Implementing the Cisco NCS540 Series Router

Duration: 5 Days **Course Code: NCS540HWE** **Version: 1.0**

Overview:

The Implementing the Cisco NCS540 Series Routers course is designed for network professionals to learn how to deploy Cisco NCS 540 Series routers in their network environment. Topics covered include understanding the features and functions of the Cisco NCS 540 Series platforms, system architecture, services implementation, Quality of Service (QoS), and system security, along with the utilization of model-driven telemetry and programmability.

This course is worth 40 (CE) Continuing Education Credits

Objectives:

- **After completing this course you should be able to:**
- Classify the Cisco NCS 540 platform hardware and understand the variations between large, medium, small, and fronthaul form factors, their features, use cases, and positioning.
- Describe the hardware architecture of the NCS 540 Series and the components necessary for packet queuing and forwarding, understand the life of a packet on ingress and egress traffic.
- Explain the system architecture for traffic queuing, scheduling, and forwarding to introduce concepts of Cisco IOS XR modular QoS on the NCS 540 platform.
- Describe the methods and protocols for establishing timing and synchronization on Cisco IOS XR router platforms.
- Describe the Cisco NCS 540 Fronthaul router family and its features and how they can be used to make mobile network architecture simpler.
- Describe Cisco IOS XR Software architecture, its programmable features, and how to install software packages.
- Implement model-driven telemetry for enhanced network visibility and management.
- Recognize, implement, and manage system security features within Cisco IOS XR Software systems, ensuring the protection of network infrastructure and data.
- Describe the main factors leading to the development and deployment of segment routing, types of segments that are used in segment routing, Segment Routing Global Block (SRGB), and configure and verify IS-IS and OSPF segment routing operations.
- Demonstrate how segment routing works and how it protects links and nodes while explaining the basic loop avoidance, segment-routing traffic-engineering (SR-TE), and traffic engineering components used in segment routing.
- Implement and configure advanced segment routing for traffic engineering (SR-TE) features.
- Describe the components and functionality of Layer 3 Multiprotocol Label Switching (MPLS) VPNs implementation in Cisco IOS XR Software deployments.
- Identify the routing protocol and LDP information necessary for Layer 3 MPLS VPN troubleshooting.
- Implement Layer 2 VPN operations in a service provider environment.
- Explain how EVPN gets around the problems that regular Layer 2 VPNs have, what the model for EVPN delivery is, and how to implement and troubleshoot EVPN solutions.

Prerequisites:

Attendees should meet the following prerequisities:

- Knowledge of core Cisco networking technologies
- Understanding of implementing and operating Cisco networking solutions
- Recognition of general networking concepts and protocols
- Basic knowledge of router installation and some experience with installation tools
- Routing protocol configuration experience with Border Gateway Protocol (BGP), Intermediate System-to- Intermediate System

Testing and Certification

Recommended as preparation for the following exams:

- There is no exam currently aligned to this course

(IS-IS), and Open Shortest Path First (OSPF)
- Knowledge of Layer 2 IEEE switching and related protocols
- Strong knowledge of MPLS configurations
- Experience troubleshooting Cisco routers in a large network environment
- CCNA - Implementing and Administering Cisco Solutions
- SPFNDU - Understanding Cisco Service Provider Network Foundations

Content:

Cisco NCS 540 Series Hardware Overview

- Cisco NCS 540 Overview
- Cisco NCS 540 Large
- Cisco NCS 540 Medium
- Cisco NCS 540 Small
- Cisco NCS 540 Fronthaul
- Cisco NCS 540 Transceiver Support
- Cisco NCS 540 Use Cases

Cisco NCS 540 System Architecture

- Cisco NCS 540 ASIC Families
- Cisco NCS 540 MACsec
- Cisco NCS 400G-ZR and ZR+ Operating Modes

Cisco NCS 540 QoS Architecture

- Cisco NCS 540 Queuing and Scheduling
- Cisco NCS 540 Packet Forwarding
- Cisco IOS XR Software Modular QoS CLI Overview

