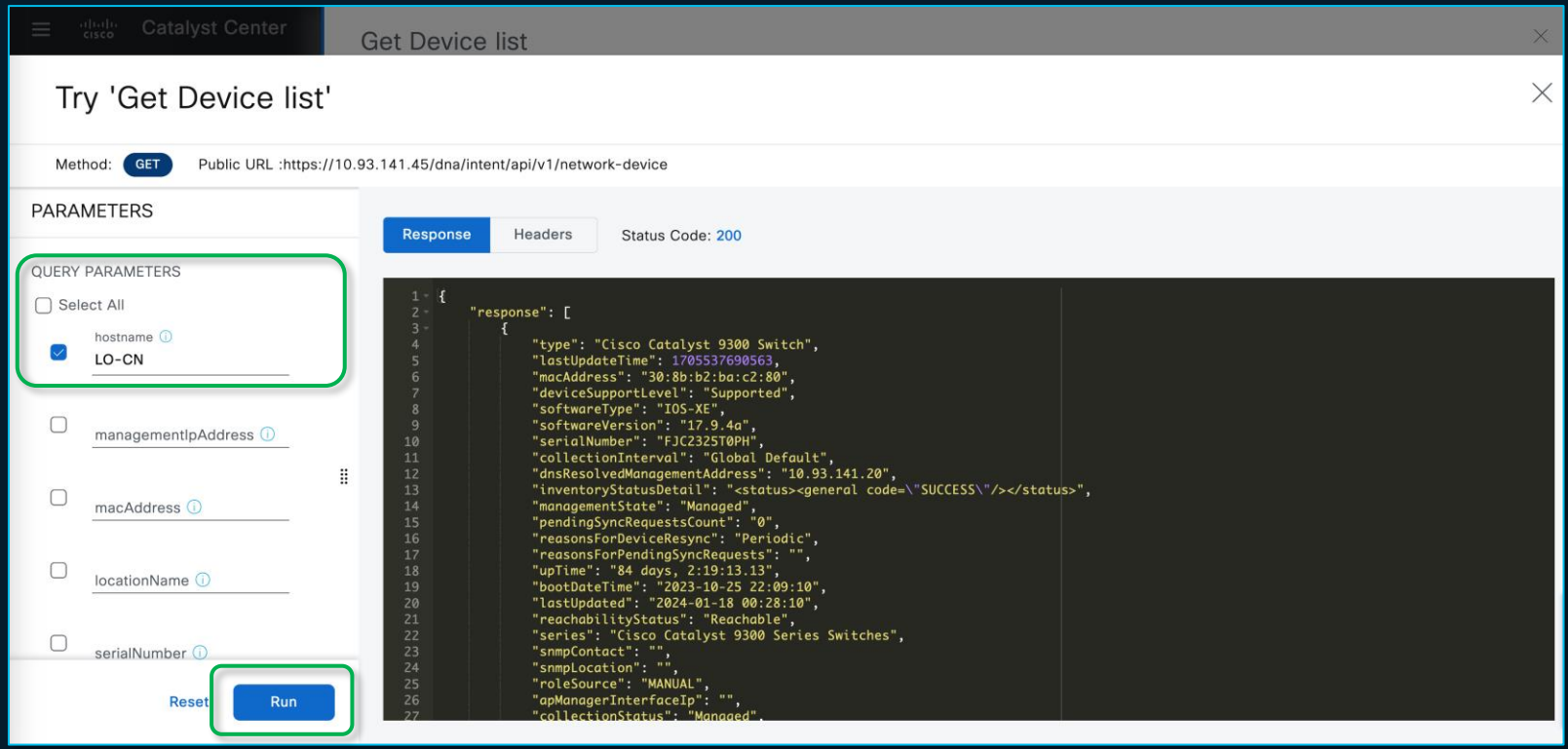
Try an API Call



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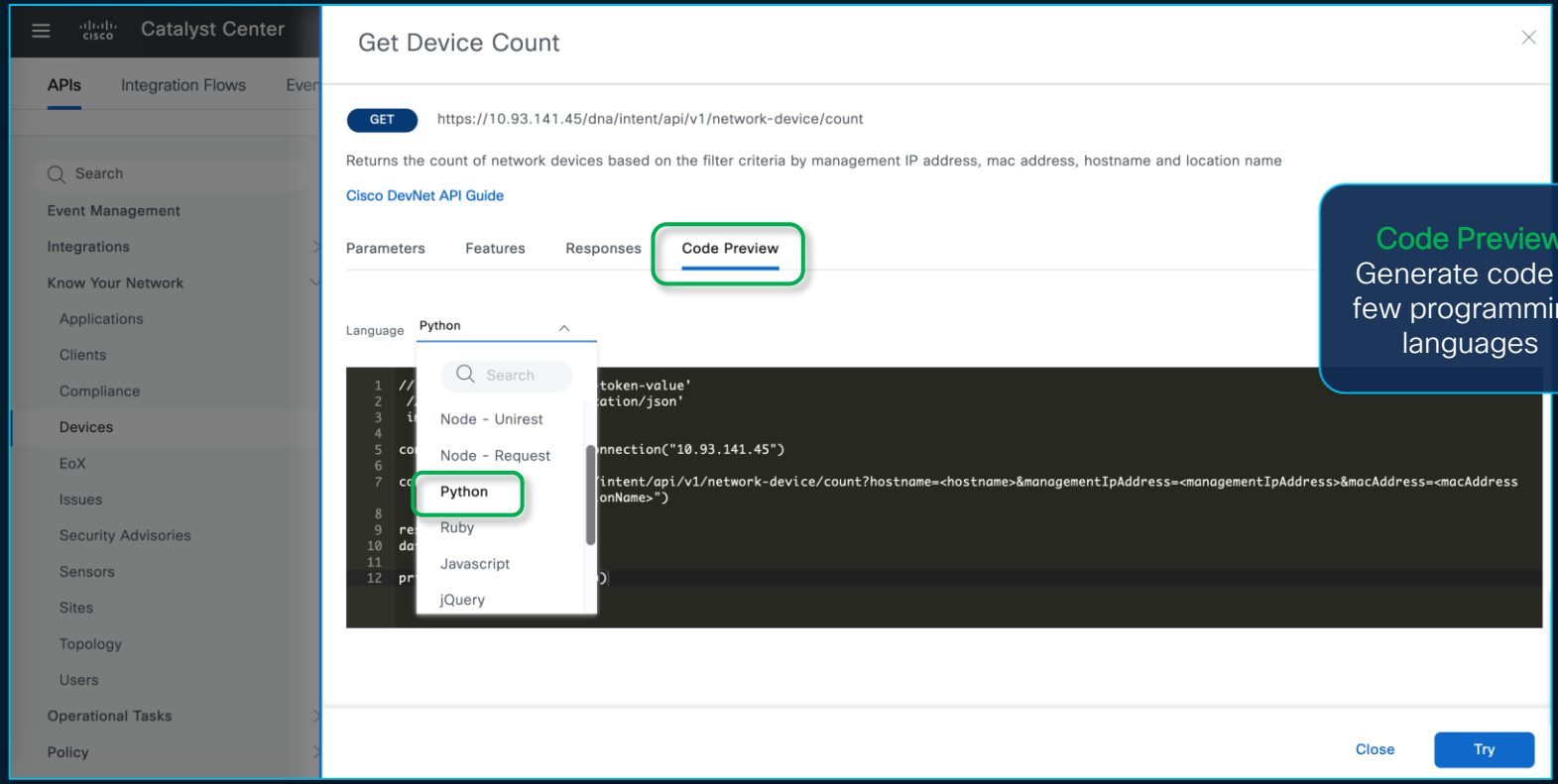
Code Preview



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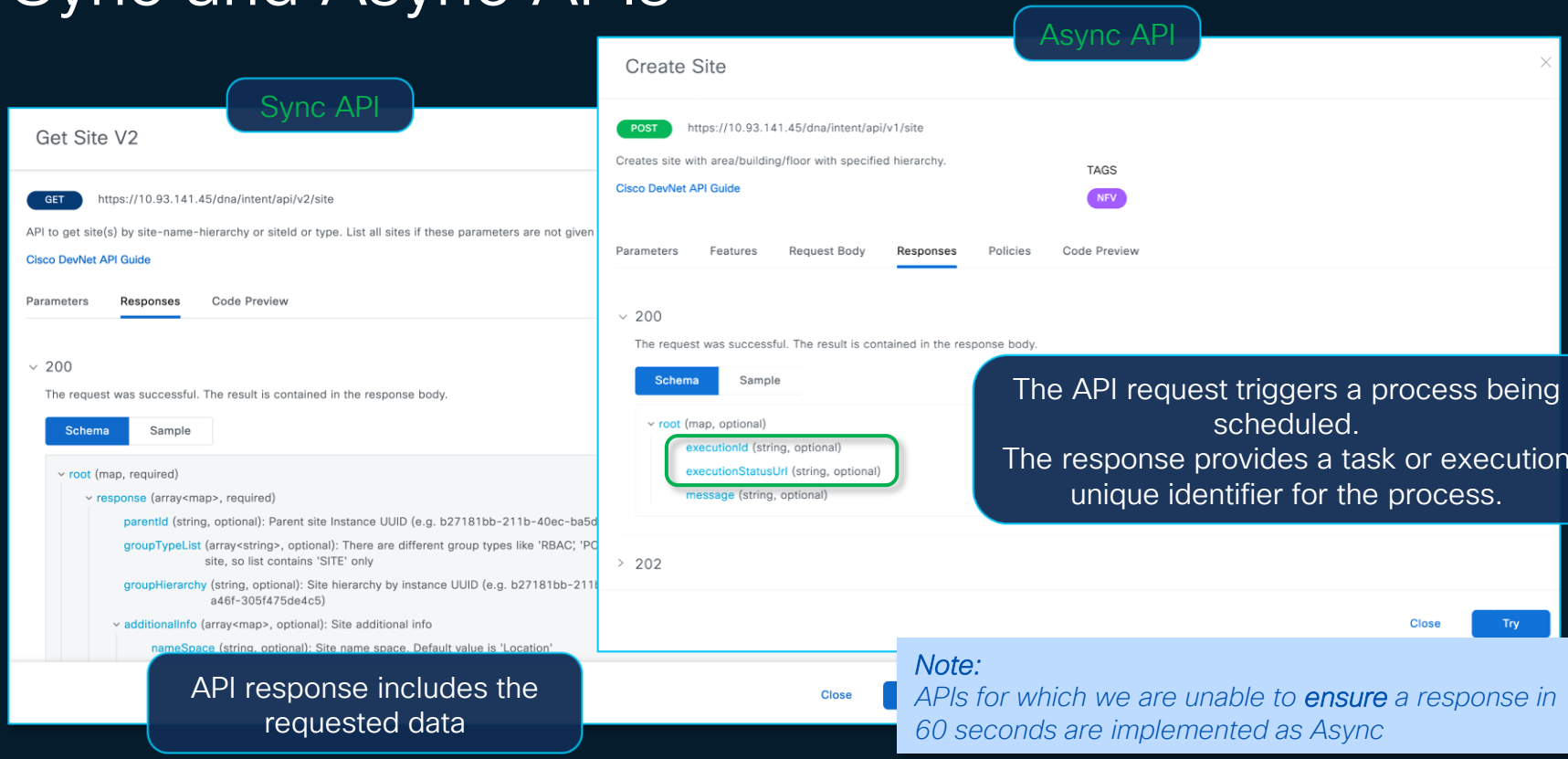
Sync and Async APIs



API response includes the requested data

The API request triggers a process being scheduled.
The response provides a task or execution unique identifier for the process.

Note:
*APIs for which we are unable to **ensure** a response in 60 seconds are implemented as Async*

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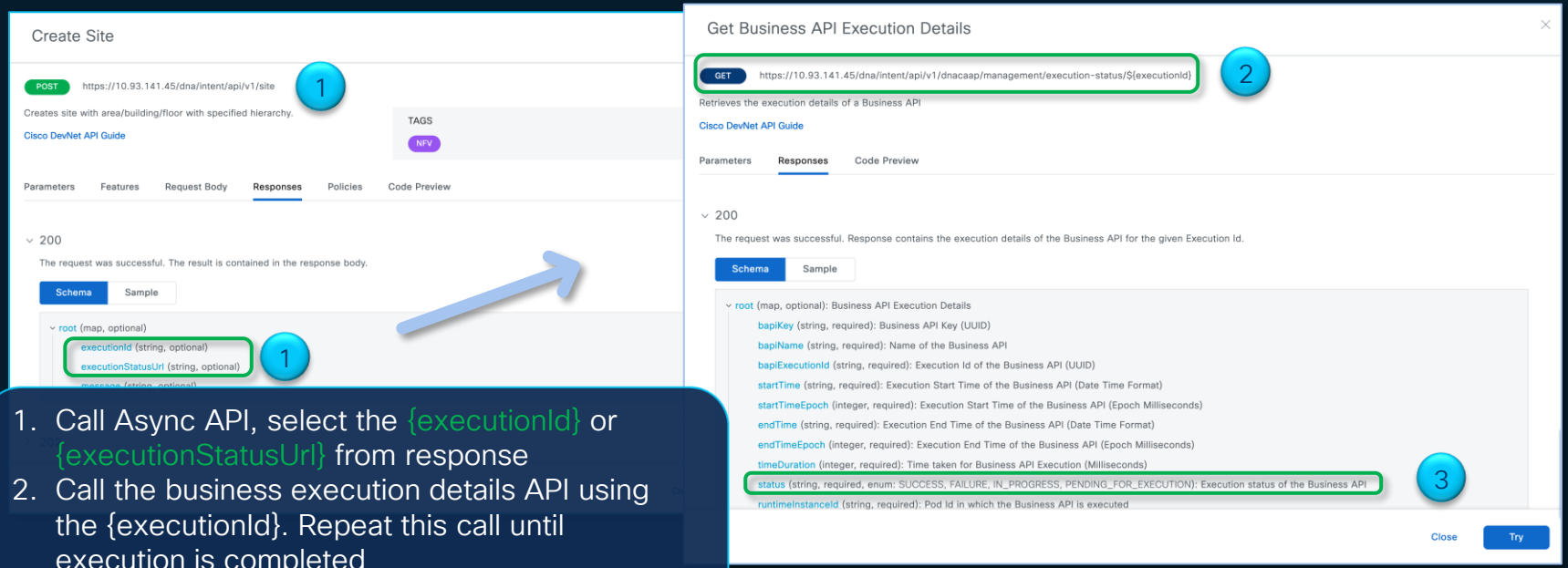
Async APIs Workflow



1. Call Async API, select the {executionId} or {executionStatusUrl} from response
2. Call the business execution details API using the {executionId}. Repeat this call until execution is completed
3. Select the execution status
4. Some Async APIs provide the option to send a webhook notification when process (report) is completed

Note:
Async APIs execution may complete in few seconds, minutes, or longer.

