The bridge to possible

Programmable approach to Transport Service Provisioning, Migration and Maintenance using Crosswork

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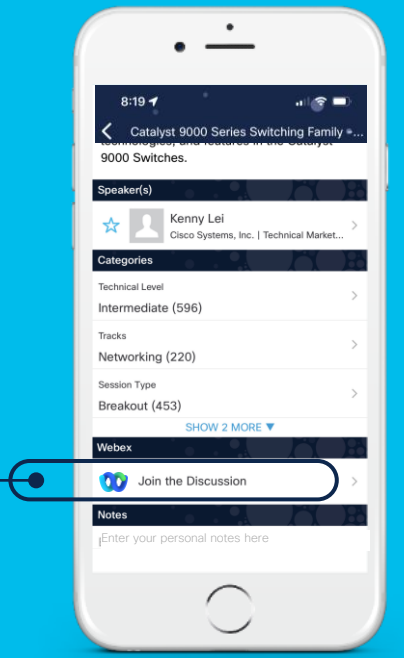
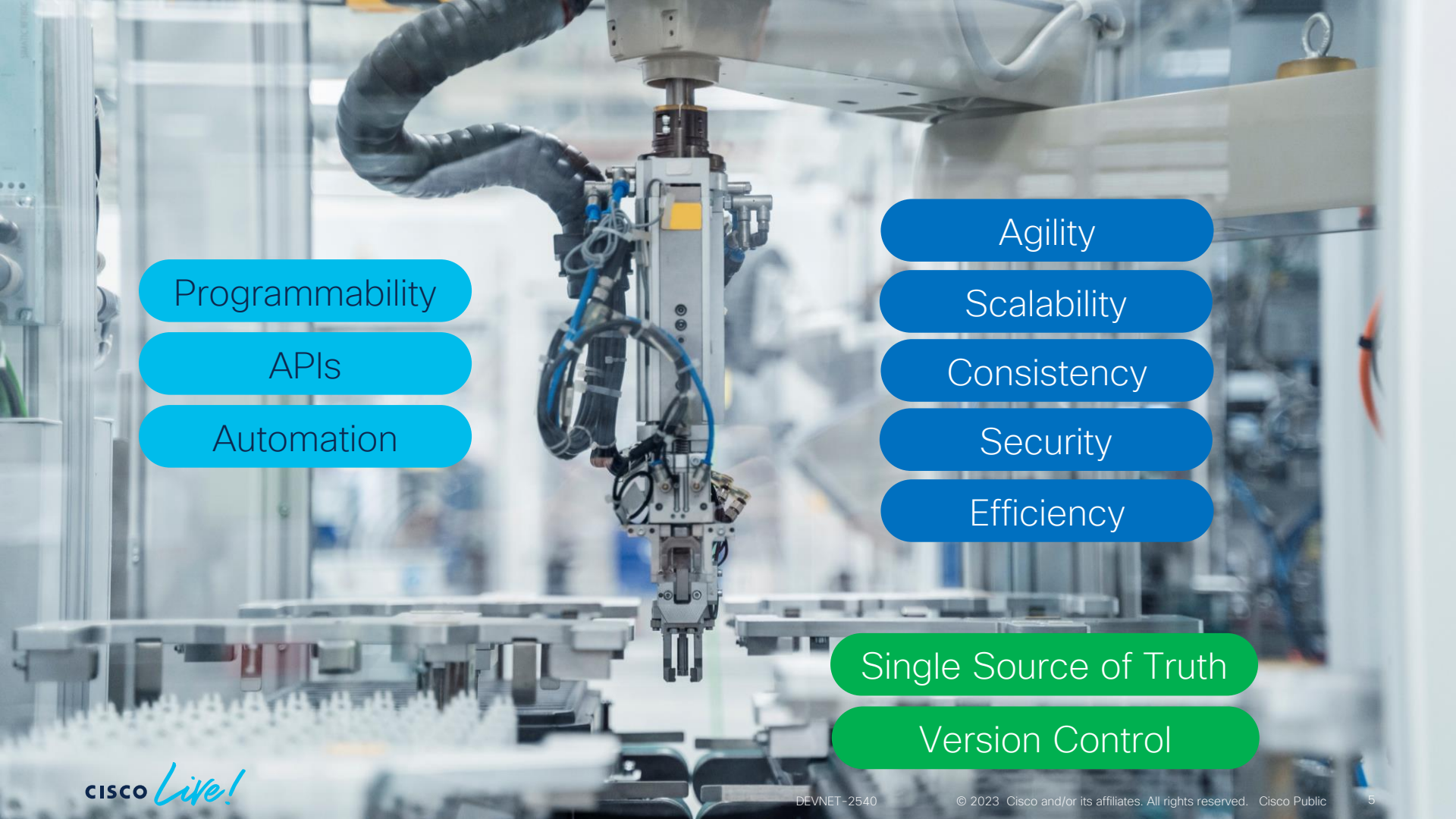


