Cisco IPv6 Fundamentals, Design & Deployment (IP6FD)

Description

Fundamentals, Design, and Deployment of IPv6

The Fundamentals, Design, and Deployment of IPv6 (IP6FD) course offers a comprehensive view on implementing IPv6. This course is designed to equip engineers and technicians with the skills needed to deploy IPv6 solutions in complex environments. You will learn how to configure and manage IPv6 features on Cisco routers, while exploring the key benefits of IPv6 over IPv4.

The goal is to give you complete mastery of the tools and technologies that facilitate the transition to IPv6. This training is distinguished by real case studies, helping you understand how these concepts apply in practical scenarios. The integration of IPv6 is now essential with the continued growth of the Internet and the increasing number of connected devices, such as IoT.

Niveau
Avancé
Course Content
Module 1: IPv6 Approach Explanation

- IP address assignment
- History of IPv4
- The next generation of IP
- Alternatives to IPv4

Module 2: Characteristics and Benefits of IPv6

- Characteristics and benefits of IPv6
- IPv6 addressing
- IPv6 autoconfiguration and aggregation
- Advanced IPv6 features

Module 3: IPv6 Transition Strategies

- IPv6 market growth and technologies
- IPv4 core address space saturation timeline

- Mergers and acquisitions driving the change
- Internet growth
- IoT and increasing number of devices
- Multinational compliance efforts and references

Module 4: IPv6 Addressing Architecture

- IPv6 address formats and types
- IPv6 address usage
- Required IPv6 addresses

Module 5: IPv6 Header Format

- Changes and benefits of the IPv6 header
- IPv6 header fields
- IPv6 extension headers

Module 6: Enabling IPv6 on Cisco Routers

- IPv6 implementation on Cisco routers
- IPv6 addressing configuration
- Using ICMPv6 and Neighbor Discovery

Module 7: ICMPv6 and Neighbor Discovery

- ICMPv6
- ICMP errors
- Echo
- IPv6 on Data Link Layers
- Neighbor Discovery
- Stateless Autoconfiguration
- Value of Autoconfiguration
- Renumbering
- Cisco IOS Neighbor Discovery command syntax
- Cisco IOS network prefix renumbering scenario

Module 8: IPv6 Mobility

- Introduction to IP Mobility
- IPv6 Mobile
- Network Mobility examples

Module 9: DNS in an IPv6 Environment

- DNS objects and records
- DNS tree structure
- Dynamic DNS

Module 10: DHCPv6 Operations

- DHCPv6
- DHCPv6 operations
- DHCPv6 multicast addresses

- DHCPv6 prefix delegation process
- DHCPv6 troubleshooting

Module 11: QoS Support in an IPv6 Environment

- IPv6 header fields used for QoS
- IPv6 and the Flow Label field
- IPv6 QoS configuration

Module 12: Cisco IOS Software Features

- Cisco IOS XE Software features
- Cisco IOS XE Software IPv6 tools
- IPv6 support for Cisco Discovery Protocol
- Cisco Express Forwarding for IPv6
- IP Service Level Agreements

Module 13: Examining OSPFv3

- Main features of OSPFv3
- OSPFv3 enhancements
- OSPFv3 address families
- OSPFv3 configuration
- OSPFv3 IPsec ESP authentication and encryption
- Advanced OSPFv3 features

Module 14: Examining EIGRP for IPv6

- EIGRP for IPv6
- Cisco IOS EIGRP for IPv6 commands

Module 15: Understanding MP-BGP

- MP-BGP support for IPv6
- IPv6 as payload and transport mechanism in MP-BGP
- BGP peering over link-local addresses
- BGP prefix filtering
- MP-BGP configuration and troubleshooting

Module 16: Configuring IPv6 Policy-Based Routing

- Policy-Based Routing
- Configuring PBR

Module 17: Configuring FHRP for IPv6

- First Hop Redundancy Protocol concepts
- HSRPv2 for IPv6
- VRRPv3 for IPv6
- GLBP for IPv6

Module 18: Configuring Route Redistribution

- Route Redistribution

- PE-CE Redistribution for Service Providers

Module 19: Implementing Multicast in an IPv6 Network

- IPv6 Multicast Addressing
- PIM for IPv6
- Rendezvous Points
- MP-BGP for IPv6 Multicast Address Family
- Example of IPv6 multicast application

Module 20: Using IPv6 MLD

- Multicast Listener Discovery
- MLD snooping and MLD group limits
- Multicast User Authentication and Group Range support