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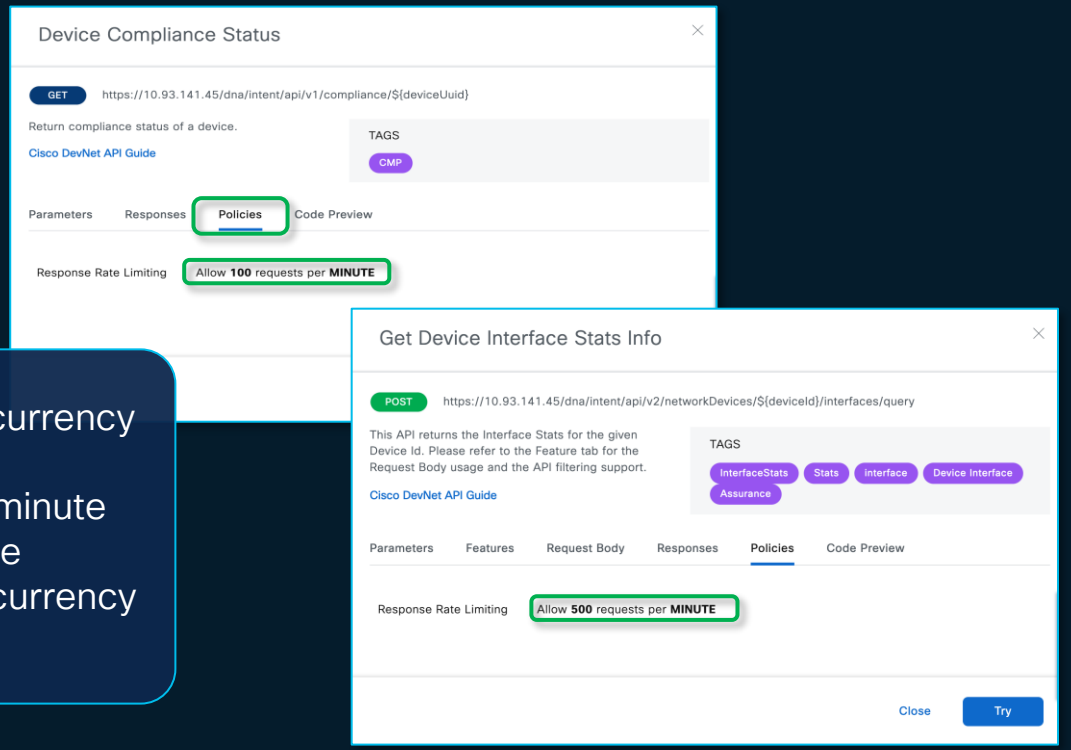
API Rate Limits

- Catalyst Center API rate and concurrency limits are defined at the API level
- Default rate limit is 100 API calls/minute
- Rate limits up 500 API calls/minute
- Continuous improvement for concurrency limits by API redesign



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API Concurrency Limits

- Default API concurrency limit is the API rate limit
- This is very important for Async APIs
- Concurrency limits are decided by the operation implemented

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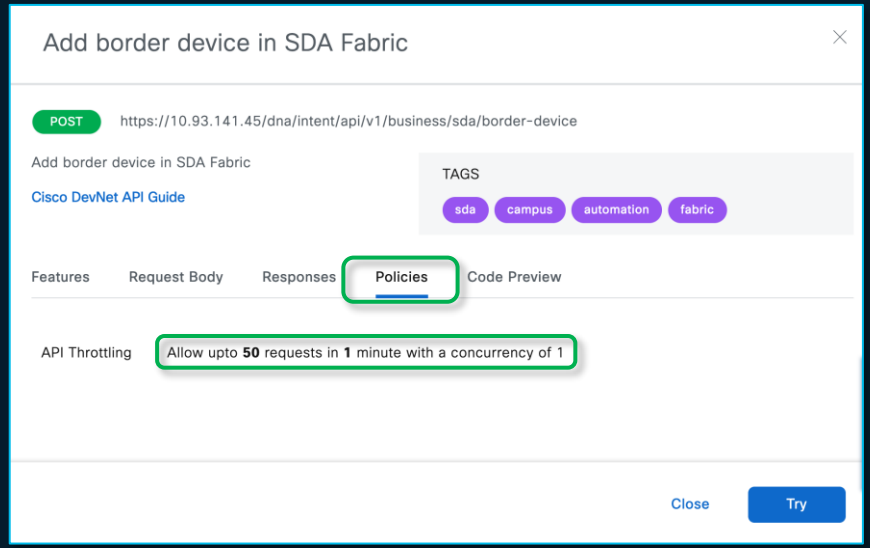
Parallel Processing

- Ansible default parallel processing is on 5 hosts
- Terraform default is 10 concurrent operations
- Other programming languages or automation platforms may vary
- Results may be unpredictable when grossly exceeding API concurrency and rate limits
- Understand the Catalyst Center resources for various processes



Note:
Best practice is to trigger the first operation, check for completion, trigger the next operation, etc.

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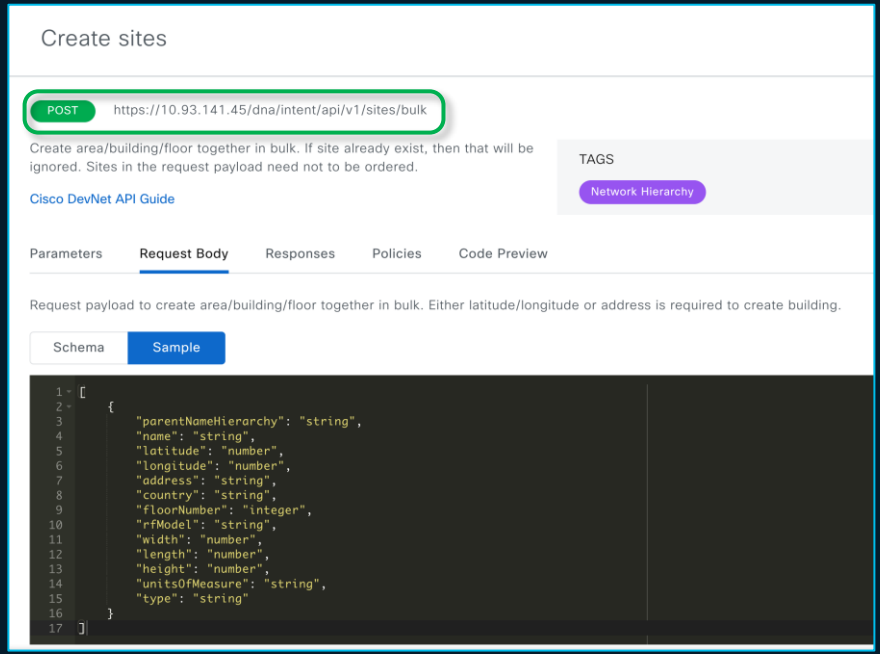
Scaling APIs with Bulk Operations and Reports

- Current recommendation for retrieval of large data sets from Catalyst Center is to use reports
- 65 reports templates and flexible reports available
- We are adding bulk APIs for specific operations: sites, profiles, health scores, and planning more



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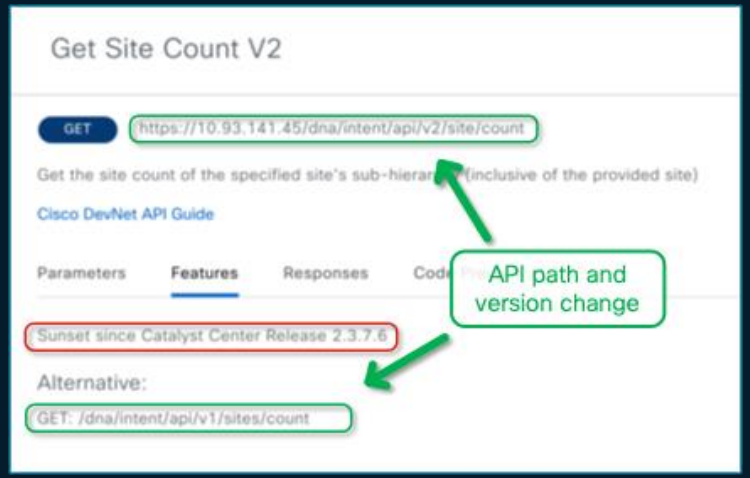
API Lifecycle Management



- Beta - The API has been released in Beta for feedback and will be supported in the future. However, the API design is not frozen and therefore may include changes in the future: request/response payload, URL change, query/header parameters.
- Supported - In production and supported. The design is frozen - breaking changes will require a new API version to be released
- Deprecated - Existing API could be deprecated, and will be retired after two major releases of Catalyst Center, or one year, whichever is later

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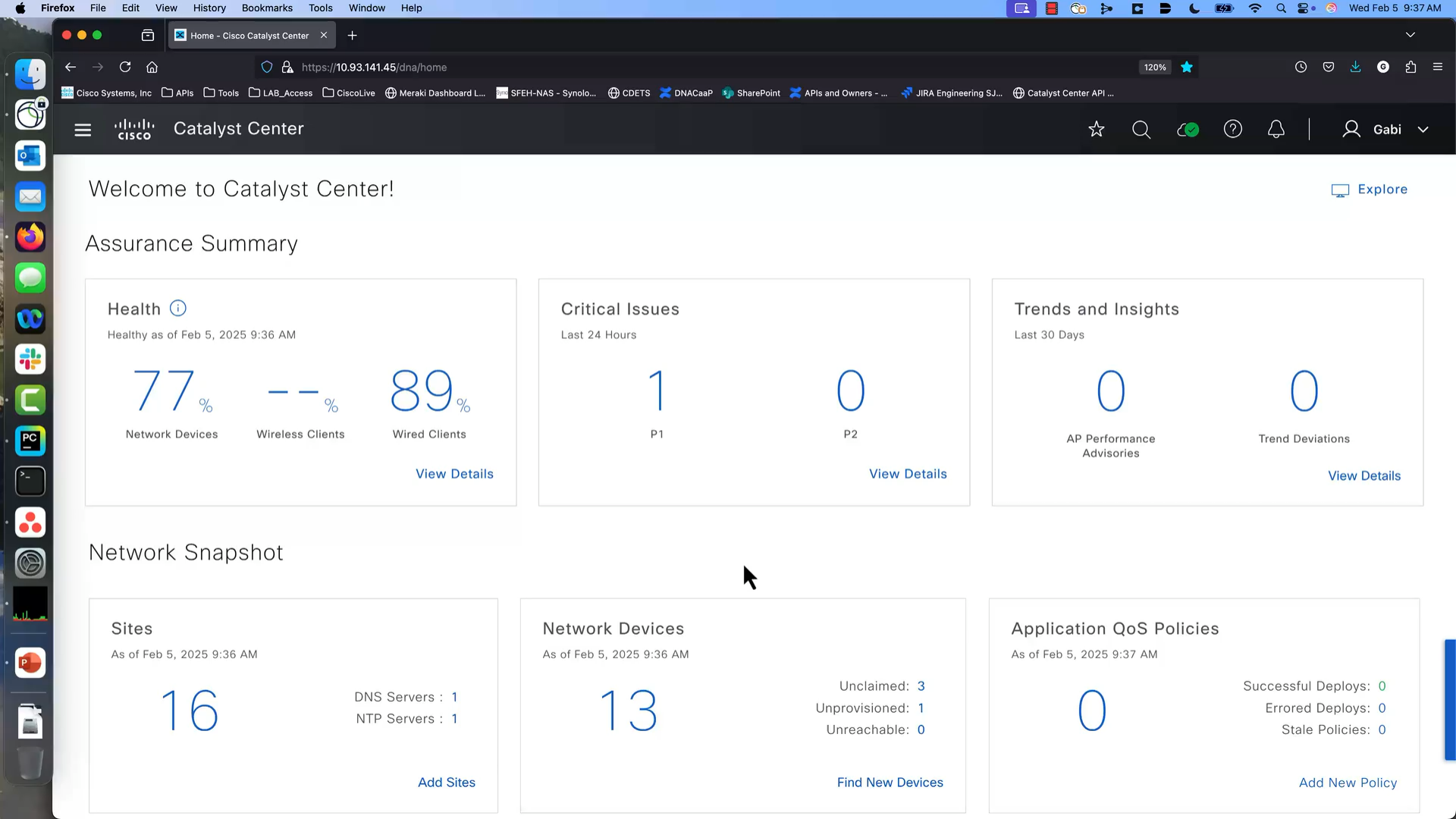
Demo Device Inventory


Firefox File Edit View History Bookmarks Tools Window Help
Wed Feb 5 9:37 AM
Home - Cisco Catalyst Center
https://10.93.141.45/dna/home
120%
Cisco Systems, Inc
APIs
Tools
LAB_Access
CiscoLive
Meraki Dashboard L...
SFEH-NAS - Synolo...
CDETS
DNACaaP
SharePoint
APIs and Owners - ...
JIRA Engineering SJ...
Catalyst Center API ...
Catalyst Center
Gabi
Welcome to Catalyst Center!
Explore
Assurance Summary
Health
Healthy as of Feb 5, 2025 9:36 AM
77 %
Network Devices
-- %
Wireless Clients
89 %
Wired Clients
View Details
Critical Issues
Last 24 Hours
1
P1
0
P2
View Details
Trends and Insights
Last 30 Days
0
AP Performance Advisories
0
Trend Deviations
View Details
Network Snapshot
Sites
As of Feb 5, 2025 9:36 AM
16
DNS Servers : 1
NTP Servers : 1
Add Sites
Network Devices
As of Feb 5, 2025 9:36 AM
13
Unclaimed: 3
Unprovisioned: 1
Unreachable: 0
Find New Devices
Application QoS Policies
As of Feb 5, 2025 9:37 AM
0
Successful Deploys: 0
Errored Deploys: 0
Stale Policies: 0
Add New Policy

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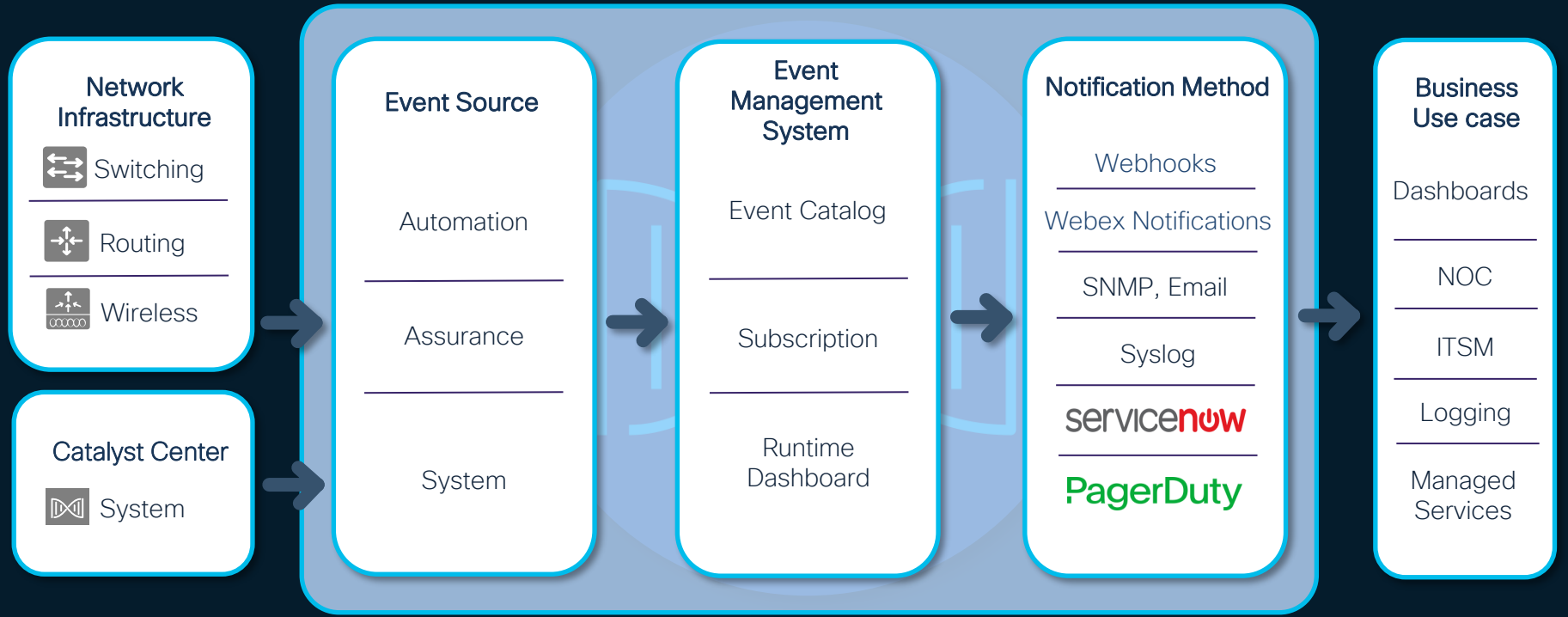
Event Notifications Framework



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269 Events in Different Areas ...

