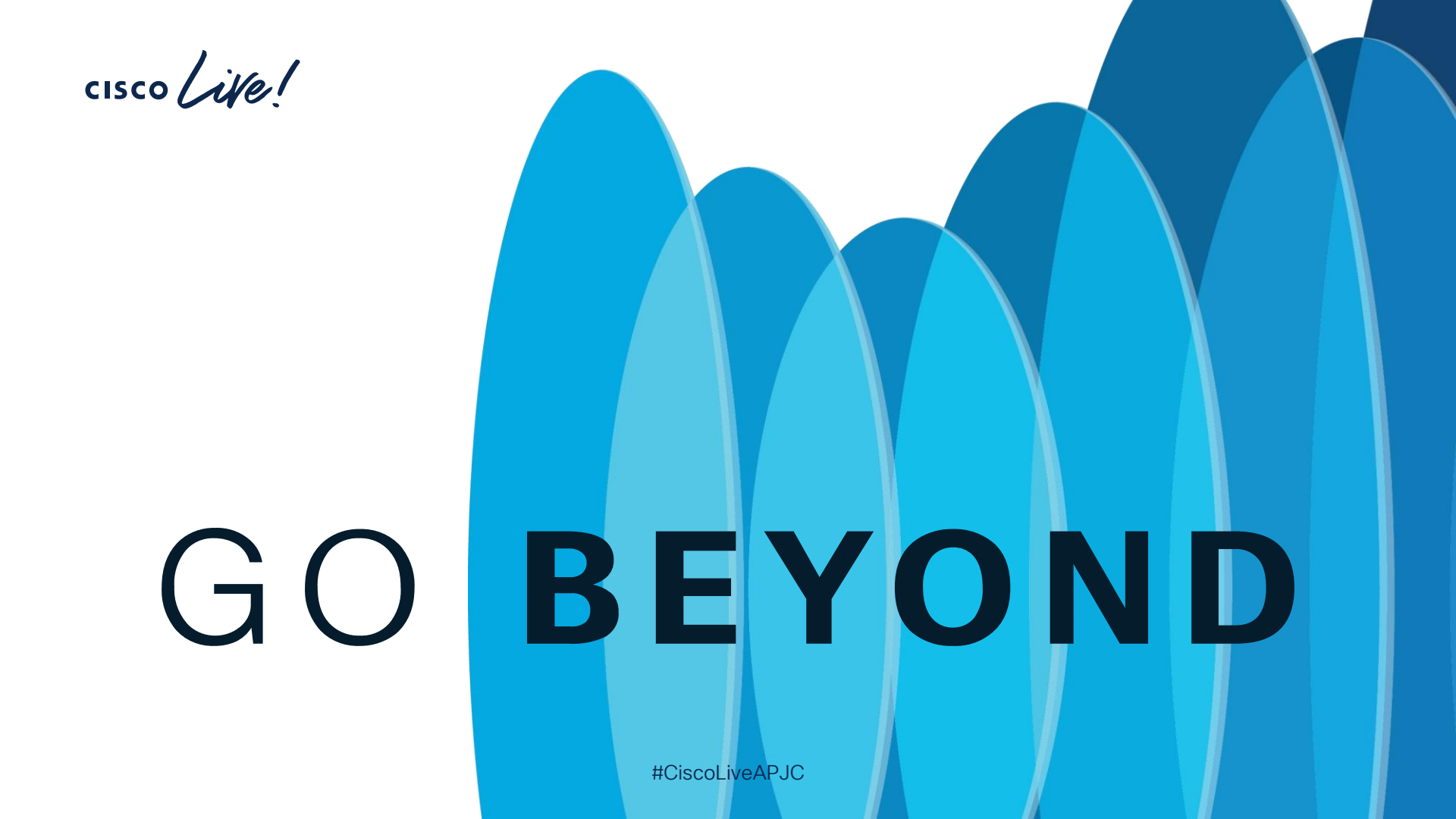
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Cisco Catalyst Center Platform:

APIs, Event Notifications, Integrations, and DevOps Resources

Gabi Zapodeanu
Principal Technical Marketing Engineer,
Cisco Systems
@zapodeanu

DEVNET-1087

Cisco Webex App

https://ciscolive.ciscoevents.com/ciscolivebot/#DEVNET-1087

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

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Agenda

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

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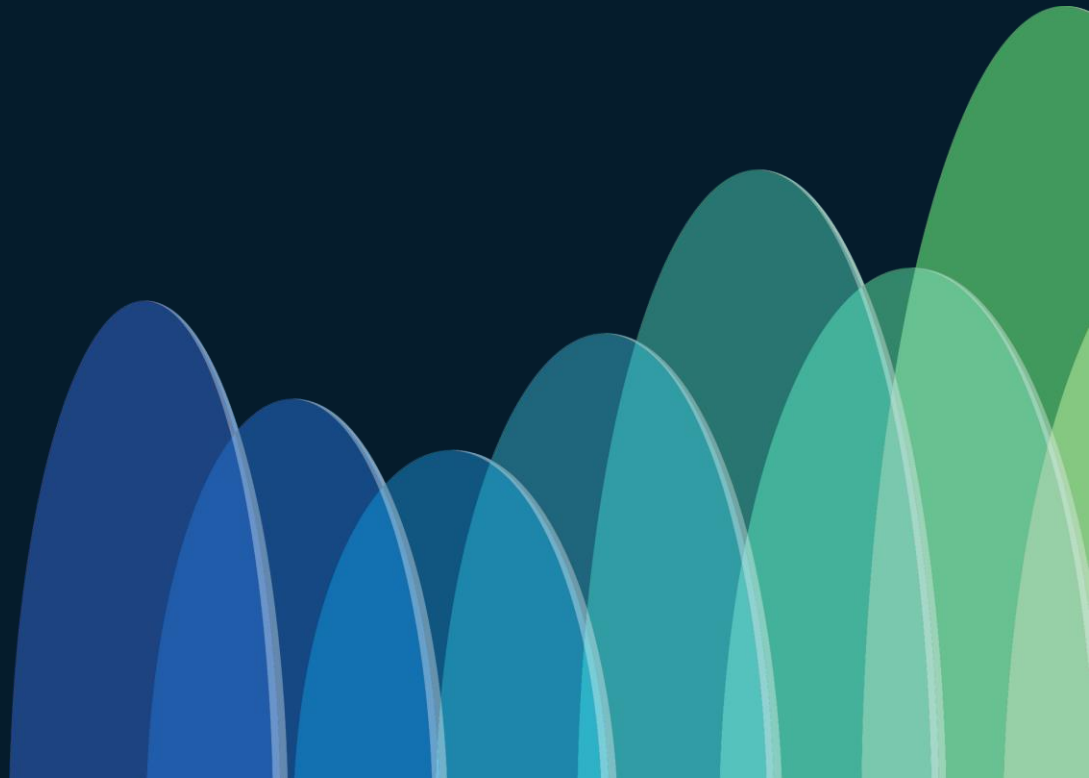
Catalyst Center Platform Overview



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Catalyst Center Platform Vision

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The Value of Catalyst Center Platform

Automate

Implement changes from enterprise-sized deployments to minor adjustments

+

Integrate

Unlock new insights, streamline business workflows through integration into Cisco and 3rd Party Platforms

Alerting/notifications

Real-time communications providing situational awareness and enabling data-driven decisions

=

Business process streamlining

Translate business process into multiplatform automation workflows

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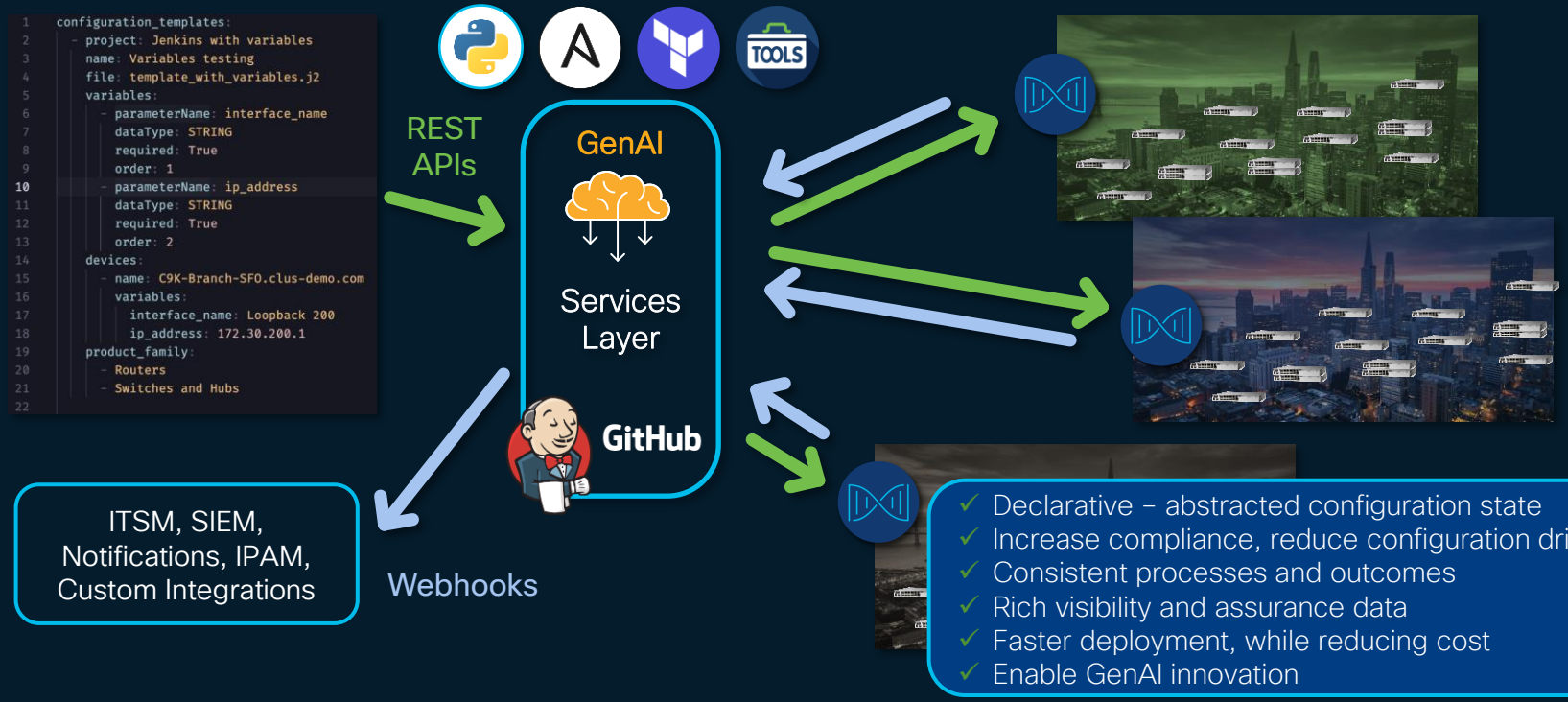
Multi Catalyst Center/Controller Managed Networks



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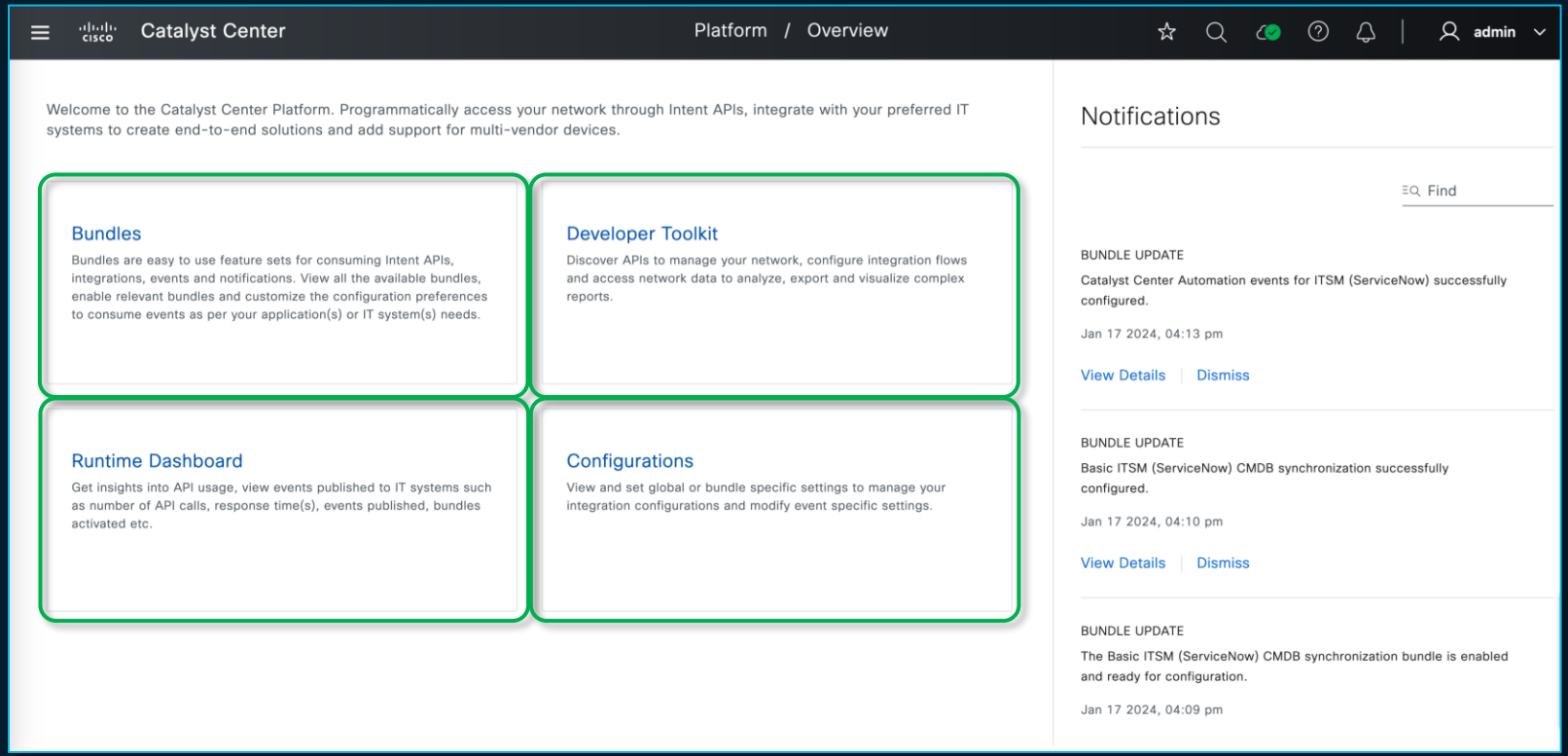
Catalyst Center Platform – Overview



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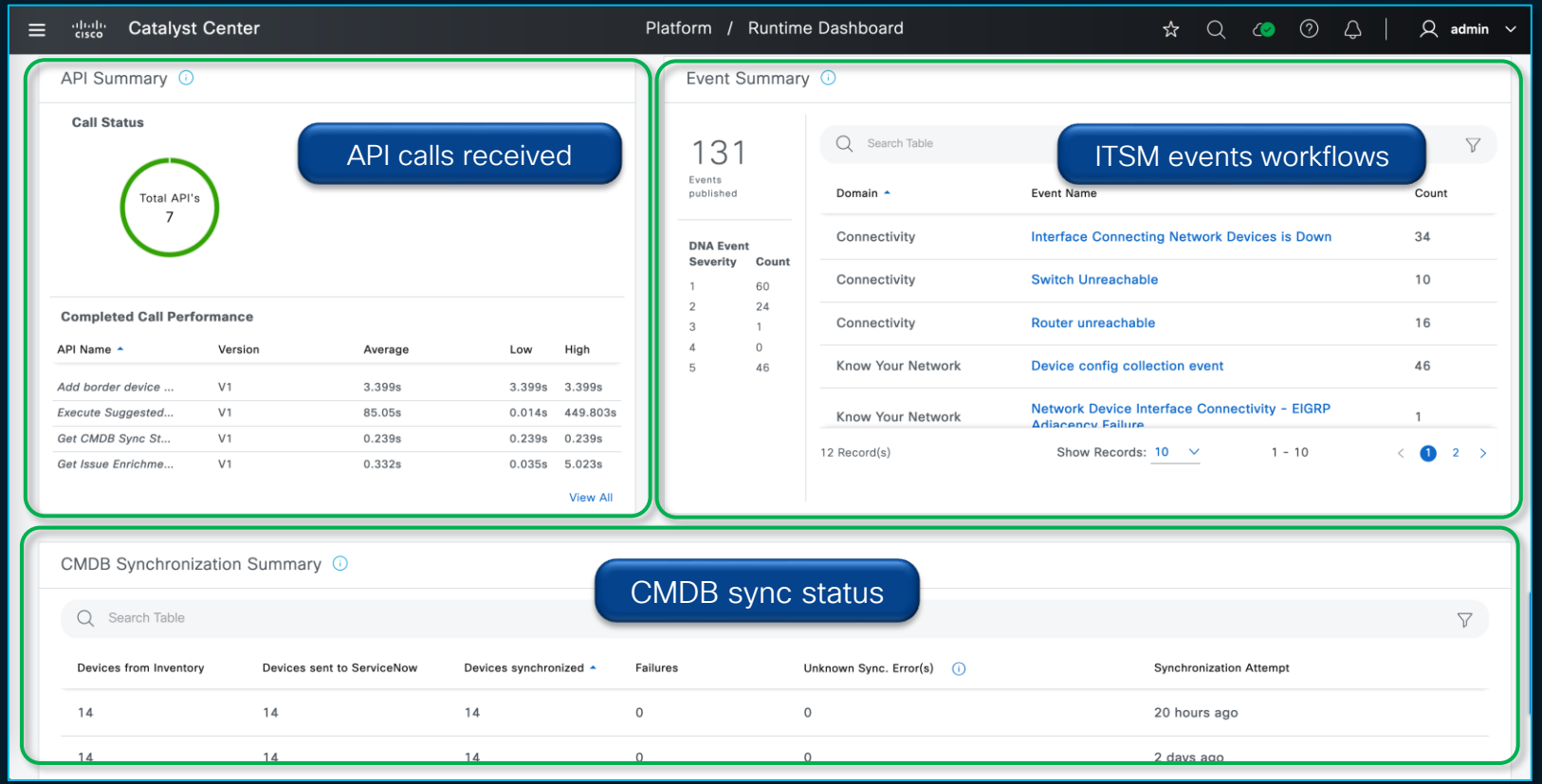
Platform Runtime Dashboard



