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Automating Service Discovery in NSO

Reconciliation Framework

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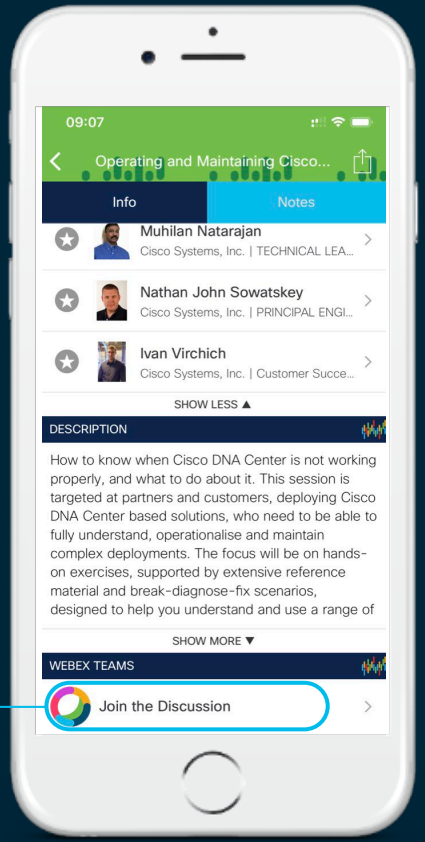


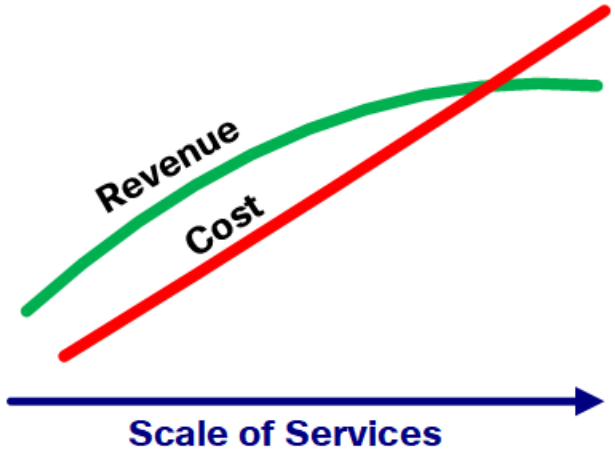
Agenda

- NSO – Why, What and How?
- What is Service Discovery in NSO?
- Automation of Service Discovery
- Advantages of Automation
- Demo

Why NSO?

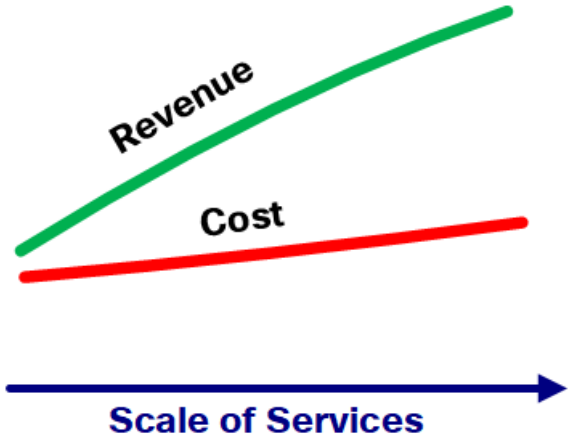
Problems with traditional network management

- Lack of standard protocols and data models
- Lack of atomicity
- Network adapters are rigid and expensive
- Provisioning is often hard-coded
- It takes time to introduce new services
- Results in high cost and complexity



