You make **possible**

Intent APIs
in Cisco DNA Center

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Agenda

- Cisco DNA Center Platform

- Intent API – overview

- Intent API – how to use?

- Intent API – demo

- References

What's in it for me?

| In this Session	Out of Scope
Cisco DNA–Center Platform overview	Cisco DNA–Center basics
How to start & basic API examples	Advanced API examples
Live demo during the session	Troubleshooting & debugging

Target audience is technical attendees knowing the basics of Cisco DNA–Center and looking for overview and basic understanding how to start and effectively use APIs in Cisco DNA–Center.

Cisco DNA – from products to platforms
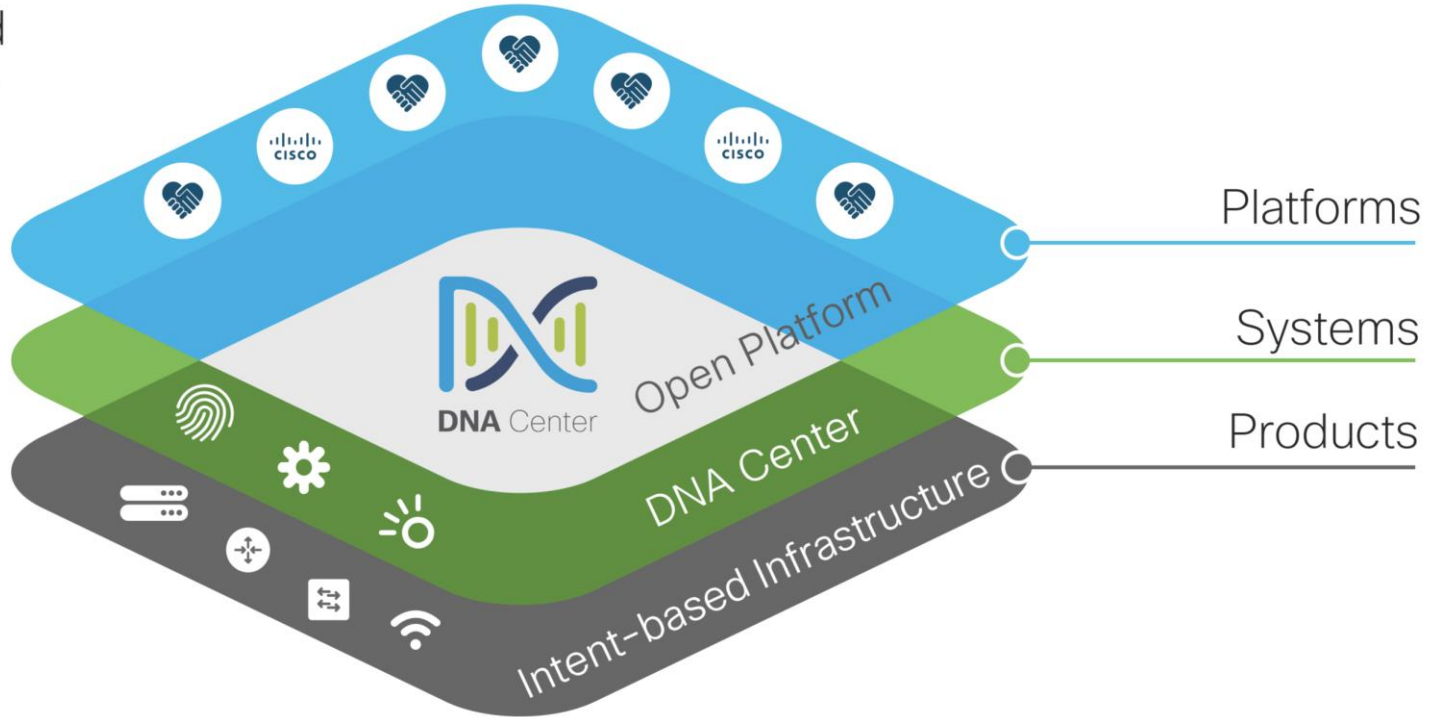
Cisco DNA Center – platform overview

IT and Network System Process

servicenow	ITSM
Infoblox	IPAM
+ableau	Reporting
MICRO FOCUS	ITSM
LiveAction	Analytics

Business and Network Intent APIs

Application Policy

Assurance

Wireless Provisioning

Plug-n-Play

Topology

Software Image Management (SWIM)