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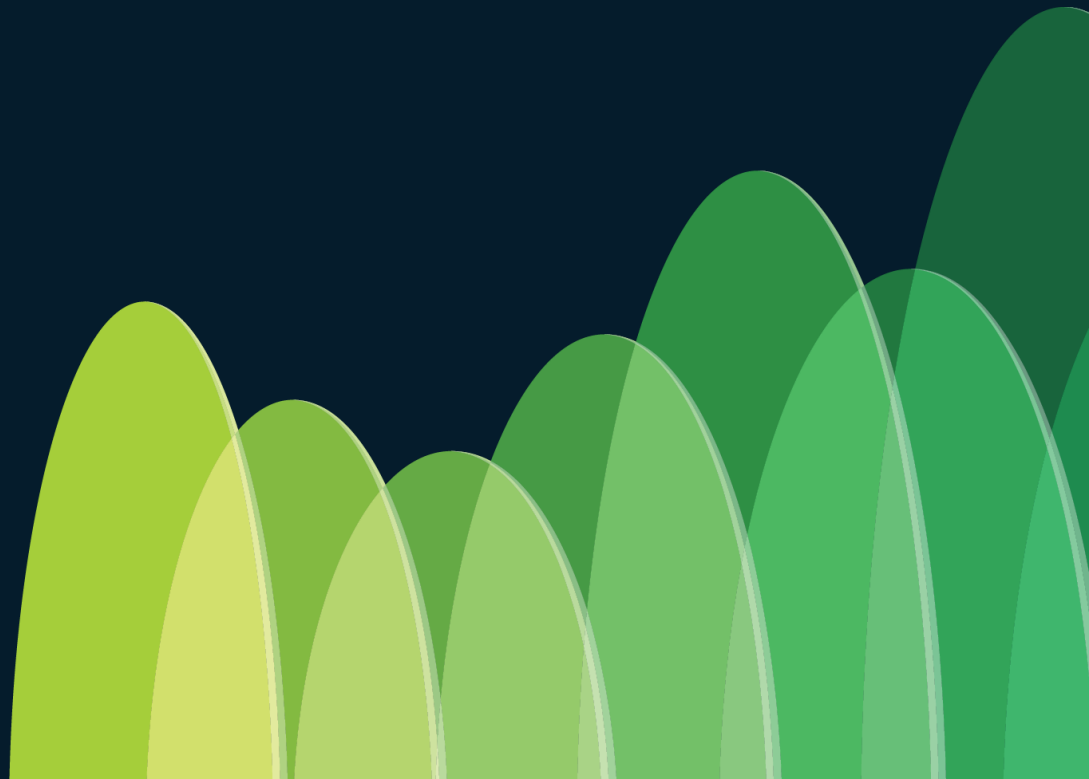
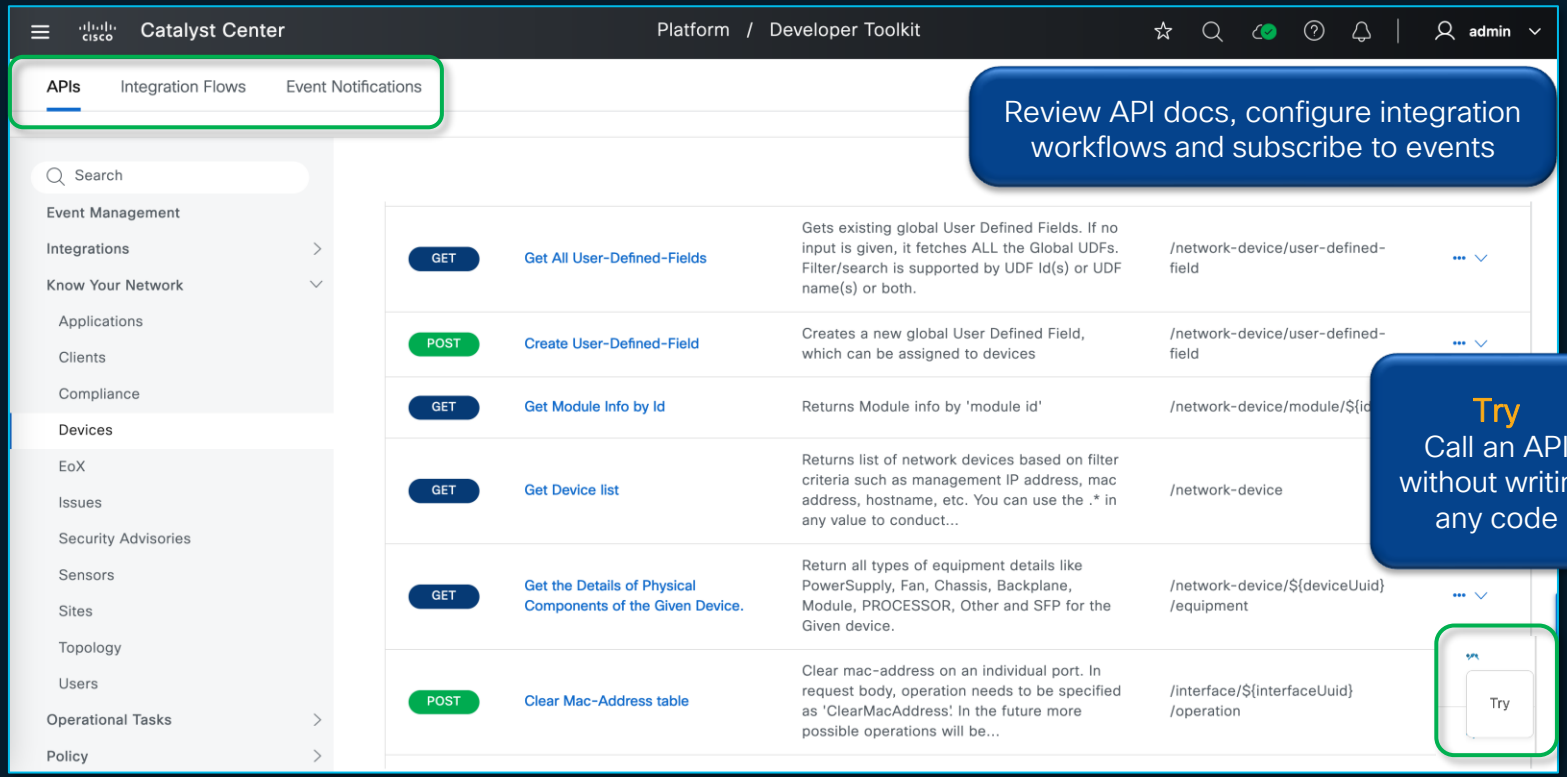
REST APIs



Catalyst Center Platform – Developer Toolkit



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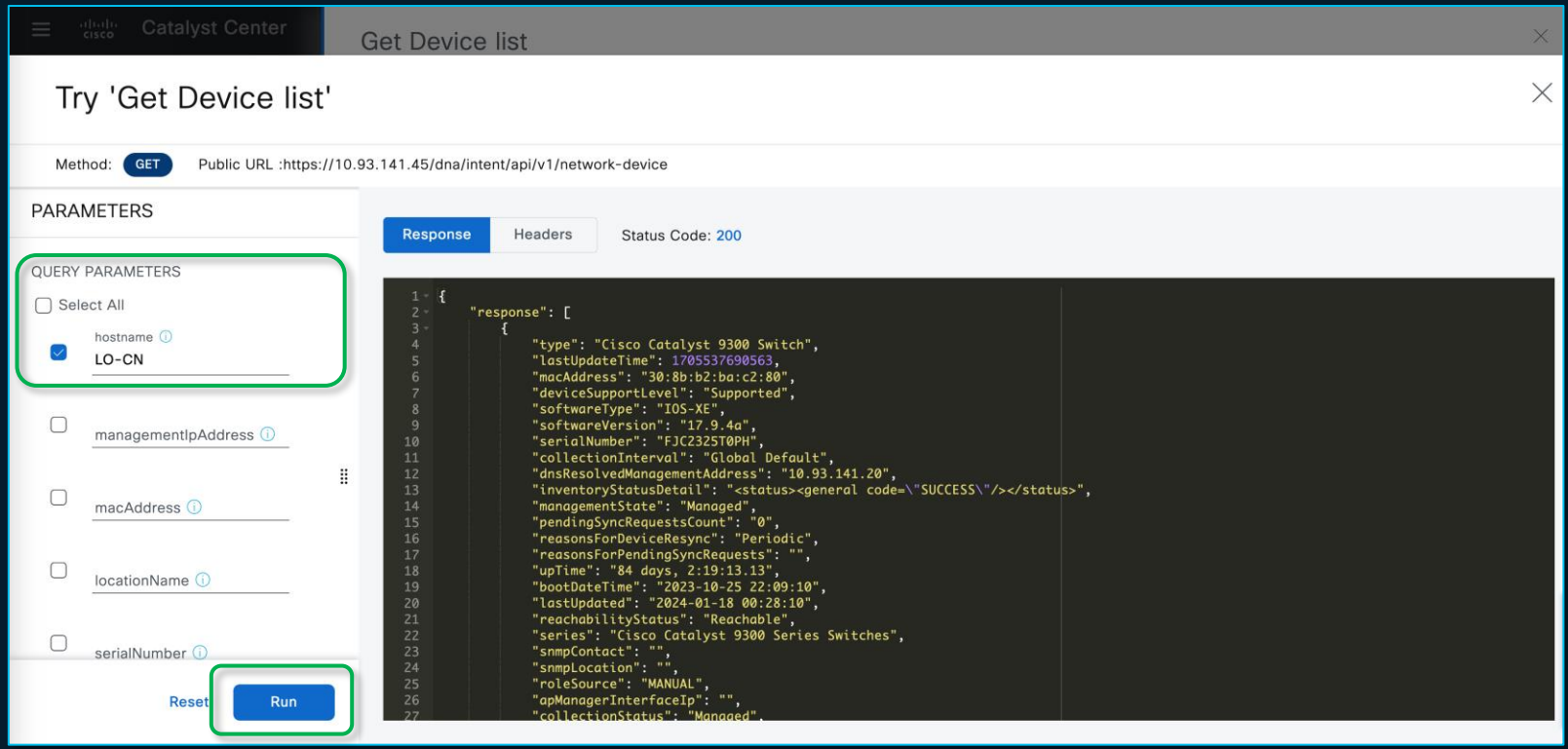
Try an API Call



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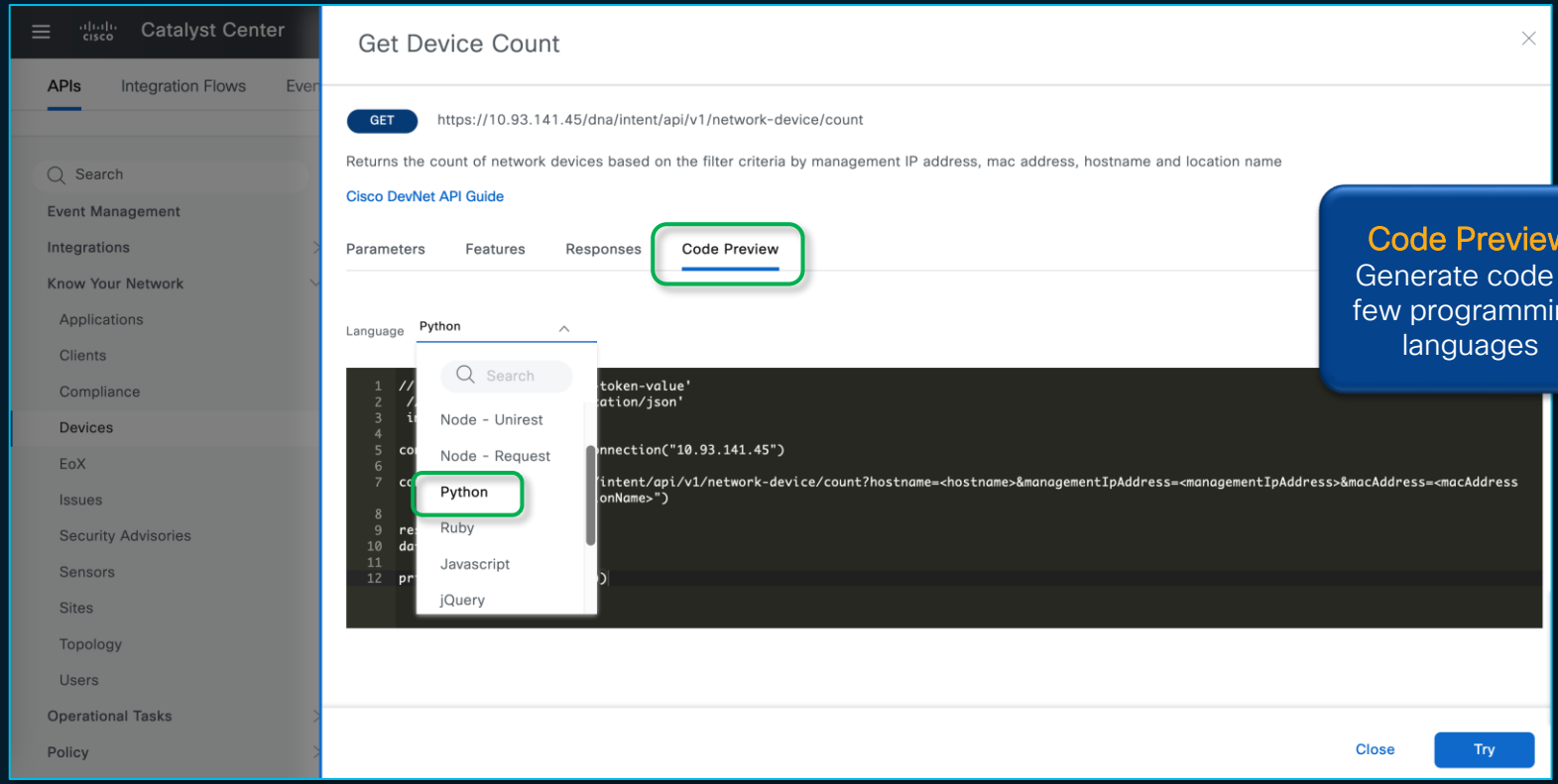
Code Preview



