Cisco ACI management with Smartsheet

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DEVNET-2653

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Agenda

- Introduction

- Smartsheet API and SDKs

- Cisco ACI REST API

- Cisco ACI management using Smartsheet

- Demo

- Conclusion

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# Introduction

Objectives

- Explore Smartsheet API and Python SDK

- Explore Cisco ACI REST API

- Demo a Python application that provides a Smartsheet based interface to managing Cisco ACI data center fabrics
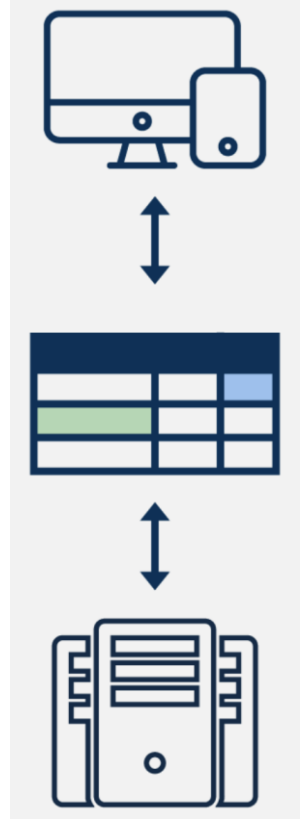
Smartsheet API

What can the API do?

- Import/export data to other systems
- Automate processing
- Without user interaction
- On regular schedule/webhook
- Enforce standardization or compliance
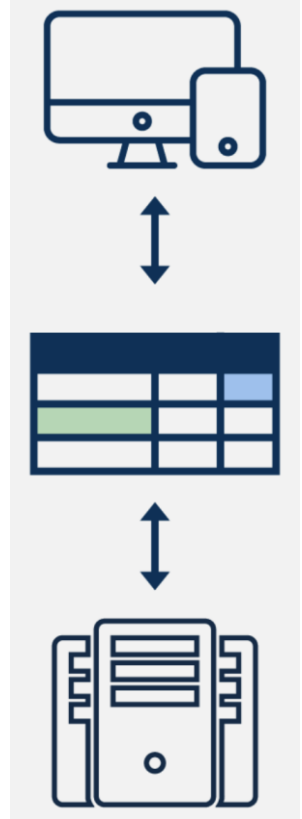
What can the API do?

- Read and update sheets
- Manage folders and workspaces
- Administer users and accounts
- Third-party applications
- Custom integrations
- Extend Smartsheet features

Getting started

- Smartsheet paid account

- Generate API token

- Get Postman

- Get Smartsheet collection

- Make your first API call

SDKs

Languages
- Java
- C#
- *Python*
- Node.js
- Ruby

Benefits
- Native language object models
- Logging
- Error retry
- Sample code
- Full reference documentation

Smartsheet Python SDK

- pip install smartsheet

```python
def initialize_client(self):
    """Initializes smartsheet client and returns smartsheet_client variable."""
    smartsheet_client = smartsheet.Smartsheet(self.smartsheet_access_token)
    smartsheet_client.errors_as_exceptions(True)
    return smartsheet_client

# Get all webhooks owned by the user.
def get_webhooks(self):
    """Return a list containing all webhooks owned by the user."""
    hooks_response = self.smartsheet_client.Webhooks.list_webhooks(include_all=True)
    print(f"[Initialize] - Found {hooks_response.total_count} hooks owned by user")
    return hooks_response
```

Cool SDK but not everything is covered

```python
playbook_url = "https://api.smartsheet.com/2.0/sheets/"+str(dict_response['sheetId'])+"/rows"
headers = {
          'Authorization': 'Bearer '+ config['Environment']['smartsheet_API_key'],
          'Content-Type': 'application/json'
          }
# If the ansible playbook failed - update the ready to deploy cell to red
if ansible_response["stats"][apic_controller]["failures"] > 0:
          red_payload = json.dumps({
                    "id": dict_response["id"],
                    "cells": [{
                              "columnId": config['Deploy an App']['ready_to_deploy_column_id'],
                              "value": True,
                              "format": ",,,,,,,,,27,,,,,,,"
                              }
                              ]
          })
playbook_fail_response = requests.request("PUT", playbook_url, headers=headers, data=red_payload)
```
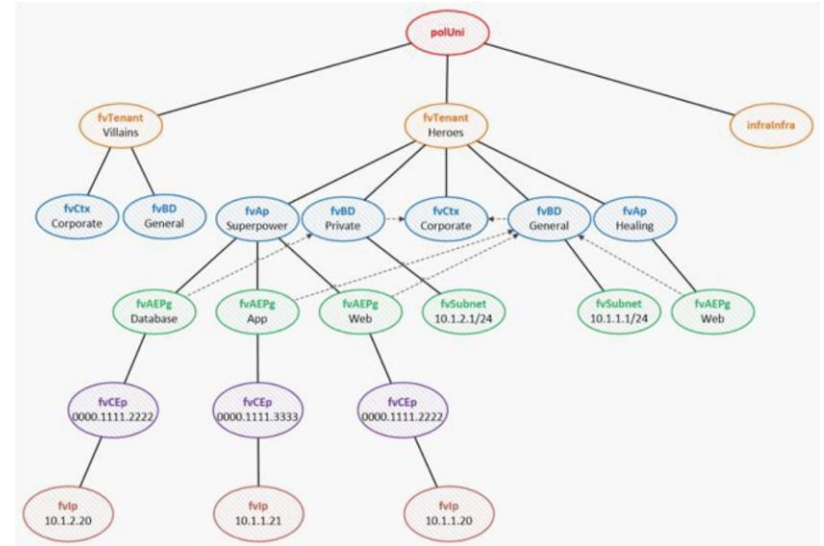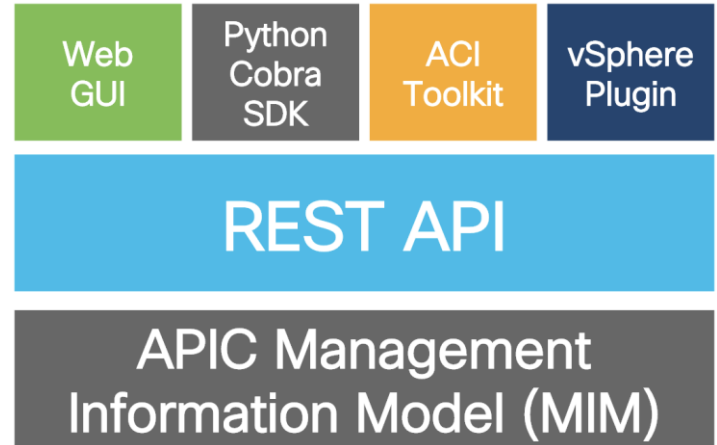
Cisco ACI REST API

