# IPv6 Fundamentals, Design & Deployment Training

Duration: **5 Day**

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**IPv6 Fundamentals, Design, and Deployment (IP6FD)** is a five-day training that provides you with the knowledge and skills needed to implement and configure the IP version 6 (IPv6) features of Cisco IOS software. The training also provides an overview of IPv6 technologies; covers IPv6 design and implementation; describes IPv6 operations, addressing, routing, services, and transition; and describes deployment of IPv6 in enterprise networks as well as in service provider networks. The training includes case studies that are useful for deployment scenarios and remote labs. **How You'll Benefit**This training will help you:

- Learn how to successfully configure the IP version 6 features of Cisco IOS Software
- Gain leading-edge skills for high-demand responsibilities in the enterprise sector
- Earn 40 CE credits toward recertification

## Prerequisites

The knowledge and skills you are expected to have before attending this course are:

- Understanding of networking and routing (on Cisco CCNP® level, but no formal certification is required)
- Working knowledge of the Microsoft Windows operating system

These skills can be found in the following Cisco Learning Offering:

- Implementing and Administering Cisco Solutions (CCNA)

## What You Will Learn

- Describe the history of IP version 4 (IPv4) and the rationale for implementing IPv6 to resolve IPv4 addressing and security issues
- Explain the benefits of addressing with IPv6 and describe how larger IPv6 address sizes facilitate auto configuration and aggregation
- Describe the market drivers that help promote IPv6 as the key technology of the future
- Describe the IPv6 addressing architecture, including types of addresses and address representation
- Describe changes in the IPv6 header and the purpose of extension headers
- Describe and use Cisco IOS software commands to enable IPv6 on Cisco routers
- Describe internet control message protocol (ICMP) types and codes and IPv6 neighbor discovery, which is the process in which neighbors discover each other and autoconfigure addresses
- Describe the IPv6 configuration process on Cisco IOS software and provide some basic methods for troubleshooting issues that relate to IPv6 configurations
- Explain IP mobility in general and describe the IPv6 network mobility model with possible usages
- Describe how domain name system (DNS) works in an IPv6 environment
- Describe dynamic host configuration protocol (DHCP) version 6 (DHCPv6) for IPv6 operations, including how DHCP operation in IPv6 differs from its operation in IPv4 and how you can implement DHCPv6 prefix delegation to improve the IPv6 numbering process
- Describe the fields in the IPv6 header that are used to support quality of service (QoS) and explain how these fields differ from the IPv4 QoS model
- Describe Cisco IOS tools, such as Telnet, Trivial File Transfer Protocol (TFTP), Secure Shell Protocol

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(SSH), and others
- Describe open shortest path first (OSPF)v3, the IPv6-capable version of the OSPF routing protocol, including its operations, configuration, and commands
- Describe Cisco enhanced interior gateway routing protocol (EIGRP), including its operation, configuration, and commands
- Explore multiprotocol border gateway protocol (MP-BGP), including operation, IPv6-related configuration, and commands
- Explain the issues when using policy-based routing (PBR) and when disabling the processing of extension headers
- Describe the characteristics of first hop redundancy protocol (FHRP) for IPv6, which are used to offer redundant connections on the network layer for upstream connectivity
- Describe redistribution of IPv6 routing information, differences among various routing protocols, and changes in the behavior of redistribution compared to IPv4
- Describe the IPv6 multicast addresses format, including a real-life multicast example
- Describe IPv6 multicast addressing options, media access control (MAC) address mappings, and multicast address scoping
- Describe the dual-stacking approach to integrating IPv6 functionality into an existing IPv4-only environment
- Describe tunneling mechanisms for IPv4-to-IPv6 transition, or for supporting IPv4 and IPv6 coexistence
- Explain the benefits of adopting IPv6 single stack instead of using both IPv4 and IPv6 and the process for converting networks from IPv4 to IPv6
- Describe the features of access control lists (ACLs) in an IPv6 environment
- Describe how security is implemented in IPv6
- Describe security issues in an IPv6 transition environment
- Describe security practices for IPv6 deployment
- Describe how Cisco IOS Firewall works and how to configure it in Pv6 traffic
- Describe the IPv6 networking environments in use today, the process of becoming an IPv6 internet service provider (ISPs), address allocation policies and organizations, and strategies for connecting to the IPv6 internet
- Identify an IPv6 multihoming issue and prescribe a potential solution
- Describe several IPv6 enterprise deployment strategies
- Explain how to deploy IPv6 over a multi-protocol label switching (MPLS) network
- Describe IPv6 broadband access services and digital subscriber line (DSL)-based access in particular
- Describe how to plan and implement IPv6 in enterprise networks
- Describe how plan and implement IPv6 cloud and software-defined deployments
- Describe and identify the most common planning and implementation approaches as they pertain to moving to IPv6 in branch networks

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## Training Outline

- Explaining the Rationale for IPv6
- IPv6 Features and Benefits
- Market Drivers
- IPv6 Addressing Architecture
- IPv6 Header Format
- Enabling IPv6 on Cisco Routers
- Using ICMPv6 and Neighbor Discovery
- Troubleshooting IPv6
- IPv6 Mobility
- DNS in an IPv6 Environment
- DHCPv6 Operations
- QoS Support in an IPv6 Environment
- Cisco IOS XE Software Features
- Examining OSPFv3
- Examining EIGRP for IPv6
- Introducing MP-BGP
- Configuring IPv6 Policy-Based Routing
- Configuring FHRP for IPv6
- Configuring Route Redistribution
- Implementing Multicast in an IPv6 Network
- Using IPv6 MLD
- Implementing Dual-Stack
- IPv6 Tunneling Mechanisms
- Transition to Single-Stack Deployments
- Configuring IPv6 ACLs
- Using IPsec, IKE, and VPNs
- Security Issues in an IPv6 Transition Environment
- IPv6 Security Practices
- Configuring Cisco IOS Firewall for IPv6
- IPv6 Address Allocation
- IPv6 Multihoming Issues
- IPv6 Enterprise Deployment Strategies
- Support for IPv6 in MPLS
- IPv6 Broadband Access Services
- Planning and Implementing IPv6 Cloud and Software-Defined Deployments
- Planning and Implementing IPv6 in Enterprise Networks
- Planning and Implementing IPv6 in Branch Networks