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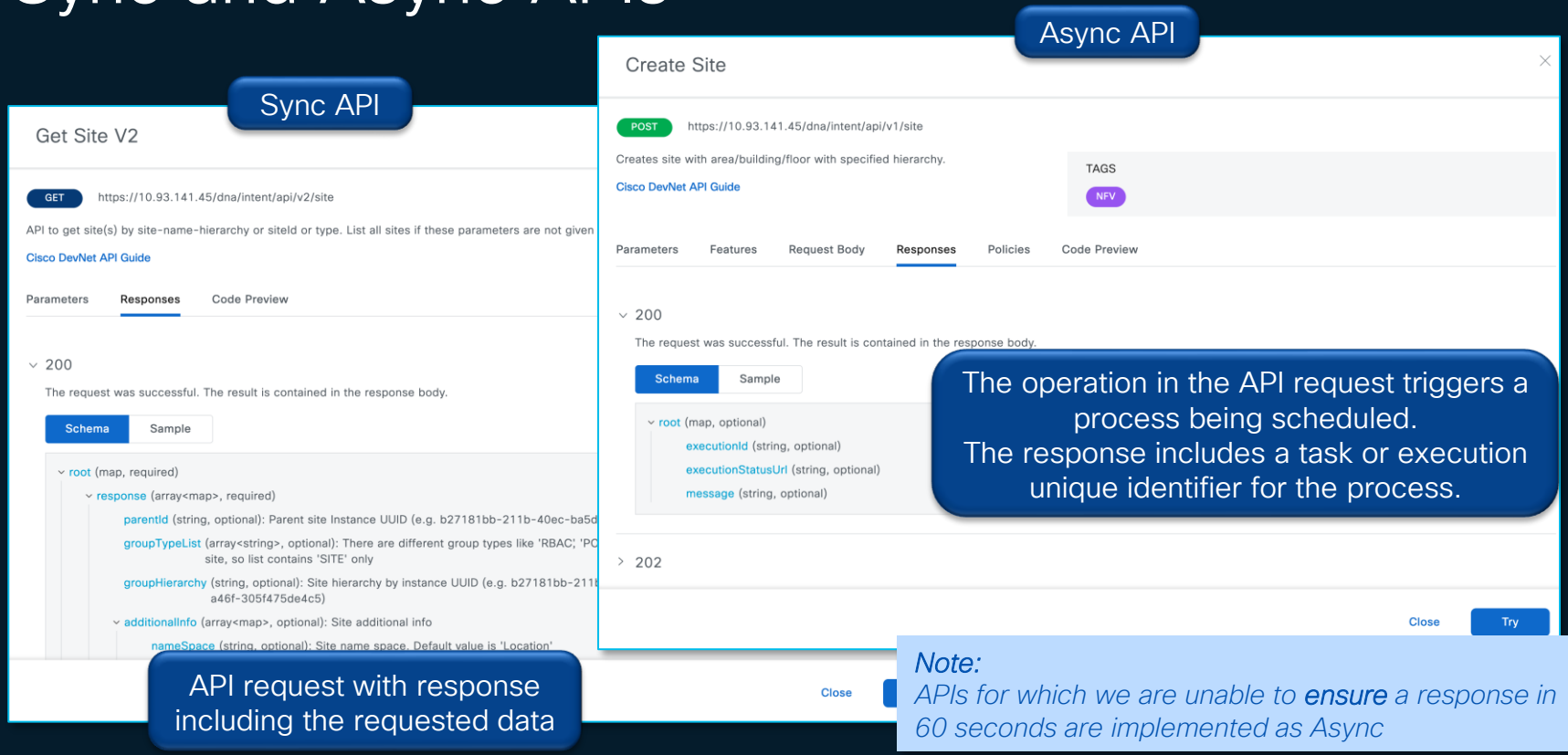
Sync and Async APIs



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

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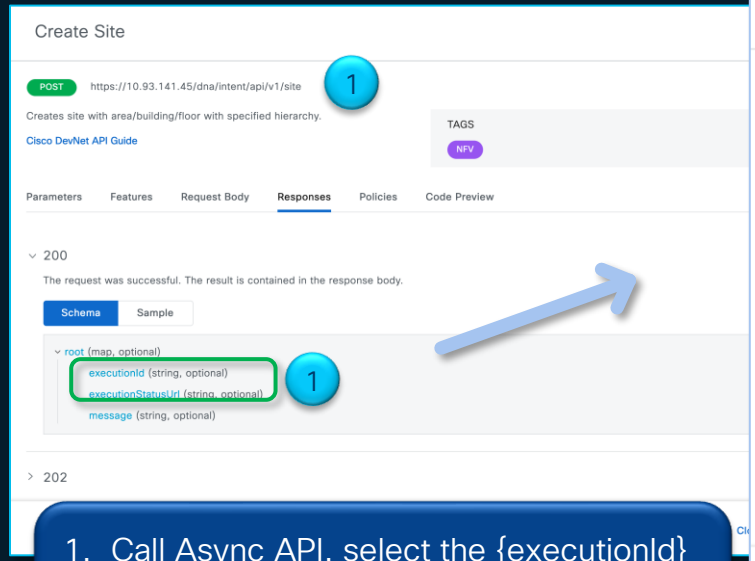
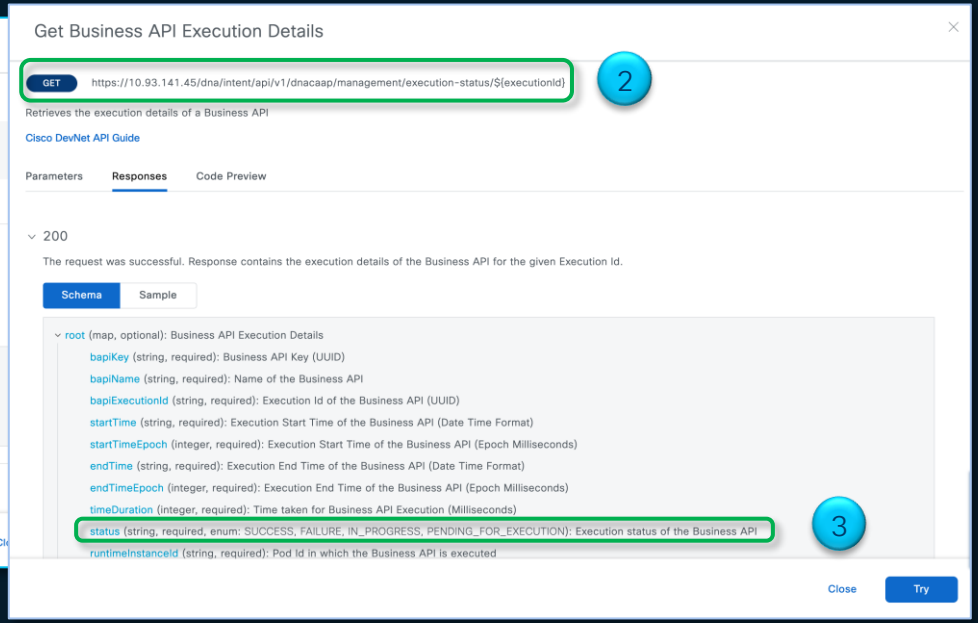
Async APIs Workflow





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

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

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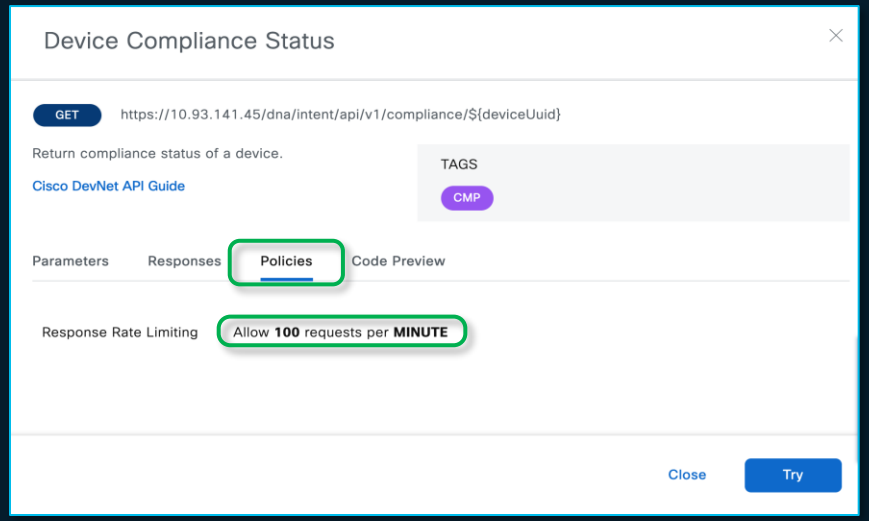
API Policies – Rate Limit



- Catalyst Center API rate limit is defined at the API level, not at a Platform level
- Default rate limit is 100 API calls/minute
- There are APIs with 20, 50, 100 or 500 calls/minute
- Example:
  - Workflows calling 20 different API endpoints
  - Total number of API calls/minute = 2,000

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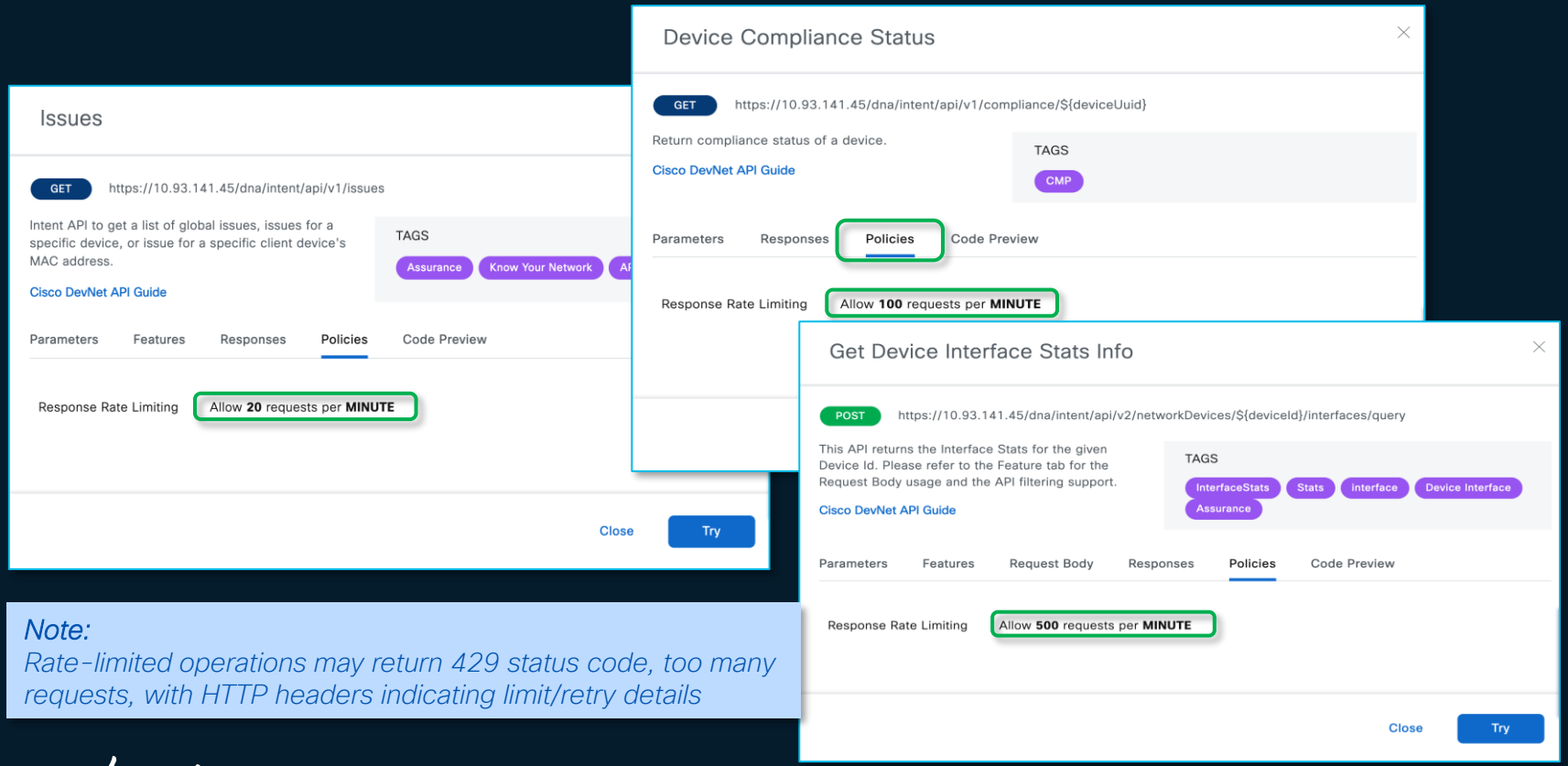
API Rate Limit Documentation



Note:
Rate-limited operations may return 429 status code, too many requests, with HTTP headers indicating limit/retry details

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API Policies – Concurrency

- Default API concurrency limit is the API rate limit
- There are APIs with a concurrency of 1, 5, 10, 50, 100, 500 calls
- This is very important for Async APIs

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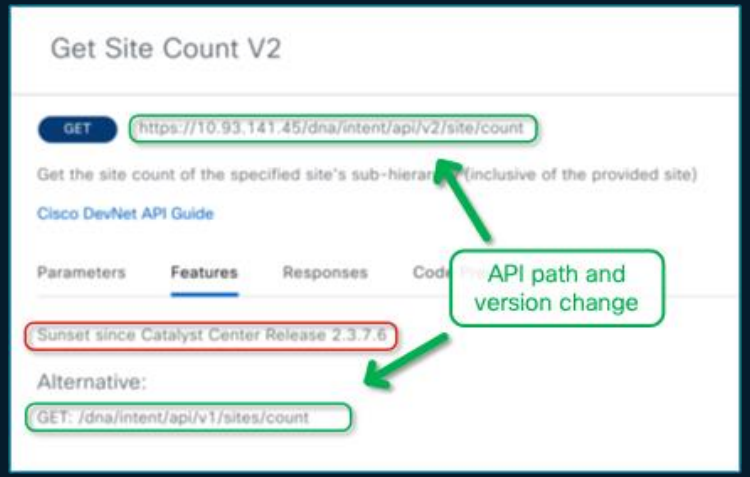
API Lifecycle Management



- 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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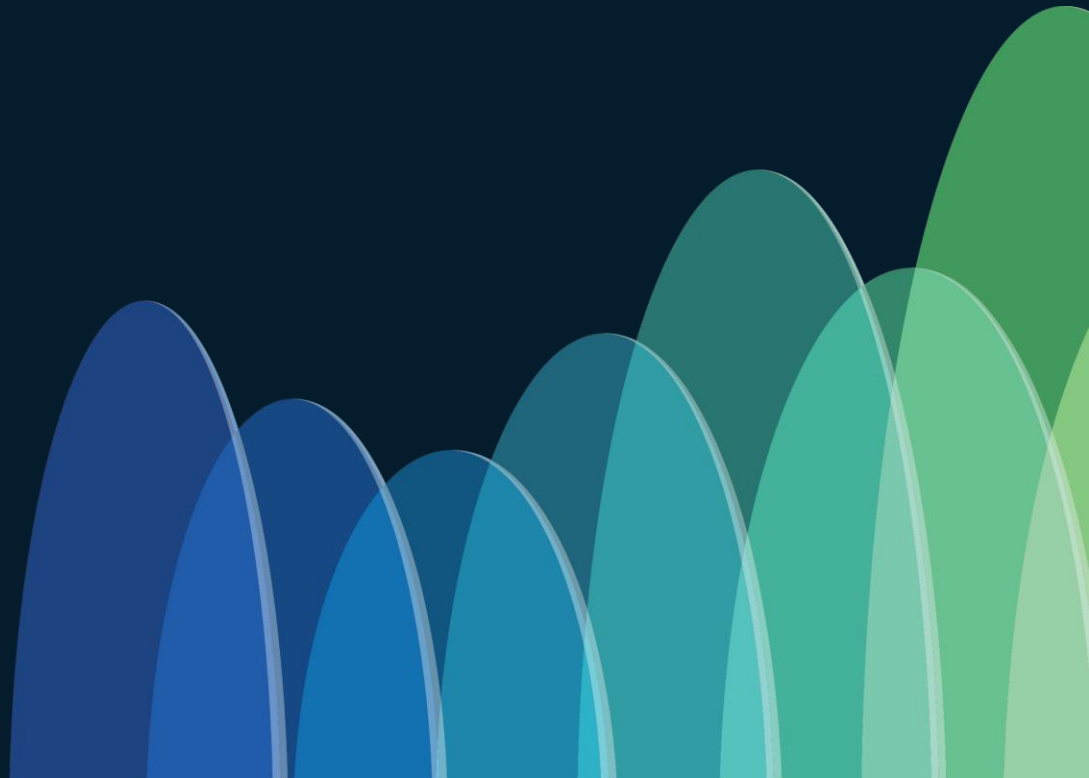
Demo Device Inventory