Timing and Synchronization

- Timing and Synchronization
- Synchronous Ethernet Clock Synchronization
- Transparent PDH over Packet and Channelized SDH over Packet Networking
- Using the Precision Time Protocol
- External Timing Clock Interfaces and Sources
- Implementing NTP
- Global Navigation Satellite System

Cisco NCS 540 xHaul Design

- RAN Architeture Evolution
- Cisco NCS 540 Fronthaul Router Models and Features
- Considerations for Cisco NCS 540 Fronthaul Design
- Cisco Converged 5G xHaul Transport
- Cisco Secure DDoS Edge Protection

Cisco IOS XR Software Fundamentals

- Cisco IOS XR Software Evolution

Cisco IOS XR Software Installation and Upgrades

- Software Package Basics
- Installation Workflows
- Golden ISO
- Bug Fix RPMs
- FPD Upgrades

Cisco IOS XR Software System Security

- Implementing Management Plane Security
- Implementing Data Plane Security
- Components of Trustworthy Systems

Segment Routing Fundamentals

- Segment Routing Overview
- Segment Identifiers
- Segment Routing Configuration and Verification Basics

Segment Routing Topology-Independent Loop-Free Alternate

- Segment Routing Topology-Independent Loop-Free Alternate

Segment Routing Traffic Engineering

- Segment Routing Traffic Engineering

Advanced Segment Routing Traffic Engineering Features

- Segment Routing Performance Measurement
- On-Demand Next Hop
- Segment Routing Flexible Algorithm

Segment Routing IPv6

- Segment Routing over IPv6 Overview
- Configuring and Verifying SRv6

Layer 3 MPLS VPN Implementation with Cisco IOS XR Software

- Layer 3 VPN Overview
- Layer 3 VPN Models
- Layer 3 VPN Configuration and Verification

Layer 2 VPNs and Ethernet Services Fundamentals

- Layer 2 Service Architecture and Carrier Ethernet Services
- Refresh on Traditional E-LAN, E-Line, and E-Tree Solutions
- Implement Ethernet Operations, Administration, and Maintenance

Cisco IOS XR Software EVPN Operation and Implementation

- EVPN Model for Ethernet Services Delivery
- Implement Ethernet VPNs (EVPN)

Cisco IOS XR Software Programmability

- Model-Driven Programmability Basics
- NETCONF Fundamentals
- gRPC Fundamentals
- Cisco IOS XR Software Service Layer
- On-Box Automation Scripts

Model-Driven Telemetry

- Examining Telemetry Fundamentals
- Model-Driven Telemetry
- Telemetry Encoding and Transport Methods
- gRPC Fundamentals
- Configuring Telemetry
- Telemetry Collectors

Labs

- Discovery Lab 1: Configure and Verify NTP
- Discovery Lab 2: Cisco IOS XR Software Installation
- Discovery Lab 3: Configure and Verify uRPF
- Discovery Lab 4: Configure and Verify MPP
- Discovery Lab 5: Configure and Verify Segment Routing
- Discovery Lab 6: Configure and Verify SR TI-LFA Using IS-IS
- Discovery Lab 7: Configure and Verify SR TI-LFA Using OSPF
- Discovery Lab 8: Configure and Verify SR-TE Using IS-IS
- Discovery Lab 9: Configure and Verify SR-TE Using OSPF
- Discovery Lab 10: Configure and Verify ODN and Flexible Algorithm
- Discovery Lab 11: Configure and Verify SRv6
- Discovery Lab 12: Configure and Verify Layer 3 VPN
- Discovery Lab 13: Configure and Verify EVPN VPWS
- Discovery Lab 14: Configure and Verify

Devices by Using Model-Driven Programmability
- Discovery Lab 15: Configure and Verify Model-Driven Telemetry

Further Information:

For More information, or to book your course, please call us on Head Office Tel.: +974 40316639

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