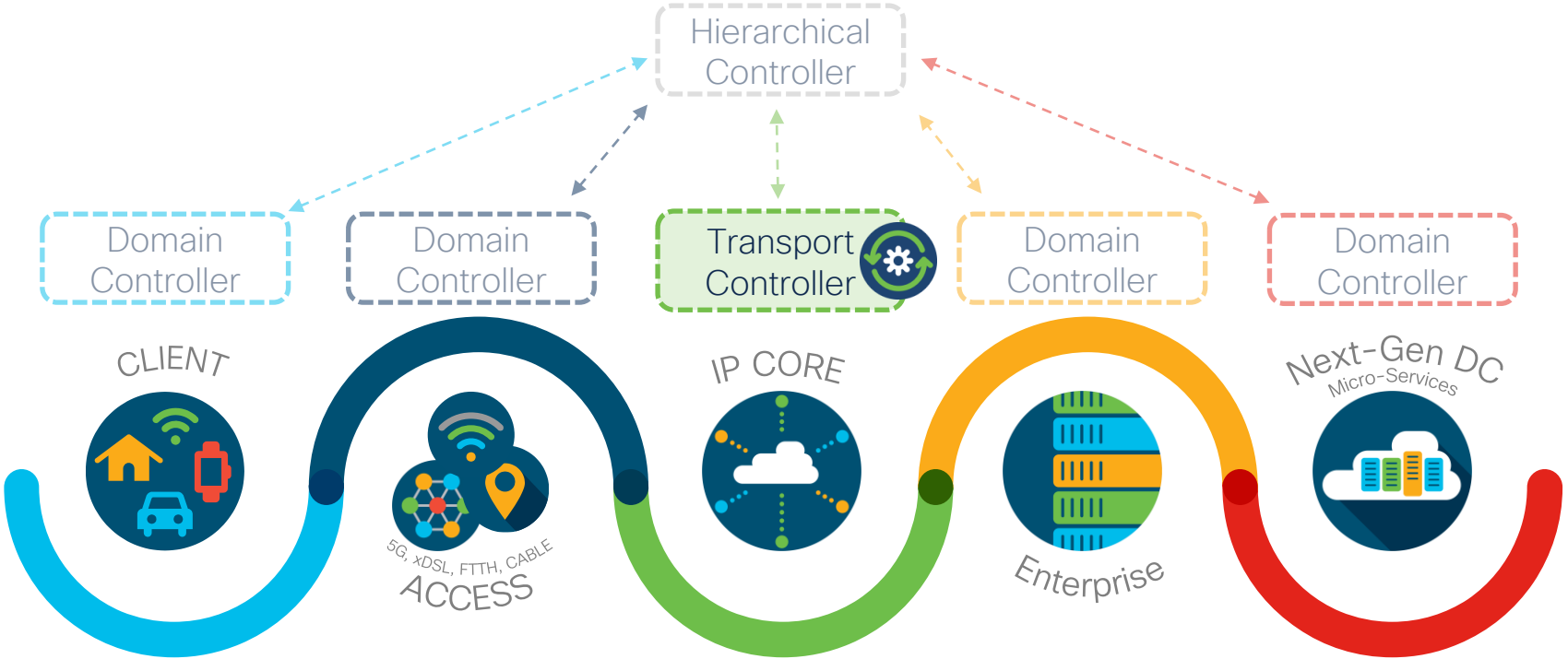
Agenda

- Crosswork Network Controller(CNC) Overview
- Service Lifecycle Management in Action
- Getting started: Pre-requisites and Packages
- Let's built Transport Service Provisioning, Migration and Maintenance Legos

Transport Service as Code(TSaC) A New Programmable approach – Why?