Module 21: Implementing Dual Stack

- Dual-Stack Applications
- Dual-Stack Node
- Dual-Stack Approach

Module 22: Tunneling Mechanisms for IPv6

- Overlay tunnels
- Manual tunnel configuration
- Automatic tunnels

Module 23: Transitioning to Single-Stack Deployments

- IPv6 Single Stack
- DNS for IPv6 migrating from A to AAAA
- Conversion options

Module 24: Configuring IPv6 ACLs

- IPv6 ACLs
- IPv6 ACL configuration
- Reflexive and time-based ACLs
- Cisco IOS IPv6 header filtering
- Cisco IOS new ICMPv6 types
- Editing ACLs
- Configuring ACLs in an IPv6 environment

Module 25: Using IPsec, IKE, and VPNs

- IPsec, IKE, and VPN fundamentals
- IPsec and IKE
- VPN connections with IPv6

Module 26: Security Issues in an IPv6 Transition Environment

- Dual-Stack transition mechanisms
- Single-Stack security issues

- Network edge security
- ICMP traffic requirements
- Private vs. public IPv6 addressing
- IP overload issues

Module 27: IPv6 Security Practices

- Threats to IPv6 networks
- Zero-trust overview
- Building distributed security capabilities
- Hiding topology when possible
- Securing the local link
- ICMPv6 at the edge - Managing ICMPv6 traffic
- Developing a mobility support plan
- Using transition mechanisms for transport
- Securing the routing plane
- Deploying an early warning system

Module 28: Configuring Cisco IOS Firewall for IPv6

- Cisco IOS Firewall for IPv6
- IPv6 inspection on ISRs
- Implementing IPv6 inspection on ISRs
- Zone-based firewall for IPv6 on ISRs
- Zone and zone-pair configuration
- Basic interzone access policy configuration for OSI layers 3 to 4
- Zone-based firewall troubleshooting

Module 29: IPv6 Address Allocation

- IPv6 Internet
- IPv6 address allocation
- Connecting to the IPv6 Internet

Module 30: IPv6 Multihoming Issues

- IPv6 multihoming aspects and issues
- IPv6 multihoming status
- Protocol-based solutions

Module 31: IPv6 Enterprise Deployment Strategies

- Enterprise networks
- Impacts on network services
- WAN networks
- Dual Stack: Advantages and disadvantages
- Tunneling: Advantages and disadvantages
- Translation: Advantages and disadvantages

Module 32: IPv6 Support in MPLS

- MPLS operations
- IPv6 deployment scenarios on MPLS

- IPv6 tunnels configured on CE routers
- IPv6 on VPN Layer 2 MPLS
- Cisco 6PE
- Deploying Cisco 6PE on MPLS networks

Module 33: High-Speed Access Services for IPv6

- IPv6 Rapid Deployment
- Customer Link encapsulations
- FTTH Access Architecture
- Cable Access Architecture
- Wireless Access Architecture
- DSL Access Architecture

Module 34: IPv6 Cloud and Software-Defined Deployments

- Cisco SD-WAN
- Cisco SD-Access
- Cloud-native deployment
- IaaS - AWS and Azure

Module 35: Planning and Implementing IPv6 in Enterprise Networks

- Definitions
- IPv6 implementation in an enterprise campus network
- IPv6 in an enterprise WAN network

Module 36: Planning and Implementing IPv6 in Branch Networks

- General considerations for branch network deployment
- Branch deployment profiles: Single-Tier profile implementation

Lab / Exercises

- Using Neighbor Discovery
- Using Prefix Delegation
- Routing with OSPFv3
- Routing with EIGRP
- Routing with BGP and MP-BGP
- Multicast Implementation
- IPv6 Tunneling Implementation
- Advanced ACL Configuration
- IPsec and IKE Implementation
- Configuring Cisco IOS Firewall

Documentation

- Digital course material included

Participant profiles

- Network engineers
- Network support technicians
- System and network administrators

- Network infrastructure consultants
- IT professionals responsible for IPv6 migration

Prerequisites

- Basic knowledge of networking (IPv4)
- Experience with Cisco routers and Cisco IOS
- Understanding of routing protocols (OSPF, BGP)
- Knowledge of network security mechanisms

Objectives

- Master IPv6 addressing and its autoconfiguration
- Configure and deploy IPv6 on Cisco routers
- Understand advanced IPv6 features
- Deploy transition strategies to IPv6
- Use Cisco tools for IPv6 management
- Troubleshoot IPv6 configurations in complex networks

Description
Cisco IPv6 Fundamentals, Design & Deployment (IP6FD) training
Classroom Registration Price (CHF)
4350
Virtual Classroom Registration Price (CHF)
4350
Duration (in Days)
5
Reference
IP6FD