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Hands-on Scaling Common Cisco DNA Center tasks via API

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DEVNET-2425

CISCO *Live!*

Barcelona | January 27-31, 2020



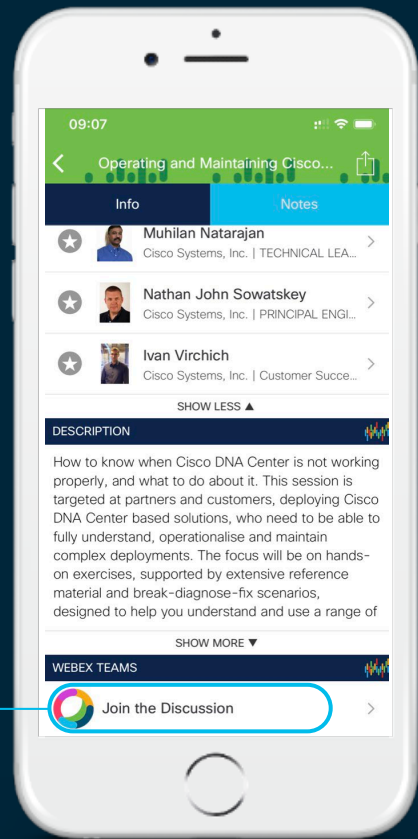
Cisco Webex Teams

Questions?

Use Cisco Webex Teams 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 Webex Teams or go directly to the team space
- 4 Enter messages/questions in the team space