CNC's role in E2E Architecture



Crosswork Network Controller (CNC) v4.1

Turnkey solution for deploying and operating IP transport networks

- Service Provisioning (L2VPN, L3VPN)
- Service-Oriented Transport Provisioning* (SR-MPLS, SRv6*, RSVP-TE)
- Real-time Network Optimization
- Bandwidth Optimization
- Programmable Closed Loop Automation

- Topology visualization extended to SRv6*
  SR Flexible Algorithm Visualization*
- Service Health Status*, **
- Network State and Device Health Insights
- Local Congestion Mitigation*
- Secured Zero Touch Provisioning

* New or Enhanced in CNC 4.1

** Pre-launch for lab trials, Supports L2VPN and L3VPN services over SR-TE/RSVP-TE only

So what did we see?

Summary of Demo

- Service Provisioning
- Service Migration between devices and interfaces
- Service Maintainance

Powered by Crosswork APIs

Service Provisioning

Provisioning L3VPN Services

Step 1 : Deploy On-Demand Next Hop Templates

```
POST https://{{cat.cw.host}}:{{cat.cw.port}}/crosswork/proxy/nso/restconf/data/
```

Step 2 : Create Route Policy for Customer at each Site

```
POST https://{{cat.cw.host}}:{{cat.cw.port}}/crosswork/proxy/nso/restconf/data/
```

Step 3 : Create VPN Profile to Identify Route Policies

```
PATCH https://{{cat.cw.host}}:{{cat.cw.port}}/crosswork/proxy/nso/restconf/data/
```

Step 4 : Create L3VPN Service

```
POST https://{{cat.cw.host}}:{{cat.cw.port}}/crosswork/proxy/nso/restconf/data/ietf-l3vpn-ntw:l3vpn-ntw/vpn-servicesa
```

Provisioning Segment Routing TE(SR-TE) Policy

Key Values >> Name | Head-end | Tail-end | Path type | Computation

```
payload_srte = json.dumps(
{
  "cisco-sr-te-cfp:sr-te": {
    "cisco-sr-te-cfp-sr-policies:policies": {
      "policy": [
        {
          "name": "srte_c_5001_ep_198.19.1.4",
          "head-end": [{"name": "Node-5"}],
          "tail-end": "198.19.1.4",
          "color": 5001,
          "path":
            [
              {
                "preference": 101,
                "dynamic":{
                  "metric-type": "igp",
                  "pce": ""}
              }
            ]
        }
)
```

- Name of the policy
- Head-End
- Tail-End
- Color
- Path Type
- Metric for Optimization
- Computations are performed by : PCE

Service Migration

L3VPN Services Migration

Step 1 : L3VPN Retrieval

```
GET  https://{{cat.cw.host}}:{{cat.cw.port}}/crosswork/proxy/nso/restconf/data/ietf-l3vpn-ntw:l3vpn-ntw/vpn-services/vpn-service={vpn_service_name}
```

Step 2 : Extracting the target node names or interfaces and creating the desired template

JSON/XML + Logic + Python = Updated Template

Step 3 : Updating the L3VPN Service

```
PUT  https://{{cat.cw.host}}:{{cat.cw.port}}/crosswork/proxy/nso/restconf/data/ietf-l3vpn-ntw:l3vpn-ntw/vpn-services/vpn-service={vpn_service_name}
```

