# Implementing and Operating Cisco Service Provider Network Core Technologies

**Duration: 5 Days** **Course Code: SPCOR** **Version: 1.2**

## Overview:

The Implementing and Operating Cisco Service Provider Network Core Technologies (SPCOR) course teaches you how to configure, verify, troubleshoot, and optimize next-generation, Service Provider IP network infrastructures. It provides a deep dive into Service Provider technologies including core architecture, services, networking, automation, quality of services, security, and network assurance.

You will gain the theoretical and practical knowledge needed to implement and operate service provider networks using technologies such as core architecture, services, networking, automation, quality of service (QoS), security, and network assurance.

**Please note that this course is a combination of Instructor-Led and Self-Paced Study - 5 days in the classroom and approx 3 days of self study. The self-study content will be provided as part of the digital courseware that you will recieve at the beginning of the course and should be part of your preparation for the exam.**

**This course is worth 64 Contnuing Education (CE) Credits**

## Target Audience:

Individuals looking to verify, troubleshoot and optmize next-generation, Service Provider IP network infrastructures.

## Objectives:

- **After completing this course you should be able to:**
- Describe the Service Provider network architectures, concepts, and transport technologies
- Describe the Cisco IOS software architectures, main IOS types, and their differences
- Implement OSPF in the Service Provider network
- Implement Integrated IS-IS in the Service Provider network
- Implement BGP routing in Service Provider environments
- Implement route maps and routing policy language
- Describe IPv6 transition mechanisms used in the Service Provider networks
- Implement high-availability mechanisms in Cisco IOS XR software
- Implement traffic engineering in modern Service Provider networks for optimal resource utilization
- Describe segment routing and segment routing traffic engineering concepts
- Describe the VPN technologies used in the Service Provider environments
- Configure and verify MPLS L2VPN in Service Provider environments
- Configure and verify MPLS L3VPN in Service Provider environments
- Implement IP multicast services
- Describe the QoS architecture and QoS benefits for SP networks
- Implement QoS in Service Provider environments
- Implement control plane security in Cisco devices
- Implement management plane security in Cisco devices
- Implement data plane security in Cisco devices
- Describe the YANG data modeling language
- Implement automation and assurance tools and protocols
- Describe the role of Cisco NSO in Service Provider environments
- Implement virtualization technologies in Service Provider environments

## Prerequisites:

**Attendees should meet the following prerequisites:**

- Intermediate knowledge of Cisco IOS or IOS XE
- Familiarity with Cisco IOS or IOS XE and Cisco IOS XR Software configuration
- Knowledge of IPv4 and IPv6 TCP/IP networking
- Intermediate knowledge of IP routing protocols
- Understanding of MPLS technologies
- Familiarity with VPN technologies
- CCNA - Implementing and Administering Cisco Solutions
- SPFNDU - Understanding Cisco Service Provider Network Foundations

## Testing and Certification

**Recommended as preparation for the following exams:**

- **350-501** - Implementing and Operating Cisco® Service Provider Network Core Technologies (SPCOR) exam.

After passing the 350-501-Implementing and Operating Cisco® Service Provider Network Core Technologies (SPCOR) exam, you will automatically be awarded the Cisco Certified Specialist – Service Provider Core certification and will have completed the mandatory core element of the CIsco CCNP Service Provider Certification.

## Follow-on-Courses:

- SPAUI - Implementing Automation for Cisco Service Provider Solutions
- SPRI - Implementing Cisco Service Provider Advanced Routing Solutions
- SPVI - Implementing Cisco Service Provider VPN Services

## Content:

Describing Service Provider Network Architectures (Self-Study)

- Service Provider Core Architectures
- MPLS Introduction
- Unified MPLS
- Segment Routing Introduction
- Network Transport Technologies
- RAN Introduction
- Evolved Packet Core
- 5G Networks Introduction

Describing Cisco IOS Software Architectures

- Cisco IOS Software Introduction
- Cisco IOS XE Software Fundamentals
- Cisco IOS XR Architecture
- Cisco IOS XR 64-Bit and 32-Bit Differences
- Cisco IOS XR 64-Bit Operational Enhancements
- Cisco IOS XR Container and VM Architecture

Implementing OSPF for Cisco IOS XR

- OSPF Introduction
- OSPF Routing
- OSPF Link-State Database
- OSPF Operation
- OSPF Adjacencies and Modes
- OSPF Implementation
- Multiarea OSPF
- OSPFv3 Implementation
- Basic OSPF Troubleshooting

Implementing IS-IS for Cisco IOS XR

- IS-IS Introduction
- Integrated IS-IS Routing
- IS-IS Operation
- IS-IS Link-State Database
- Integrated IS-IS for IPv6
- IS-IS Configuration for IPv4
- IS-IS Configuration for IPv6
- Basic IS-IS Troubleshooting

Implementing BGP in Service Provider Network

- BGP Introduction
- BGP in Customer Connections
- BGP Routing
- BGP Implementation
- BGP Path Selection
- Weight and Local Preference
- Autonomous System Path Prepending and MEDs
- BGP Communities
- Route Redistribution Introduction
- Redistribution Implementation
- BGP Additional Paths
- BGP Prefix Independant Convergance
- Basic BGP Troubleshooting

