

# Cisco 8000 Series Routers Essentials (SP8KE) v1.0

## What you'll learn in this course

The **Cisco 8000 Series Routers Essentials (SP8KE) v1.0** 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.

## Course duration

- Instructor-led training: 5 days in the classroom and hands-on lab practice
- Virtual instructor-led training: 5 days of web-based classes and hands-on lab practice
- E-learning: Equivalent of 5 days of instruction

## How you'll benefit

This course 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

## Who should enroll

This course is designed for the following roles:

- System engineers
- Technical support personnel
- Channel partners and resellers

## How to enroll

### Instructor-led training

- Find a class at the [Cisco Learning Locator](#).
- Arrange training at your location through [Cisco Private Group Training](#).

### E-learning

- To buy a single e-learning license, visit the [Cisco Learning Network Store](#).
- For more than one license, or a learning library subscription, contact us at [learning-bdm@cisco.com](mailto:learning-bdm@cisco.com).

## Technology areas

- Networking
- Network virtualization
- Routing

## Course details

### Prerequisites

Before taking this course, you should have:

- 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

### 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

## Outline

- Cisco 8000 Series Hardware Fundamentals
- Cisco 8000 System Architecture
- Packet Flow Through the Cisco 8000 Series Router
- Traffic Management and QoS on Cisco 8000 Routers
- SONiC Basics
- Cisco IOS XR Software Architecture
- Cisco IOS XR Software Installation
- Automatic Provisioning
- Cisco IOS XR MPLS
- Introducing Segment Routing
- Segment Routing TI-LFA and Traffic Engineering
- EVPN Layer 2 Basics
- Layer 3 VPNs
- Advanced SR-TE Features
- SRv6
- Telemetry
- Cisco IOS XR Programmability
- Application Hosting Overview

## Lab Outline

- 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