How NSO solves these problems

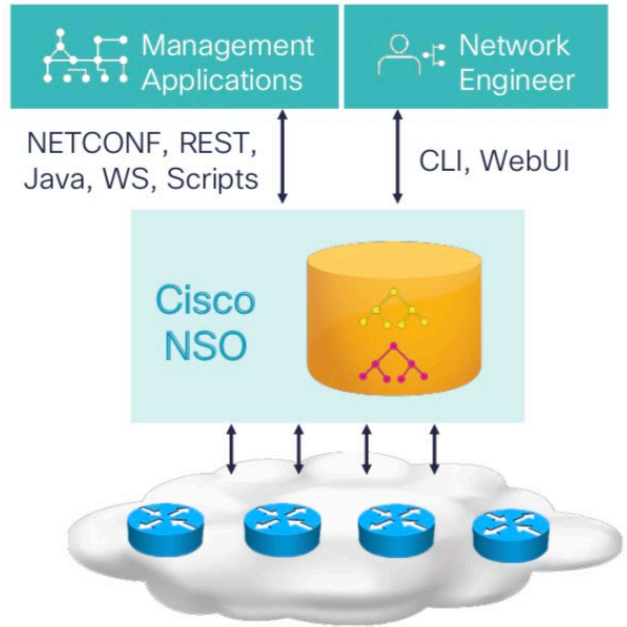
- Use of standardized protocols
- Use of device and service models
- Provides network wide transactions
- Reduction in product development time
- Rapid deployment of provisioning and configuration
- Results in reduction in cost and complexity



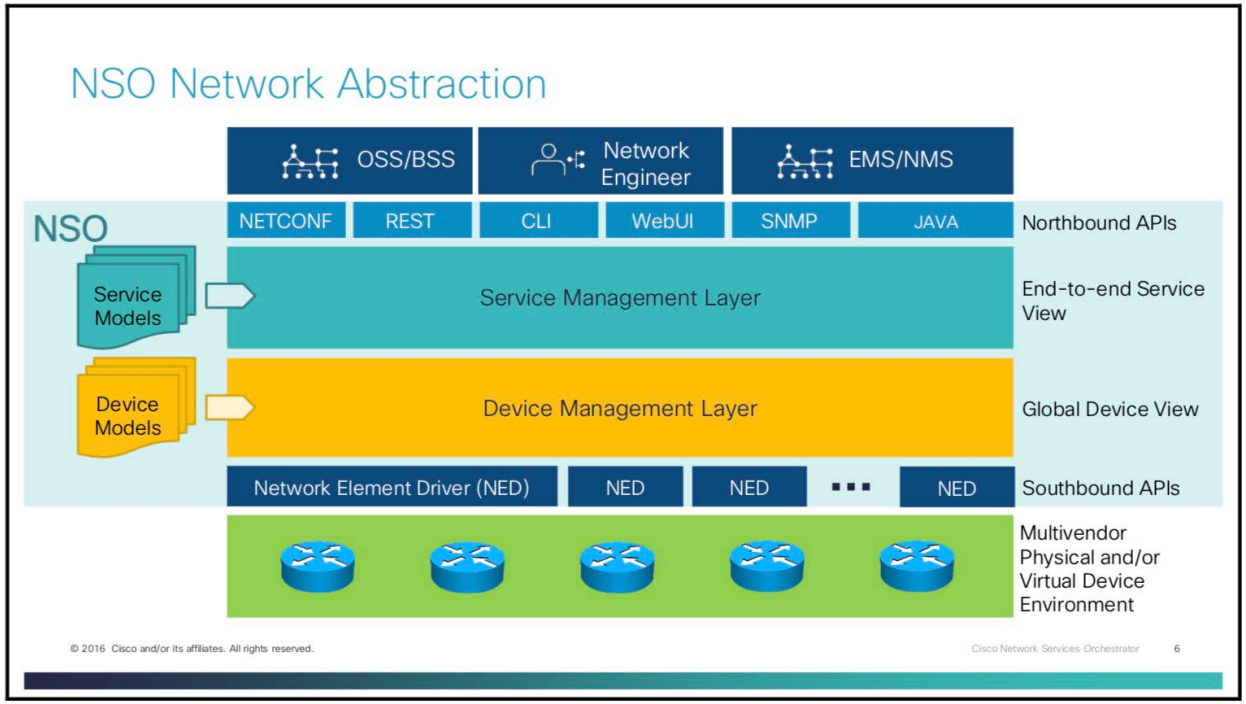
What is NSO?