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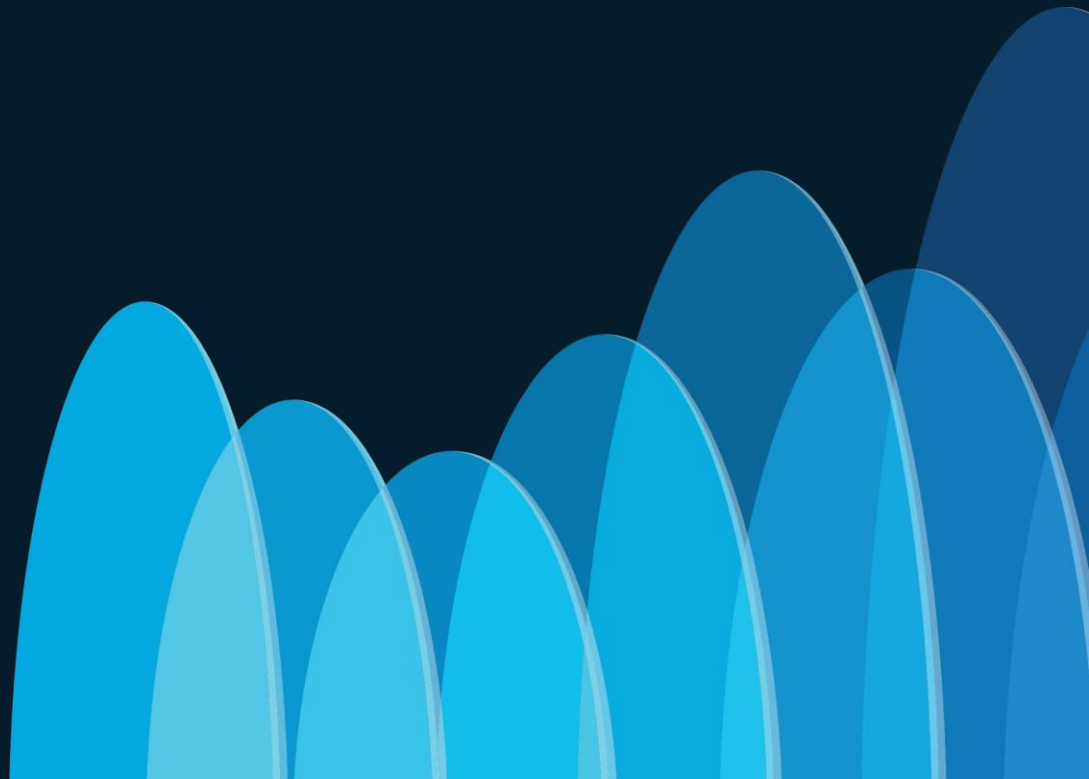
Event Notifications



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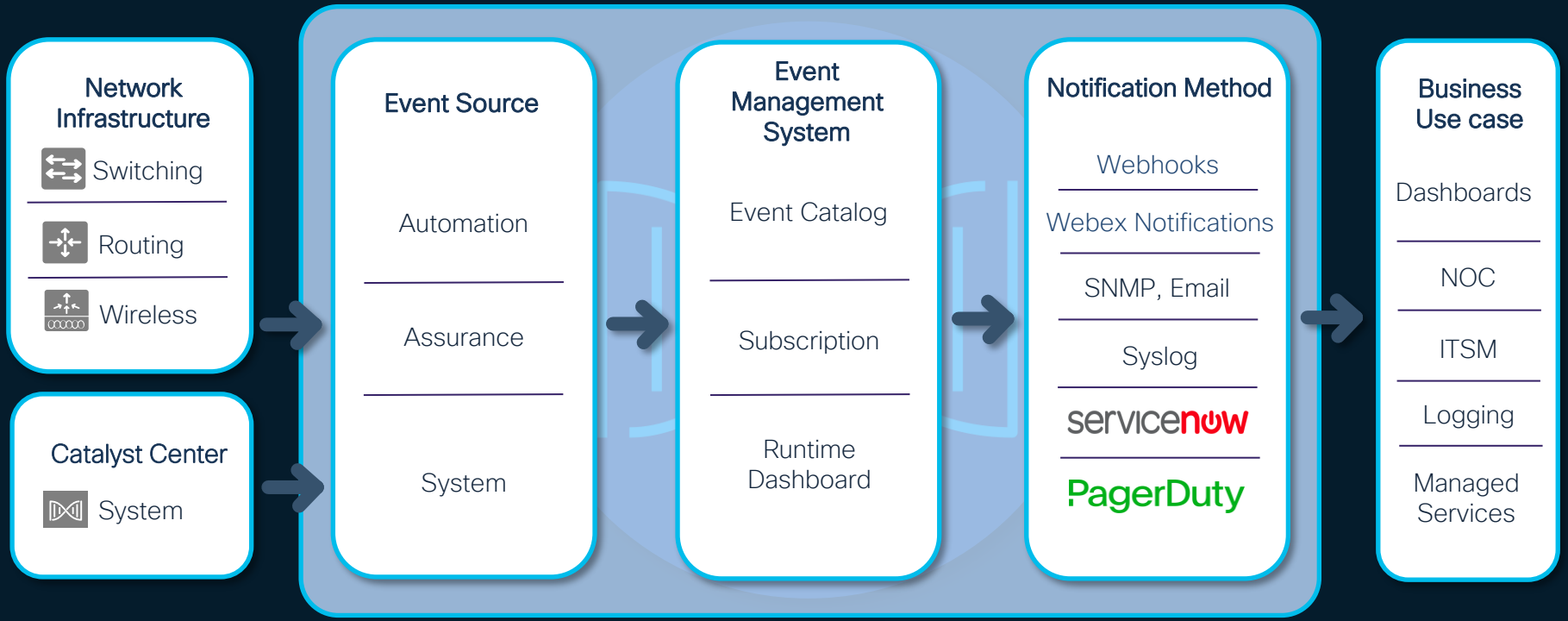
Event Notifications Framework



Note: Two steps process, configure destination followed by subscribe to events

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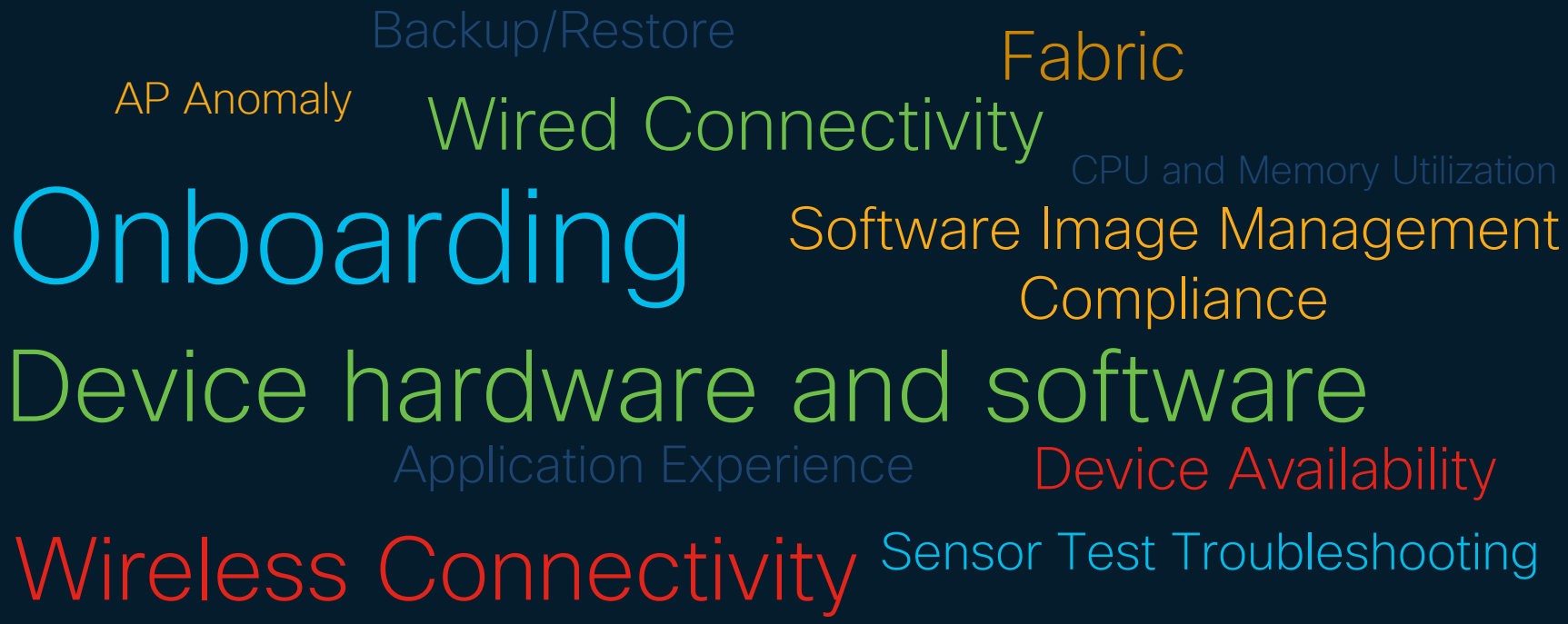
269 Events in Different Areas ...



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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, typically
- Server sends data when something new
- Push Model

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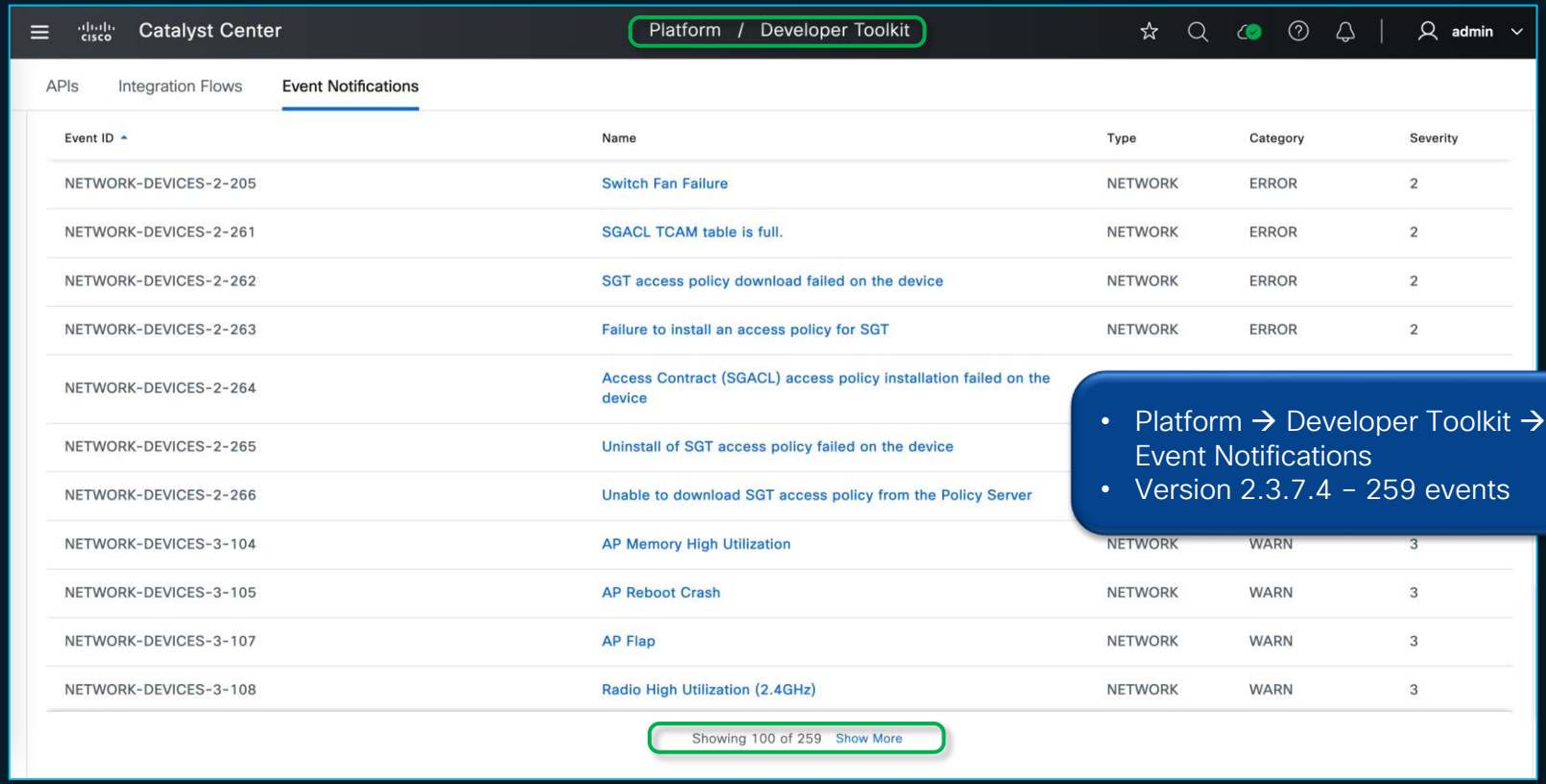
Event Catalog



- Platform → Developer Toolkit → Event Notifications
- Version 2.3.7.4 – 259 events

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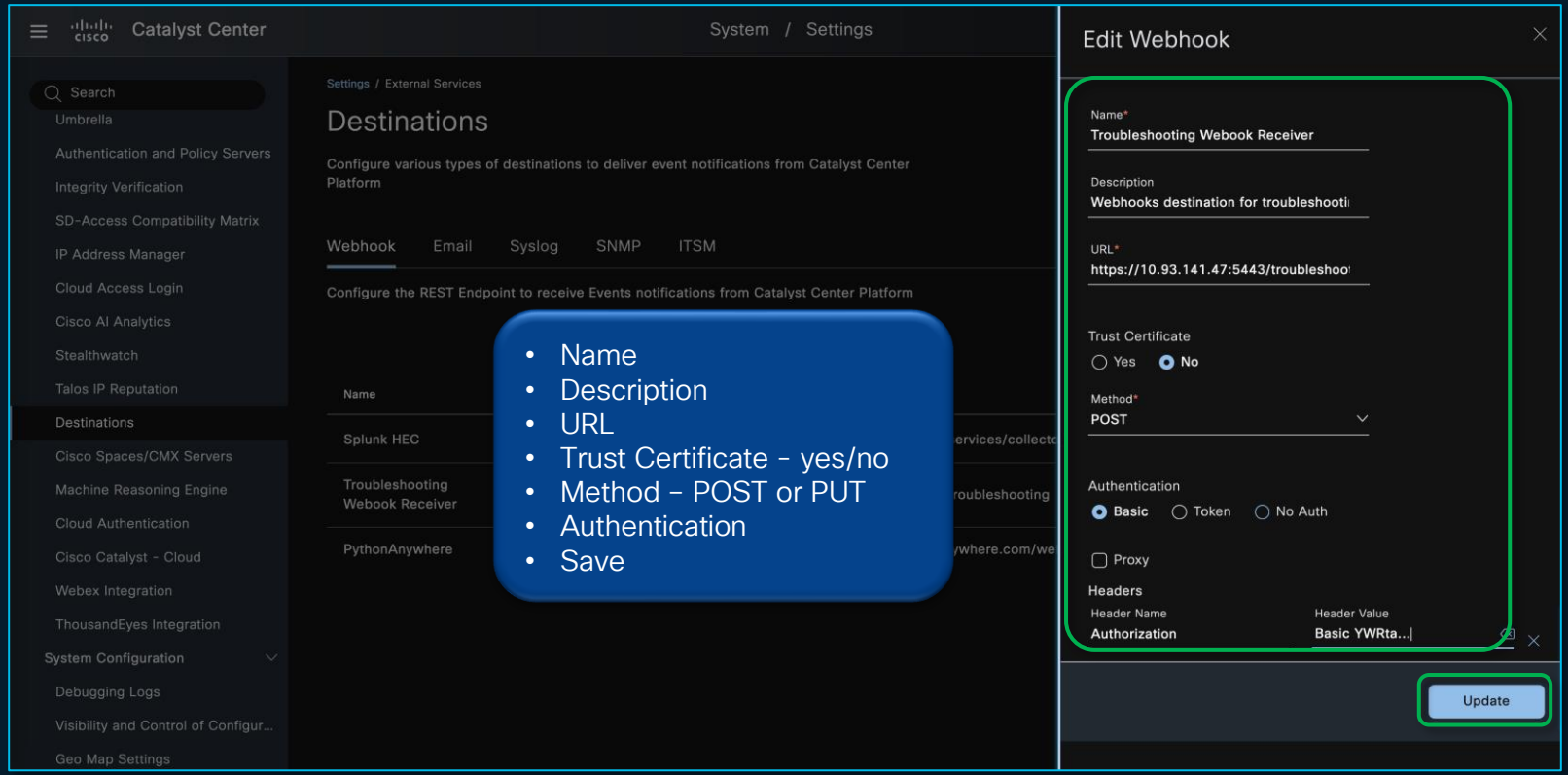
Create a new Webhook Destination