Network Inventory / Discovery

Command Runner

Template Programmer

eNFV Provisioning

APIs

Adapters

Adapters

SDKs

3rd Party SDKs

Map 3rd Party Network Devices to Data Model

Level 1 Operations support:
Discovery, Inventory, Topology, Availability, Health Score

X-Domain Integration

Networking	cisco Meraki
Security	cisco Stealthwatch
Data Center	cisco Cisco ACI

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Business and Network Intent API

Intent API:

- exposes specific capabilities of Cisco DNA Center Platform (Northbound REST API),

- provides standard network-based resource operations such as create/update/delete on objects,

- supports the standard HTTP verbs GET, POST, PUT and DELETE,

- simplifies the process of creating workflows that consolidate multiple network actions.

API vs Intent API

"Atomic" API:

- create wireless interface API

- configure WLAN settings API

- change security settings API

etc.

Intent API:

- SSID provisioning API

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Intent API – purpose – why should I care?

- Enhance the overall network experience by:
  - optimizing end-to-end IT processes,
  - reducing Total Cost of Ownership (TCO),
  - developing new value-added network solutions.

Cisco DNA Center Platform - installation

Cisco DNA Center   DESIGN   POLICY   PROVISION   ASSURANCE   PLATFORM

System 360   **Software Updates**   Settings   Data Platform   Users   Backup & Restore

Updates

Installed Apps

Installed Applications

DNA Center Core	Version	Action
Automation – Base *i*	2.1.78.60109	Uninstall *i*
Cisco DNA Center Global Search *i*	1.0.0.44	Uninstall *i*
Cisco DNA Center UI *i*	1.4.0.244	Uninstall *i*
NCP – Base *i*	2.1.78.60109	Uninstall *i*
NCP – Services *i*	2.1.78.60109	Uninstall *i*
Network Controller Platform *i*	2.1.78.60109	Uninstall *i*
Network Data Platform – Base Analytics *i*	1.4.0.116	Uninstall *i*
Network Data Platform – Core *i*	1.4.0.328	Uninstall *i*
Network Data Platform – Manager *i*	1.4.0.101	Uninstall *i*

Automation	Version	Action
Application Policy *i*	2.1.75.170275	Uninstall
Command Runner *i*	2.1.78.60109	Uninstall
Device Onboarding *i*	2.1.78.60109	Uninstall *i*
Image Management *i*	2.1.78.60109	Uninstall *i*
SD Access *i*	2.1.78.60109	Uninstall
Stealthwatch Security Analytics *i*	2.1.78.1090091	Uninstall

Assurance	Version	Action
Assurance – Base *i*	1.4.0.488	Uninstall *i*
Automation – Sensor *i*	2.1.78.60109	Uninstall
Machine Reasoning *i*	2.1.78.210010	Uninstall
Path Trace *i*	2.1.78.60109	Uninstall *i*

Programmability And Integrations	Version	Action
Cisco DNA Center Platform *i*	1.2.0.50	Uninstall *i*

Cisco DNA Center Platform – API activation

Cisco DNA Center Platform – API activation

Cisco DNA Center   DESIGN   POLICY   PROVISION   ASSURANCE   **PLATFORM**

Overview   **Manage** ⌄   Developer Toolkit ⌄   Runtime Dashboard

Bundles

▽ Filter   ≡Q Find

Bundle ▲	Status	Description	
Basic ITSM (ServiceNow) CMDB synchronization Cisco Systems, Inc. v1.2.0 | DNAC 1.2.5 + Version Dated Oct 24, 2019	NEW	You can schedule a synchronization or trigger an update between the DNA Center device inventory and your ITSM(ServiceNow) configuration management database(CMDB). These activities integrate DNA Center processes into the IT System Management processes of incident, change and problem management. Note: If your network devices...	Enable
DNA Center REST API Cisco Systems, Inc. v1.2.0 | DNAC 1.2.5 + Version Dated Aug 28, 2019	DISABLED	This bundle contains the REST API supported by Cisco DNA Center. These REST APIs provide a rich set of capabilities, including the ability to discover network devices, query network health and provision network devices.	① Enable
Network Events for REST API Endpoint Cisco Systems, Inc. v1.2.0 | DNAC 1.2.5 + Version Dated Aug 19, 2019	NEW	This bundle is deprecated from Release 1.3.1.0 and will be removed from the future releases. See Release Notes for more details.	Enable
Network Issue Monitor and Enrichment for ITSM (ServiceNow) Cisco Systems, Inc. v1.2.0 | DNAC 1.2.5 + Version Dated Oct 24, 2019	NEW	You can use this bundle to monitor your network for assurance and maintenance issues, and then publish the event details about these issues to an ITSM(ServiceNow) system. This bundle also contains APIs that extract rich network context data. Please note that, if your network devices have not yet been synchronized between...	Enable

