DeveloperDays
Network Services Orchestrator

Migration from CLI NED to NETCONF NED

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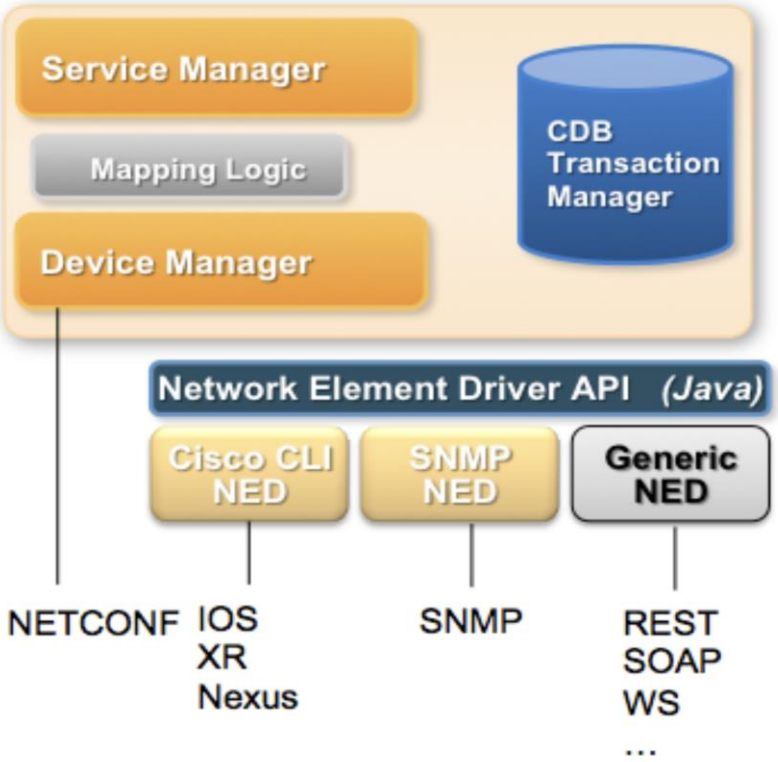
Agenda

- NSO NED architecture
- Introduction to CLI NEDs & NETCONF NEDs
- Comparison of NETCONF vs. CLI NEDs
- CLI NED to NETCONF NED Migration Procedure
- Demos
  - NED migration using a pre-built IOS-XR NETCONF NED
  - NED migration using a BYO IOS-XR NETCONF NED

NSO NED Architecture



CLI NEDs

- YANG model written with annotations to produce the Cisco-like CLI for the managed device
- Develop Java CLI NED code to allow NSO to communicate with the device using the annotated YANG model
- CLI NEDs are developed and maintained by Cisco

NETCONF NEDs

- YANG models come from the devices
- No need to create YANG models and write Java code
- Specific use cases for your NSO services are then validated
  - NEPs can validate their NETCONF implementation using Cisco's NETCONF & YANG Automation Testing Program *
- Use pre-built (by Cisco or NEPs) or build your own NETCONF NEDs

* https://info.tail-f.com/netconf_yang_automation_testing

NETCONF vs. CLI NEDs

Reliability

- NETCONF uses 2- or 3-phase, network-wide transactions (database theory)
- CLI NEDs use transaction emulation

Testability

- NETCONF allows systematic testing
- CLI NEDs hard to test. Retest for minor upgrades

Performance

- NETCONF optimized for machines
- CLI optimized for human operators

Service Integration

- NETCONF based on standard YANG models, service to device mapping can be reused
- Each CLI NED produce a proprietary model which results in different service mapping

Cost / TTM / Coverage

- NETCONF NED covers all device features in day 1 with zero code
- CLI NED is use case driven that is developed on demand

NED Migration Procedure

Migration Procedure from CLI to NETCONF NED

1. Select a CLI-based device that supports NETCONF
2. Upgrade the CLI NED and software of the selected device
3. Install a NETCONF NED (pre-built or BYO) for the selected device
4. Extend service template to cover the NETCONF interface of the device
   a) Use the same variables from the CLI template to parameterize the NETCONF template
   b) Change to Java code is usually not required
5. Switch the service to use the NETCONF NED

Demos

Demo #1: Basic service example using only service templates

- simple-mpls-vpn example from NSO distribution

- Port l3vpn service to use a pre-built IOS-XR NETCONF NED
  - Extend service templates to support the IOS-XR NETCONF device type
  - Modify the service to connect one of the PEs to the NETCONF device

Demo #2: Advanced service example using both Java code and service templates

- mpls-vpn example from NSO distribution
- Build your own NETCONF NED for a Cisco XRv 9000 router
- Port the two l3vpn services to use my own IOS-XR NETCONF NED
  - Extend service templates to support the IOS-XR NETCONF device type
  - Modify the services to connect one of the PEs to the NETCONF device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