Day0 – DayN

DEVNET-3603 Exploring DNAC Programmability

Thu 2pm

DEVNET-1228 Whirlwind Tour

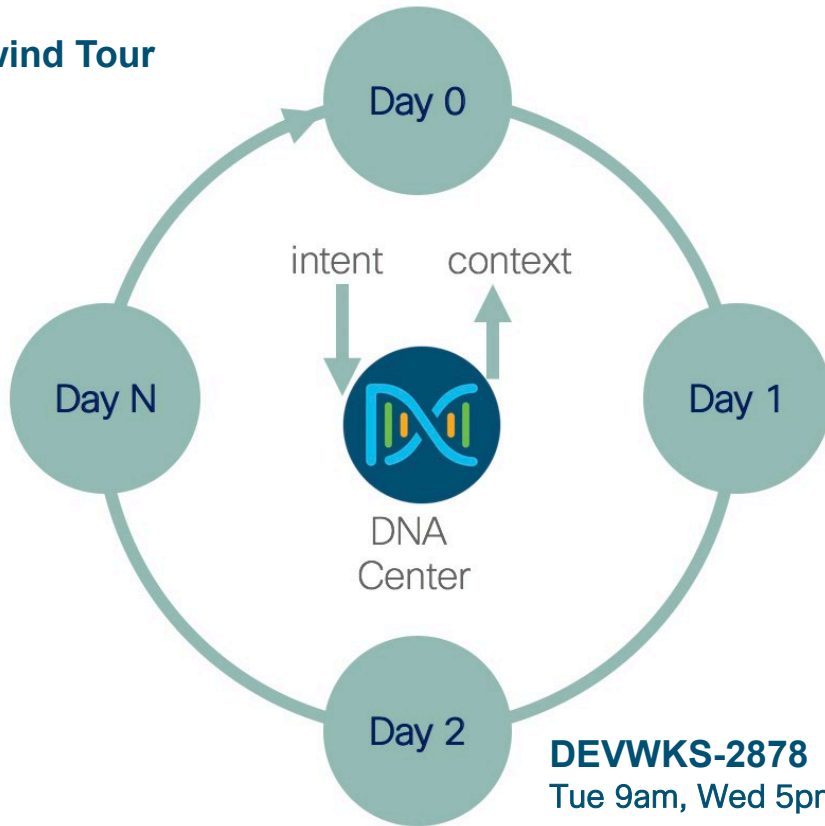
Tue 5pm

DEVNET-2877 DNACaaP

Wed 3pm

DEVWKS-2879 DNACaaP

Tue 3pm, Thu 9am



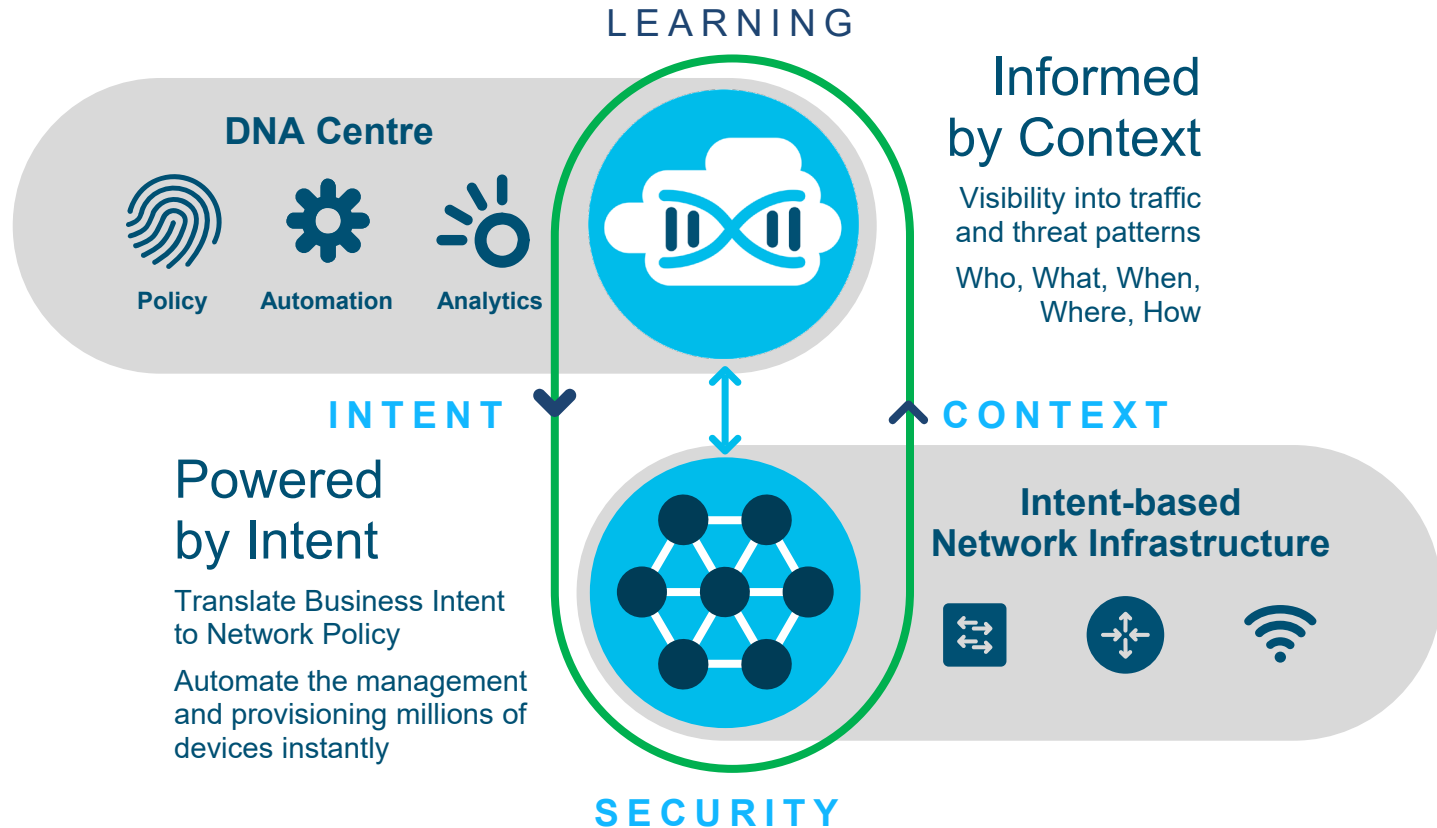