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Cisco DNA Center Platform – API overview

API online documentation - DevNet

API – built-in documentation

Get Site Health

DESCRIPTION

Returns Overall Health information for all sites

Method	URL
GET	https://10.48.18.192/dna/intent/api/v1/site-health

TAGS

site health API

PARAMETERS

Request Query Parameters

Name	Description	DataType	Default Value	Required
timestamp	Epoch time(in milliseconds) when the Site Hierarchy data is required	string		false

RESPONSES

Response Codes

Code	Message
200	The request was successful. The result is contained in the response body.
400	The client made a request that the server could not understand (for example, the request syntax is incorrect).
401	The client's authentication credentials included with the request are missing or invalid.
404	The client made a request for a resource that does not exist.
500	The server could not fulfill the request.

API – built-in documentation

MODEL SCHEMAS

Response

Model   Model Schema

⌃ root (map, optional)
    ⌃ response (array<map>, optional)
        siteName (string, optional)
        siteId (string, optional)
        parentSiteId (string, optional)
        parentSiteName (string, optional)
        siteType (string, optional)
    ⌃ latitude (map, optional)
    ⌃ longitude (map, optional)
        healthyNetworkDevicePercentage (string, optional)
        healthyClientsPercentage (string, optional)
        clientHealthWired (string, optional)
    ⌃ clientHealthWireless (map, optional)
        numberOfClients (string, optional)
    ⌃ clientNumberOfIssues (map, optional)
    ⌃ networkNumberOfIssues (map, optional)
        numberOfNetworkDevice (string, optional)
    ⌃ networkHealthAverage (map, optional)

POLICIES

API Throttling   Allow upto **5** requests in **1** minute

① [Code Preview] [Try It]

How to run API calls?
Option 1 – code snippets

Code Preview

Select Language

Python

Snippet

```
1   //'x-auth-token': 'x-auth-token-value'
2    //'content-type': 'application/json'
3    import http.client
4
5   conn = http.client.HTTPSConnection("10.48.18.192")
6
7   headers = { 'content-type': "application/json" }
8
9   conn.request("POST", "/dna/intent/api/v1/network-device-poller/cli/read-request", headers=headers)
10
11  res = conn.getresponse()
12  data = res.read()
13
14  print(data.decode("utf-8"))
```

Close

API – built-in documentation

MODEL SCHEMAS

Response

Model   Model Schema

˄ root (map, optional)

   ˄ response (array<map>, optional)

       siteName (string, optional)

       siteId (string, optional)

       parentSiteId (string, optional)

       parentSiteName (string, optional)

       siteType (string, optional)

     ˄ latitude (map, optional)

     ˄ longitude (map, optional)

       healthyNetworkDevicePercentage (string, optional)

       healthyClientsPercentage (string, optional)

       clientHealthWired (string, optional)

     ˄ clientHealthWireless (map, optional)

       numberOfClients (string, optional)

     ˄ clientNumberOfIssues (map, optional)

     ˄ networkNumberOfIssues (map, optional)

       numberOfNetworkDevice (string, optional)

     ˄ networkHealthAverage (map, optional)

POLICIES

API Throttling   Allow upto **5** requests in **1** minute

Code Preview   Try It   2

How to run API calls?
Option 2 – try it now

Try It

Method

GET

Public URL :

https://10.48.18.192/dna/intent/api/v1/network-device/ip-address/${ipAddress}

Name	**Description**	**Value**
Path Params		
ipAddress*	Device IP address	172.31.0.1

Response   **Status Code:** 200

```
1  {
2      "response": {
3          "type": "Cisco Catalyst 9500 Switch",
4          "memorySize": "NA",
5          "family": "Switches and Hubs",
6          "roleSource": "AUTO",
7          "hostname": "KRK04-BORDER-01.cisco.com",
8          "lastUpdateTime": 1577098514318,
9          "macAddress": "00:a3:d1:44:d2:00",
10         "serialNumber": "FCW2124A4PC",
11         "collectionInterval": "Global Default",
12         "inventoryStatusDetail": "<status><general code=\"SYNC\"/></status>",
```