Service Maintenance

L3VPN Services Maintenance

Step 1 : L3VPN Retrieval

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GET  https://{{cat.cw.host}}:{{cat.cw.port}}/crosswork/proxy/nso/restconf/data/ietf-l3vpn-ntw:l3vpn-ntw/vpn-services/vpn-service={vpn_service_name}
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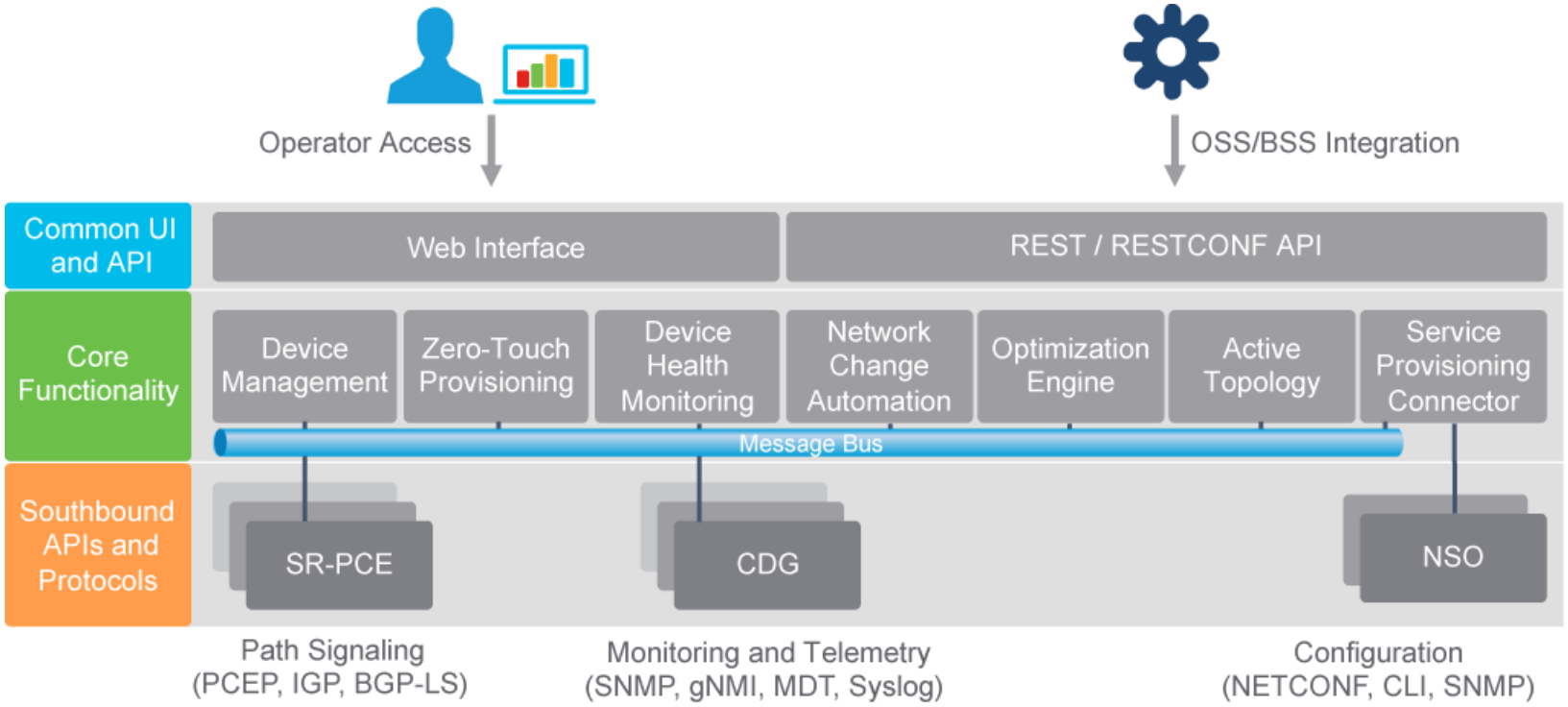
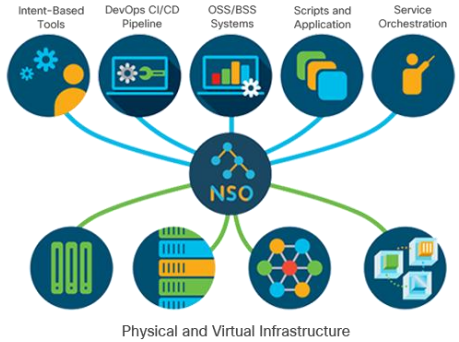
```

Cisco CNC Architecture Overview



Transport SDN Function Pack Bundle for NSO



Core Function Packs extend the functionality of NSO to address specific needs

- NSO T-SDN FP Bundle is based on the SDN architecture to control and manage the transport networks in a multi-layer and multi-vendor environment
- The NSO T-SDN FP Bundle consists of:
  - SR-TE CFP: SR-TE policies & ODN
  - Example FPs: L2VPN, L3VPN, IETF L2VPN, IETF L3VPN, RSVP-TE
  - FPs can be customized by the customer or by Cisco Professional Services

APIs

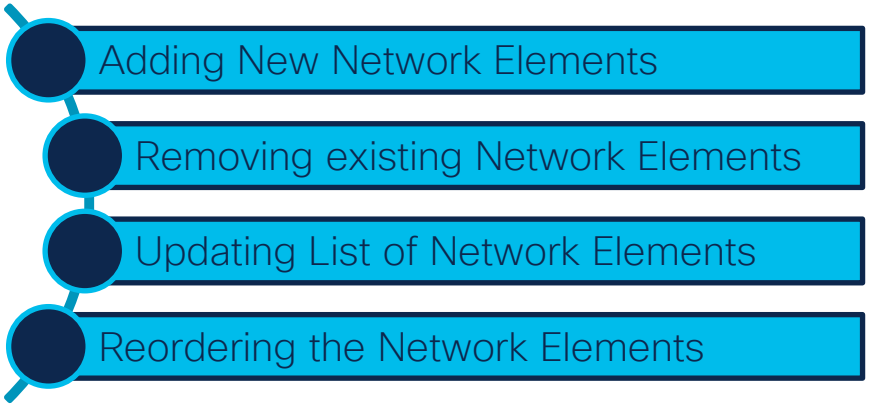
- Enabling external integration, development and customization is at the core of Cisco Crosswork Network Automation
- Each product in the platform provides easy-to-use RESTCONF APIs
- Documentation: https://developer.cisco.com/docs/crosswork/

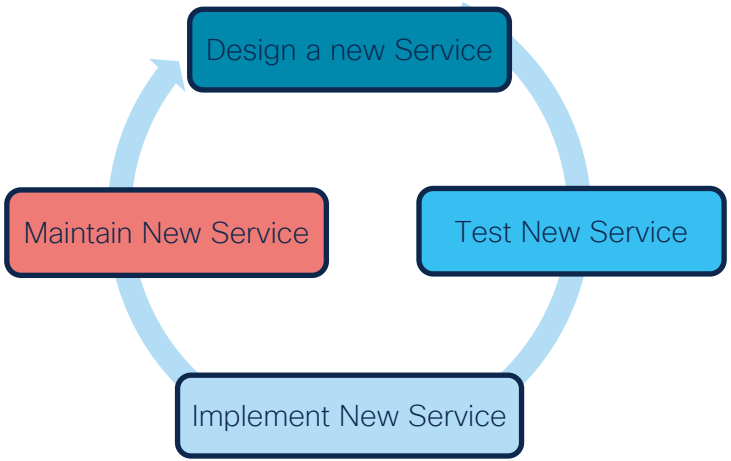
Service Lifecycle Management

Provisioning, Maintenance, and Migration

Requirements

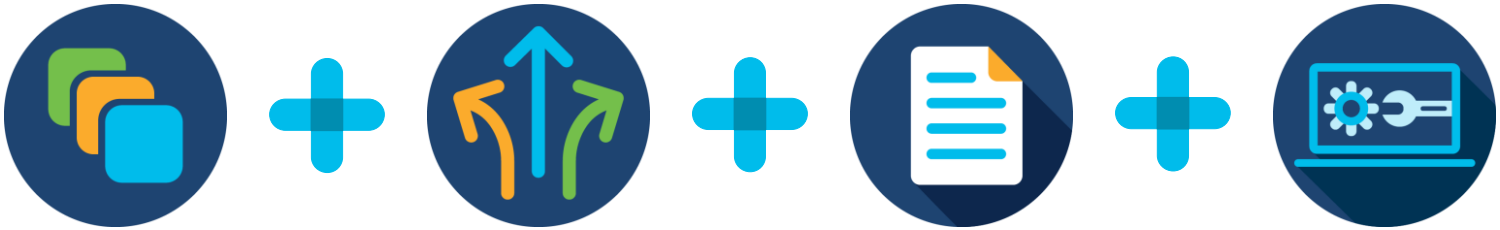
- NSO to have the relevant service packages loaded
- CNC WebUI or RESTCONF API can be leveraged





What's an NSO Service?

- A declarative method to abstract and automate a task you want to do repeatedly
- Customer facing and resource facing services
- Internally it maintains mapping between inputs (user intent) and outputs (infrastructure configurations)



YANG Model
Defines the service in high level terms