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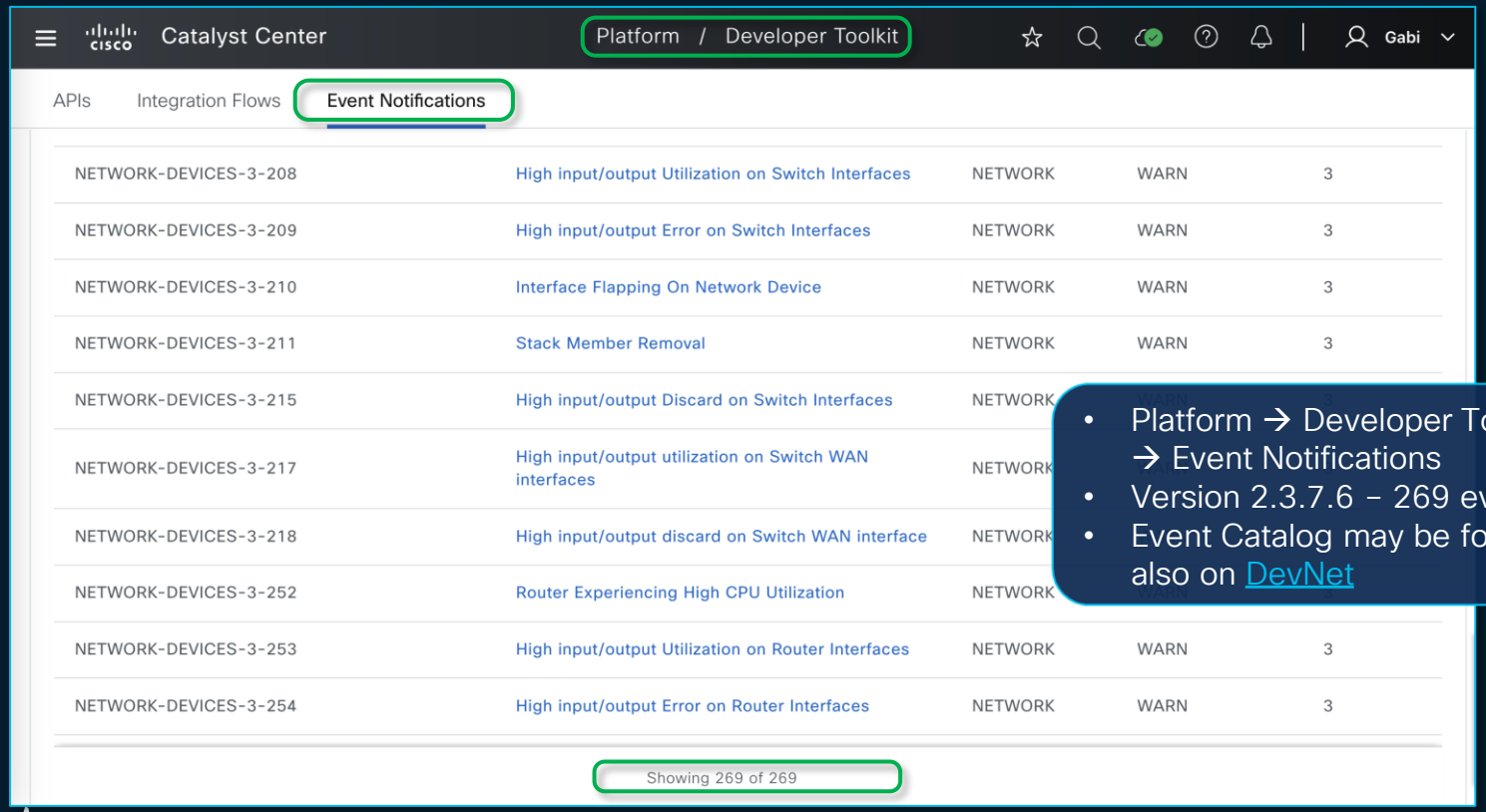
Event Catalog



- Platform → Developer Toolkit → Event Notifications
- Version 2.3.7.6 – 269 events
- Event Catalog may be found also on DevNet

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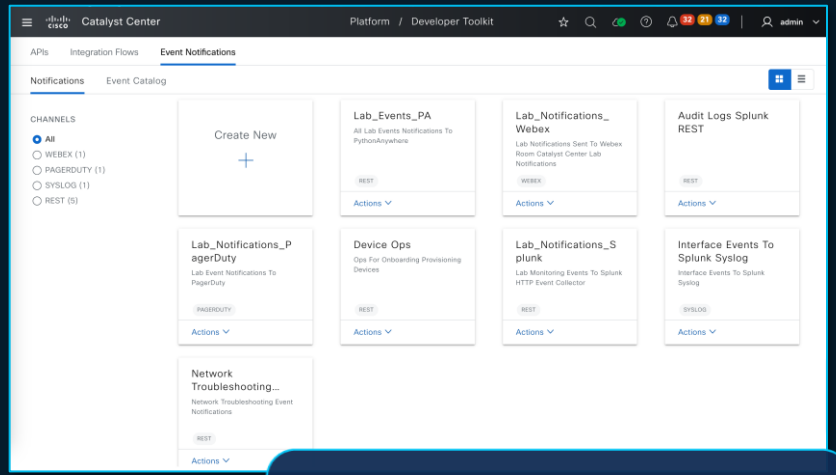
Event Catalog – Notifications Channels



Two steps are required for sending event notifications:

1. Configure destinations
2. Subscribe to events

- 269 Events supported (version 2.3.7.7)
- Supported notifications channels:
  - Webhooks (REST)
  - ITSM - ServiceNow
  - Syslog and SNMP
  - PagerDuty
  - Webex Teams
  - Email
- Active/Resolved status updates
- Audit Logs events notifications

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Webhooks

- Used by servers to publish data, (or event notifications)
- Pre-configured destinations to send data to
- Using POST or PUT methods
- Server sends data when something new
- Push Model

{"severity": "1", "category": "ALERT", "timestamp": 1701864600273, "Assurance Issue Name": "Network Device 10.93.141.24 Is Unreachable From Controller - Notification from Cisco DNA Center, PA", "Assurance Issue Details": "This network device SP is unreachable from controller. The device role is BORDER ROUTER", "Assurance Issue Status": "resolved", "Assurance Issue URL": "https://10.93.141.45/dna/assurance/issueDetails?issueId=c82bf364-ec1b-41a2-9b2b-504da2083fc8"}
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{"severity": "3", "category": "WARN", "timestamp": 1706245934821, "Assurance Issue Name": "Interface (Interface description:) is Flapping on Network Device - Notification from Cisco DNA Center, PA", "Assurance Issue Details": "Switch Interface (Interface description:) is flapping", "Assurance Issue Status": "", "Assurance Issue URL": "https://10.93.141.45/dna/assurance/issueDetails?issueId=b16fd046-4352-46c8-830a-f1b0636f5eb9"}

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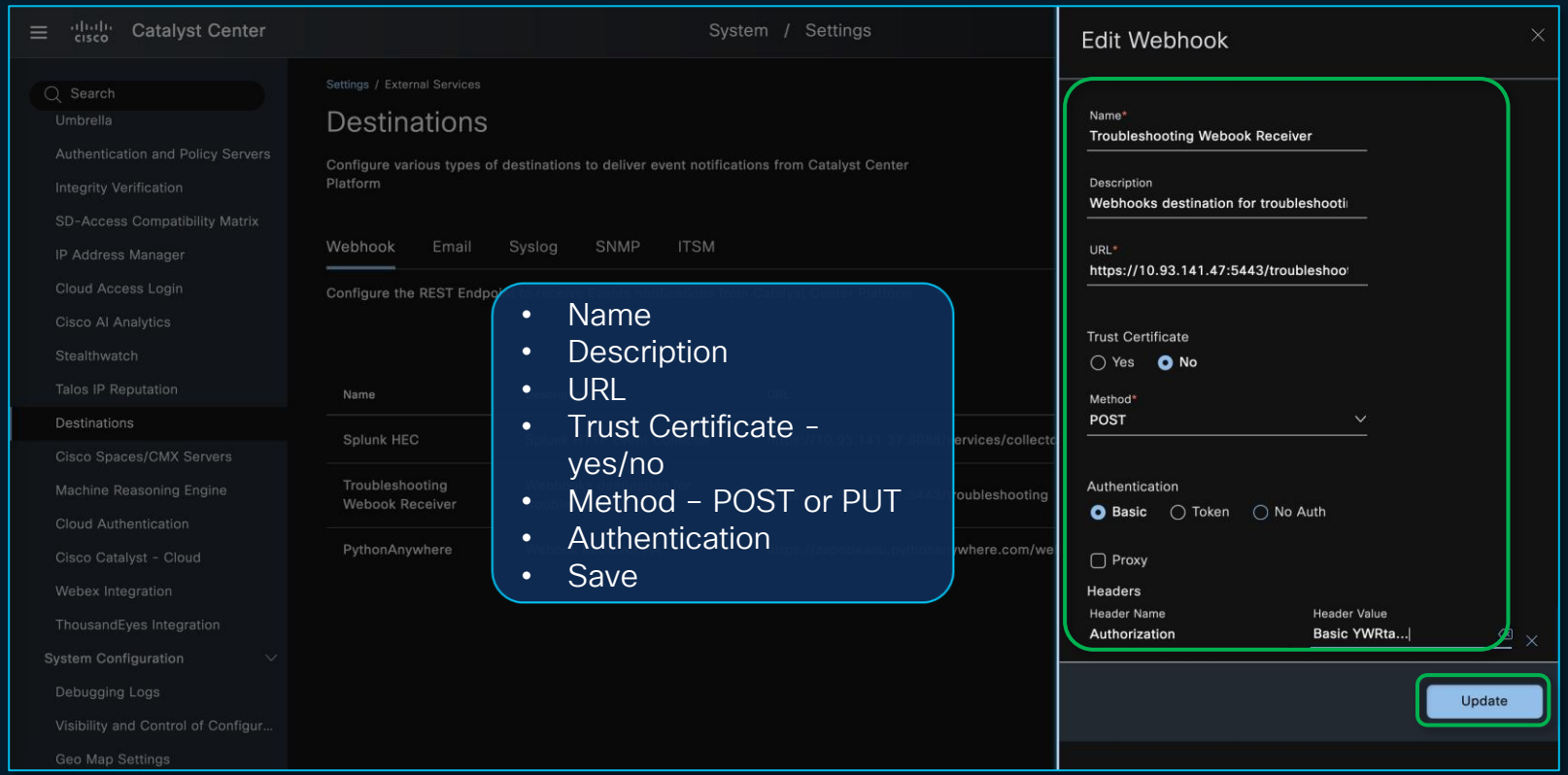
Create a new Webhook Destination



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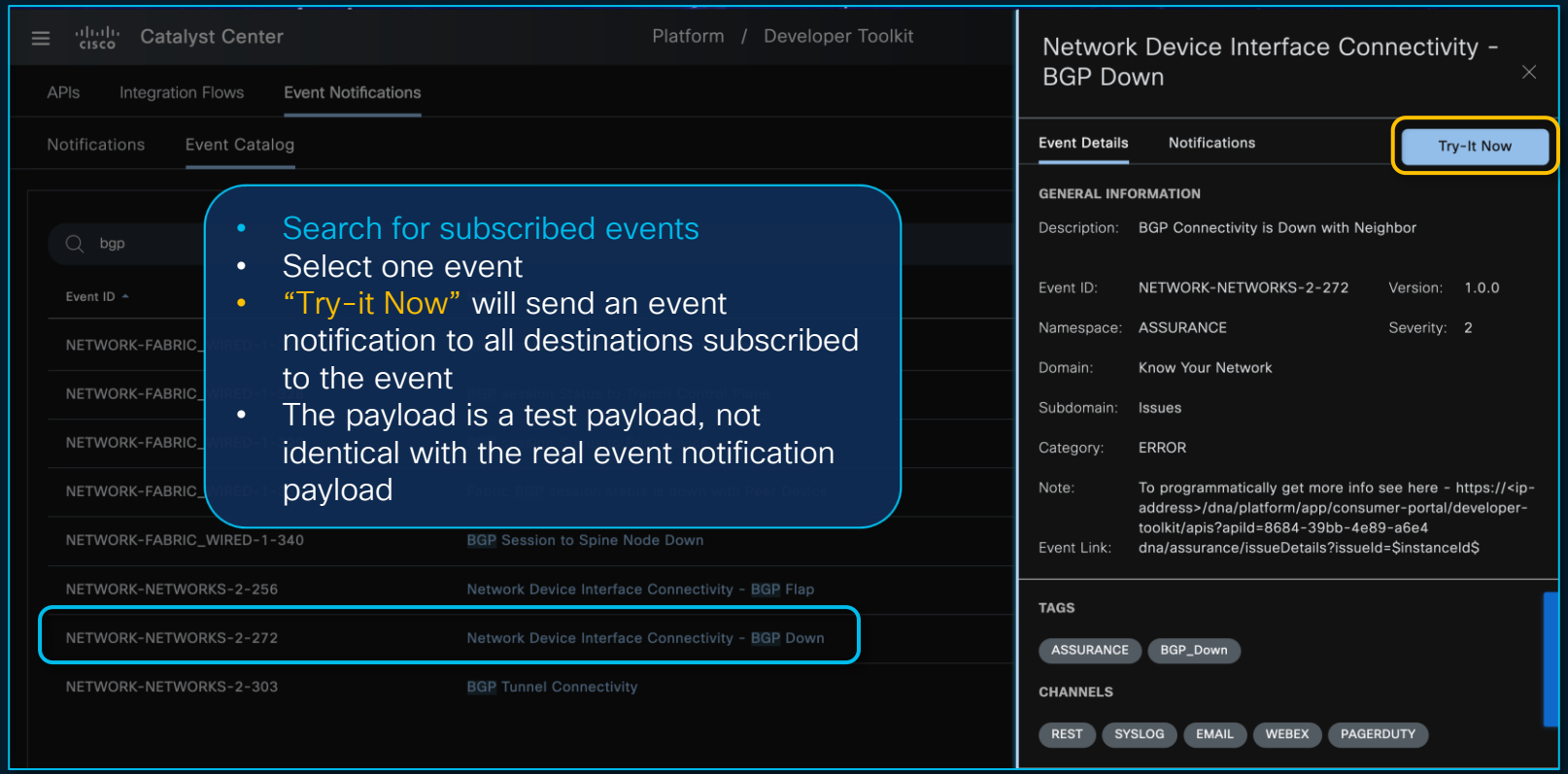
Verify Webhook Receiver



