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Network Convergence System 4000 Series Integrated Services Router

The Network Convergence System 4000 Series Integrated Services Router (NCS4000HW) course is an instructor-led, lab-based, hands-on course offered by Learning@Cisco. The overall goal of the course is for you to be able to operate the NCS 4000 platform using the Cisco® Transport Controller Graphical User Interface (GUI), as well as the Cisco IOS® XR Software Command-Line Interface (CLI).

This course covers how to use the Cisco Transport Controller and Cisco IOS XR Software version 6.1.22 to create Cisco MPLS-TE network topologies. ITU-T G.709 Optical Transport Network (OTN) circuits will be created and edited on the fly with path protection and revertive options. It will also cover how to manage NCS 4000 Network Elements (NEs), provision services, install software and packages, manage configuration files, back up the system, and provide an overview of the system hardware. Cards used in this course include the 2x 100G CPAK 10x 10G SFP+ OTN/Packet, 2x 100G CP-DQPSK WDM Full C band Tunable, 4009 Agnostic Cross Connect single-chassis, External Connection Unit, and two Route Processor and Controller 32-GB RAM line cards.

Duration
Instructor-Led Training (ILT): 3 days.
Virtual Instructor-Led Training (VILT): 4 days.

Target audience
This course is designed for technical professionals who need to know how to deploy and operate OTN circuits over a Dense Wavelength Division Multiplexing (DWDM) network.
The primary audience for this course includes:

- System administrators
- Network administrators
- Technical support personnel who are involved with the deployment, operation, and maintenance of Cisco NCS 4000 Series systems
- Channel partners and resellers

**Course objectives**

Upon completion of this course, you should be able to:

- Describe the NCS 4000 Series functionality in the OTN
- Recognize where the NCS 4000 Series can be used in the OTN
- Identify the two NCS 4000 Series chassis
- Describe the NCS 4000 Series system hardware
- Apply the appropriate fabric card for the backplane
- Distinguish between the common cards and line cards used in both chassis
- Configure the NCS 4000 Series node using Cisco IOS XR
- Demonstrate the operation of the NCS 4000 Series platform using the Cisco Transport Controller GUI
- Demonstrate the operation of the NCS 4000 Series platform using the Cisco IOS XR CLI
- Underline the OTN standard hierarchy
- Discuss the OTN frame structure for Optical Transport Unit (OTUk), Optical Channel Data Unit (ODUk), and Optical Channel Payload Unit (OPUk)
- Explain how OTN circuits are protected and restored
- Cite the necessary requirements for creating OTN circuits
- Provision circuits for OTN using Cisco Transport Controller
- Provision circuits for OTN using Cisco IOS XR
- Manage the installation of software and packages
- Back up the system database
- Provide general troubleshooting on the NCS 4000 Series

**Course prerequisites**

- Cisco Optical Technology Intermediate (OPT200 or OPT300)
- Advanced Services Cisco ONS Time Division Multiplexing SONET (ONS-TDM)
- Introduction to Cisco IOS XR (IOSXR100)
- Cisco IOS XR Basic Troubleshooting (IOSXR201)
Course outline

- Module 1: Cisco NCS 4000 Series Overview
  - NCS 4000 Series in the OTN Environment
  - Interpreting the Use Cases for the NCS 4000

- Module 2: Cisco NCS 4000 Hardware Introduction
  - Comparing the NCS 4000 Chassis Architecture
  - Examining the Common Equipment on the NCS 4000 Series
  - Categorizing the NCS 4000 Line Cards

- Module 3 Cisco IOS XR Configuration Basics
  - Configuring Cisco IOS XR Operations
  - Cisco IOS XR NCS 4000 Minimal Configuration
  - Reviewing the Configuration

- Module 4 NCS 4000 System Setup
  - Establishing a Connection to a Node
  - Installing and Logging In to Cisco Transport Controller
  - Creating User Profiles and Assigning Privileges
  - Provisioning the Node for Network Connectivity
  - Performing Preliminary Checks

- Module 5 OTN Service Capabilities
  - ITU-T OTN Definition
  - OTN Hierarchy
  - Protection and Restoration

- Module 6 Cisco NCS 4000 OTN Circuits
  - Explaining OTN Circuit Parameters
  - Configuring Circuits with Cisco Transport Controller
  - Configuring Circuits with Cisco IOS XR Software

- Module 7 Maintenance on the NCS 4000 System
  - NCS 4000 Node Maintenance Tab
  - Configuring Bridge and Roll with Cisco Transport Controller
  - Capturing NCS 4000 Logs
  - Viewing and Provisioning Performance Monitor Parameters

- Module 8 Cisco NCS 4000 Management and Troubleshooting
  - Performing a System Upgrade and Installing Feature Packages
  - Performing Disaster Recovery
  - Smart License Overview
  - Troubleshooting NCS 4000 Line Cards
  - OTN Alarms
Lab outline

- Activity 1 – 3D Chassis and Line Card Review
- Lab 1: Performing the Minimal Configuration from the Console Port
- Lab 2: Performing a Telnet Connection to the NCS 4000
- Lab 3: Cisco Transport Controller
- Lab 4: Network Setup
- Lab 5: Configuring Client Line Cards
- Lab 6: Verifying the Client Line Card Configuration
- Activity 2 – Drag and Drop OTN Frame Structure
- Activity 3 – ODU MUX Hierarchy
- Lab 7: Creating Unprotected Circuits with Cisco Transport Controller
- Lab 8: Creating On-the-Fly Path Options on Unprotected Circuits
- Lab 9: Creating Path Protection Profiles with Revertive Capability
- Lab 10: Creating 1+R ODU User Network Interface (UNI) Circuits
- Lab 11: Performing a Fabric Upgrade for Maintenance Replacement
- Lab 12: Bridge and Roll
- Lab 13: Performing a Cisco IOS In-Service Software Upgrade (ISSU) on the NCS 4000

Lab topology

Registration email

For more information about schedules and registration for this course, contact aeskt_registration@cisco.com.
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