DEVNET-2425 Common Tasks

Thu 4pm

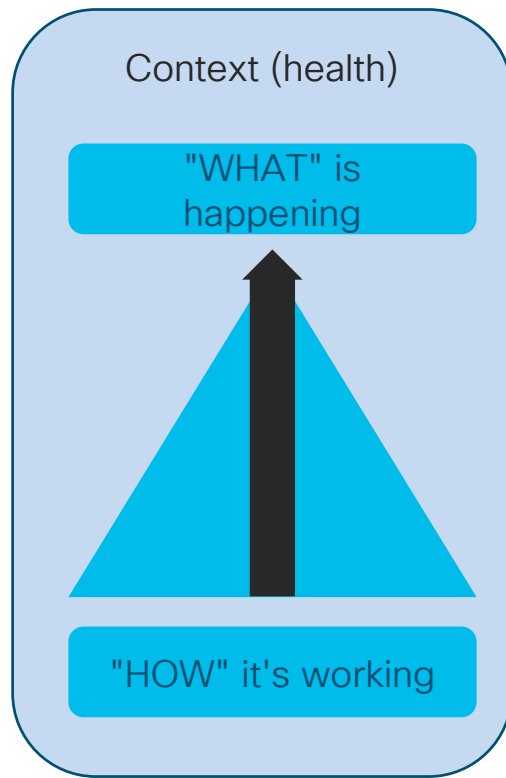
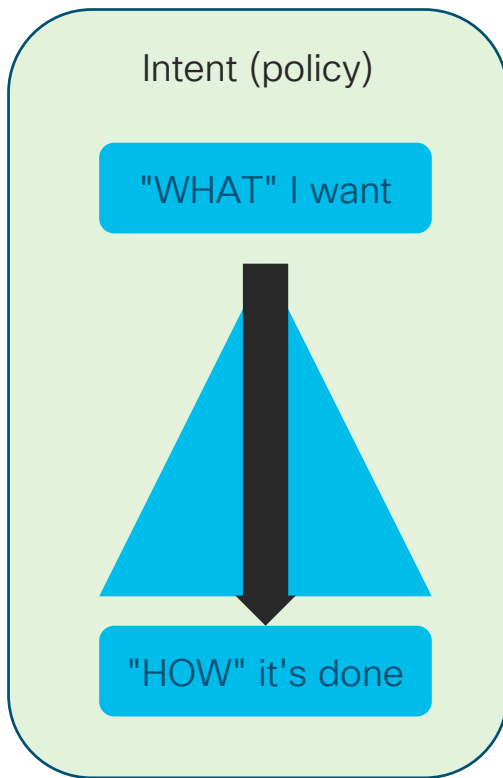
DEVWKS-2878 Assurance workshop

Tue 9am, Wed 5pm

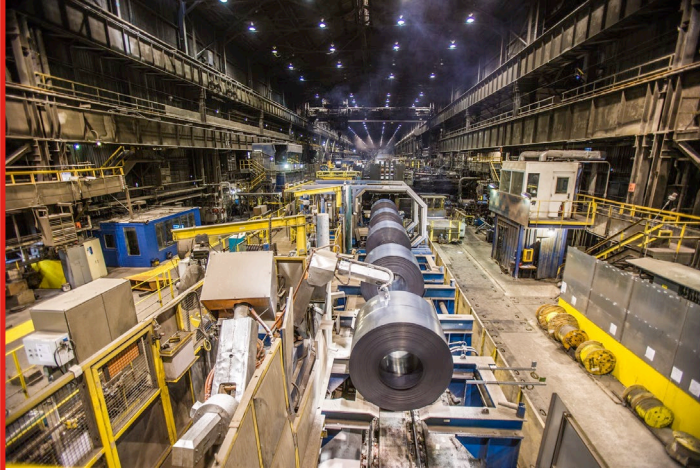
The Network. Intuitive



Abstractions



Why API?