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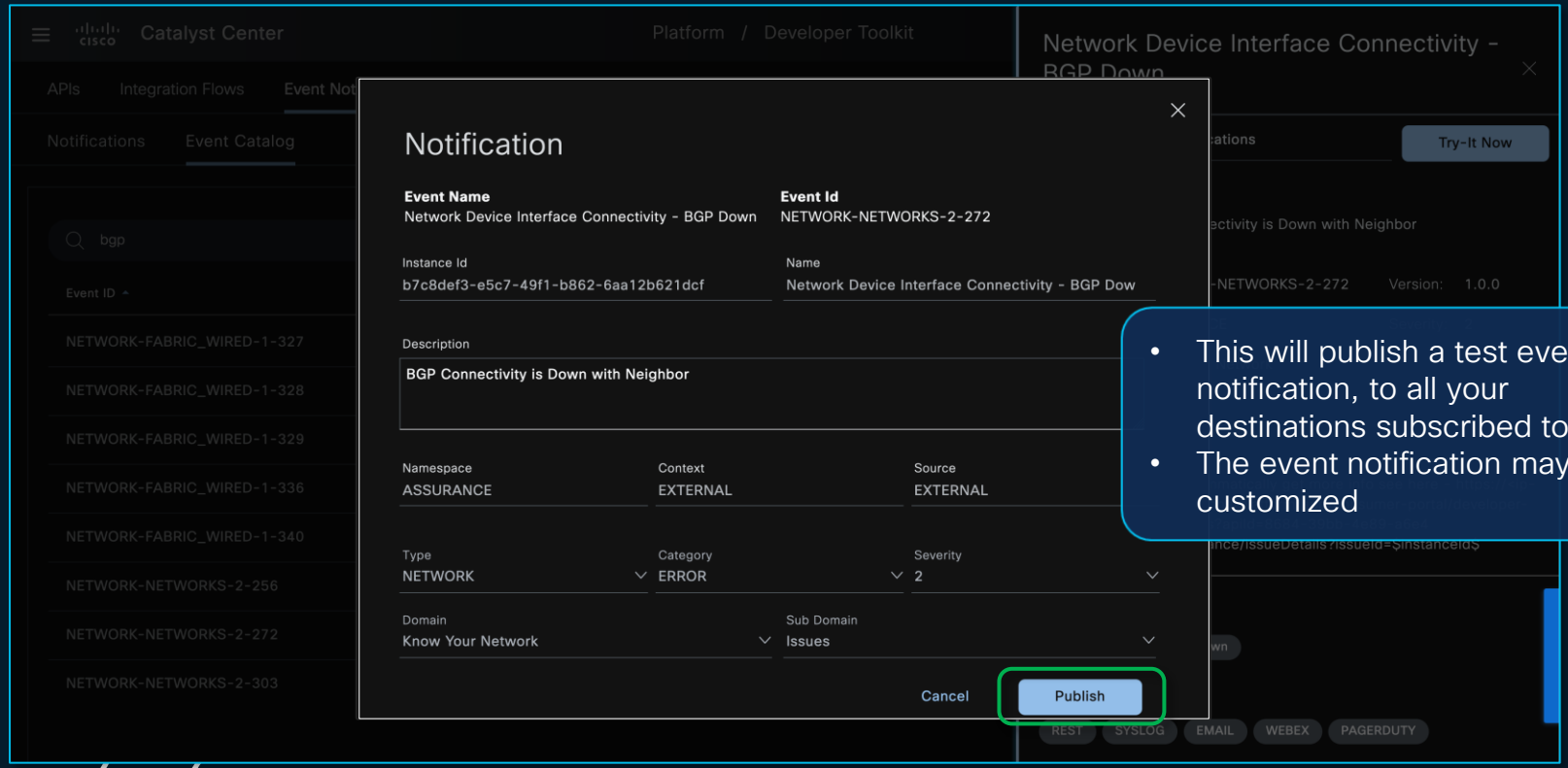
Verify Webhook Receiver - continued



- This will publish a test event notification, to all your destinations subscribed to it
- The event notification may be customized

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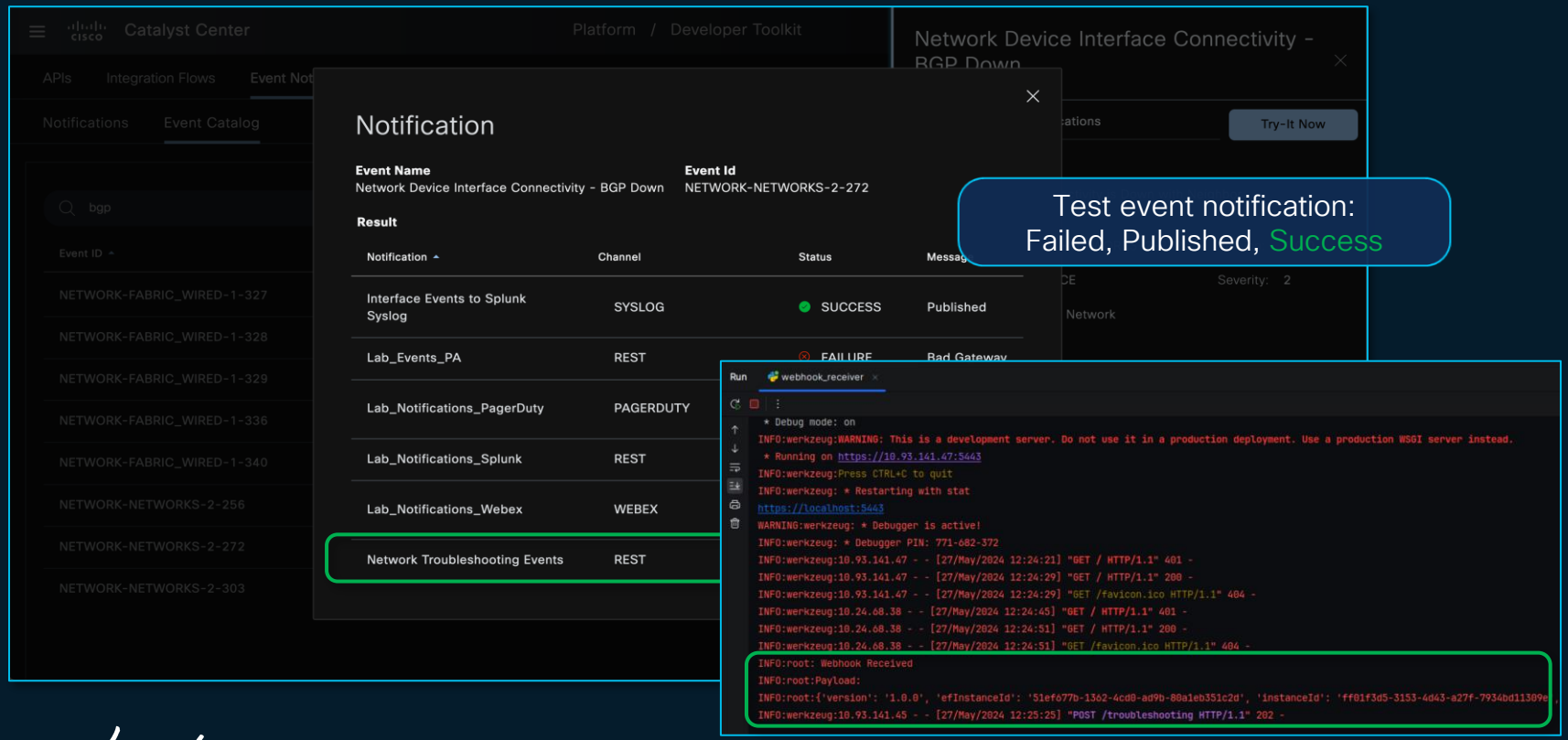
Verify Webhook Receiver – continued



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Catalyst Center Webhook Sample Payload

Interface Connecting Network Devices is Down

Details Included:

- Cisco Assurance Issue Link
- Issue details: name, description, device management IP Address, priority and status
- Catalyst Center IP Address
- Event Id
- Event unique identifier

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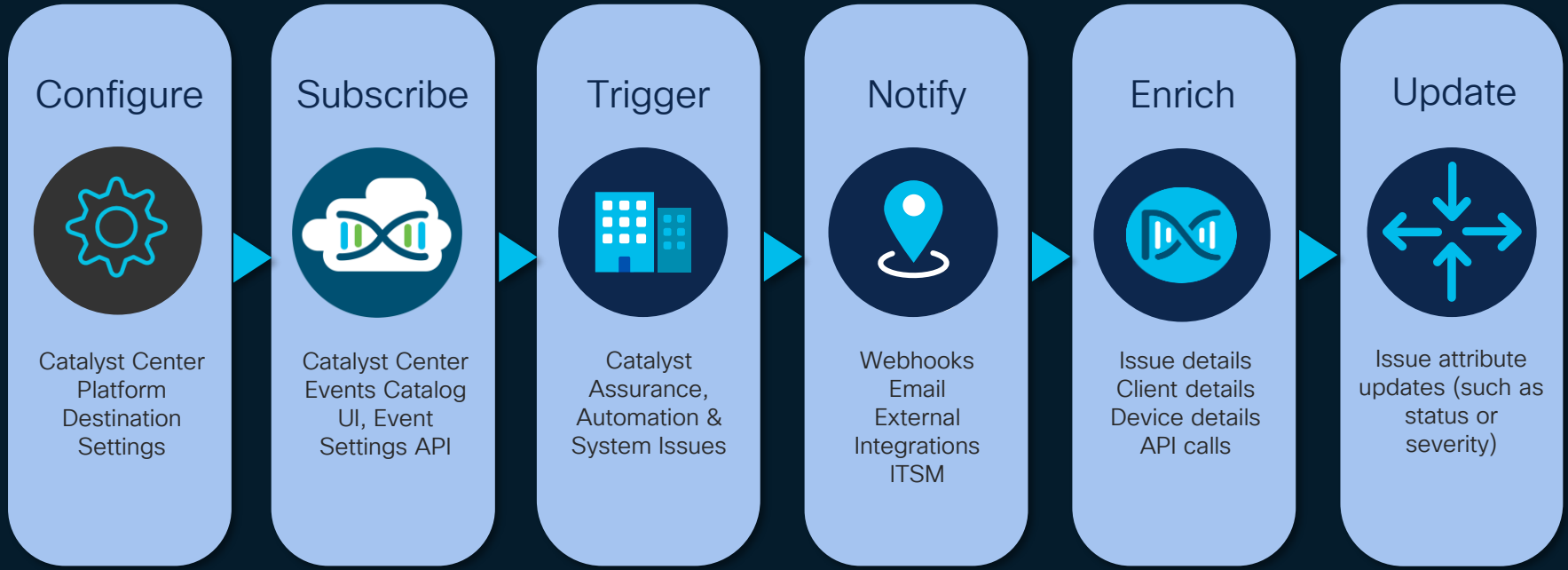
Event Notifications Workflow



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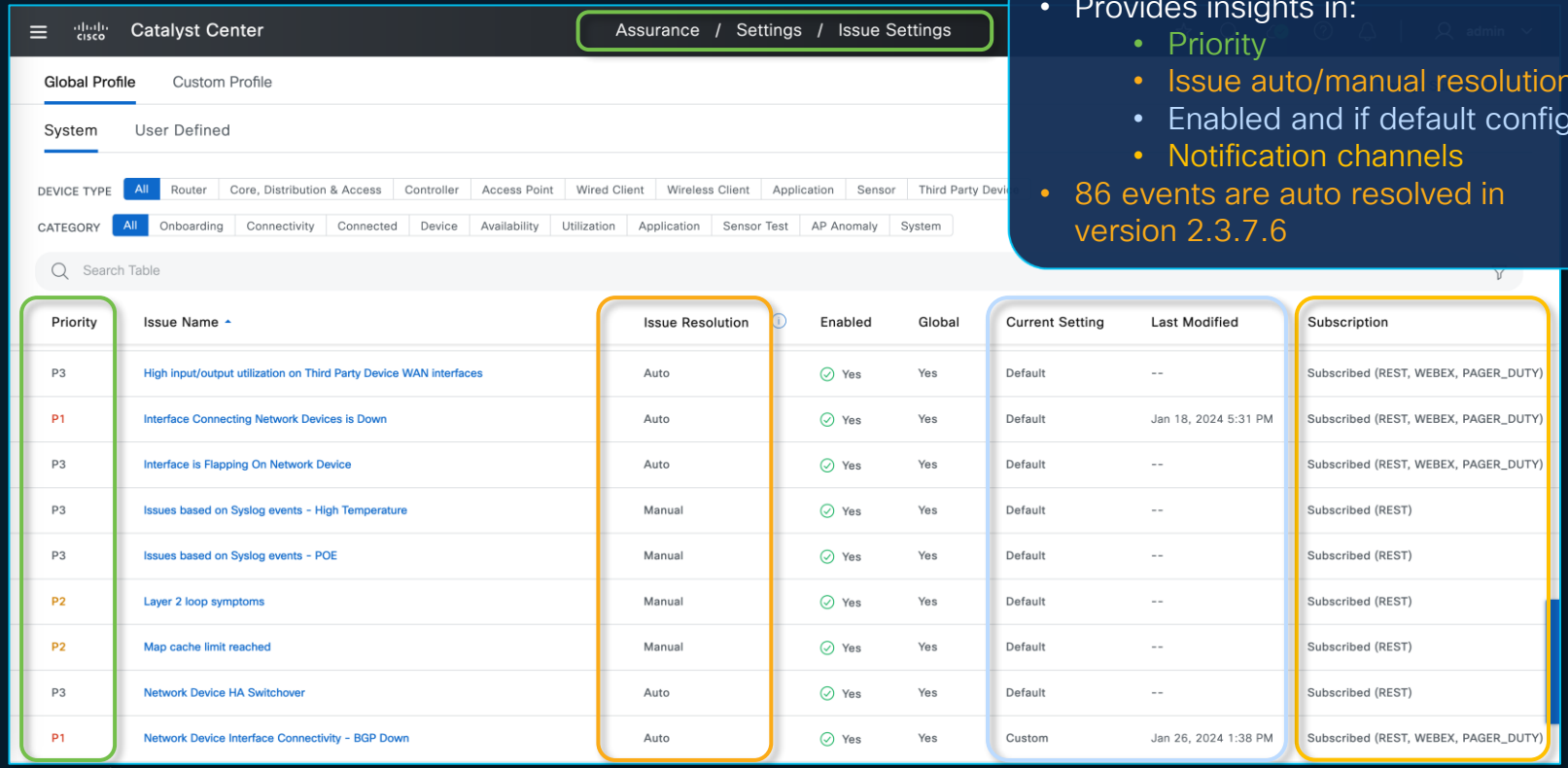
Assurance Issue Settings



- Provides insights in:
  - Priority
  - Issue auto/manual resolution
  - Enabled and if default config
  - Notification channels
- 86 events are auto resolved in version 2.3.7.6

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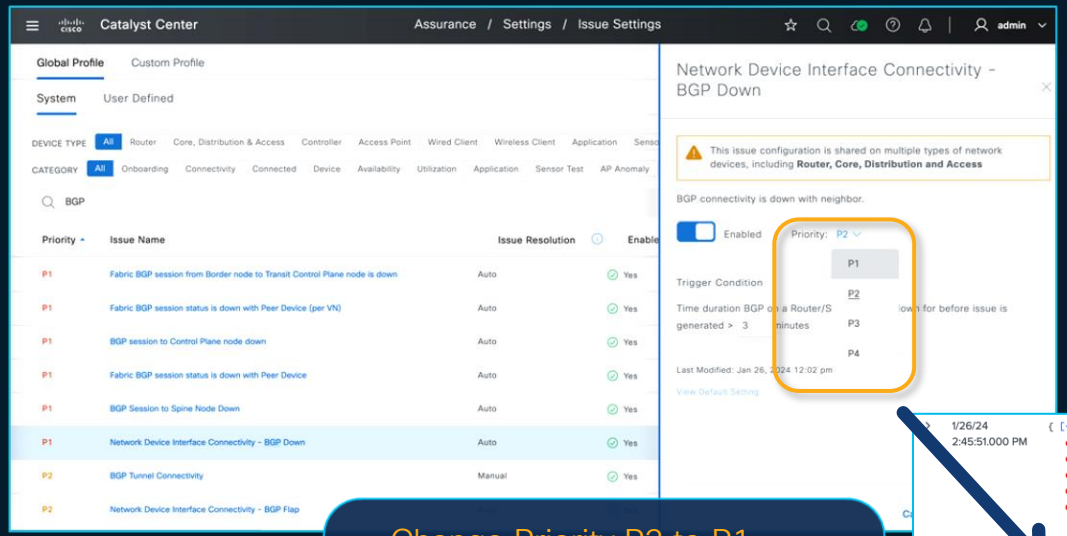
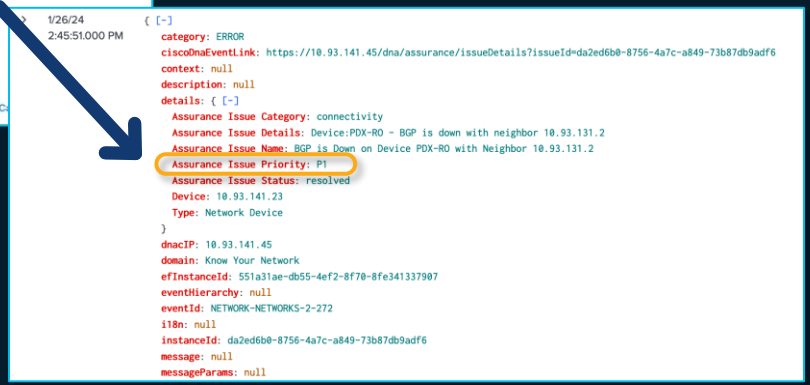
Changing Assurance Issue Settings