Cisco ACI Object Model

- Everything in ACI is an Object
  - Object Class identifies its type
- Parent/Child relationships between objects
  - 1 Parent to Many Children
- Assembled, create the MIT
- Everything builds from "root"
  - Aka "uni"

Object Model + REST API

- ACI designed as "API First"

- Everything built on top of the REST API
  - APIC GUI
  - Cobra SDK
  - PyACI
  - acitoolkit
  - Plugins
  - ACI Kubernetes Integration

Web GUI	Python Cobra SDK	ACI Toolkit	vSphere Plugin
REST API			
APIC Management Information Model (MIM)			

Things to know about the Cisco ACI REST API

- Leverages token in cookie or certificate-based authentication
- Uses .json and .xml within URI instead of Content-Type and Accept headers to indicate data format
- API will target specific class type or managed object (mo)
- REST API guide available on cisco.com

Getting started

- DevNet Sandbox

- DevNet Learning Labs

- DevNet Automation Exchange

- Cisco ACI Postman collection

- Cisco ACI REST API documentation

acitoolkit

- pip install acitoolkit

```python
import sys
import acitoolkit.acitoolkit as ACI
import configparser

config = configparser.ConfigParser()
config.read("../config.ini")

def main():

        for apic in config['Environment']['APICs'].split(','):

                # Login to APIC
                session = ACI.Session(config[apic]["hostname"], config[apic]["username"], config[apic]["password"])
                resp = session.login()
                if not resp.ok:
                        print('%% Could not login to '+ apic)
                        sys.exit(0)

                # Download all of the tenants
                tenants = ACI.Tenant.get(session)
                tenants_list=[]
                for tenant in tenants:
                        tenants_list.append(tenant.name)
```
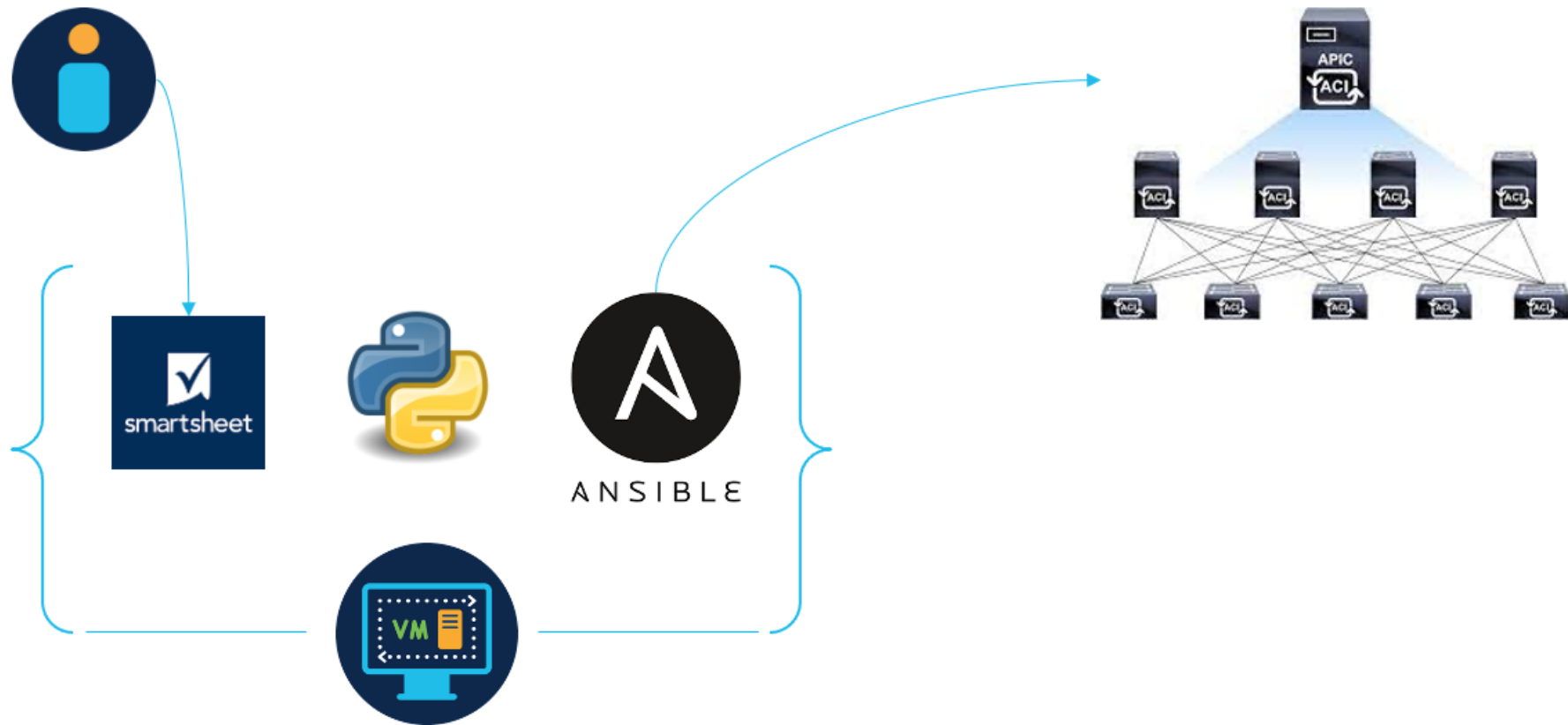
Cisco ACI management using Smartsheet