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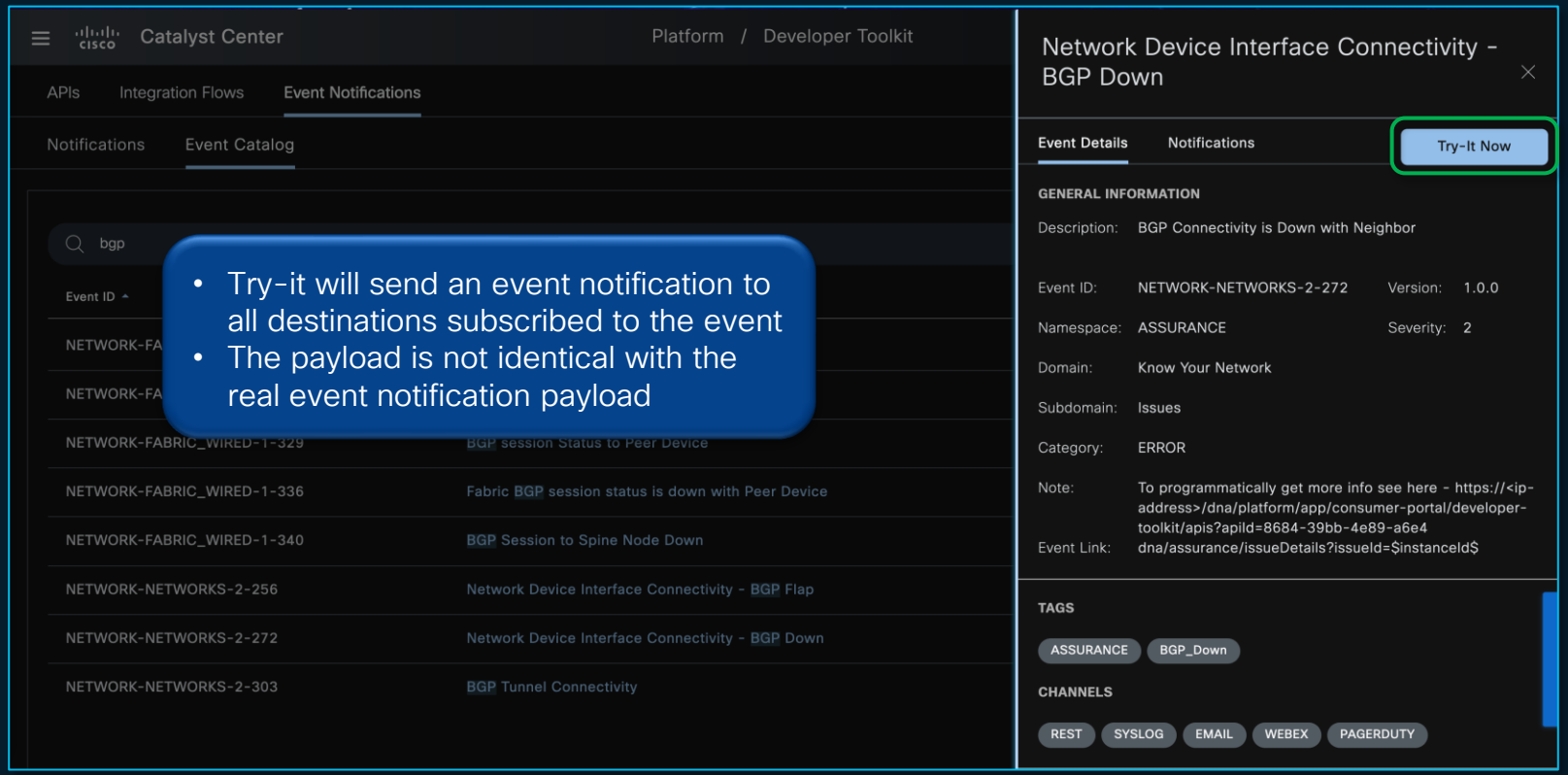
Verify Webhook Receiver



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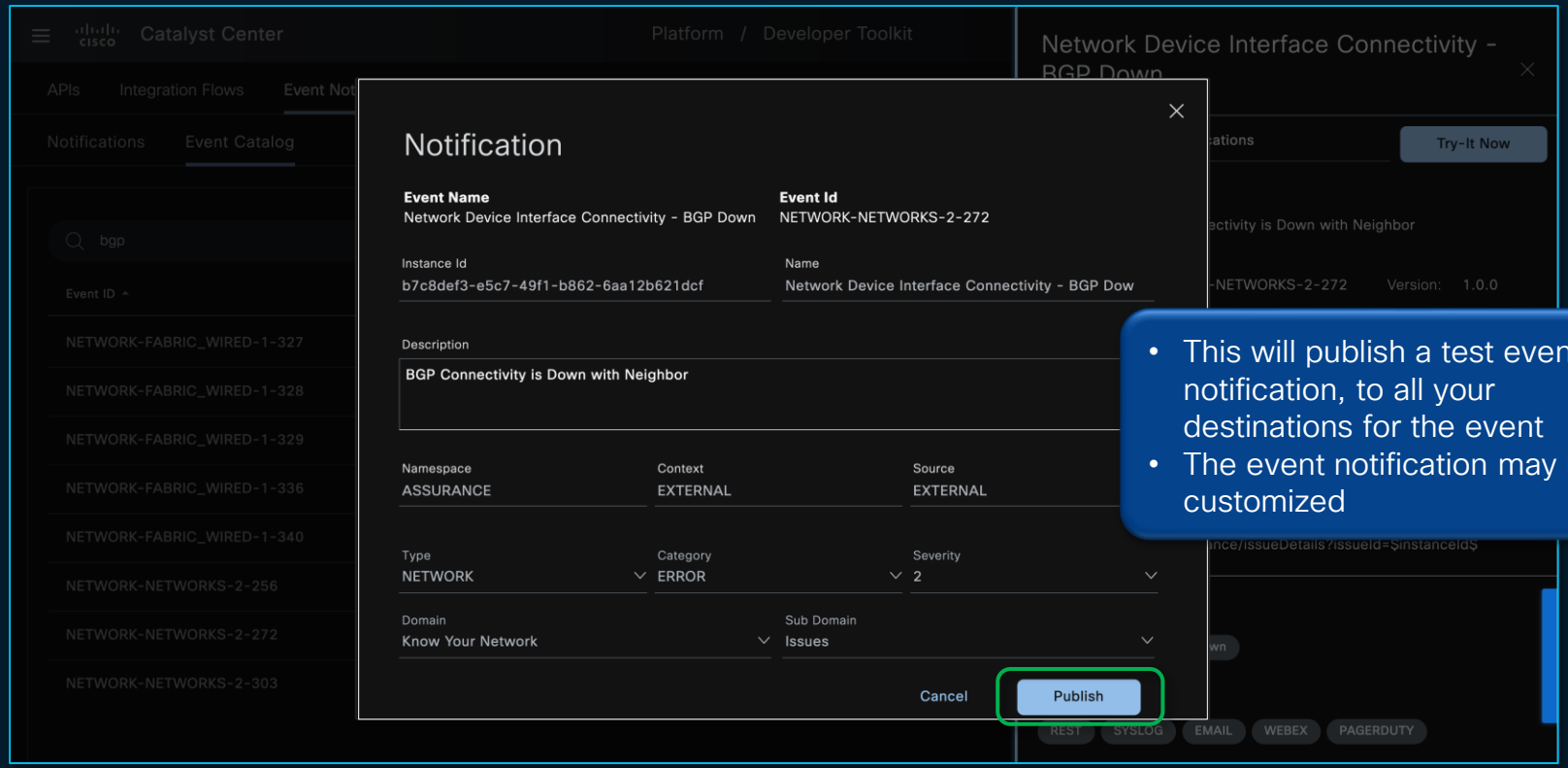
Verify Webhook Receiver – continued



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

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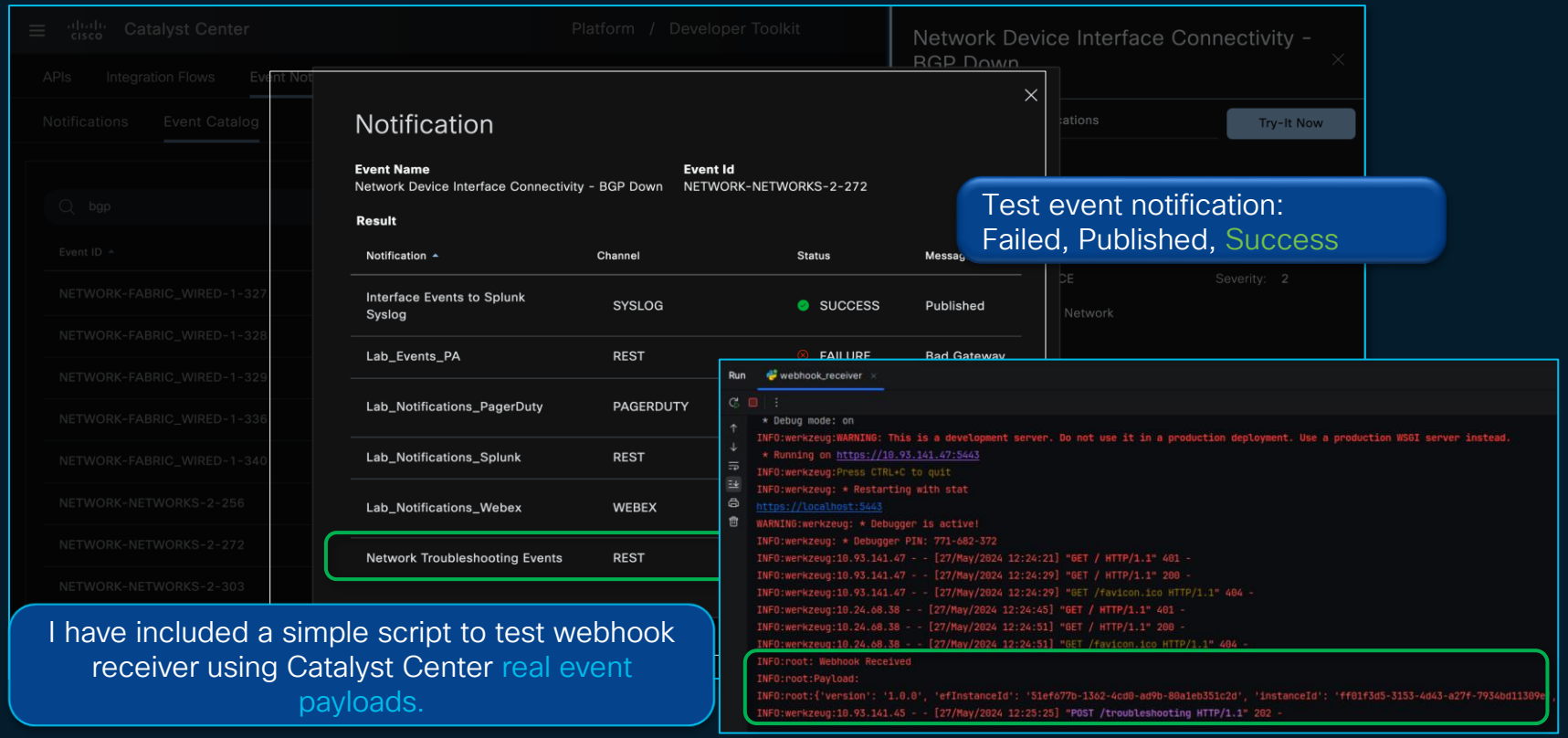
Verify Webhook Receiver – continued



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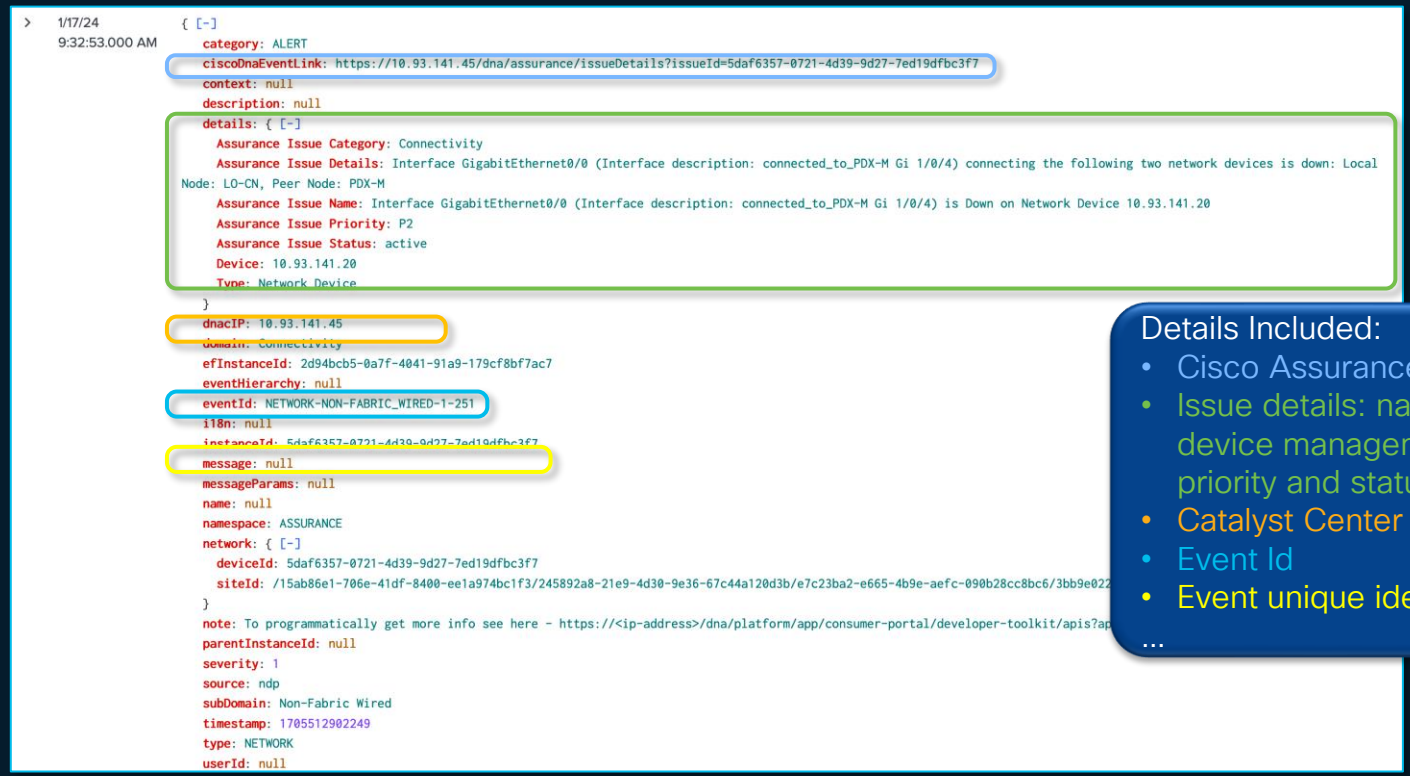
Catalyst Center Webhook Sample Payload

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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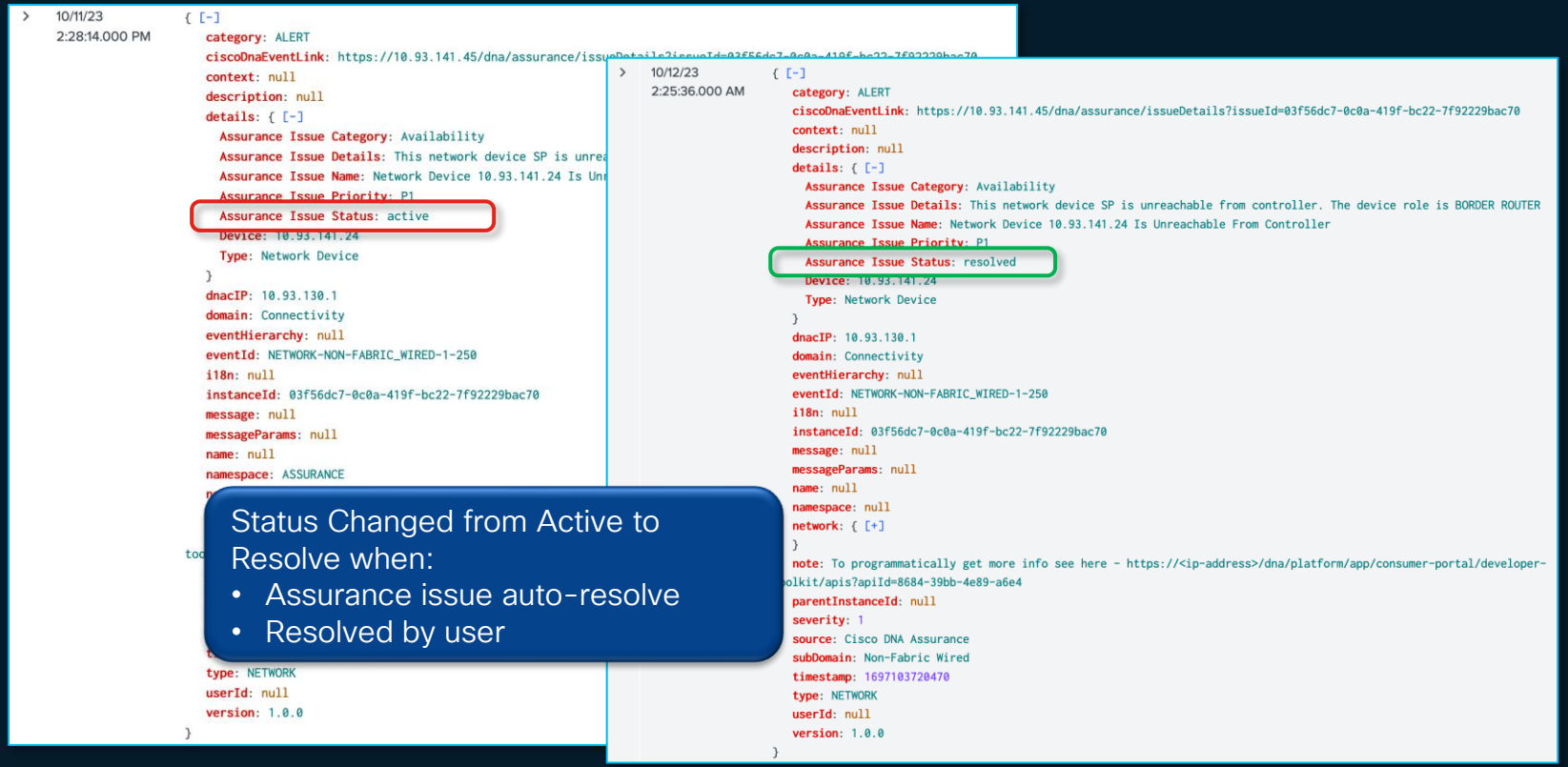
Catalyst Center Webhook Update