- Change Priority P2 to P1
- Enable or disable event
- Options to change the KPIs
- The changes will impact the UI and all notifications channels

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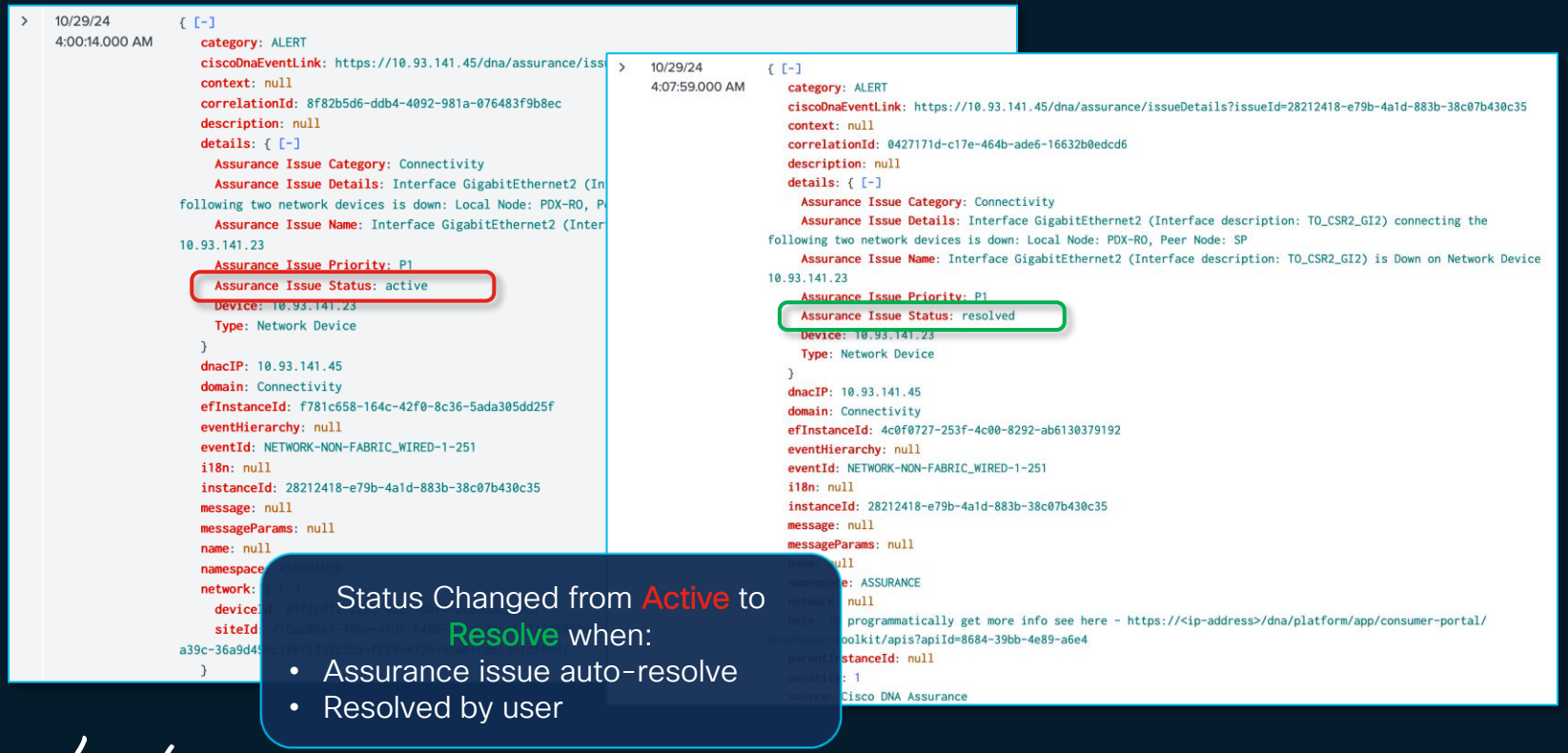
Catalyst Center Issue Update



Status Changed from Active to Resolve when:

- Assurance issue auto-resolve
- Resolved by user

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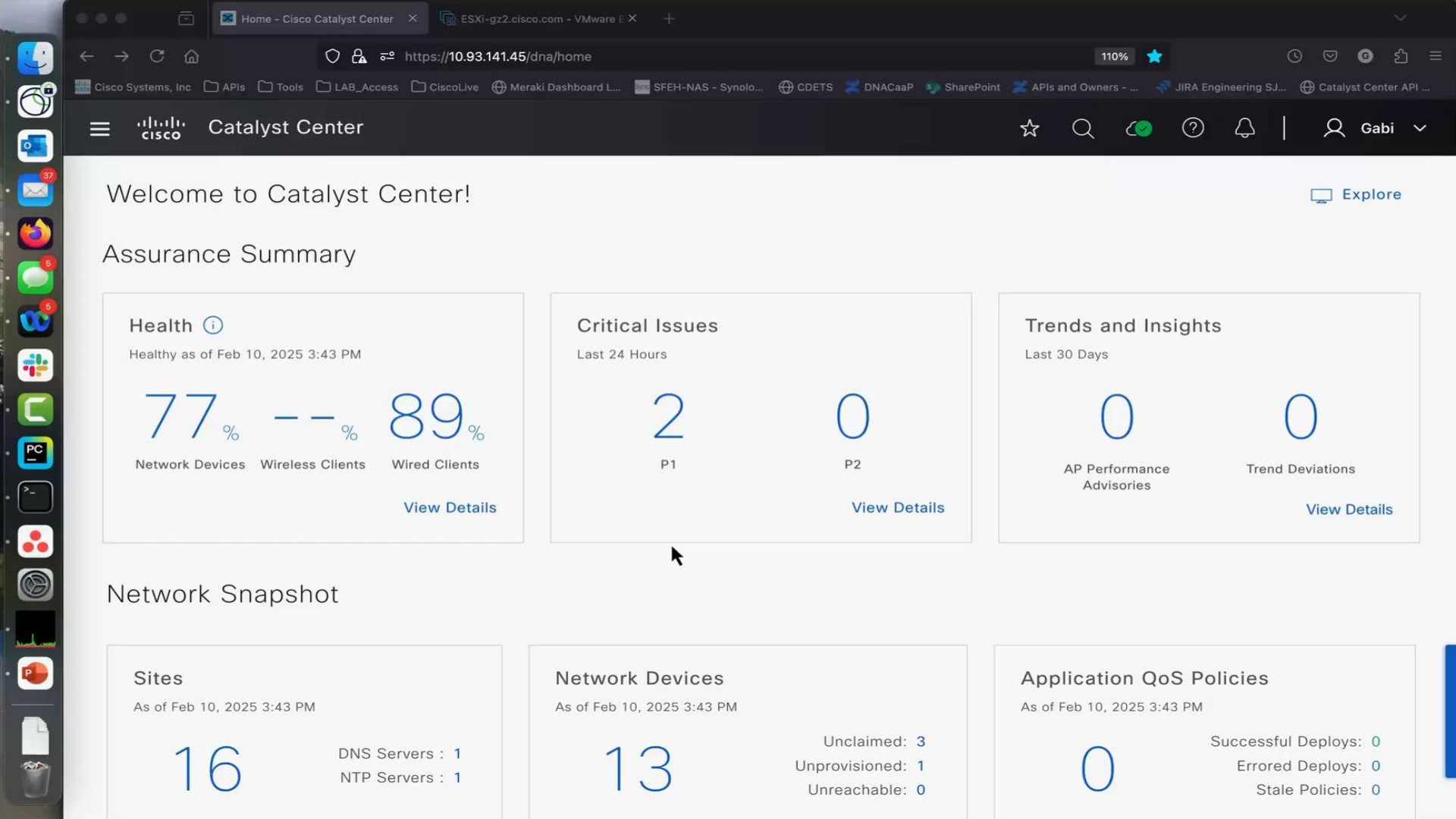
Demo Webhook Receiver

cisco Live!


Home - Cisco Catalyst Center
ESXi-gz2.cisco.com - VMware
https://10.93.141.45/dna/home
110%
Cisco Systems, Inc
APIs
Tools
LAB_Access
CiscoLive
Meraki Dashboard L...
SFEH-NAS - Synolo...
CDETS
DNACaaP
SharePoint
APIs and Owners - ...
JIRA Engineering SJ...
Catalyst Center API ...
Catalyst Center
Gabi
Welcome to Catalyst Center!
Explore
Assurance Summary
Health
Healthy as of Feb 10, 2025 3:43 PM
77%
Network Devices
--%
Wireless Clients
89%
Wired Clients
View Details
Critical Issues
Last 24 Hours
2
P1
0
P2
View Details
Trends and Insights
Last 30 Days
0
AP Performance Advisories
0
Trend Deviations
View Details
Network Snapshot
Sites
As of Feb 10, 2025 3:43 PM
16
DNS Servers : 1
NTP Servers : 1
Network Devices
As of Feb 10, 2025 3:43 PM
13
Unclaimed: 3
Unprovisioned: 1
Unreachable: 0
Application QoS Policies
As of Feb 10, 2025 3:43 PM
0
Successful Deploys: 0
Errored Deploys: 0
Stale Policies: 0

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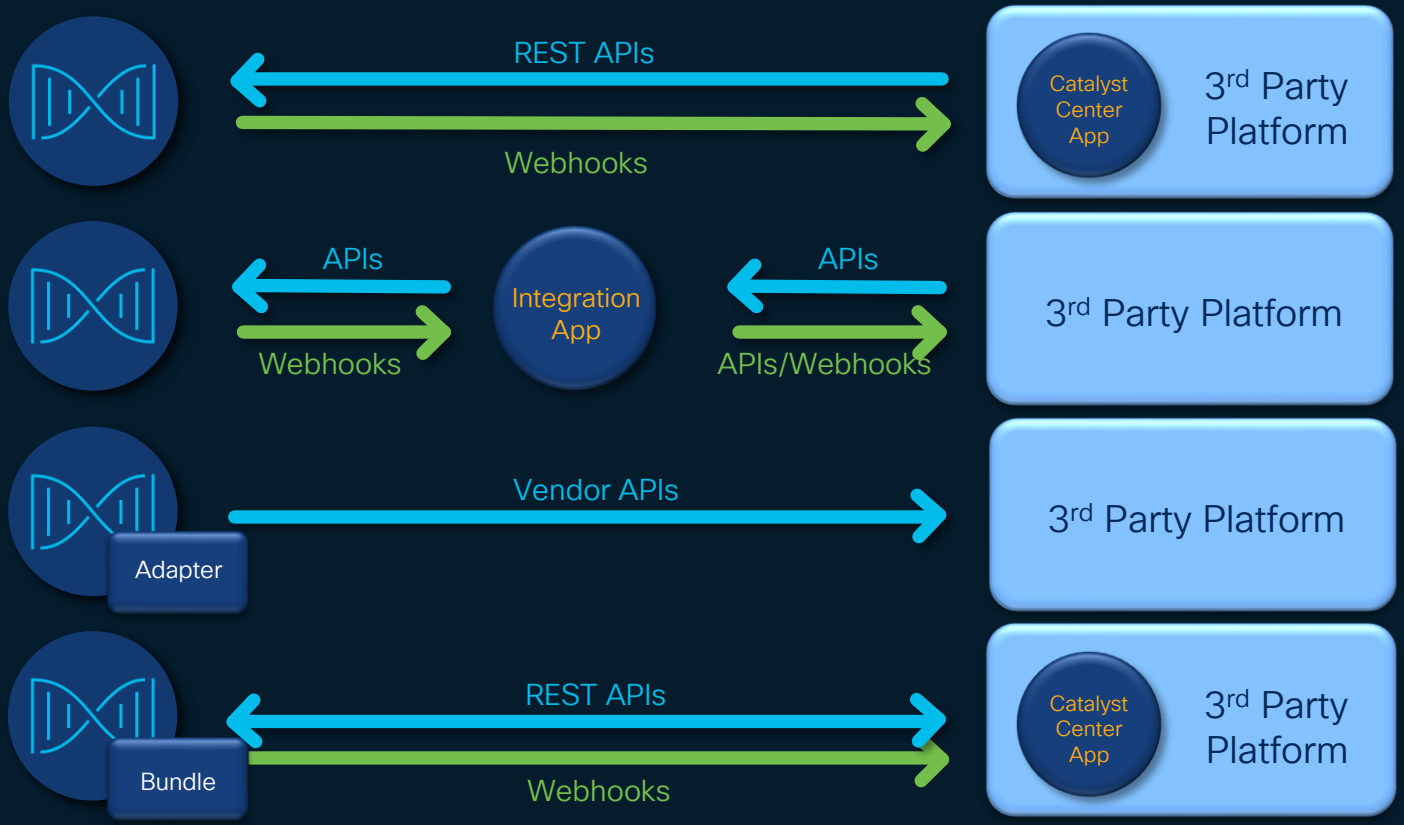
Catalyst Center Integration Options