Logic
Python/Java collects info, does verification

Template
How the service is rendered on devices

Package meta data
Version requirements, components, dependencies

NSO Service Creation Steps Overview

2nd step
NSO CLI
Implement the service configurations via NSO CLI

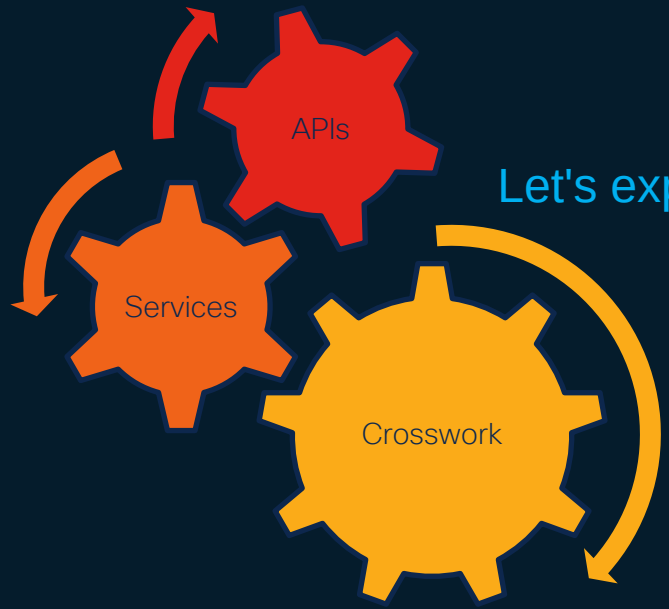
4th step
YANG
Create Service Model
Define input types and restrictions

1st step
Service Creation
Using one NSO built-in script, create a service package skeleton

3rd step
XML
Create Service Template
Define the Variables to be mapped in YANG model

5th step
Service usage
Compile and Deploy the Service

Show me how it's done.
Demo 2



Let's explore Building Blocks!

“Perfection is achieved not when there is nothing more to add, but rather when there is nothing more to take away.”

Antoine de Saint-Exupéry

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SP Automation and Orchestration

This learning map explains how Cisco's innovations and software solutions enable mass-scale programmable next generation networks. The sessions explore the latest in automation and orchestration to model-based operations and programmability while trusting cutting-edge security capabilities embedded within network elements and software assurance platforms monitoring them.

START

Feb 6 | 08:45
TECOPS-2003
Embracing SRE Practices in Infrastructure

Feb 6 | 08:45
TECSPG-2014
Cisco Converged SDN Transport

Feb 6 | 14:15
TECOPS-1201
From Zero to Hero: Cisco Network Service Orchestrator (NSO)

Feb 7 | 08:30
BRKOPS-2136
Experience Telemetry - Driving Insights and Actions

Feb 7 | 08:45
BRKOPS-2376
Expand your Automation Journey with new Cisco NSO Use Cases and Features

Feb 7 | 10:00
BRKSP-2080
Crosswork Hierarchical Controller - Cross layer-vendor-domain Automation