Status Changed from Active to Resolve when:

- Assurance issue auto-resolve
- Resolved by user

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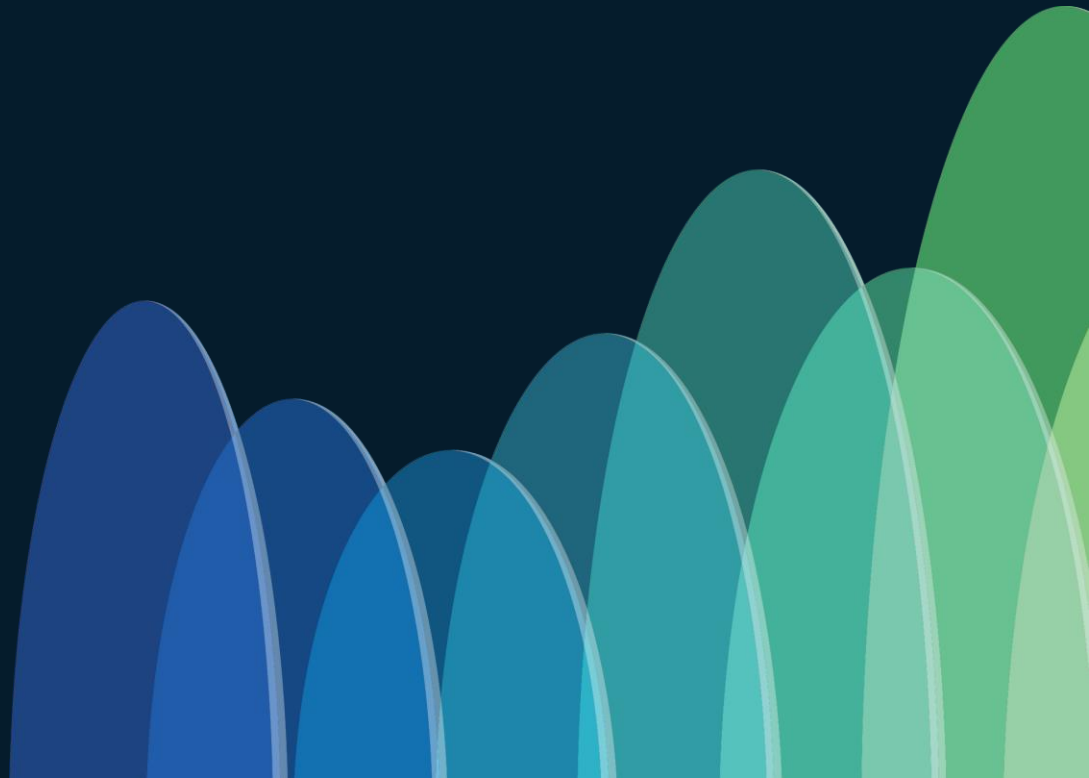
Demo Webhook Receiver



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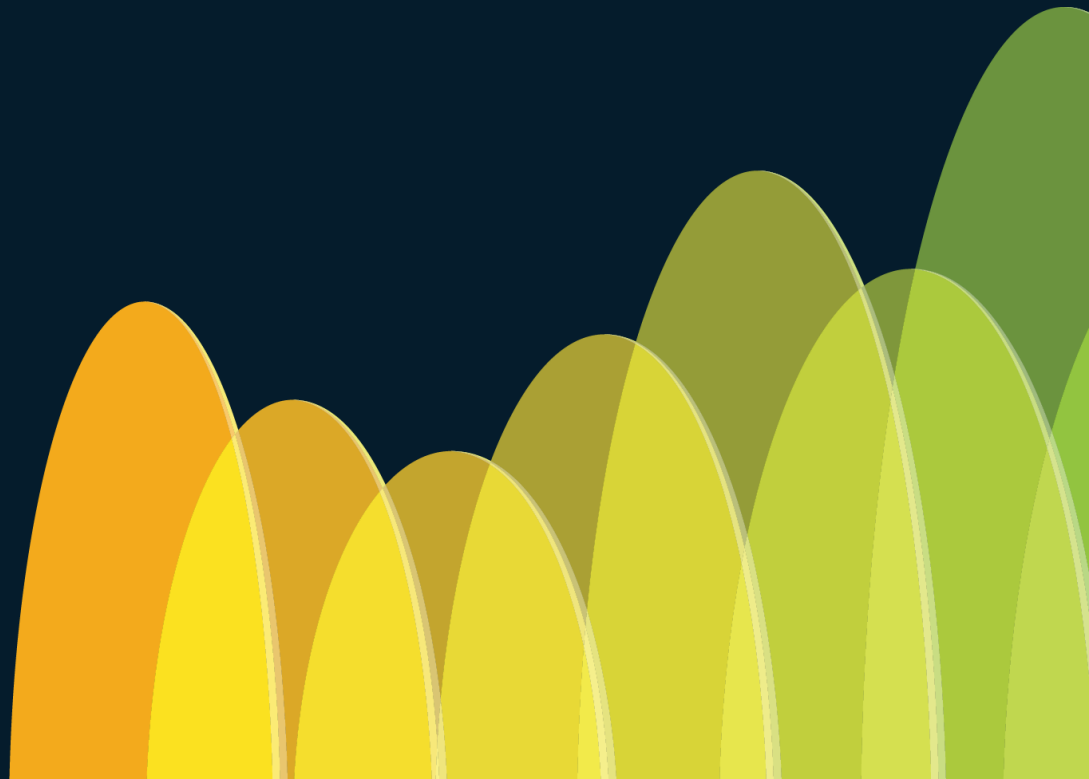
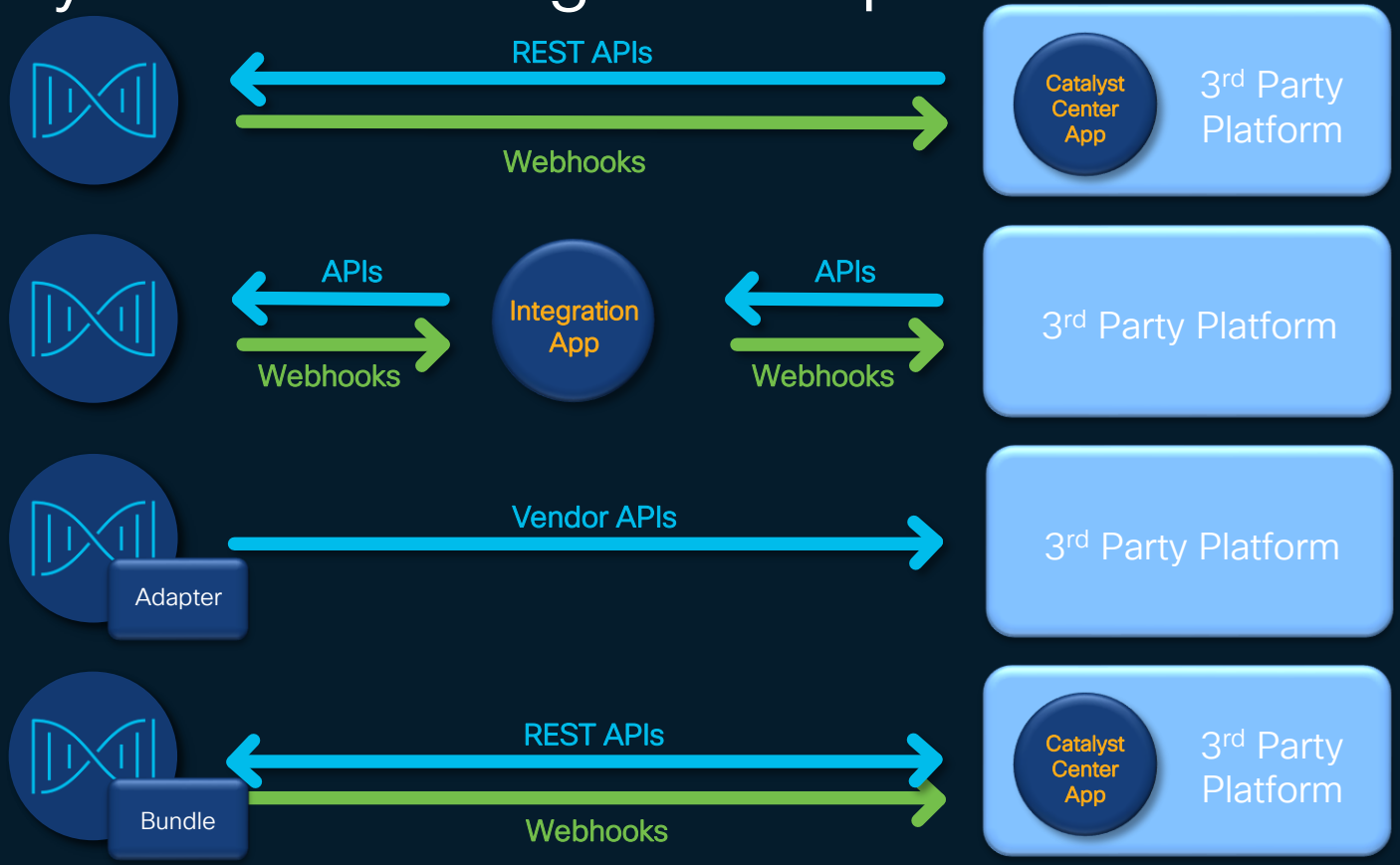
Integrations



Catalyst Center Integration Options



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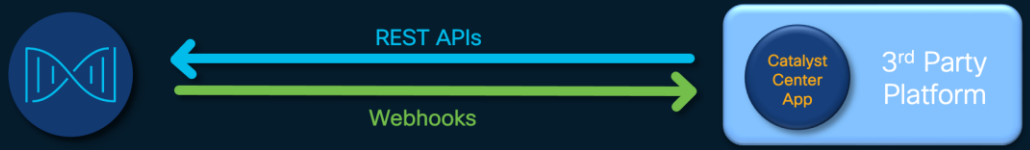
Direct Integrations

- Catalyst Center Notifications sent using Webhooks
- App may call Catalyst Center REST APIs to:
  - Enrich the issue, client, device
  - Collect additional information: health, compliance, …
  - Run other automations workflows
- Forward the collected data, store for long term
- Log events, correlate with other platforms
- Build dashboards



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Integration Apps

- Rich features, innovation and maximum extensibility
- Enable GenAI use cases
- Supports non-matching API architectures, auth options, data encoding and data structures
- Ability to build custom integrations with any platforms
- May be required as a proxy between Catalyst Center and cloud platforms

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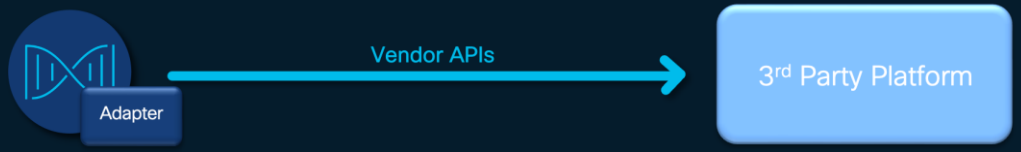
Adapter Integrations

- Catalyst Center software adapters developed for interoperability with other platforms
- The adapter will transform the event notification auth, header, data format and payload structure to match the destination
- Simple Catalyst Center workflows to integrate with 3rd Party Platforms
- Ready to use out-of-the-box



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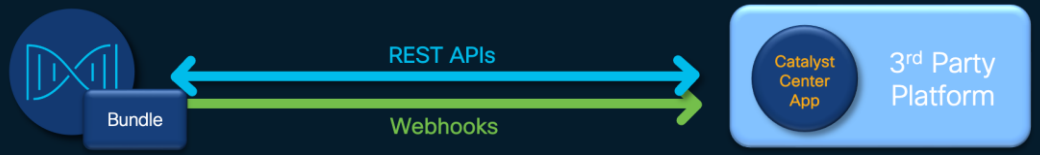
Bundle Integrations

- High value bi-directional, closed-loop integrations between Catalyst Center and 3rd Party Platforms
- Catalyst Center bundles and Integration Apps developed for interoperability between platforms
- Complex Catalyst Center workflows, processes and automations
- Integration App and bundle compatibility and certifications required
- Ready to use out-of-the-box, and customizable



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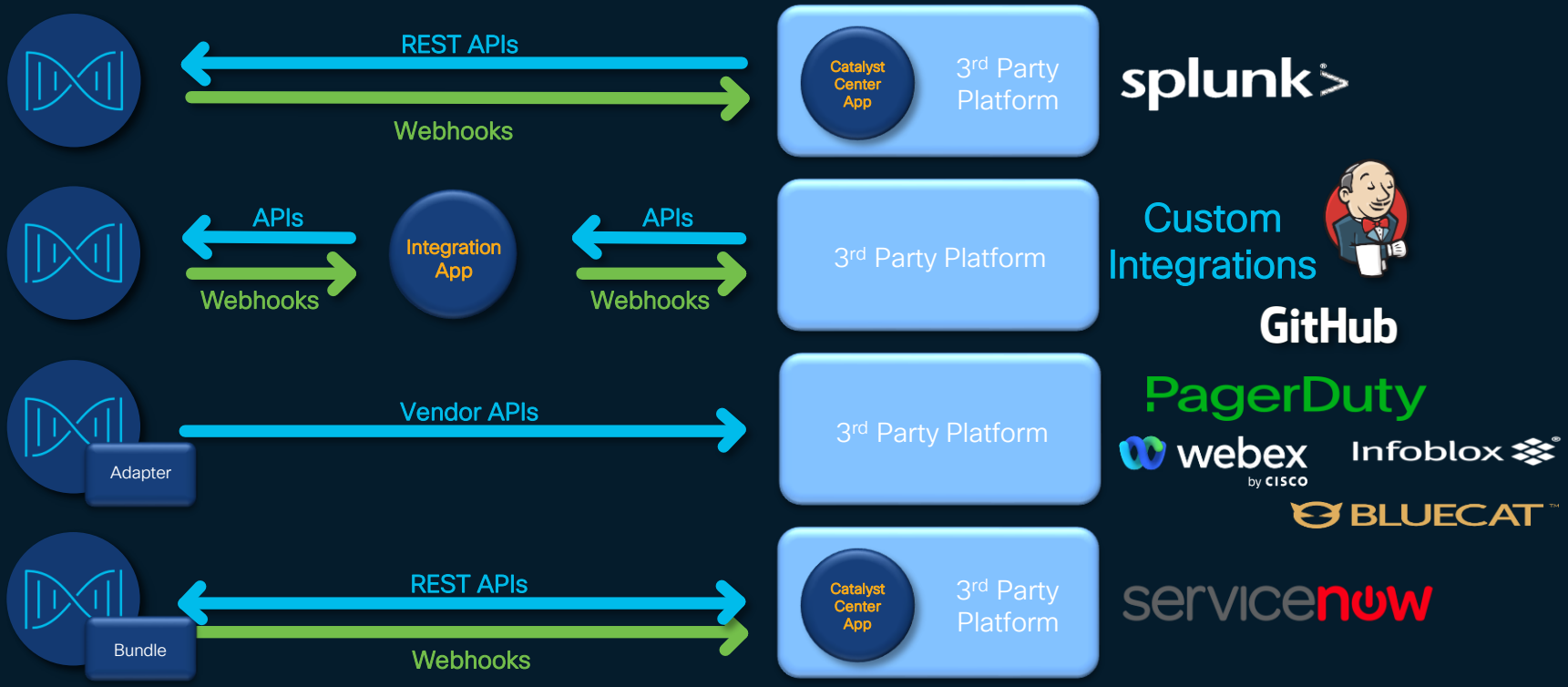
Catalyst Center Integration Options