Cancel   Run

How to run API calls?
Option 3 – CURL

```
$ curl --insecure
      --request POST
      --header "Authorization: Basic $(echo -n api:CiscoLive2020 | base64)"
       https://10.48.18.192/dna/system/api/v1/auth/token
```

{"Token":"eyJ0eXAiOiJKV1QiLCJhbGciOiJSUzI1NiJ9.eyJzdWIiOiI1ZTAwOWZhYTZlMzcyZDAwYzIwODQ0Yjk
iLCJhdXRoU291cmNlIjoiaW50ZXJuYWwiLCJ0ZW5hbnROYW1lIjoiVE5UMCIsInJvbGVzIjpbIjVkZWMzZTdlNmUzN
zJkMDBjMjA4MzM0NSJdLCJ0ZW5hbnRJZCI6IjVkZWMzZTdlNmUzNzJkMDBjMjA4MzM0MyIsImV4cCI6MTU3NzEwMjg
wNiwiaWF0IjoxNTc3MDk5MjA2LCJqdGkiOiJmZTJkOTViYy04NTAyLTRiZTUtYjQyNC0wMmQzZGVmmMGM5OGEiLCJ1c
2VybmFtZSI6ImFwaSJ9.SzZTYIXpljsWLmBmVWvHdEddMJCXSoavV3Smc6hNZkOEhuJB6ilLBJfVZegbty9utrFsQ5
DF3EfuY4_YfABh9l1R_rSim6Qw57YYmJbgBleAjoVZArzzyxpX9lMwSJ8qMc6fmkzGiXfs9n4DcVruGV0StnuGgyRy
5JDP1_ov8046y4rIibw04PzDnJKzHGBCCmyonR857Pd_EF2RzutQT4IIDvK7aQW6wPADVQCseqyKWsk8_OFYDtD_aP
n_VpI47UOpkZuc77iWVHDZL3Nm8xzJAHTNgp49TDDBblQxytJCON8lbBQjBsL1zDi46WTE6tWmyGYzfVsOg"}

How to run API calls?
Option 4 – Postman

POSTMAN

▶ Get auth token   Examples (0) ▼

| POST ▼ | https://{{dnac}}/dna/system/api/v1/auth/token | **Send** ▼ | Save ▼ |

Params   **Authorization** ●   Headers (2)   Body   Pre-request Script   Tests ●   Cookies   Code   Comments (0)

TYPE

| Basic Auth ▼ |

The authorization header will be automatically generated when you send the request. Learn more about authorization

Preview Request

Username   {{username}}

Password   {{password}}

              ☑ Show Password

Body Cookies (2) Headers (14) Test Results   Status: **200 OK** Time: **355 ms** Size: **1.18 KB**   Save   Download

Pretty   Raw   Preview   JSON ▼   ⇥

```
1 ▾ {
2        "Token": "eyJ0eXAiOiJKV1QiLCJhbGciOiJSUzI1NiJ9.eyJzdWIiOiI1ZTAwOWZhYTZlMzcyZDAwYzIwODQ0YjkiLCJhdXRoU291cmNlIjoiaW5(
3 }
```

Intent API – Available categories

- Authentication

- Know your network

- Site Management

- Connectivity

- Operational Tasks

- Policy

Cisco DNA-Center – Intent API categories

Authentication

- Authentication API provide an authorized token for accessing any REST API.

- The token obtained using this API is required to be set as value to the X-Auth-Token HTTP Header for all API calls to Cisco DNA

Cisco DNA-Center – Intent API categories

Know Your Network

- can be used to discover details about clients, sites, topology and devices,

- provides programmatic REST APIs to add devices to the network and export device data.

∨ Know Your Network

Sites

Topology

Devices

Clients

Users

Issues

Cisco DNA-Center – Intent API categories

Site Management

- help provision enterprise networks with zero touch deployment,

- manage the activation and distribution of software images in the network.

∨ Site Management

Site Design

Network Settings

Software Image Management (SWIM)

Device Onboarding (PnP)

Configuration Templates

Cisco DNA-Center – Intent API categories

Connectivity

- provide the mechanism to configure and manage non-fabric wireless networks as a single step process.

⌄ Connectivity

Fabric Wired

Non-Fabric Wireless

Cisco DNA-Center – Intent API categories

Operational Tasks

- provide programmatic access to DNA Center tasks such as configure and manage CLI templates, discover network devices, configure network settings and path trace through the network.