Implementing Cisco MPLS Traffic Engineering

- Traffic Engineering Concepts
- Cisco MPLS TE Introduction
- Cisco MPLS TE Operation
- Constraint-Based Path Computation
- Cisco MPLS TE Tunnel Attributes
- Traffic Steering
- Cisco MPLS TE Implementation
- Protection of Cisco MPLS TE Traffic

Describing Segment Routing

- Segment Routing Concepts
- SR IGP Control Plane Overview
- Segment Types
- TI-LFA Fundamentals
- SR-TE Overview
- PCE-PCC Architecture
- Segment Routing Traffic Engineering
- Segment Routing IPv6
- Segment Routing Flexible Algorithm
- SRv6 Micro-Segment

Describing VPN Services

- VPN Introduction
- MPLS VPN Architecture
- MPLS VPN Routing
- Interdomain MPLS VPN Solutions
- CSC Overview
- Multicast VPN Overview
- EVPN Introduction
- EVPN Terminology and Concepts

Configuring L2VPN Services

- Layer 2 VPN Introduction
- MPLS Layer 2 VPN Types
- EoMPLS Configuration
- VPLS Configuration
- Ethernet OAM Review

Configuring L3VPN Services

- MPLS L3VPN Backbone Implementation
- VRF Configuration
- MP-BGP Configuration
- Basic PE-CE Routing Implementation
- OSPF as PE-CE Protocol
- BGP as PE-CE Protocol
- MPLS L3VPN Shared Services
- Internet Access in MPLS L3VPN

Implementing Multicast for Cisco IOS XR (Self-Study)

- Multicast Overview
- Multicast Service Model
- Multicast Protocols
- PIM-SM Introduction
- Dynamic RP Mechanisms

Implementing Control Plane Security

- Control Plane Protection Overview
- LDP Security Implementation
- IGP Control Plane Security
- BGP Security Implementation
- BGP FlowSpec Implementation

Implementing Management Plane Security

(Self-Study)

- Management Plane Security Overview
- AAA Implementation
- REST API Security

Implementing Data Plane Security

- ACL Implementation
- uRPF Implementation
- RTBH Filtering Implementation
- Cisco MACsec Overview

Introducing Network Programmability (Self-Study)

- Network Programmability Introduction
- Network APIs and Protocols Introduction
- YANG Introduction
- YANG Data Types
- XPath Overview
- Basic YANG Statements
- Pyang Tool

Implementing Automation and Assurance (Self-Study)

- NETCONF Overview
- RESTCONF Overview
- Model Driven Telemetry Overview
- gNMI Overview
- Zero Touch Provisioning Overview
- NetFlow Overview
- SNMP Overview

Introducing Cisco NSO (Self-Study)

- Logical Architecture
- Components
- Orchestration Use Cases
- Packages
- Mapping Logic
- Network Element Drivers

Implementing Virtualization in Service Provider Environments (Self-Study)

- NFV Infrastructure
- OpenStack Introduction
- Containers Overview
- Application Hosting Basics

Implementing Route Maps and RPL

- Routing Protocol Tools Overview
- Prefix Lists and AS Path Access Lists
- Route Map Introduction
- RPL Introduction
- RPL Parameters and Parameterization
- RPL Implementation

Transitioning to IPv6 for Cisco IOS XR and IOS XE (Self-Study)

- Transitioning from IPv4 to IPv6
- Translation Mechanisms
- IPv6 Tunneling Mechanisms

Implementing High Availability in Networking

- Cisco Nonstop Forwarding Overview
- Bidirectional Forwarding Detection Support
- Link Aggregation

Implementing MPLS for Cisco IOS XR

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

- PIM-SM Enhancements Overview
- Interdomain Multicast Routing
- IPv6 Multicast Implementation
- PIMv6 Overview

Describing QoS Architecture (Self-Study)

- QoS Introduction
- Models for Implementing QoS
- QoS Trust Boundaries
- MPLS QoS Introduction
- Cisco MPLS TE QoS

Implementing QoS for Cisco IOS XR (

Self-Study)

- QoS Mechanisms
- QoS Implementation
- Congestion Management
- Congestion Avoidance Implementation
- Traffic Policing and Shaping

Labs

- Discovery Lab 1: Deploy Cisco IOS XR and IOS XE Basic Device Configuration
- Discovery Lab 2: Implement OSPF Routing
- Discovery Lab 3: Implement Integrated IS-IS Routing
- Discovery Lab 4: Implement Basic BGP Routing
- Discovery Lab 5: Filter BGP Prefixes Using RPL
- Discovery Lab 6: Implement MPLS in the Service Provider Core
- Discovery Lab 7: Implement Cisco MPLS Traffic Engineering (TE)
- Discovery Lab 8: Implement Segment Routing
- Discovery Lab 9: Implement Ethernet over MPLS (EoMPLS)
- Discovery Lab 10: Implement MPLS L3VPN
- Discovery Lab 11: Implement BGP Security
- Discovery Lab 12: Implement Remotely Triggered Black Hole (RTBH) Filtering

## Further Information:

For More information, or to book your course, please call us on Head Office 01189 123456 / Northern Office 0113 242 5931

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