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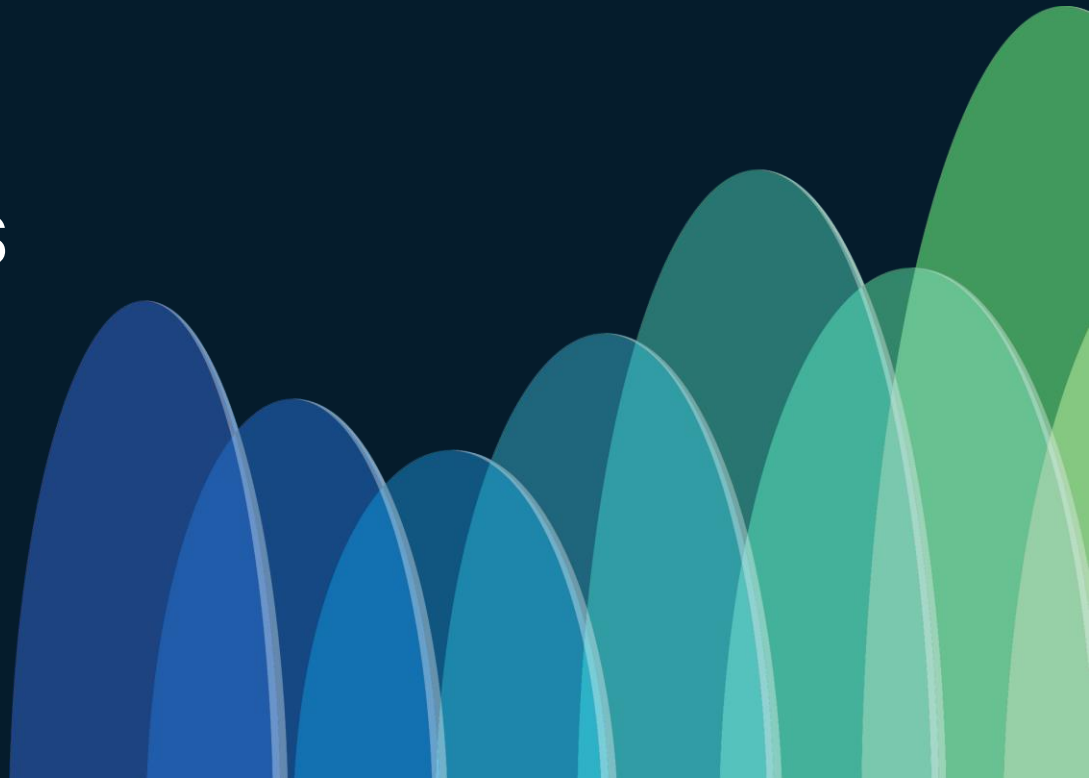
Demo
Microsoft Teams Integration App



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Developer Resources

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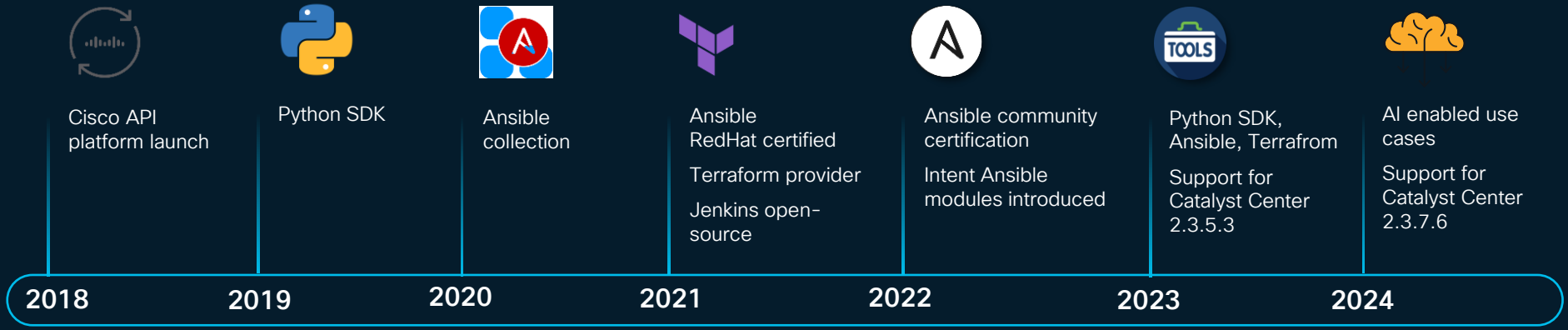
Catalyst Center: API Journey/Progression



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 – 6,300 downloads/month
- Ansible collection – 66,000 downloads
- Terraform provider – 44,000 downloads

25 New Catalyst Center DevNet sandboxes

Data as of 09/01/2024

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Catalyst Center API Focus Areas

Usability

Documentation

Ease of API use

Developer Resources

Completeness

Improve API coverage

Backward compatibility and versioning

Better Prioritization

Scale

Rate Limit

Concurrence

Bulk Operations

Conformance

Cisco Standards

API governance, Open API

API Best Practices

Quality

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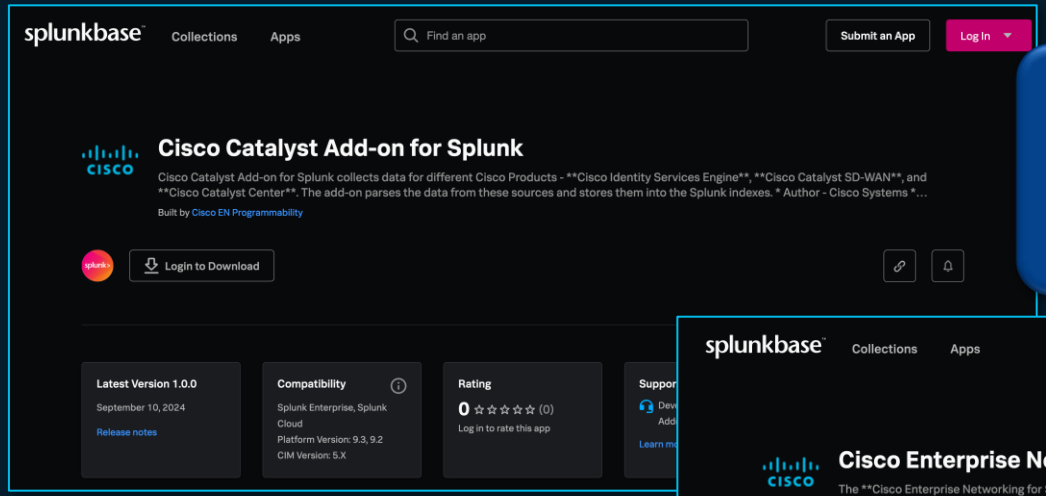
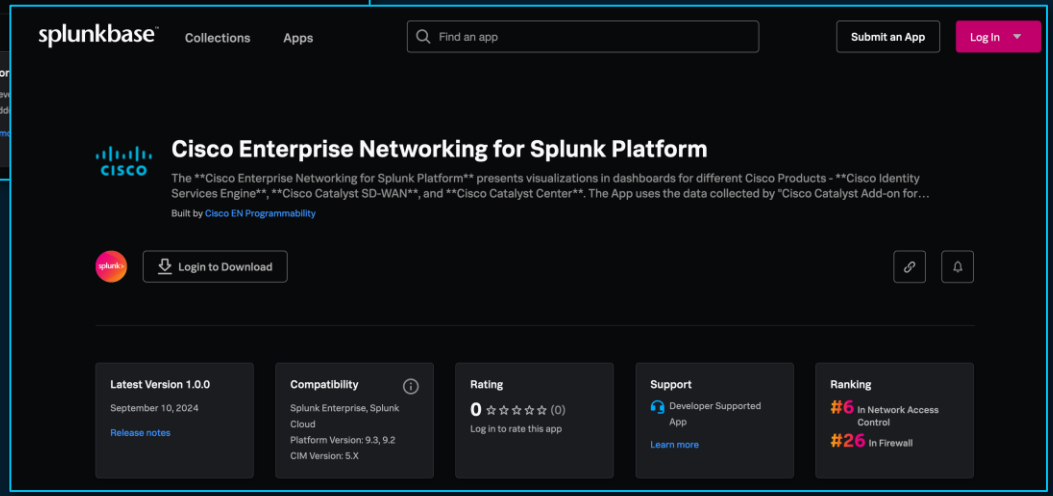
New Cisco EN Splunk Integration Apps





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

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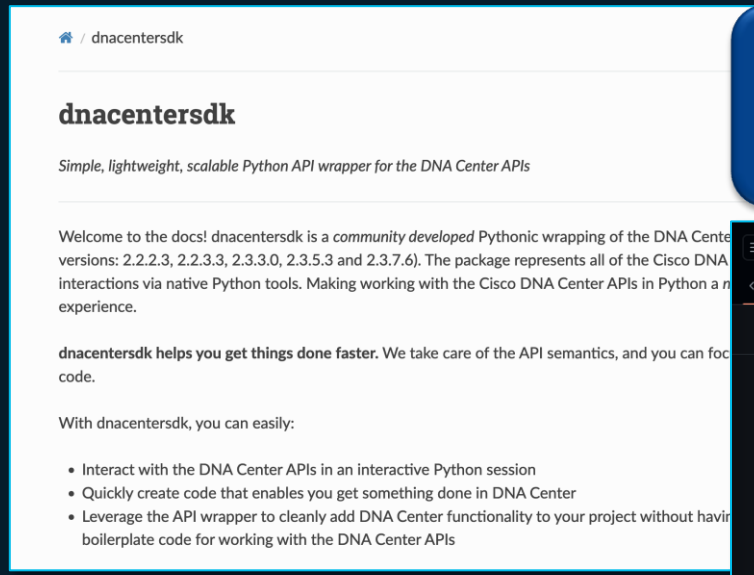
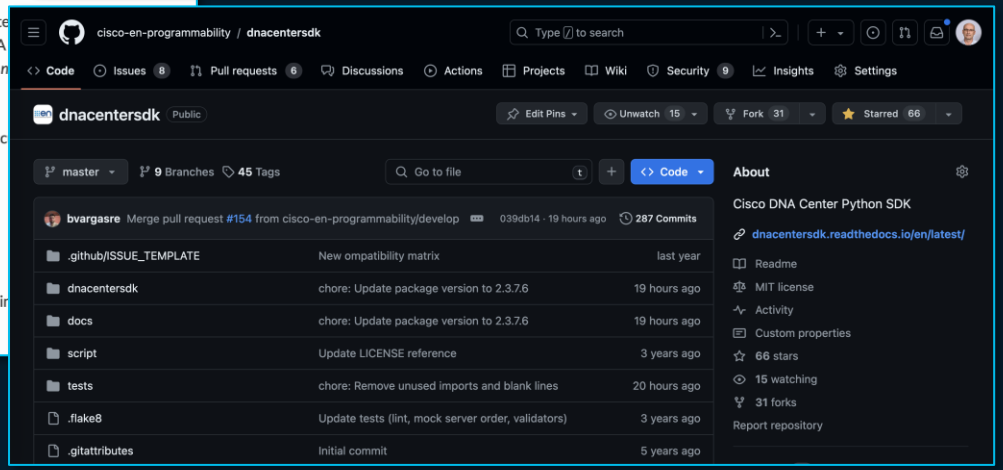
Catalyst Center Python SDK



https://dnacentersdk.readthedocs.io

- Covers all Cisco Catalyst Center REST APIs
- Support for Cisco Catalyst Center version 2.3.7.6
- First SDK version August 2019
- Average downloads/month 6,000+ (last 30 days 12,000+)



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

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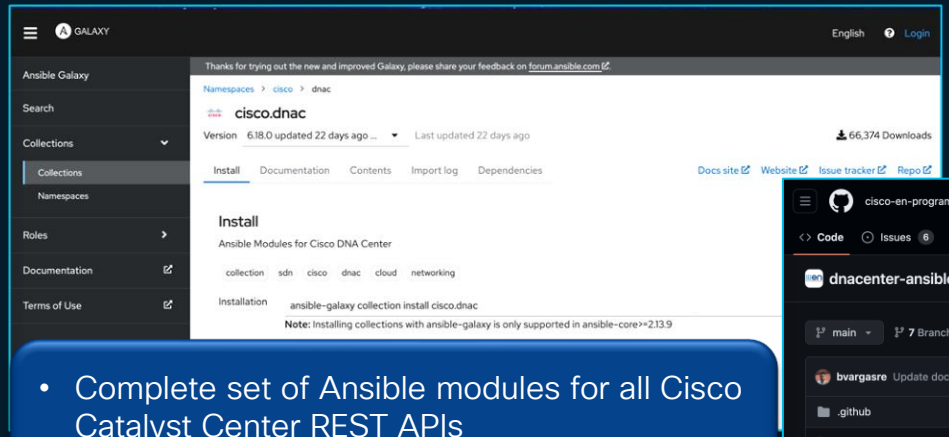
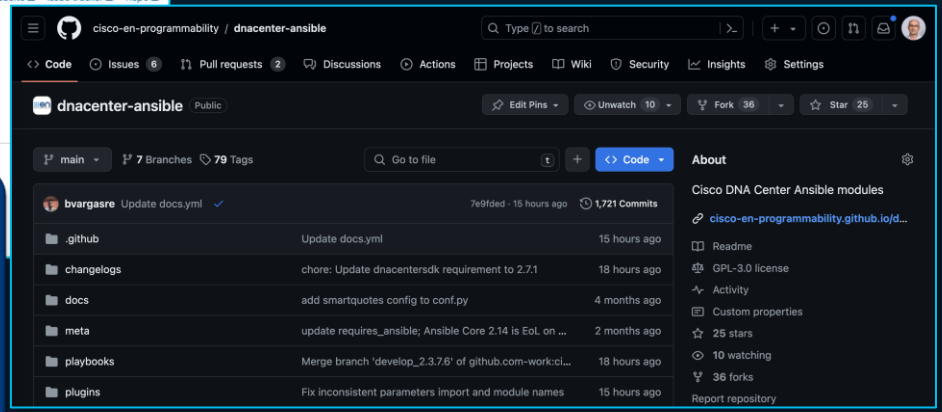
Cisco Catalyst Center Ansible Modules

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





- Complete set of Ansible modules for all Cisco Catalyst Center REST APIs
- First library version Dec 2020
- Certified by RedHat v 2.9 – 04/2021
- Community certified - 05/2022
- Support for Cisco Catalyst Center version 2.3.7.6
- 66,300+ downloads
- 33% increase in last 3 Months

https://github.com/cisco-en-programmability/dnacenter-ansible

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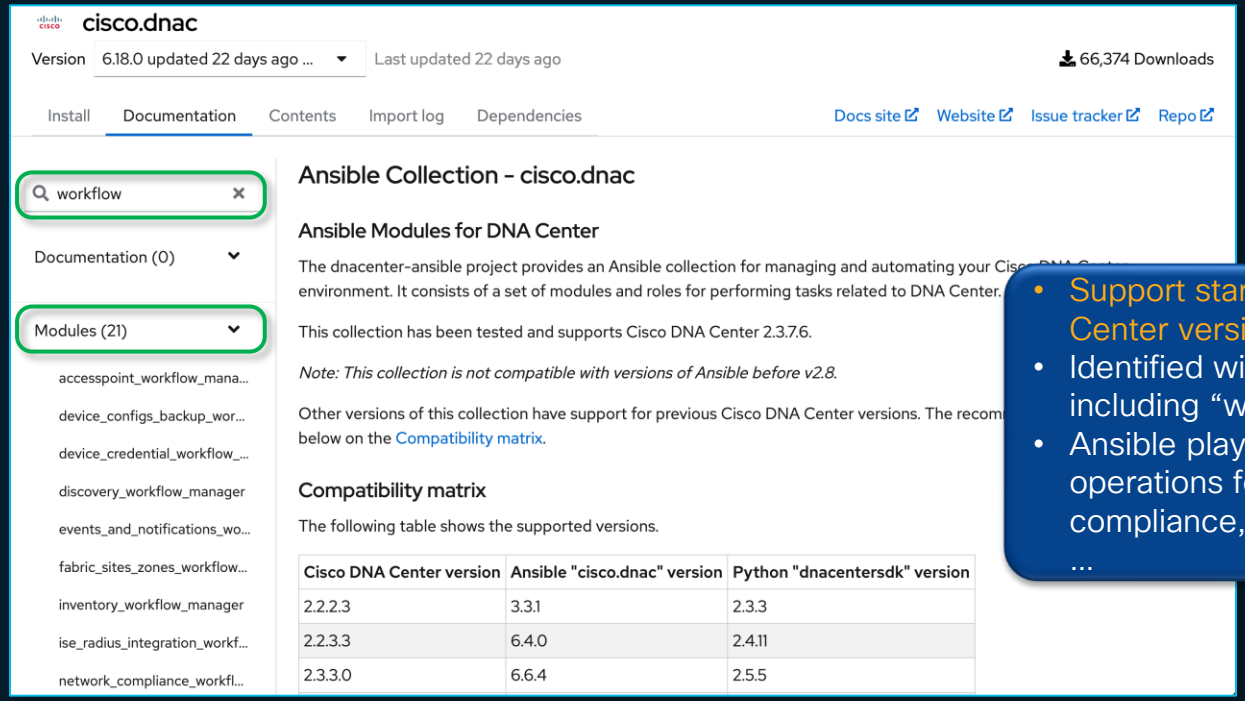
Cisco Developed, TAC/Engineering Supported