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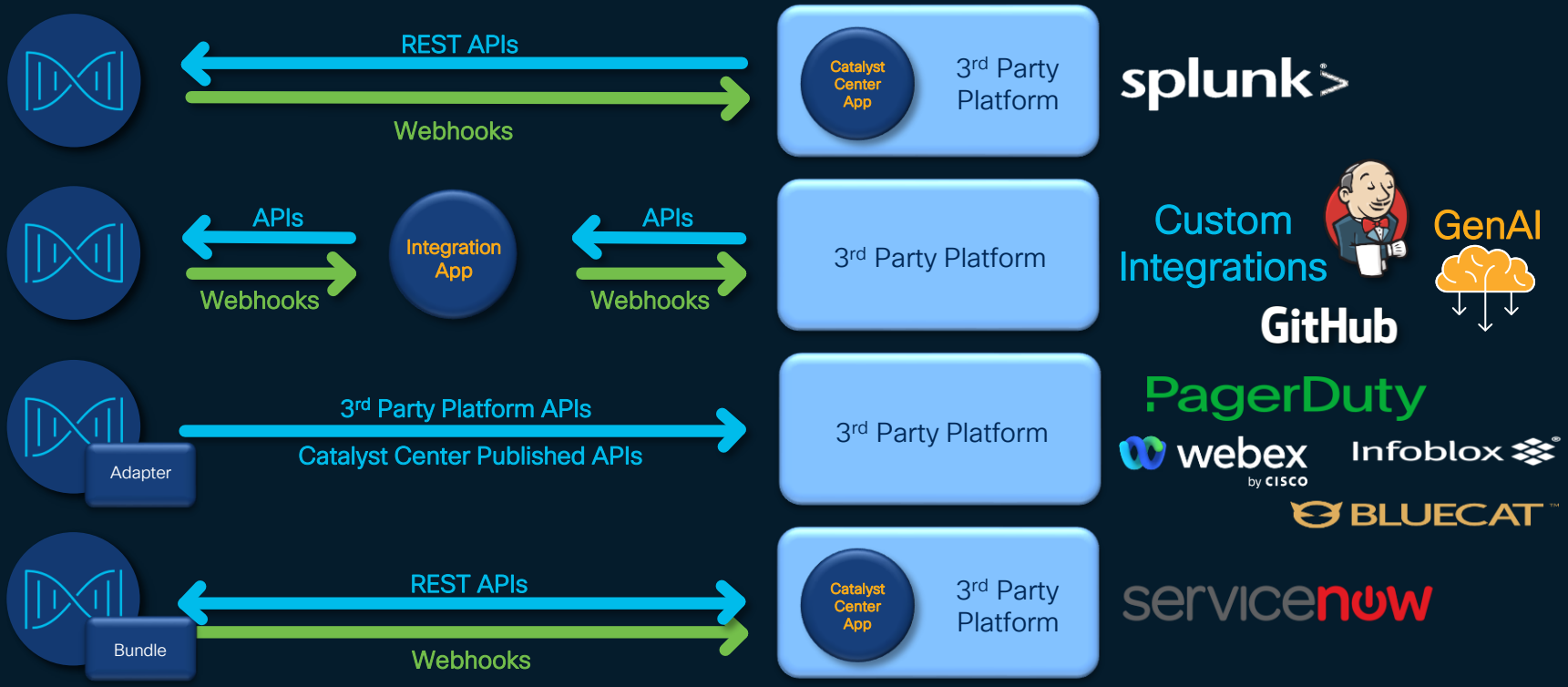
Catalyst Center Integration Options



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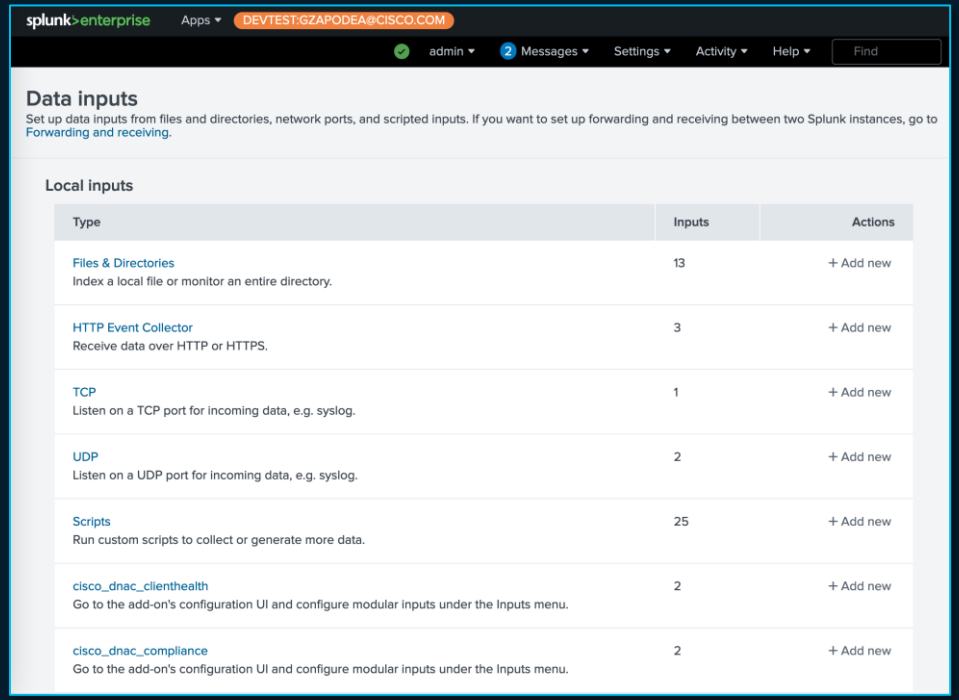
How to Integrate with Splunk

- Use the Cisco Catalyst Apps
- Webhook notifications to Splunk HTTP Event Collectors
- Run Python scripts hosted by Splunk
- Syslog messages from Catalyst Center



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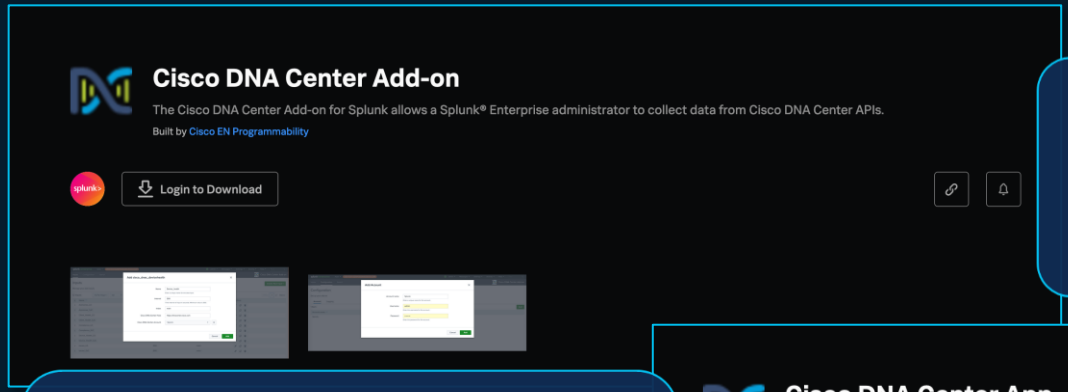
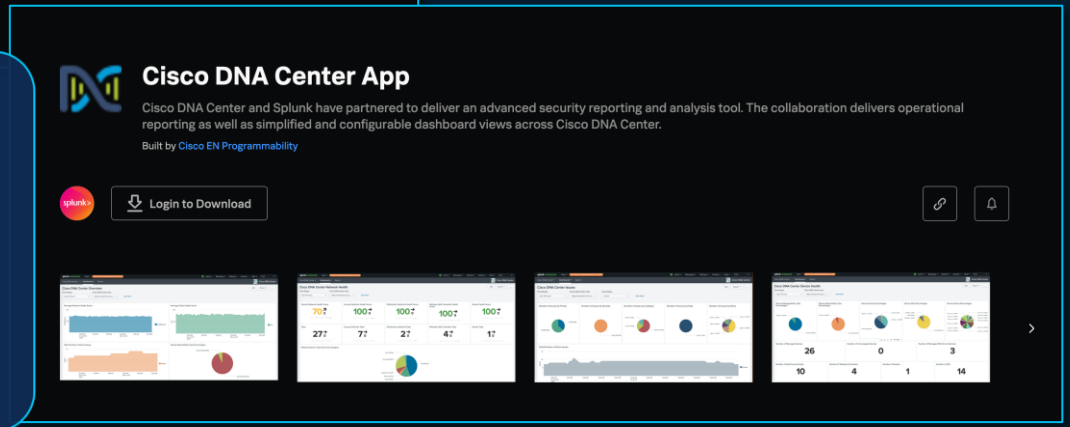
Catalyst Center Splunk Integration Apps



- Adoption – 1,300+ downloads
- Planned enhancements:
  - Client dashboards
  - Site filtering and UI updates
  - Catalyst Center rebranding

- Two Apps:
  - Add-on – data collection
  - Visualizations
- Released as an open-source project
- Published on Splunkbase and GitHub
- Support via GitHub issues
- Requires a Splunk user account to be configured on Catalyst Center
- Fully customizable



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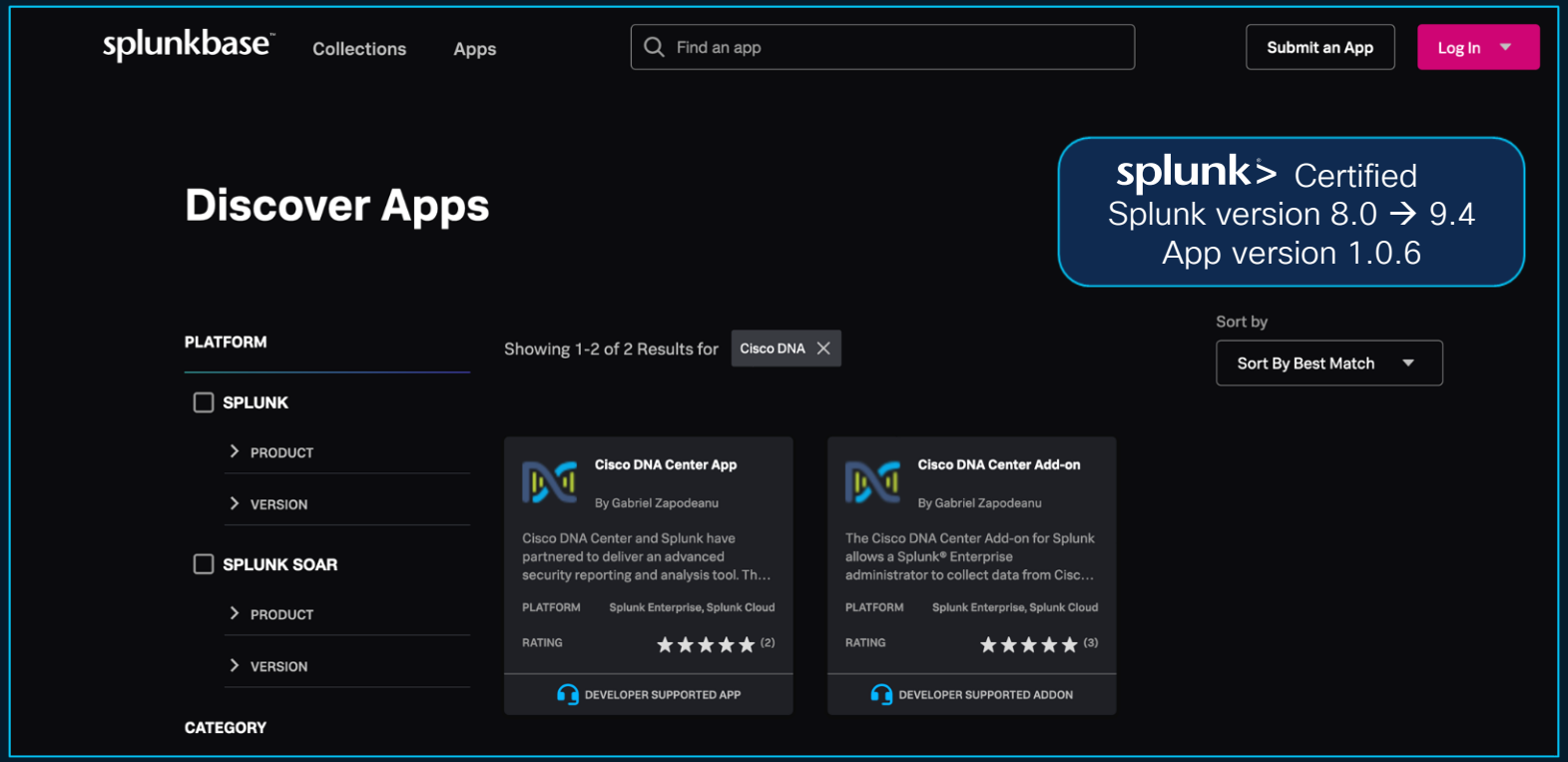
Cisco DNA Center Apps – Splunkbase

https://splunkbase.splunk.com/



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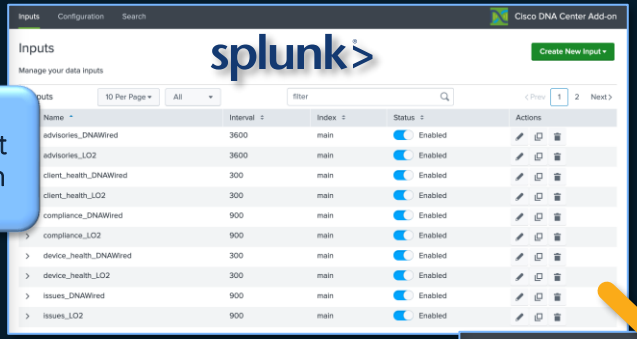
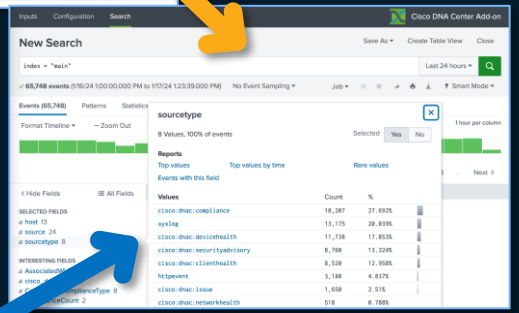
Catalyst Center Splunk Integration Apps

REST APIs

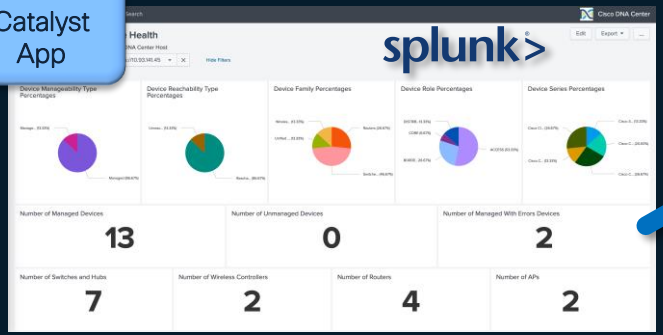
Cisco Catalyst Add-on App



Save data to index



Cisco Catalyst App



Query/Search index/input

Multi Catalyst Center clusters integrated with Splunk supported

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Demo Splunk Integration

Camtasia 2024 File Edit Modify Text View Export Window Help

Thu Nov 7 10:41 AM

Cisco Catalyst Center | Cisco Catalyst Center Overview

Not Secure 10.93.141.37:8000/en-US/app/Splunk_CiscoDNACenter/cisco_dna_center_overview?form.timeRangePicker2.earliest=-24h%40h&form.timeRangePicker2.latest=

120%

splunk>enterprise Apps DEVTEST:GZAPODEA@CISCO.COM admin Messages Settings Activity Help Find

Cisco DNA Center Dashboards Search Cisco DNA Center

Cisco Catalyst Center Overview

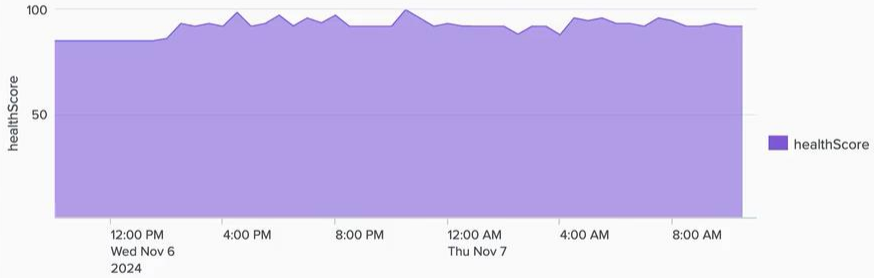
Edit Export ...