⌄ Operational Tasks

Command Runner

Network Discovery

Path Trace

File

Task

Tag

Cisco DNA-Center – Intent API categories

Policy

- allows to create policies that reflect your organization's business intent for a particular aspect of the network, such as network access.

∨ Policy

Application Policy

Demo

Intent API in action

accenture

Tickets and requests in ServiceNow automate the process when DNA Center Assurance detects device noncompliance.

INTENT APIS (SOFTWARE IMAGE MANAGEMENT/SWIM), INTEGRATION APIS (SERVICENOW)

Intent API in action

Use DNA Center as a single source of truth for network hardware inventory and port usage to inform business analytics.

INTENT APIS (INVENTORY, COMMAND RUNNER)

Intent API in action

IBM

Automated cloning to create quality, efficiency, and cost savings for a large global site rollout.

INTENT APIS (INVENTORY, TOPOLOGY)

How to start?

1) I have Cisco DNA-Center

- Install Cisco DNA-Center Platform

- Enable REST API bundle

- FUN TIME ☺

How to start?

1) I have Cisco DNA-Center

- Install Cisco DNA-Center Platform

- Enable REST API bundle

- FUN TIME ☺

2) I do not have Cisco DNA-Center

- Always-on sandbox (shared)

- Reservation-based sandboxes (dedicated)

- FUN TIME ☺

Cisco DNA-Center
Always-on sandbox

24 Version 1.2.10

Cisco DNA Center
Always On Lab

ALWAYS ON

Cisco DNA Center v.1.2.10 Always-On Sandbox

- Access at any time without making a reservation or using VPN connection
- Perfect for learning the Cisco DNA Center GUI or experimenting with the REST API
- Provides access to a pre-configured network topology running on genuine Cisco hardware
- Cannot configure the network or devices on it
- Cannot activate and enforce policy on network devices
- Because this sandbox is always available to all users, any other user may potentially overwrite your work at any time.
- **NOTE:** The **Platform** tab of the Cisco DNA Center GUI is not visible in this Sandbox, but the Cisco DNA Center platform is pre-installed. You can use an external HTTP client (such as Postman) to send REST requests to this Sandbox, and you can view the API documentation on Cisco DevNet.

24 Version 1.2.6

Cisco DNA Center
Always On Lab

ALWAYS ON

Cisco DNA Center v.1.2.6 Always-On Sandbox

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https://developer.cisco.com/docs/dna-center/#!sandboxes/cisco-dna-center-sandboxes

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Cisco DNA–Center
Reservation–based sandboxes

Version 1.2.10

Cisco DNA Center
Hardware Lab 1

REQUIRES RESERVATION

Cisco DNA Center v.1.2.10 Lab 1

- Requires a reservation and setup of VPN
- Provides your own private lab environment for the duration of the reservation, and you can allow other users to access the lab by invitation.
- Perfect for working on lighter-weight application development projects that do not require a large network
- Provides access to pre-configured network topologies running on genuine Cisco hardware
- You can configure the hardware and network topology.
- Provides a Linux VM development machine that resides on the lab network.
- Supports automated discovery of the hardware by Cisco DNA Center as well as enforcement of policy

Version 1.2.10

Cisco DNA Center
Hardware Lab 2
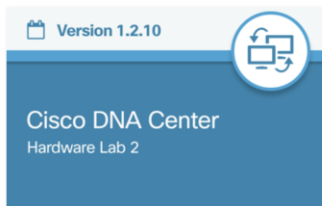
REQUIRES RESERVATION

Cisco DNA Center v.1.2.10 Lab 2

- Requires a reservation and setup of VPN
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- Provides access to pre-configured network topologies running on genuine Cisco hardware
- You can configure the hardware and network topology.
- Provides a Linux VM development machine that resides on the lab network.
- Supports automated discovery of the hardware by Cisco DNA Center as well as enforcement of policy

https://developer.cisco.com/docs/dna-center/#!sandboxes/cisco-dna-center-sandboxes

Reference materials

1) DevNet – Cisco DNA-Center:

   https://developer.cisco.com/docs/dna-center/

2) DevNet – Intent API - overview:

   https://developer.cisco.com/docs/dna-center/#!cisco-dna-center-v-1-2-6-and-later

3) DevNet – Cisco DNA-Center – Intent API (docs):

   https://developer.cisco.com/docs/dna-center/api/1-3-1-x/

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