NSO – Overview

- Multi-vendor service orchestration platform
- Provides single API and UI to entire managed network environment
- Keep accurate copy of network configuration state
- Makes sure configuration is synchronized with the network

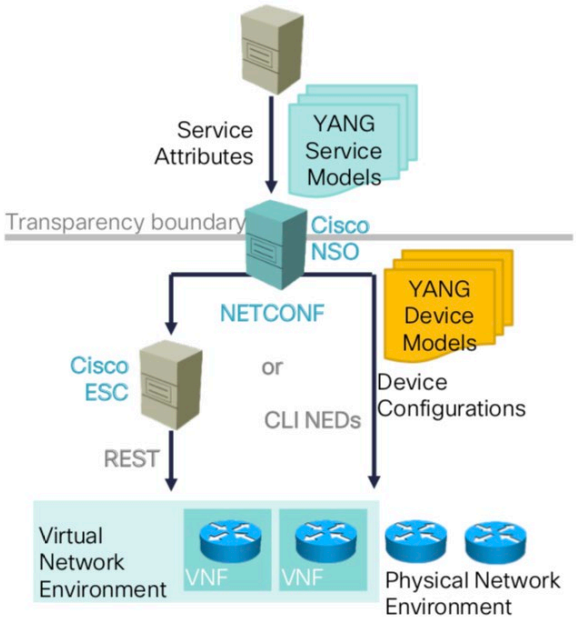


NSO – Architecture



NSO – Details

- Service is modelled in YANG
- Mapping logic maps service to device data
- Templates manage device configuration
- FASTMAP manages service create, modify and delete
- Provides management through network-wide transactions
- Network Element Drivers (NEDs) for non-NETCONF elements



What is Service Discovery?

- Technique use to identify and create service instance from existing device config
- Necessary to onboard brownfield devices in NSO
- Performed one time during brownfield device onboarding activity

Service Discovery Use Cases

- During Onboarding of brownfield devices in NSO
- To handle out-of-band changes done by network operator
- In disaster recovery scenarios if CDB has lost service and config data
- In migration of device configuration from source to target using service instance

Automation of Service Discovery

- NSO Service YANG model forms the basis of discovery process
- Java POJO classes are derived and defined from YANG model of the service
- POJO classes are annotated with custom annotations
- Mapping of YANG elements to Java class elements:
  - container -> class
  - list -> java.util.List
  - leaf {type string} -> String
  - leaf {type uint32} -> Integer

Automation of Service Discovery

Mapping example

- container -> class
- list -> java.util.List
- leaf {type string} -> String
- leaf {type uint32} -> Integer

```
container snmp {
  uses std-acl-rules;
  leaf community-name{
      type string;
  }
}
```

```
@XmlRootElement(name = "snmp", namespace = Acl.NS)
@XmlAccessorType(XmlAccessType.FIELD)
public class Snmp extends ServiceModel {
    static final String   NS = Acl.NS;

    @XmlElement(name = "community-name", namespace = Acl.NS)
    private String        communityName;

    @XmlElement(name = "std-rule", namespace = NS)
    private List<StdRule> stdRules;

    public List<StdRule> getStdRules() {
        return stdRules;
    }

    public String getCommunityName() {
        return communityName;
    }

    public void setCommunityName(String communityName) {
        this.communityName = communityName;
    }
```

Automation of Service Discovery

- User extends reconcile action class defined in reconciliation framework
- User defined action class contains logic of reading device config and set values in POJO
- Framework reads the POJO and creates services in NSO automatically
- Framework abstracts device sync and redeploy reconcile calls
- NSO NAVU (Navigation Utilities) APIs are used for reading data model tree

Advantages of Automation

- The network services can be large and complex in nature making service discovery a challenging task
- Automating the process of service discovery reduces development effort
- Automation reduces repetitive tasks across multiple services
- Automation can also reduce potential defects in service instances created in NSO
- Automation of the discovery process increases productivity and delivery

Demo

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