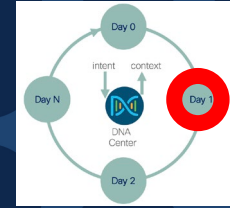
Automation



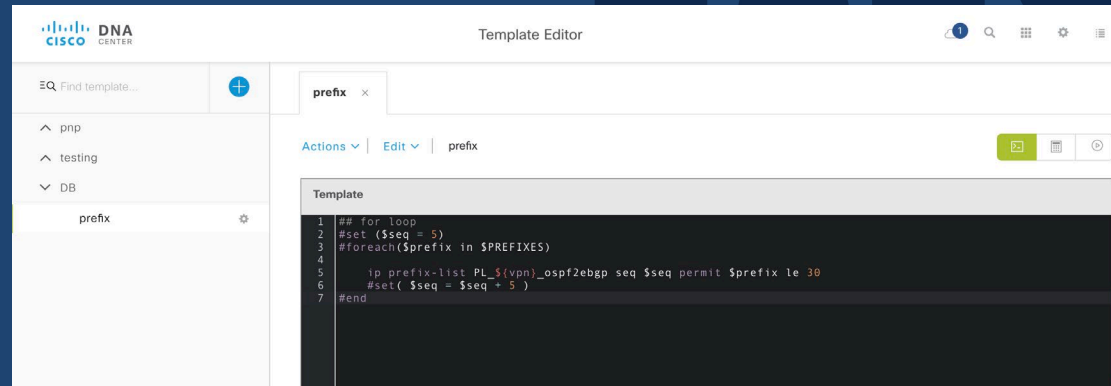
Integration



Innovation



Day 1 – Template



Examples

- `./template.py`
`./template.py --help`
`./template.py --template DB/prefix`
`./template.py --template DB/prefix --device 192.168.200.80 --params`
`'{"vpn":"adam","PREFIXES":["1.1.1.1/29", "2.2.2.2/29"]}'`

- <https://github.com/CiscoDevNet/DNAC-TemplateProgrammer>

Example Payload

<https://dnac/dna/intent/api/v1/template-programmer/template/deploy> POST

```
{  "targetInfo": [{
    "params": { "interface": "gig1/0/20","vlan": "20"},
    "type": "MANAGED_DEVICE_IP",
    "id": "10.10.50.2"
  }],
  "forcePushTemplate": false,
  "templateId": "610a718c-0a71-484b-a632-a79b64192cb7"
}
```

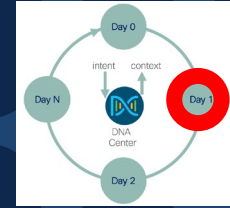
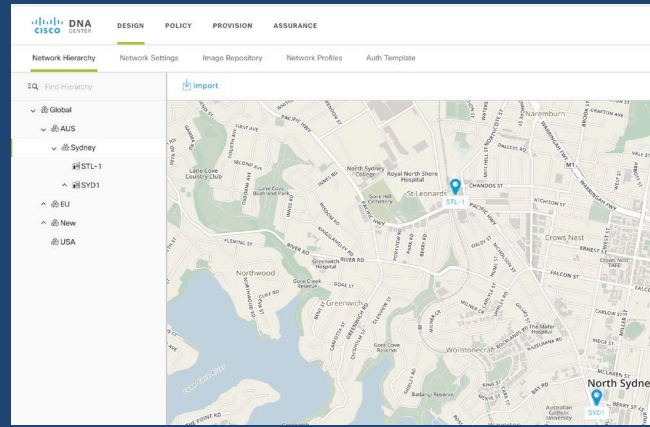
```
{
  "deploymentId": "Deployment of Template: 610a718c-0a71-484b-a632-a79b64192cb7.ApplicableTargets: [10.10.50.2]Template Deployemnt Id: 2fd83b9e-d396-4956-9ae7-842bf7ab1f10",
  "startTime": "",
  "endTime": "",
  "duration": "0 seconds"
}
```

NOTES

- All templates are versioned. Need to save && Commit. (There is API for this)
- Semantics of "**forcePushTemplate**". Default is NOT to re-apply a template with same variables.
- Default provisioning behaviour is to apply a single (or nested template) to a device. Also includes **site specific settings** (aaa, ntp etc). API just pushes template to device(s)
- Multiple device requires unique parameters for template (can duplicate)

Template API Summary

| Endpoint | Verb | Description |
|---|-----------------|--|
| dna/intent/api/v1/template-programmer/project | GET/POST/DELETE | CRUD on template projects |
| dna/intent/api/v1/template-programmer/template | GET/POST/DELETE | CRUD on templates. A template is part of a project |
| dna/intent/api/v1/template-programmer/template/deploy | POST | Deploy a template to a device |
| dna/intent/api/v1/template-programmer/template/deploy/status/{{deploymentId}} | GET | Status of the deployment job |