Time Range: Last 24 hours

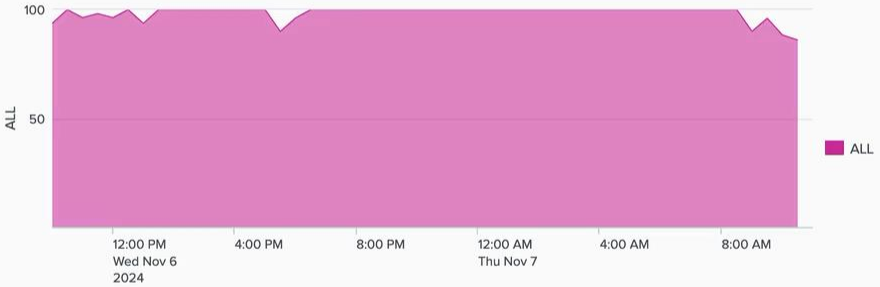
Cisco Catalyst Center Host: https://10.93.141.45

Hide Filters

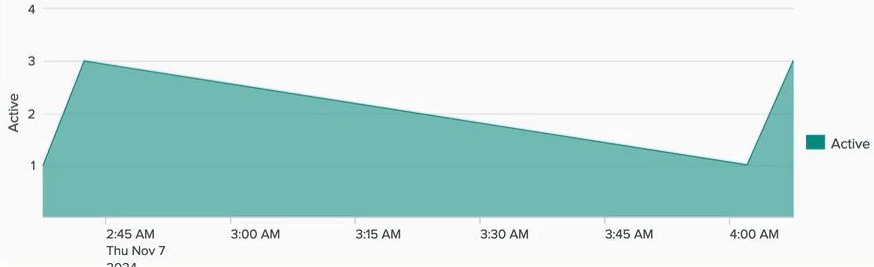
Average Network Health Score



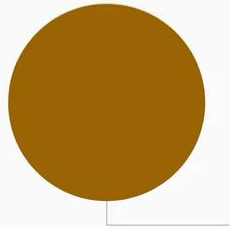
Average Client Health Score



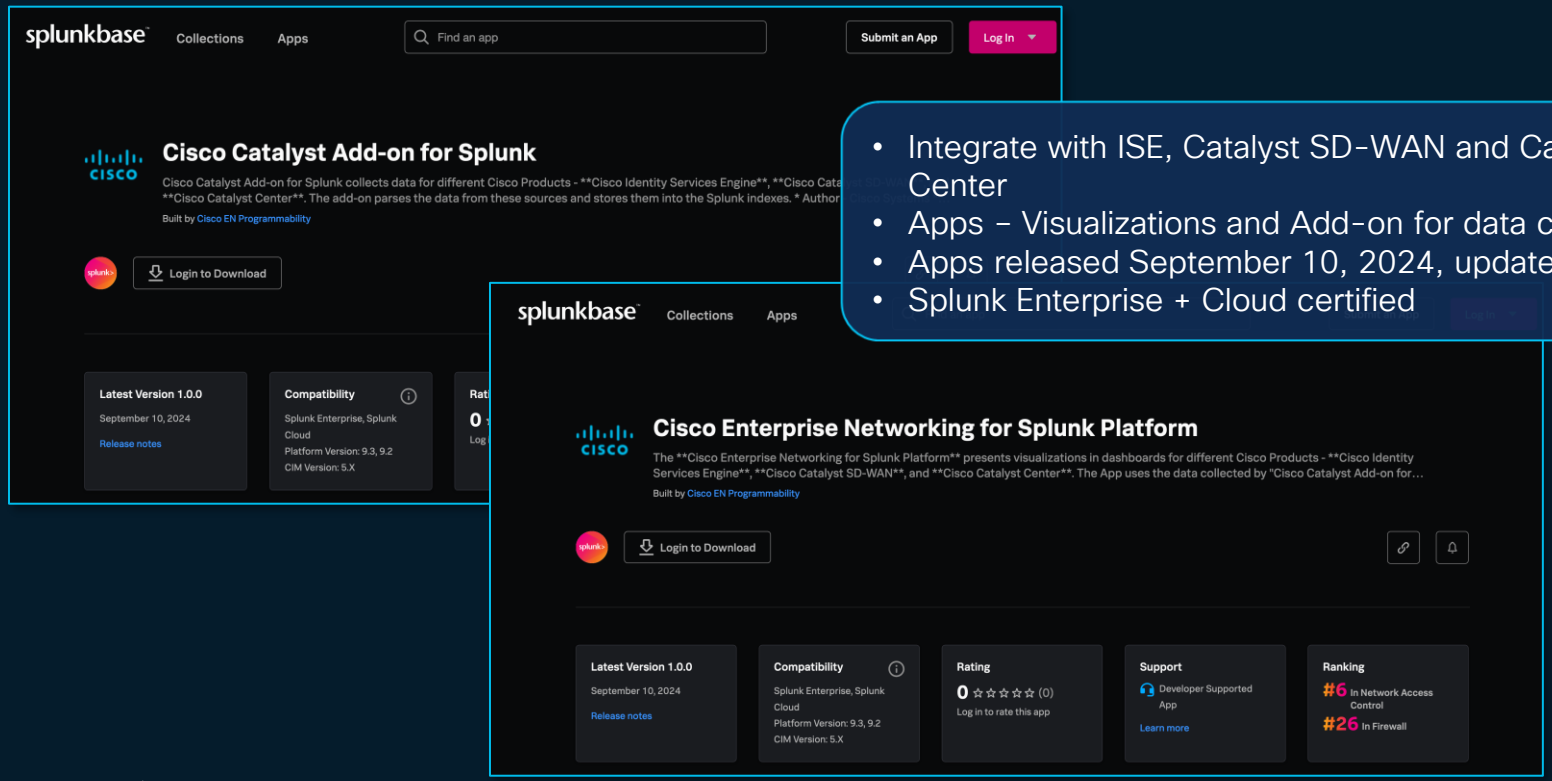
Total Number of Active Issues



Device Reachability Type Percentages



New Cisco EN Splunk Integration Apps



- Integrate with ISE, Catalyst SD-WAN and Catalyst Center
- Apps – Visualizations and Add-on for data collection
- Apps released September 10, 2024, updates pending
- Splunk Enterprise + Cloud certified

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Agenda

- Catalyst Center Platform Overview
- REST APIs
- Event Notifications
- Integrations
- Developer Resources
- Summary

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Catalyst Center API Journey

Cisco API platform launch

Python SDK

Ansible collection

Ansible RedHat certified

Terraform provider

Jenkins open-source

Ansible community certification

Intent Ansible modules introduced

Python SDK, Ansible, Terrafrom

Support for Catalyst Center 2.3.5.3

AI enabled use cases

Support for Catalyst Center 2.3.7.6

2018 2019 2020 2021 2022 2023 2024/2025

API adoption

- 2 billion API calls per year, 45% customers
- 850+ APIs available (300+ new APIs in 2.3.7.6)
- 269 events and 65 reports

DevOps resources

- Python SDK – 16,000 downloads/month
- Ansible collection – 84,000 downloads
- Terraform provider – 47,000 downloads

30 Catalyst Center DevNet sandboxes
https://devnetsandbox.cisco.com/DevNet/catalog/catalyst-center-sandbox_catalyst-center

Data as of 11/06/2024

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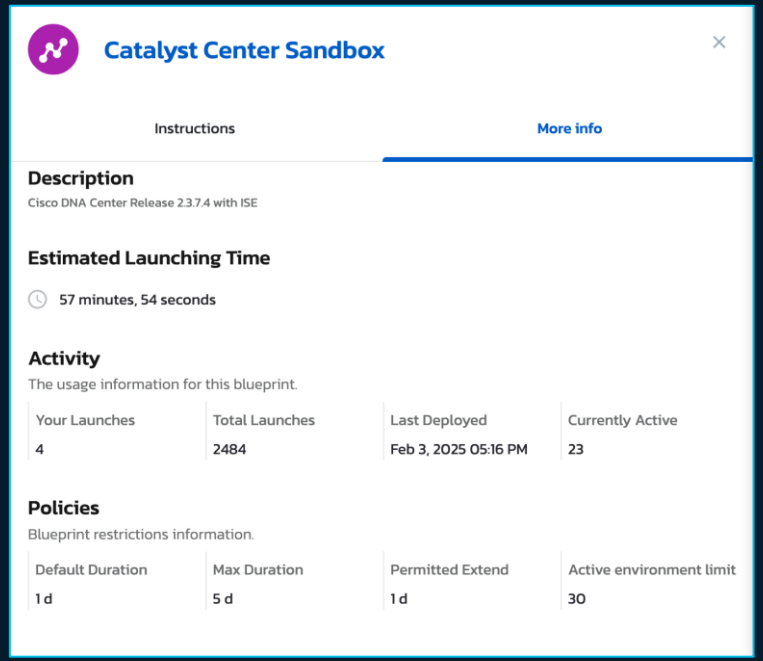
DevNet Catalyst Center Sandboxes



- 30 Catalyst Center DevNet sandboxes
- Include virtual Catalyst Center 2.3.7.4, ISE, CML, and 4 Cat9kV switches
- Unrestricted access to all Catalyst Center APIs
- Build and test your IaC workflows
- Develop your custom integrations
- Free

https://devnetsandbox.cisco.com/DevNet/catalog/catalyst-center-sandbox_catalyst-center

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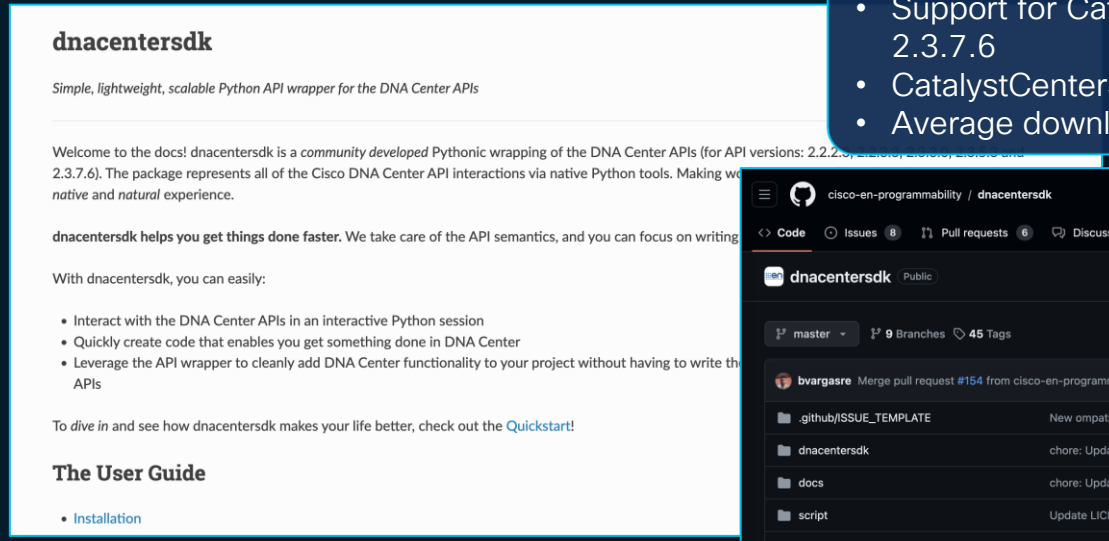
Catalyst Center Python SDK

- Covers all Cisco Catalyst Center REST APIs
- Support for Catalyst Center versions up to 2.3.7.6
- CatalystCenterSDK rebranded library released
- Average downloads/month 16,000+



dnacentersdk

Simple, lightweight, scalable Python API wrapper for the DNA Center APIs

Welcome to the docs! dnacentersdk is a *community developed* Pythonic wrapping of the DNA Center APIs (for API versions: 2.2.2.3, 2.3.3.0, 2.3.5.3 and 2.3.7.6). The package represents all of the Cisco DNA Center API interactions via native Python tools. Making wo *native* and *natural* experience.

dnacentersdk helps you get things done faster. We take care of the API semantics, and you can focus on writing

With dnacentersdk, you can easily:

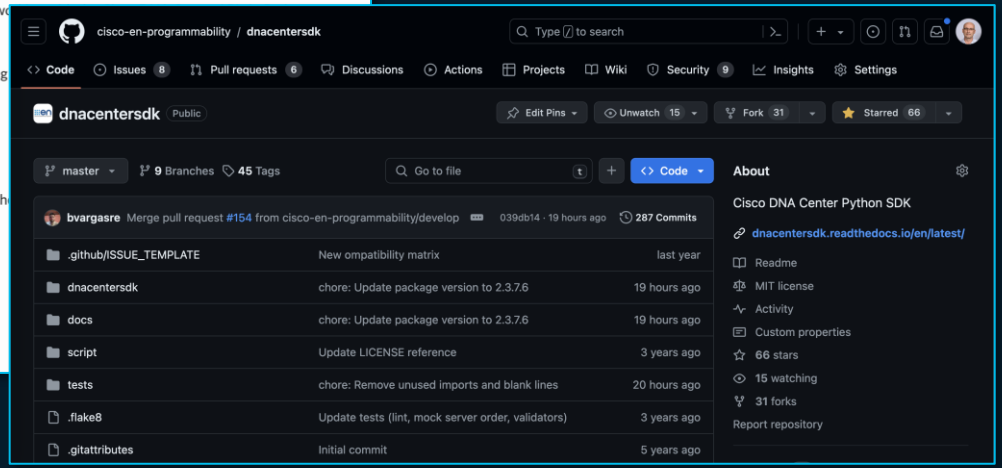
- Interact with the DNA Center APIs in an interactive Python session
- Quickly create code that enables you get something done in DNA Center
- Leverage the API wrapper to cleanly add DNA Center functionality to your project without having to write th APIs

To *dive in* and see how dnacentersdk makes your life better, check out the Quickstart!

The User Guide

- Installation

https://dnacentersdk.readthedocs.io
https://catalystcentersdk.readthedocs.io



https://github.com/cisco-en-programmability/dnacentersdk

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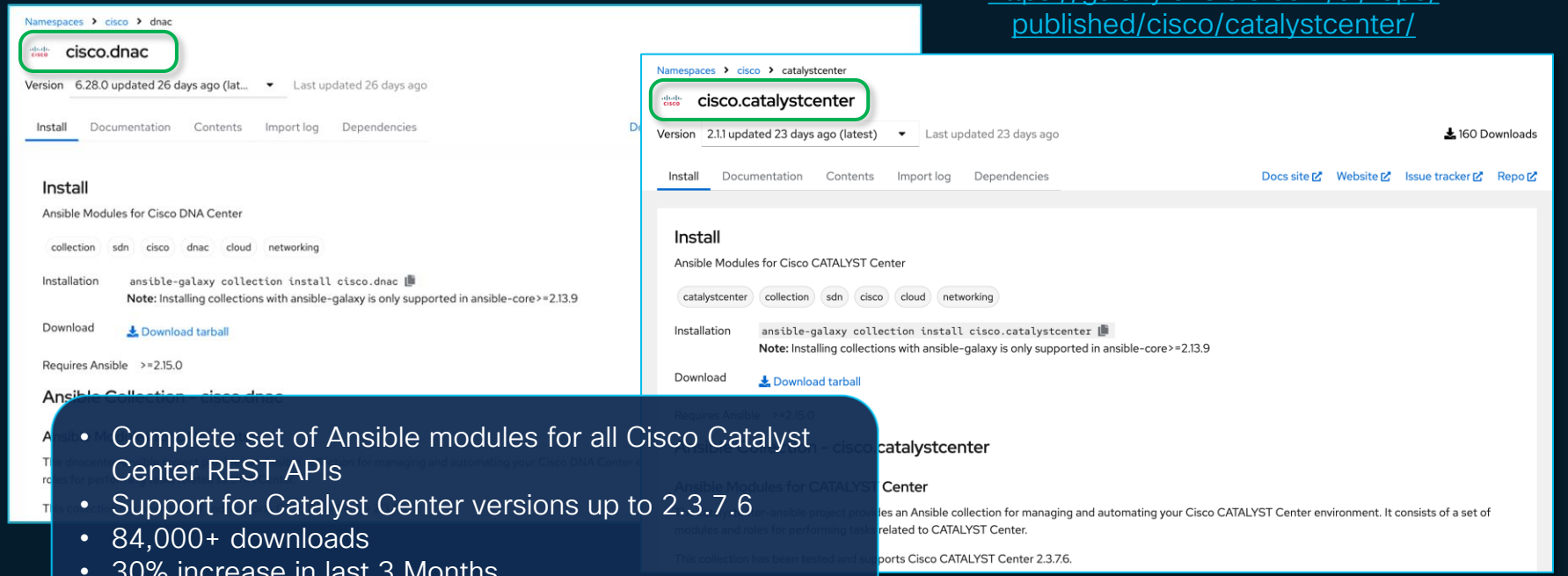
Cisco Catalyst Center Ansible Collection

https://galaxy.ansible.com/ui/repo/published/cisco/dnac

https://galaxy.ansible.com/ui/repo/published/cisco/catalystcenter/



- Complete set of Ansible modules for all Cisco Catalyst Center REST APIs
- Support for Catalyst Center versions up to 2.3.7.6
- 84,000+ downloads
- 30% increase in last 3 Months
- Libraries may be found
  https://github.com/cisco-en-programmability