Feb 7 | 14:00
BRKOPS-2312
Do's and Don'ts in Network Test Automation

Feb 7 | 15:30
BRKSP-2637
Network Automation with Routed Optical Networking (RON) Architecture

Feb 7 | 17:00
BRKSPG-2263
Design, Deploy and Manage Transport Slices using SDN Controller and Assurance

Feb 8 | 08:30
IBOOPS-2270
Get Ready for the Next Generation of Incident Response and Analysis

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Feb 8 | 08:30

IBOOPS-2270

Get Ready for the Next Generation of Incident Response and Analysis

Feb 8 | 12:00

BRKSPG-2028

Management of IP+Optical Networks Using an SDN Controller Architecture

Feb 8 | 12:00

BRKSPG-2028

Management of IP+Optical Networks Using an SDN Controller Architecture

Feb 8 | 13:30

BRKSPG-2664

Automate 5G Datacentre and Transport Components with NSO Cross-Domain Function Packs

Feb 8 | 16:45

BRKSPG-2474

Reduce Resolution Time with a Service-Centric Approach to Troubleshooting

Feb 9 | 08:30

LTROPS-1964

Test Automation for everyone using CXTA

Feb 9 | 08:30

LTROPS-2417

Automate your Network Migration

Feb 9 | 08:30

LTROPS-2711

Unified End 2 End Test Automation with CX Test Manager (CXTM)

Feb 9 | 08:45

BRKMPL-2131

Deploying VPNs Over Segment Routed Networks Made Easy

Feb 9 | 10:30

BRKOPS-2176

Leveraging Advanced Automation Capabilities in the Fault Management System

Feb 9 | 15:45

BRKSPG-2250

Eliminate Congestion Surprises and Fire Drills Forever with Crosswork Cloud - Traffic Analysis as a Service

Feb 10 | 11:00

BRKOPS-2766

How to Supercharge your Next-Gen Network with AIOps and Managed Services

Feb 10 | 11:00

FINISH

BRKSPG-2031

Deploying XR Programmability in Production Networks

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Thank you !

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