Day 1 – Site

Examples

```
./site.py
```

```
./site.py --help
```

```
./site.py -add work_files/add.csv
```

```
./site.py -add work_files/add.csv --commit
```

- <https://github.com/CiscoDevNet/DNAC-Site>

Example Payload(s)

```
{ "type": "area",  
  "site": {  
    "area": {  
      "parentName": "Global/AUS",  
      "name": "Sydney"  
    }  
  }  
}
```

Create area: Global/AUS/Sydney

```
{ "type": "building",  
  "site": {  
    "building": {  
      "name": "NSYD1",  
      "address": "177 pacific highway north  
sydney australia"  
    },  
    "area": {  
      "parentName": "Global/AUS",  
      "name": "Sydney"  
    }  
  }  
}
```

Create building: Global/AUS/Sydney/NSYD1

```
{ "type": "floor",  
  "site": {  
    "floor": {  
      "parentName": "NSYD1",  
      "name": "F22"  
    },  
    "area": {  
      "parentName": "Global/AUS",  
      "name": "Sydney"  
    }  
  }  
}
```

Simple case, just provide area and parent

Need to attach building to parent area. Also need an address

Need to define grandparent area AND parent building

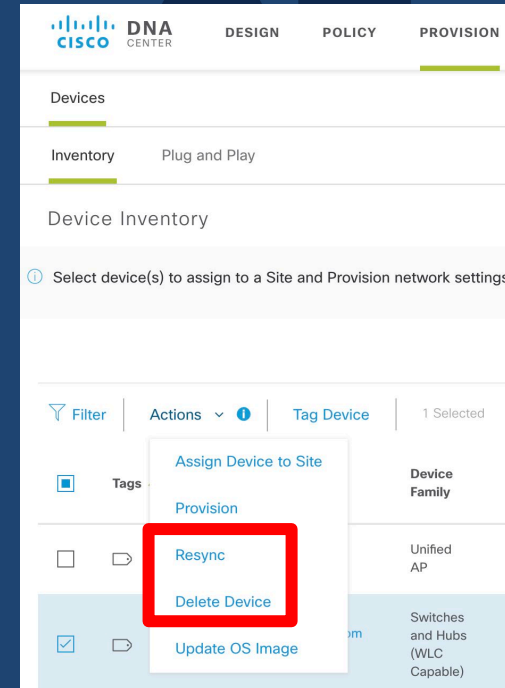
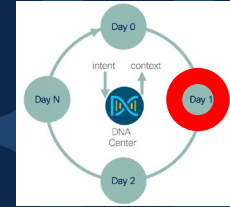
Notes

- Areas can be nested, building is a child of area, floor child of building
- Payloads for building and floor need to contain the parent area
- Make sure use the `__runsync : true` header
- No way to provide floor map or dimensions in 1.2.8.
- No official GET, DELETE API
- Cannot remove a site with children (go bottom up)
- Cannot remove a site with device member (remove device)

Site API Summary

| Endpoint | Verb | Description |
|------------------------|------|-------------------|
| dna/intent/api/v1/site | POST | Create a new site |

Day 1 – Network Device



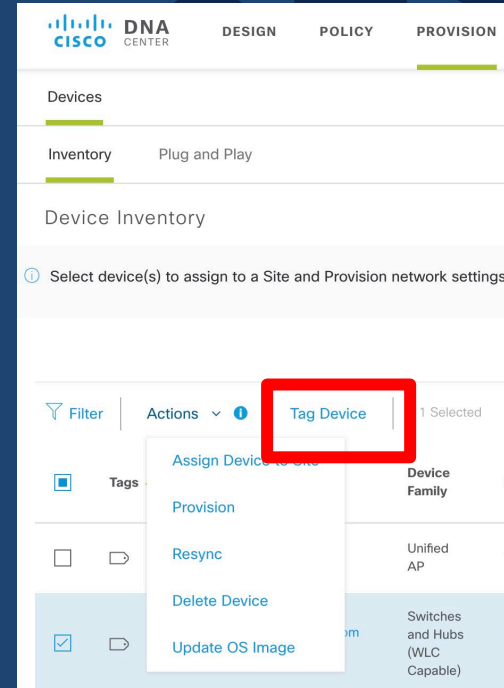
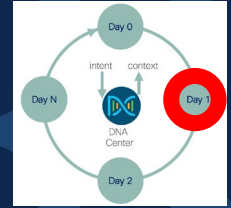
Examples

```
./networkDevice.py  
./networkDevice.py --netdev <ipAddress>  
./networkDevice.py --forcesync <ipAddress>  
./networkDevice.py --delete <ipAddress>
```

