NSO Essentials for Programmers and Network Architects

Duration: 4 Days **Course Code: NSO201** **Version: 4.2** **Delivery Method: Virtual Learning**

Overview:

The Cisco NSO Essentials for Programmers and Network Architects (NSO201) course introduces you to Cisco® Network Services Orchestrator (NSO). You will learn to install Cisco NSO and use it to manage devices and create services based on YANG templates with XPath. This course provides an overview of NSO as a network automation solution, as well as introductions to NETCONF, YANG, and XPath. You will learn about managing devices and creating device templates, service management and service package creation, network element drivers, interfacing with other systems using APIs, configuring and troubleshooting system settings, managing alarms and reporting, configuring NSO for scalability and performance, and capabilities that can be added to Cisco NSO.

This course is worth 40 Contnuing Education (CE) Credits.

Virtual Learning

This interactive training can be taken from any location, your office or home and is delivered by a trainer. This training does not have any delegates in the class with the instructor, since all delegates are virtually connected. Virtual delegates do not travel to this course, Global Knowledge will send you all the information needed before the start of the course and you can test the logins.

Target Audience:

System installers, system integrators, system administrators, network administrators, and solutions designers.

Objectives:

- **After completing this course you should be able to:**
- Explain the transactional service activation and how it relates to business requirements
- Explain how Cisco NSO communicates with network devices
- Understand the NETCONF protocol and be able to read and write simple YANG models
- Understand the difference between devices that are fully NETCONF capable and those that are less or not NETCONF capable
- Understand the support for candidate configuration and confirmed commit support
- Use logs to troubleshoot the Cisco NSO deployment and check NSO communication with network devices
- Explain the YANG service model structure
- Design a real-world usable service
- Explain the mapping logic of service parameters to device models and consequently to device configurations
- Describe the use of different integration options and APIs
- Explain how to implement action with use of config-templates in NSO package
- Explain the use of Reactive FASTMAP in for manipulating and implementing advanced NFV components
- Describe the use of feature components and function packs
- Define and explain the ETSI MANO principles and solution
- Work with the alarm console, and understand the NSO alarm structure and how it conforms to modern network operations procedures
- Describe Cisco NSO 6.0 new features and changes in NSO

Prerequisites:

Attendees should meet the following prerequisites:

- Basic knowledge of the Cisco Command-Line Interface (CLI) or the CLI of UNIX-like operating systems

Testing and Certification

Recommended as preparation for the following exams.

- There are no exams currently aligned to this course.

- Working knowledge of UNIX-based operating systems and basic tasks
- Basic knowledge of programming constructs and YANG data modeling
- Basic knowledge of the NETCONF communication protocol
- Knowledge of XML data structures and schemas
- Basic management of network components (routers, switches, etc.)
- PRNE-CPLL - Programming for Network Engineers - CPLL
- CSAU - Introducing Automation for Cisco Solutions

Content:

Introducing Service Orchestration with Cisco NSO

- Challenges of Network Management
- Network Management without Cisco NSO
- Network Management with Cisco NSO
- Challenges of Network Orchestration
- Main Components of NSO

Exploring Cisco NSO Architecture

- Cisco NSO Architecture
- Cisco NSO Components
- Cisco NSO and Ansible

Orchestrating Network Solutions

- Orchestration Use Cases Overview
- Orchestration Use Case Examples

Describing Cisco NSO Operation

- NETCONF and YANG Overview
- Cisco NSO Packages
- Cisco NSO Mapping Logic
- Network Element Drivers

Installing Cisco NSO

- Setup Overview
- Cisco NSO Local Installation
- Installing NEDs
- Using Netsim

Exploring the Advantages of NETCONF

- NETCONF Basics
- NETCONF Operation

Managing Devices Using the Device Manager

- Device Manager Overview
- Device Configuration Management
- Device Connection Management
- Templates and Groups
- Device Template Processing
- Commit Queues

Creating YANG Models

- YANG Basics
- YANG Data Types
- XPath Overview
- Basic YANG Statements
- Other Representations of YANG
- Verify Yang Statements

Using Services

- Package Architecture
- Creating a Service Package
- Sample Service Configuration
- Service Template
- YANG Service Model
- Deploying a Service

Implementing Services with Model-to-Model Mapping

- Mapping Service Parameters
- FASTMAP
- Template Processing
- NSO Transaction Model

Designing Services in Cisco NSO

- Service Design Overview
- Top-Down Service Design
- Bottom-Up Service Design
- Device Configuration
- Service Model

Managing the Service Lifecycle

- Service Management Tasks
- CDM Migration
- Service Lifecycle Management Guidelines

Programming with Python in Cisco NSO

- Cisco NSO Programmability Overview
- NSO Python API Overview
- Python Scripting
- Python Service Skeleton
- Creating a Service YANG Model
- Creating a Service Template
- Template Processing with Python

Configuring and Troubleshooting System Settings

- System Configuration
- Role-Based Access Control
- System Troubleshooting

Discovering Cisco NSO Northbound APIs

- NSO Integration Options
- NETCONF Server
- Web Integration
- SNMP Agent

Managing Alarms and Reporting

- Alarm Management
- Reporting

Configuring Cisco NSO for Scalability and Performance

- High Availability
- High-Availability Cluster Communications
- Addressing Performance Limitations
- Layered Service Architecture

Describing Cisco NSO VNF Manager and Function Packs

- Function Packs
- Cisco SD-WAN Solution
- NFV Orchestration
- Reactive FastMap

Labs

- Discovery Lab 1: Install Cisco NSO
- Discovery Lab 2: Use Device Manager
- Discovery Lab 3: Create a Device Template
- Discovery Lab 4: Create a Loopback Template Service
- Discovery Lab 5: Create a VLAN Template Service
- Discovery Lab 6: Create an L3VPN Template Service
- Discovery Lab 7: Migrate a CDM Device
- Discovery Lab 8: Set Up Device Using Python Scripts
- Discovery Lab 9: Create an SVI Python Template Service
- Discovery Lab 10: Use NSO RESTCONF API with Postman

Further Information:

For More information, or to book your course, please call us on 0800/84.009

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