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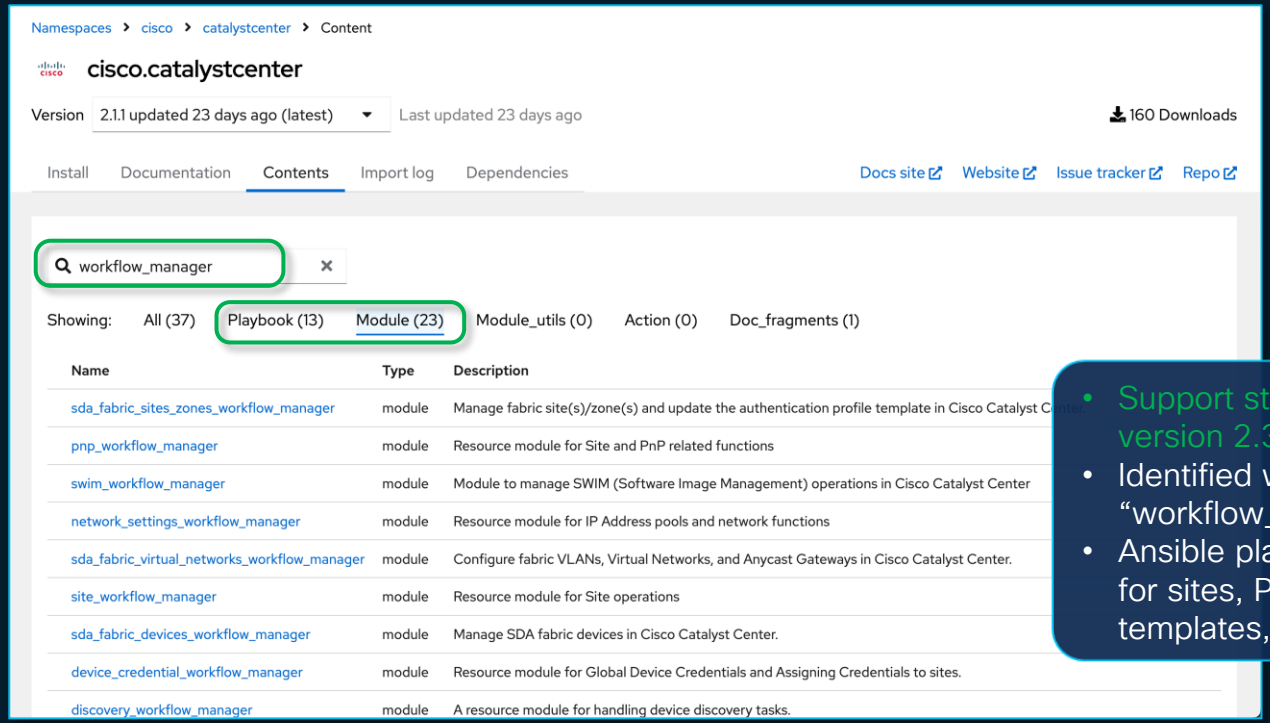
Cisco Developed; TAC/Engineering Supported



- Support starting with Cisco Catalyst Center version 2.3.7.6
- Identified with the module name including “workflow_manager”
- Ansible playbooks for common operations for sites, PnP, SWIM, compliance, templates, network settings, …

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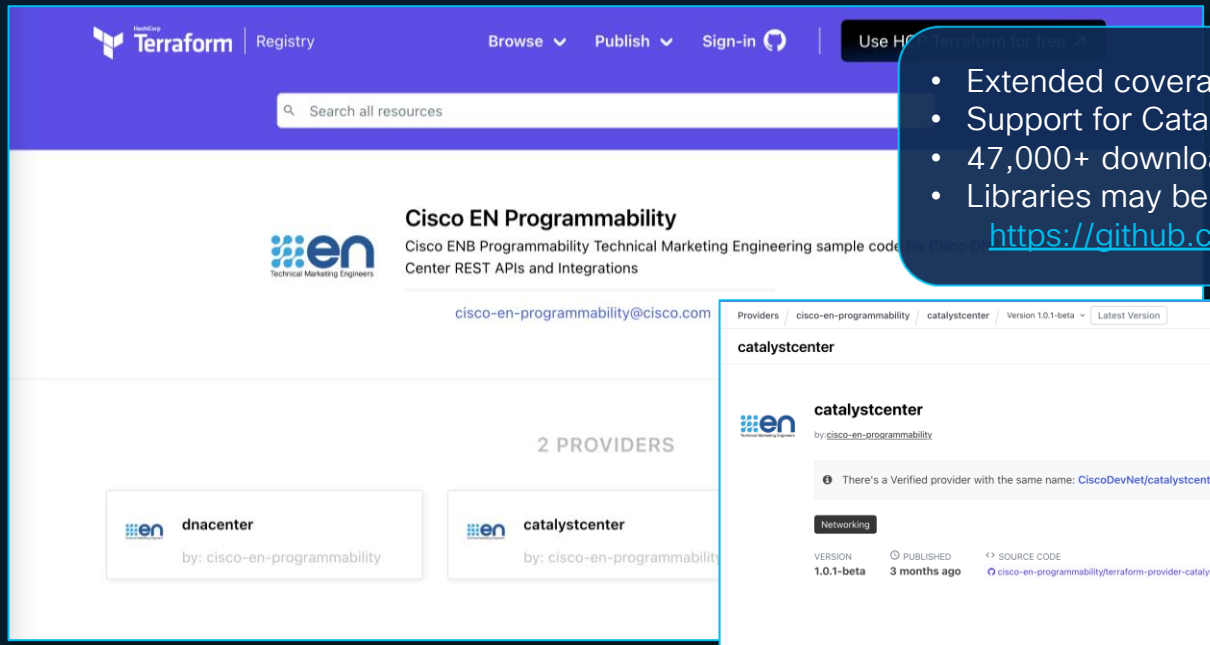
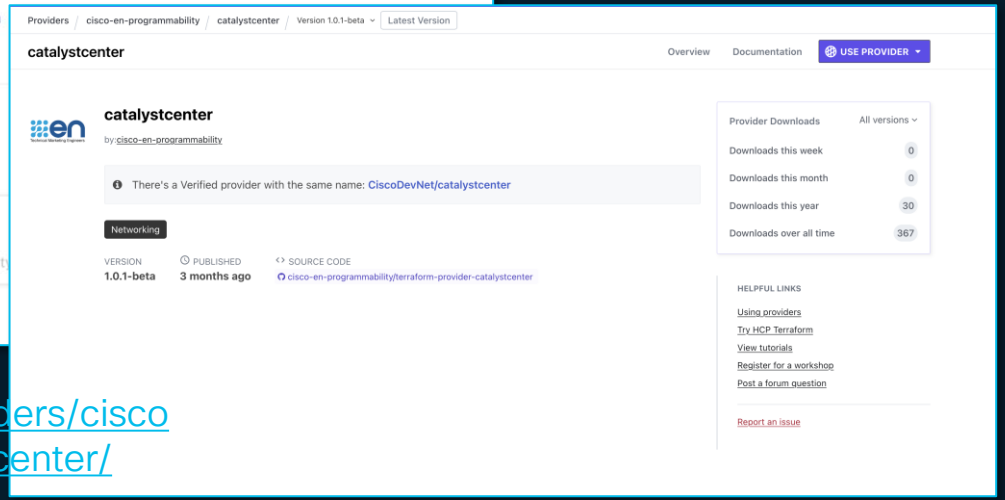
Terraform Provider and Go SDK

https://registry.terraform.io/providers/cisco-en-programmability/dnacenter



- Extended coverage of Catalyst Center REST APIs
- Support for Catalyst Center versions up to 2.3.7.6
- 47,000+ downloads
- Libraries may be found here: https://github.com/cisco-en-programmability



https://registry.terraform.io/providers/cisco-en-programmability/catalystcenter/

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Agenda

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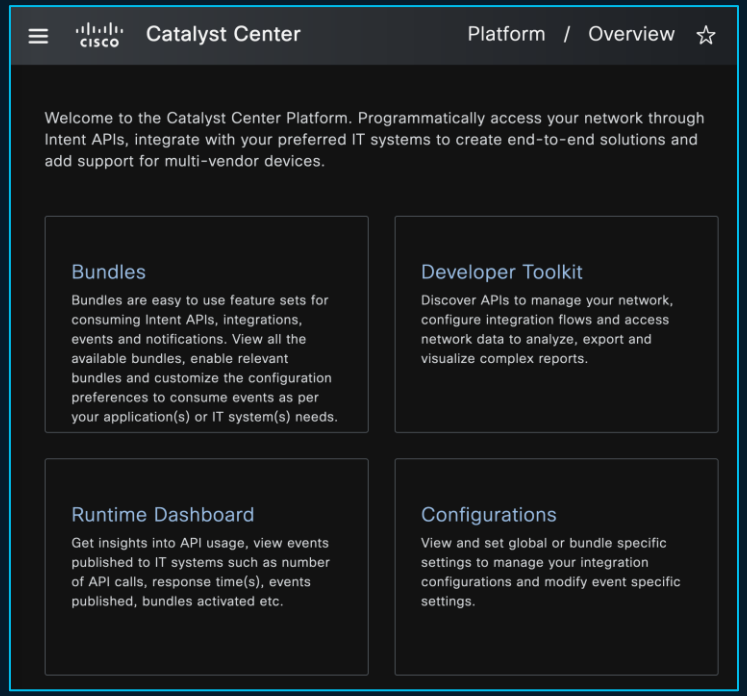
Catalyst Center APIs, Events, Integrations

- Manage Catalyst Center and infrastructure efficiently, consistent and at scale
- Real-time insights and notifications with webhooks
- Rich Assurance data available via APIs
- Ready-to-use Integrations or build custom integrations
- Enable GenAI use cases



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Catalyst Center Platform Sessions

Session	Title	Room	Date
TECOPS-2158	Cisco Catalyst Center Out-of-the-Box and Custom Integrations	Lab 9 - G107	February 09 1:30 PM
DEVNET-3000	Open-Source GenAI Bot for Catalyst Center	DevNet Theater 1	February 11 3:00 PM
DEVNET-1087	Cisco Catalyst Center Platform: APIs, Event Notifications, Integrations, and DevOps Resources	DevNet Theatre 2	February 12 9:30 AM
IBOOPS-2882	Let's Talk about Cisco Catalyst Center Integrations	Session Room D508	February 12 4:00 PM
BRKOPS-3429	Simplify Network Management using GenAI and Cisco Catalyst Center APIs	Session Room A6	February 13 10:30 AM
DEVNET-3419	Transform your Network Automation Apps with GenAI	DevNet Theater 1	February 12 2:30 PM

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Participants who fill out a minimum of 4 session surveys and the overall event survey will get a unique Cisco Live t-shirt.

(from 11:30 on Thursday, while supplies last)

All surveys can be taken in the Cisco Events mobile app or by logging in to the Session Catalog and clicking the ‘Participant Dashboard’

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- Attend the interactive education with DevNet, Capture the Flag, and Walk-in Labs
- Visit the On-Demand Library for more sessions at ciscolive.com/on-demand. Sessions from this event will be available from March 3.

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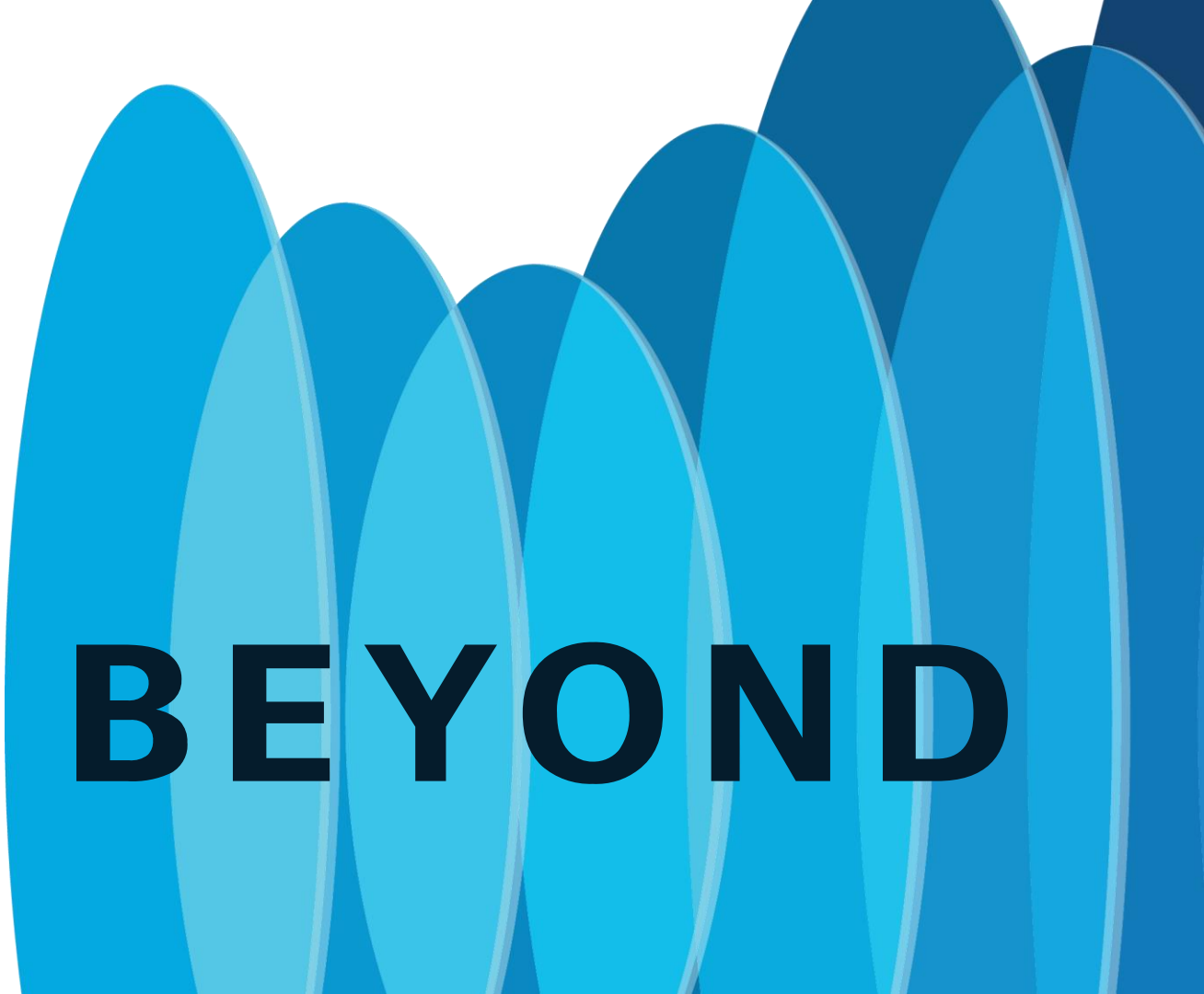
cisco
Thank you
cisco Live!

cisco Live!



GO BEYOND