NetworkDevice API Summary

| Endpoint | Verb | Description |
|---|--------|--|
| dna/intent/api/v1/network-device | GET | GET all network Devices |
| dna/intent/api/v1/network-device/ip-address/<ipAddress> | GET | Get a specific device with this ip address |
| dna/intent/api/v1/network-device/sync | PUT | Force a re-sync of the device |
| dna/intent/api/v1/network-device/<deviceId> | DELETE | Remove Network Device |

Day 1 – Tags



Examples

```
./tag.py
```

```
./tag.py --tag adam
```

```
./tag.py --addtag adam 10.10.50.2
```

```
./tag.py --deletetag adam
```

<https://github.com/CiscoDevNet/DNAC-Tag>

Sample Payloads

```
https://dnac/dna/intent/api/v1/tag POST
```

```
{ "name" : "MyTag" }
```

Simple create. Tags can also have rules.

```
https://dnac/dna/intent/api/v1/tag/<tagId>/member POST
```

```
{ "networkdevice" : [<deviceIds>] }
```

Membership is very simple. Just supply a list of Ids

Notes

- Can be applied to multiple things. These examples are just network devices.
- Tag rules can also be used. In this scenario, you do not add members, the rule does it for you. E.g. match on product family.
- Tags will be used to address the siteProfile -> Template mapping limitation, where all templates in a site profile are applied to a device. Use tags to filter templates
- I use tags to identify groups of devices I want to perform an action on.
 - E.g. SWIM distribution and activation
 - E.g. command runner

Tag API Summary

| Endpoint | Verb | Description |
|--|--------|--|
| <code>dna/intent/api/v1/tag</code> | GET | Get all tags. Can parameterize with <code>?name=<tagName></code> |
| <code>dna/intent/api/v1/tag/<tagId>/member?memberType=networkdevice</code> | GET | find all networkDevices with this tagId |
| <code>dna/intent/api/v1/tag</code> | POST | Create tag. Async |
| <code>dna/intent/api/v1/tag/<tagId>/member</code> | POST | Add members to the Tag |
| <code>dna/intent/api/v1/tag/<tagId>/member/<deviceId></code> | DELETE | Remove Tag members |
| <code>dna/intent/api/v1/tag/<tagId></code> | DELETE | Delete Tag |

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Network Hierarchy

Network Settings

Image Repository

Network Profiles

Auth Template

Profile Name*

9800_profile

Profile Type

wlan

Edit Network Profile

Cancel

Save

Templates are created in the [Template Programmer](#).

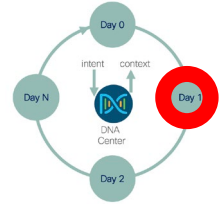
Wireless SSID

+

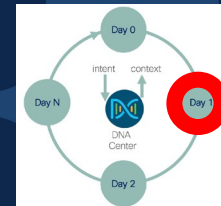
Add SSID

| SSID | Type | Traffic Switching |
|------|------------|--|
| 9800 | Enterprise | <div>Interface Name</div> <div>management</div> <div> <div>+</div> <div>Delete</div> </div> <div> <input type="checkbox"/> Flex Connect Local Switching </div> |

Attach Template(s)



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[Network Hierarchy](#) |
 [Network Settings](#) |
 [Image Repository](#) |
 [Network Profiles](#) |
 [Auth Template](#)

Profile Name*

9800_profile

Profile Type

wlan

Edit Network Profile

Templates are created in the [Template Programmer](#).

