

## Implementing and Operating Cisco Service Provider Network Core Technologies

**Durée: 180 Jours**    **Réf de cours: SPCOR**    **Version: 1.1**    **Méthodes d'apprentissage: E-learning**

### Résumé:

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.

### Public visé:

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

### Objectifs pédagogiques:

- **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

### Pré-requis:

**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

### Test et 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

- Intermediate knowledge of IP routing protocols
- Understanding of MPLS technologies
- Familiarity with VPN technologies
- CCNA - Mettre en oeuvre et administrer des solutions réseaux Cisco

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.

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Après cette formation, nous vous conseillons le(s) module(s) suivant(s):

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

### Describing Service Provider Network Architectures (Self-Study)

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

### Describing Cisco IOS Software Architectures

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

### Implementing OSPF

- 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

- 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

- BGP Introduction
- BGP in Customer Connections
- BGP Routing
- BGP Implementation
- BGP Path Selection
- Weight and Local Preference
- AS Path Prepending and MEDs
- BGP Communities
- Route Redistribution Introduction
- Redistribution Implementation
- Basic BGP Troubleshooting

### Implementing Route Maps and RPL

### 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
- Segment Routing TE Overview
- PCE-PCC Architecture

### 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

### 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

- Multicast Overview
- Multicast Service Model
- Multicast Protocols
- PIM-SM Introduction
- Dynamic RP Mechanisms
- PIM-SM Enhancements Overview
- Interdomain Multicast Routing
- IPv6 Multicast Implementation

### Describing QoS Architecture

### Implementing Management Plane Security

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

### Implementing Data Plane Security

- ACL Implementation
- uRPF Implementation
- RTBH Filtering Implementation

### Introducing Network Programmability

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

### Implementing Automation and Assurance

- NETCONF Overview
- RESTCONF Overview
- gNMI Overview
- Model Driven Telemetry Overview
- NetFlow Overview
- SNMP Overview

### Introducing Cisco NSO

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

### Implementing Virtualization in Service Provider Environments

- NFV Infrastructure
- OpenStack Introduction

### Labs

- Deploy Cisco IOS XR and IOS XE Basic Device Configuration
- Implement OSPF Routing
- Implement Integrated IS-IS Routing
- Implement Basic BGP Routing
- Filter BGP Prefixes Using RPL
- Implement MPLS in the Service Provider Core
- Implement Cisco MPLS Traffic Engineering (TE)
- Implement Segment Routing
- Implement Ethernet over MPLS (EoMPLS)
- Implement MPLS L3VPN
- Implement BGP Security
- Implement Remotely Triggered Black Hole

- 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

- 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

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

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

#### Implementing QoS

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

#### Implementing Control Plane Security

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

(RTBH) Filtering