Cisco 8000 Series Routers Essentials

Duration: 5 Days **Course Code: SP8KE** **Version: 1.0**

Overview:

The Cisco 8000 Series Routers Essentials (SP8KE) course introduces you to the features and functions of the Cisco® 8000 Series router platforms. Through a combination of lectures and labs, you will gain an understanding of all major aspects of the platform, including hardware, software, Layer 2 and Layer 3 services, Quality of Service (QoS) features, network virtualization, and programmability.

This class will help you:
Increase your experience with the Cisco 8000 Series system
Describe and implement the Cisco 8000 Series system and its components
Gain hands-on experience with the Cisco 8000 Series system in a lab setting

Target Audience:

Individuals involved in the deployment of the Cisco 8000 Router Platfom.

Objectives:

- After taking this course, you should be able to:
- Describe the various Cisco 8000 Series hardware components
- Explain the system architecture of the Cisco 8000 Series systems
- Describe the packet flows through the Cisco 8000 Series Router and Command-Line Interface (CLI) commands for verifying packet flows through various Cisco 8000 Series router components
- Describe how the QoS features are implemented within the Cisco 8000 Series router, how to examine the Virtual Output Queueing (VOQ) QoS architecture, and describe how to implement modular VOQ, including congestion avoidance, priority flow control, and congestion management
- Describe the Software for Open Networking in the Cloud (SONiC) Operating System
- Describe Cisco Internetwork Operating System (Cisco IOS®) XR Software architecture
- Explain how to install Cisco IOS XR software packages
- Describe how to provision network devices by using Zero Touch Provisioning (ZTP)
- Implement and configure Multiprotocol Label Switching (MPLS) and describe MPLS label propagation in service provider networks
- Describe the main factors leading to the development and deployment of segment routing, describe the various types of segments that are used in segment routing, describe the Segment Routing Global Block (SRGB), and configure and verify IS-IS and OSPF segment routing operation
- Describe how to implement and verify Topology Independent Loop-Free Alternate (TI-LFA) in a segment routing environment, the benefits of Segment Routing for Traffic Engineering (SR-TE), and briefly describe the tools required for enabling it
- Describe the fundamentals of Ethernet VPN (EVPN), how to configure and verify EVPN Native, and how to configure and verify EVPN Virtual Private Wire Service (VPWS)
- Describe the operation and data flow of the Layer 3 VPN control plane, describe different Layer 3 MPLS VPN models, and describe how to configure and verify a basic Layer 3 VPN by using Cisco IOS XR 64-bit software
- Implement and configure advanced SR-TE features
- Implement and configure Segment Routing over IPv6 (SRv6)
- Implement and configure model-driven telemetry
- Describe programmable features of Cisco IOS XR software
- Describe the application hosting architecture and how to deploy a third-party application on a Cisco IOS XR router

Prerequisites:

Testing and Certification

Attendees should meet the following pre-requisites:

- 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 (IS-IS), and Open Shortest Path First (OSPF)
- Knowledge of Layer 2 IEEE switching and related protocols
- Strong knowledge of MPLS configuration experience
- Experience troubleshooting Cisco routers in a large network environment
- CCNA - Implementing and Administering Cisco Solutions
- ENCOR - Implementing and Operating Cisco Enterprise Network Core Technologies

Recommended as preparation for the following exams:

- There is no exam currently aligned to this course

Content:

Cisco 8000 Series Hardware Fundamentals

- Cisco 8000 Series Router Overview
- Cisco 8100 and 8200 Series Fixed Systems
- Cisco 8800 Series Modular Systems
- Cisco 8800 Series Line Cards

Cisco 8000 System Architecture

- Silicon One Architecture
- Chassis Architecture
- Switch Fabric Architecture
- Route Processor Architecture
- Line Card Architecture
- Power Architecture
- Baseboard Management Controller

Packet Flow Through the Cisco 8000 Series Router

- Flow of Packets in the System
- Tracing Packet Flow Through Line Cards
- Tracing Packet Flows Through the Route Processor
- Tracing Packet Flows Through the Switch Fabric
- Troubleshoot Traffic Through the Cisco 8000 Router

Traffic Management and QoS on Cisco 8000 Routers

- VOQ Overview
- MQC Framework

SONiC Basics

- SONiC Overview
- SONiC Deployment on the Cisco 8000 Series Routers

Cisco IOS XR Software Architecture

- Cisco IOS XR7 Software Fundamentals

Cisco IOS XR Software Installation

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

Automatic Provisioning

- Automatic Provisioning Overview

Cisco IOS XR MPLS

- MPLS Architecture
- MPLS Applications
- LDP Introduction
- MPLS Forwarding Introduction
- MPLS Forwarding Operation
- MPLS Configuration
- MPLS Monitoring
- MPLS Troubleshooting

Introducing Segment Routing

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

Segment Routing TI-LFA and Traffic Engineering

- Topology-Independant Loop-Free Alternate
- Local SR-TE

EVPN Layer 2 Basics

- EVPN Foundation
- Configuring and Verifying EVPN Native
- Configuring and Verifying EVPN VPWS

Layer 3 VPNs

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

Advanced SR-TE Features

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

SRv6

- Segment Routing over IPv6 Overview
- Configuring and Verifying SRv6

Telemetry

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

Cisco IOS XR Programmability

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

Application Hosting Overview

- Application Hosting Basics

Labs

- Investigate and Monitor Cisco 8000 Series Hardware
- Troubleshoot Traffic Through the Cisco 8000 Router
- Cisco IOS XR Software Installation
- Configure and Verify Zero Touch Provisioning (ZTP)
- Configure and Verify Multiprotocol Label Switching
- Configure and Verify Segment Routing (SR)
- Configure and Verify SR TI-LFA Using IS-IS
- Configure and Verify SR TI-LFA Using OSPF
- Configure and Verify SR-TE Using IS-IS
- Configure and Verify SR-TE Using OSPF
- Configure and Verify Basic EVPN
- Configure and Verify Layer 3 VPN
- Configure and Verify On-Demand Next-Hop (ODN) and Flexible Algorithm
- Configure and Verify Segment Routing over IPv6 (SRv6)
- Configure and Verify Model-Driven Telemetry
- Configure and Verify Devices by Using Model-Driven Programmability
- Configure and Verify Application Hosting Within a Docker Container

Further Information:

For More information, or to book your course, please call us on 00 20 (0) 2 2269 1982 or 16142

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