Wireless SSID

| SSID | Type | Traffic Switching |
|---|------------|--|
| 9800 ▼ | Enterprise | Interface Name management ▼ |

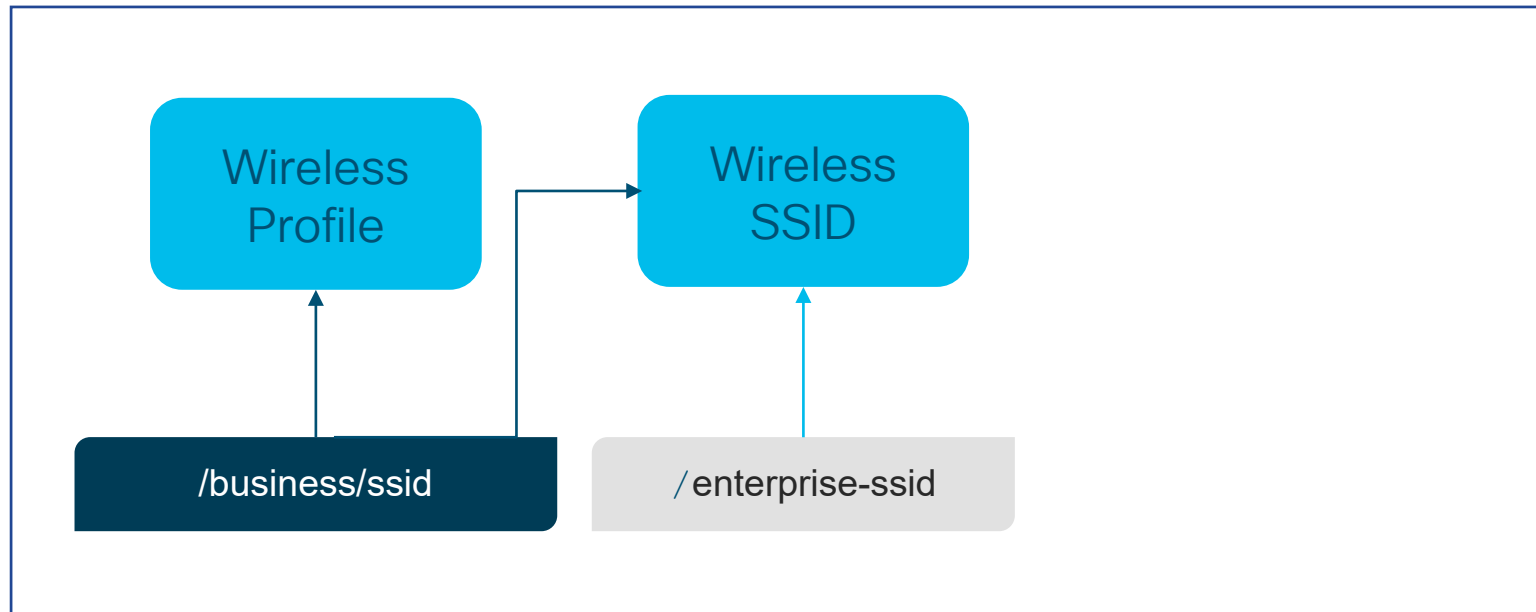
☐ Flex Connect Local Switching

Attach Template(s)

Cancel Save

+ Add SSID

Relationships



Examples

```
./wlan.py
```

```
./wlan.py --addssid fred --passphrase 12345678 Global/Perth/PER1/floor1
```

```
./wlan.py --delssid fred Global/Perth/PER1/floor1
```

<https://github.com/CiscoDevNet/DNAC-WLAN>

Notes

- Limited error checking and validation on BETA API.
- For DELETE need to percent-encode the site ['Global/Sydney']
- Enterprise version also provisions/de-provisions

WLAN API Summary

| dna/intent/api/v1/enterprise-ssid | POST/DELETE | Create/Delete SSID (only) |
|-----------------------------------|-------------|---|
| dna/intent/api/v1/business/ssid/ | POST/DELETE | Create/Delete SSID and provision on locations |
| dna/intent/api/v1/enterprise-ssid | GET | GET SSID |

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