- 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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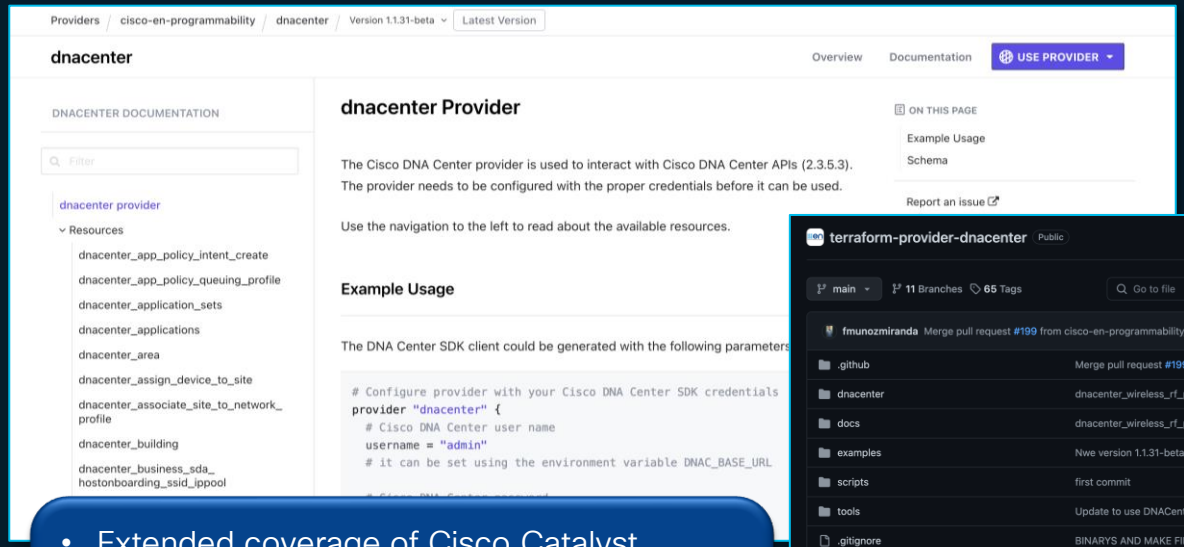
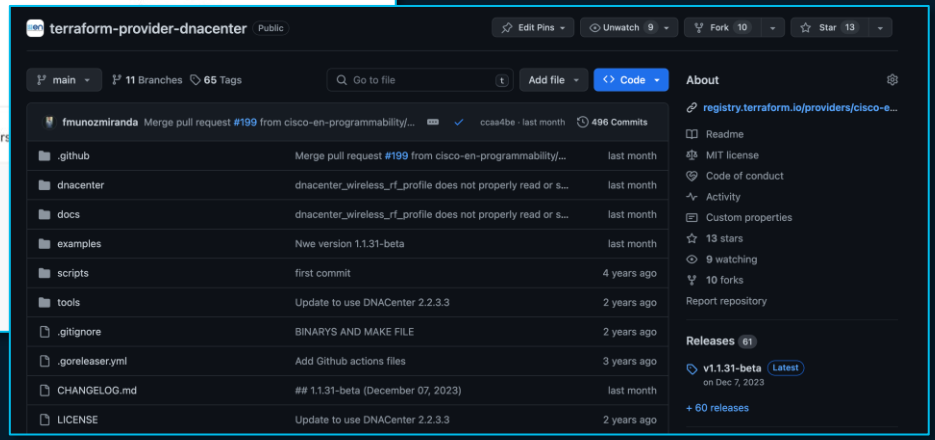
Terraform Provider and Go SDK

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





- Extended coverage of Cisco Catalyst Center REST APIs
- Support for Catalyst Center version 2.3.7.6
- Released January 2021
- 44,000+ downloads

https://github.com/cisco-en-programmability/terraform-provider-dnacenter

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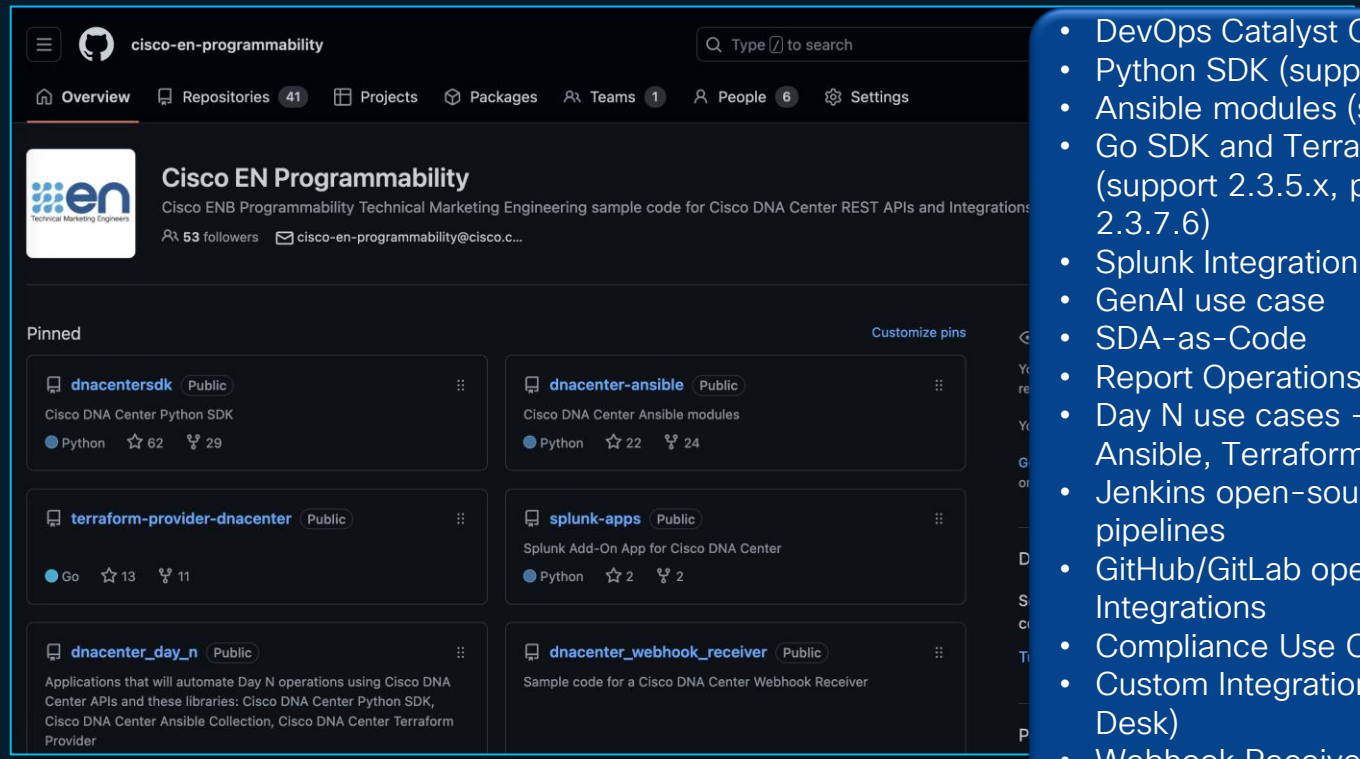
Cisco EN Programmability GitHub Org



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

- DevOps Catalyst Center use cases
- Python SDK (support 2.3.7.6)
- Ansible modules (support 2.3.7.6)
- Go SDK and Terraform provider (support 2.3.5.x, pending support 2.3.7.6)
- Splunk Integration Apps
- GenAI use case
- SDA-as-Code
- Report Operations
- Day N use cases – Python SDK, Ansible, Terraform
- Jenkins open-source Integration and pipelines
- GitHub/GitLab open-source Integrations
- Compliance Use Cases
- Custom Integration App (Jira Service Desk)
- Webhook Receiver
- Other sample code

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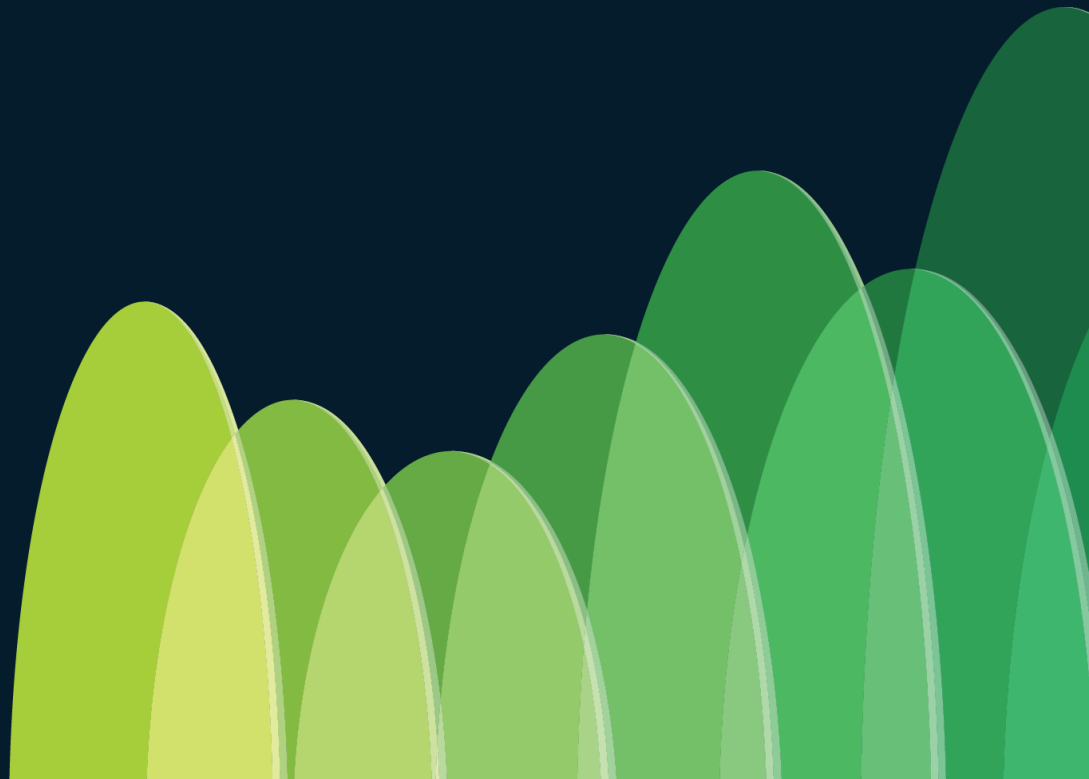
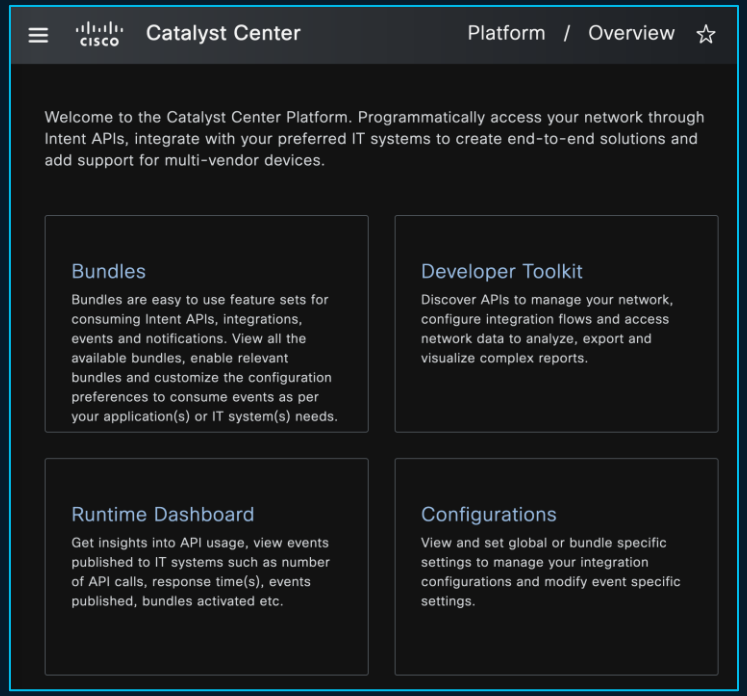
Summary



Catalyst Center APIs, Events, Integrations

- Manage Catalyst Center and the 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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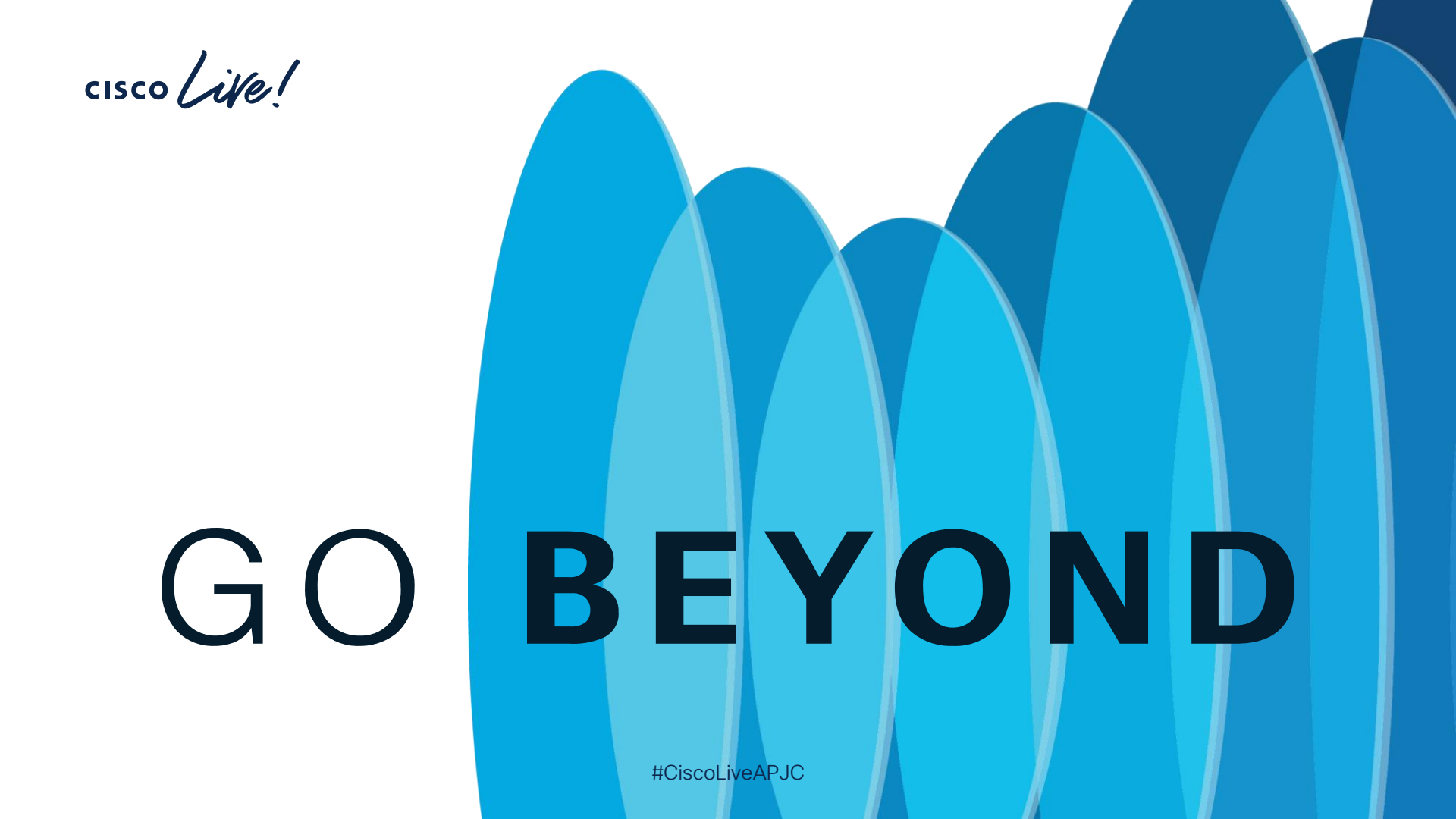
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