Architecture / Framework

ACI Day 2 configuration with smartsheets

A Cisco DevNet Automation Exchange use case

Advantages

- Simplified workflows for ACI configuration changes

- Parallelism of configuration changes

- Idempotency

- Alternative front-end for Cisco ACI REST API

Demo

EXPLORER

ACI-DAY2-CONFIG-WITH-SMARTS...
- > Associate-EPGs-Contracts
- > Associate-Int-Policy-Gro...
- > Configure-Contracts
- > Configure-Filters
- > Configure-Policy
- > Configure-Switch-Int-Pr...
- > Create-Static-Path-Bindi...
- > Cron
- > Deploy-App
- ∨ Frontend
  - > Resources
  - <> index.html
  - ① README.md
  - > images
  - > modules
- CODE_OF_CONDUCT.md
- config.ini   M
- CONTRIBUTING.md
- LICENSE
- main.py
- NOTICE
- README.md
- requirements.txt
- USECASE.md

config.ini M ●

≡ config.ini

```
 5    call_back_url =
 6    webhook_name = aci
 7    status_sheet = 3930469545863044
 8
 9    [APIC1]
10    hostname = https://10.10.10.81
11    username = admin
12    password = P@ssw0rd123
13    tenant_column_id = 7511131446110084
14    tenant_column_id_index = 2
15
16    [APIC2]
17    hostname = https://10.10.10.82
18    username = admin
19    password = P@ssw0rd123
20    tenant_column_id = 3730391994525572
21    tenant_column_id_index = 3
22
23    [ACI Provisioning Start Point]
24    sheet_id = 1079356438144900
25    site_column_id = 1768794531096452
```

PROBLEMS   OUTPUT   TERMINAL   DEBUG CONSOLE

```
ailiesiu@AILIESIU-M-G2KN aci-day2-config-with-smartsheet % ngrok http 3000
```

> zsh
> zsh

> OUTLINE
> TIMELINE

master*   ⊘ 0 ⚠ 0   Ln 5, Col 17   Spaces: 4   UTF-8   LF   Ini

---

config-with-smartsheet/Frontend/index.html

☑ smartsheet

ACI Provisioning Start Point

- n App
- atic Path Binding
- e Filters
- e Contracts
- e EPGs to Contracts
- e Policy Groups
- e Switch & Interface Profiles
- e Int to Policy Groups

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Conclusion

Conclusion

- Easy to get started with Smartsheet and Cisco ACI APIs

- Application can be easily extended to larger environments and with additional use cases

- Excellent entry point into ACI configuration for non-technical or junior employees

Resources

- ACI day2 config management with Smartsheet – https://developer.cisco.com/codeexchange/github/repo/aidevnet/aci-day2-config-with-smartsheet/

- Smartsheet Postman collection – https://github.com/smartsheet-platform/postman

- Smartsheet API docs – https://smartsheet-platform.github.io/api-docs/

- DevNet Sandbox – https://developer.cisco.com/sandbox

- DevNet Learning Labs – https://developer.cisco.com/learning

- DevNet Automation Exchange – https://developer.cisco.com/network-automation/

- acitoolkit – https://github.com/datacenter/acitoolkit

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