IP6FD - IPV6 FUNDAMENTALS, DESIGN, AND DEPLOYMENT V4.1

Course Code: 5764

Gain the knowledge and skills you need to configure the Cisco IOS software IPv6 features.

In this course, you will gain the knowledge and skills needed to configure Cisco IOS software IPv6 features. You will get an overview of IPv6 technologies, design, and implementation. You will also learn about IPv6 operations, addressing, routing, services, and transition. By reviewing case studies, you'll learn to deploy IPv6 in enterprise and service provider networks.

This course is eligible for 40 Continuing Education Credits (ILT Modality).

What You'll Learn

- Factors that led to the development of IPv6 and possible uses of this new IP structure
- Structure of the IPv6 address format
- How IPv6 interacts with data link layer technologies
- How IPv6 is supported in Cisco IOS software
- Implementing IPv6 services and applications
- Changes to DNS and DHCP required to support IPv6
- How networks can be renumbered using DNS and DHCP
- Updates to IPv4 routing protocols needed to support IPv6 topologies
- Multicast concepts and IPv6 multicast specifics
- The best transition mechanism for a given scenario
- How security for IPv6 is different than for IPv4
- Emerging security practices for IPv6-enabled networks
- Standards bodies that define IPv6 address allocation and one of the leading IPv6 deployment issues: multihoming
- Deployment strategies that service providers might consider when deploying IPv6

Who Needs to Attend

Network engineers and technicians in the enterprise sector

Prerequisites

- ICND1 and ICND2 or CCNA certification
- ROUTE or CCNP-level understanding of networking and routing
- Working knowledge of the Microsoft Windows operating system

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VIRTUAL CLASSROOM LIVE	$4,295 USD	5 Day

Virtual Classroom Live Outline

1. Introduction to IPv6
   - Rationale for IPv6
     - IP Address Allocation
     - History of IPv4
     - Next Generation of IP
     - IPv4 Workarounds
   - Evaluating IPv6 Features and Benefits
     - Features and Benefits of IPv6
     - IPv6 Addresses
     - IPv6 Autoconfiguration and Aggregation
     - Advanced IPv6 Features
     - Transition Strategies to IPv6
   - Market Drivers
     - Market Growth for IPv6
     - Native IPv6 Content
     - Drivers for Adoption
2. IPv6 Operations
   - IPv6 Addressing Architecture
     - IPv6 Address Formats and Types
     - IPv6 Address Uses
     - Required IPv6 Addresses
   - IPv6 Header Format
     - IPv6 Header Changes and Benefits
     - IPv6 Header Fields
     - IPv6 Extension Headers
   - Enabling IPv6 on Hosts

        - Enabling IPv6 on Windows
        - Enabling IPv6 on Mac OS X
        - Enabling IPv6 on Linux
    - Enabling IPv6 on Cisco Routers
        - IPv6 Address Configuration
        - Autoconfiguration
    - Using ICMPv6 and Neighbor Discovery
        - ICMP Errors
        - Echo
        - IPv6 over Data Link Layers
        - Neighbor Discovery
        - Stateless Autoconfiguration
        - Value of Autoconfiguration
        - Renumbering
        - Cisco IOS Neighbor Discovery Command Syntax
        - Cisco IOS Network Prefix Renumbering Scenario
        - ICMP MLD
        - IPv6 Mobility
    - Troubleshooting IPv6
        - Cisco IOS IPv6 Configuration Example
        - Cisco IOS show Commands
        - Cisco IOS debug Commands

3. IPv6 Services
    - IPv6 Mobility
        - Mobile IPv6
        - Network Mobility Examples
    - DNS in an IPv6 Environment
        - DNS Objects and Records
        - DNS Tree Structure
        - Dynamic DNS
    - DHCPv6 Operations
        - DHCPv6 Multicast Addresses
        - DHCPv6 Prefix Delegation Process
        - DHCPv6 Troubleshooting
    - QoS Support in an IPv6 Environment
        - IPv6 Header Fields Used for QoS
        - IPv6 and the Flow Label Field
        - IPv6 QoS Configuration
    - Cisco IOS Software Features
        - Cisco IOS IPv6 Tools
        - IPv6 Support for Cisco Discovery Protocol
        - Cisco Express Forwarding IPv6
        - IP Service Level Agreements

4. IPv6-Enabled Routing Protocols

- Routing with RIPng
  - RIPng for IPv6
  - RIPng Enhancements
  - Configuring RIPng
- Examining OSPFv3
  - OSPFv3 Key Characteristics
  - OSPFv3 Enhancements
  - OSPFv3 Configuration
  - OSPFv3 IPsec ESP Authentication and Encryption
  - OSPFv3 Advanced Functionalities
- Integrated IS-IS
  - Integrated IS-IS Characteristics
  - Changes Made to IS-IS to Support IPv6
  - Single SPF Architecture
  - Multitopology IS-IS for IPv6
  - IS-IS IPv6 Configuration on Cisco Routers
- EIGRP for IPv6
  - Cisco IOS EIGRP for IPv6 Commands
- 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
- Configuring IPv6 Policy-Based Routing (PBR)
  - PBR Basics
  - Configure PBR
- Configuring First-Hop Redundancy Protocols (FHRPs) for IPv6
  - FHRP Concepts
  - HSRP for IPv6
  - GLBP for IPv6
- Configuring Route Redistribution
  - Route Redistribution
  - PE-CE Redistribution for Service Providers

5. IPv6 Multicast Services

- Implementing Multicast in an IPv6 Network
  - IPv6 Multicast Addressing
  - PIM for IPv6
  - Rendezvous Points
  - MP-BGP for the IPv6 Multicast Address Family
  - How to Implement Multicasting in an IPv6 Network
  - IPv6 Multicast Application Example
- Using IPv6 MLD
  - Multicast Listener Discovery (MLD)
  - MLD Snooping

        - Multicast User Authentication and Group Range Support

6. IPv6 Transition Mechanisms
    - Implementing Dual-Stack
        - Dual-Stack Applications
        - Dual-Stack Node
        - The Dual-Stack Approach
    - IPv6 Tunneling Mechanisms
        - Overlay Tunnels
        - Manually Configured Tunnels
        - Automatic Tunnels
7. IPv6 Security
    - Configuring IPv6 ACLs
        - IPv6 ACLs
        - Reflexive and Time-Based ACLs
        - Cisco IOS IPv6 Header Filtering
        - Cisco IOS New ICMPv6 Types
        - Editing ACLs
        - Configuring ACLs in an IPv6 Environment
    - IPsec, IKE, and VPNs
        - VPN Connections Using IPv6
    - Security Issues in an IPv6 Transition Environment
        - Dual-Stack Issues
        - Tunnel Security Issues
        - NAT-PT Security Issues
        - ICMP Traffic Requirements
    - IPv6 Security Practices
        - Threats in IPv6 Networks
        - Build Distributed Security Capability
        - Hide Topology when Possible
        - Secure the Local Link
        - ICMPv6 at Edge: Manage ICMPv6 Traffic
        - Develop Mobility Support Plan
        - Use Transition Mechanisms as Transport
        - Secure the Routing Plane
        - Deploy an Early-Warning System
    - Cisco IOS Firewall for IPv6
        - IPv6 Inspection on ISRs
        - Implement IPv6 Inspection on ISRs
        - Zone-Based Policy Firewall for IPv6 on ISRs
        - Configuring Zones and Zone Pairs
        - Configuring a Basic OSI Layer 3 to 4 Interzone Access Policy
        - Troubleshooting the Zone-Based Policy Firewall
8. Deploying IPv6
    - IPv6 Address Allocation

        - IPv6 Internet
        - IPv6 Address Allocation
        - Connecting to the IPv6 Internet
    - IPv6 Multihoming
        - IPv6 Multihoming Aspects and Issues
        - IPv6 Multihoming Status
    - IPv6 Enterprise Deployment Strategies
        - Enterprise Networks
        - Impacts of Network Services
        - WAN Networks
        - Dual Stack: Advantages and Disadvantages
        - Tunneling: Advantages and Disadvantages

9. IPv6 and Service Providers
    - IPv6 Service Provider Deployment
        - Dual-Stack Deployment
        - IPv6-Only Deployment
        - Encapsulation
        - IPv6 Services
        - Key Service Provider Strategies
        - Service Layer Address Allocation
        - Encapsulation Support
    - Support for IPv6 in MPLS
        - MPLS Operations
        - IPv6 over MPLS Deployment Scenarios
        - IPv6 Tunnels Configured on CE Routers
        - IPv6 over Layer 2 MPLS VPN
        - Cisco 6PE
        - How to Deploy Cisco 6PE on MPLS Networks
    - 6VPE
        - Cisco 6VPE Basics
        - Configuring 6VPE
    - IPv6 Broadband Access Services
        - IPv6 Rapid Deployment
        - Customer Link Encapsulations
        - FTTH Access Architecture
        - Cable Access Architecture
        - Wireless Access Architecture
        - DSL Access Architecture

10. IPv6 Case Studies
    - Planning and Implementing IPv6 in Enterprise Networks
        - Enterprise Network Definition
        - Implementing IPv6 in an Enterprise Campus Network
        - IPv6 in an Enterprise WAN Network
    - Planning and Implementing IPv6 in Service Provider Networks

    - Service Provider Network Design
    - Native IPv6 Deployment in Service Provider Access Networks
    - Native IPv6 Deployment in the Service Provider Core Network
    - 6PE Deployment in the Service Provider Core Network
- Planning and Implementing IPv6 in Branch Networks
    - Branch Deployment Overview
    - Branch Deployment Profiles: Single-Tier Profile Implementation

Virtual Classroom Live Labs

Lab 1: Enabling IPv6 on Hosts

Lab 2: Using Neighbor Discovery

Lab 3: Using Prefix Delegation

Lab 4: Routing with OSPFv3

Lab 5: Routing with IS-IS

Lab 6: Routing with EIGRP

Lab 7: Routing with BGP and MP-BGP

Lab 8: Multicasting

Lab 9: Implementing Tunnels for IPv6

Lab 10: Configuring Advanced ACLs

Lab 11: Implementing IPsec and IKE

Lab 12: Configuring Cisco IOS Firewall

Lab 13: Configuring 6PE and 6VPE

Aug 18 - 22, 2025 | 8:30 AM - 4:30 PM EDT

Dec 8 - 12, 2025 | 8:30 AM - 4:30 PM EST

Mar 30 - Apr 3, 2026 | 8:30 AM - 4:30 PM EDT

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ON-DEMAND	$900 USD

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PRIVATE GROUP TRAINING	5 Day

Visit us at www.globalknowledge.com or call us at 1-866-716-6688.

Date created: 7/30/2025 12:33:56 PM