IP6FD

Cisco IPv6 Fundamentals, Design & Deployment

40 horas | Enterprise Network | Cisco

Cisco Continuing Education Credits

40 CE Credits

INTRODUÇÃO

The IPv6 Fundamentals, Design, and Deployment (IP6FD) v3.0 course is an instructor-led course that is presented by Cisco Learning Partners to their end-user customers. This five-day course aims at providing network engineers and technicians that are working in the enterprise sector with the knowledge and skills that are needed to study and configure Cisco IOS Software IPv6 features. The course also provides an overview of IPv6 technologies, covers IPv6 design and implementation, describes IPv6 operations, addressing, routing, services, transition, and deployment of IPv6 in enterprise as well as in service provider networks, and includes case studies useful for deployment scenarios.

OBJETIVO DO CURSO

Upon completing this course, you will be able to:

Describe the factors that led to the development of IPv6 and possible uses of this new IP structure
Describe the structure of the IPv6 address format, how IPv6 interacts with data link layer technologies, and how IPv6 is supported in Cisco IOS Software
Implement IPv6 services and applications
Understand the updates to IPv4 routing protocols needed to support IPv6 topologies
Understand multicast concepts and IPv6 multicast specifics
Evaluate the scenario and desired outcome and identify the best transition mechanism for the situation
Describe security issues, how security for IPv6 is different than for IPv4, and emerging practices for IPv6-enabled networks
Describe the standards bodies that define IPv6 address allocation, in addition to one of the leading IPv6 deployment issues—multihoming
Describe the deployment strategies that service providers might consider when deploying IPv6
Describe case studies for enterprise, service provider, and branch networks

PÚBLICO-ALVO

This course is primarily intended for Network Engineers and Technicians, Network Operations Center (NOC) Support Personnel and Help Desk Technicians, Any individual involved in implementation and verification of routing protocols in the enterprise networks.

PRÉ-REQUISITOS

The knowledge and skills that a learner must have before attending this course are as follows:

Cisco Certified Network Associate (CCNA) certification.

Understanding of networking and routing (on CCNP level, but no certification required).

Working knowledge of the Microsoft Windows operating system.

CONTEÚDO PROGRAMÁTICO

Module 1: Introduction to IPv6

Lesson 1: Explaining the Rationale for IPv6

IP Address Allocation

History of IPv4

Next Generation of IP

IPv4 Workarounds

Lesson 2: Evaluating IPv6 Features and Benefits

Features and Benefits of IPv6

IPv6 Addresses

IPv6 Autoconfiguration and Aggregation

Advanced IPv6 Features

Transition Strategies to IPv6

Lesson 3: Understanding Market Drivers

Market Growth for IPv6

Native IPv6 Content

Drivers for Adoption

Module 2: IPv6 Operations

Lesson 1: Understanding the IPv6 Addressing Architecture

IPv6 Addressing Architecture

IPv6 Address Formats and Types

IPv6 Address Uses

Required IPv6 Addresses

Lesson 2: Describing the IPv6 Header Format

IPv6 Header Changes and Benefits

IPv6 Header Fields

IPv6 Extension Headers

Lesson 3: Enabling IPv6 on Hosts

Enabling IPv6 on Hosts

Enabling IPv6 on Windows

Enabling IPv6 on Mac OS X

Enabling IPv6 on Linux

Lesson 4: Enabling IPv6 on Cisco Routers

Enabling IPv6 on Cisco Routers

IPv6 Address Configuration

Autoconfiguration

Lesson 5: Using ICMPv6 and Neighbor Discovery

ICMPv6

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

Lesson 6: Troubleshooting IPv6

Cisco IOS IPv6 Configuration Example

Cisco IOS show Commands

Cisco IOS debug Commands

Cisco IOS debug Command Example

Module 3: IPv6 Services

Lesson 1: IPv6 Mobility

Introduction to IP Mobility

Mobile IPv6

Network Mobility Examples

Lesson 2: Describing DNS in an IPv6 Environment

DNS Objects and Records

DNS Tree Structure

Dynamic DNS

Lesson 3: Understanding DHCPv6 Operations

DHCPv6

DHCPv6 Operation

DHCPv6 Multicast Addresses

DHCPv6 Prefix Delegation Process

DHCPv6 Troubleshooting

Lesson 4: Understanding QoS Support in an IPv6 Environment

IPv6 Header Fields Used for QoS

IPv6 and the Flow Label Field

IPv6 QoS Configuration

Lesson 5: Using Cisco IOS Software Features

Cisco IOS Software Features

Cisco IOS IPv6 Tools

IPv6 Support for Cisco Discovery Protocol

Cisco Express Forwarding IPv6

IP Service Level Agreements

Module 4: IPv6-Enabled Routing Protocols

Lesson 1: Routing with RIPng

Introducing RIPng for IPv6

Examining RIPng Enhancements

Configuring RIPng

Lesson 2: Examining OSPFv3

OSPFv3 Key Characteristics

OSPFv3 Enhancements

OSPFv3 Configuration

OSPFv3 IPsec ESP Authentication and Encryption

OSPFv3 Advanced Functionalities

Lesson 3: Examining 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

Lesson 4: Examining EIGRP for IPv6

EIGRP for IPv6

Cisco IOS EIGRP for IPv6 Commands

Lesson 5: 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

Lesson 6: Configuring IPv6 Policy-Based Routing

Policy-Based Routing

Configure PBR

Lesson 7: Configuring FHRP for IPv6

First-Hop Redundancy Protocols and Concepts

HSRP for IPv6

GLBP for IPv6

Lesson 8: Configuring Route Redistribution

Route Redistribution

PE-CE Redistribution for Service Providers

Module 5: IPv6 Multicast Services

Lesson 1: 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

The lesson includes these activities:

Lesson 2: Using IPv6 MLD

Multicast Listener Discovery

MLD Snooping and MLD Group Limits

Multicast User Authentication and Group Range Support

Module 6: IPv6 Transition Mechanisms

Lesson 1: Implementing Dual-Stack

Dual-Stack Applications

Dual-Stack Node

The Dual-Stack Approach

Lesson 2: Describing IPv6 Tunneling Mechanisms

Overlay Tunnels

Manually Configured Tunnels

Automatic Tunnels

The lesson includes these activities:

Module 7: IPv6 Security

Lesson 1: Configuring IPv6 ACLs

IPv6 ACLs

IPv6 ACL Configuration

Reflexive and Time-Based ACLs

Cisco IOS IPv6 Header Filtering

Cisco IOS New ICMPv6 Types

Editing of ACLs

How to Configure ACLs in an IPv6 Environment

The lesson includes these activities:

Lesson 2: Using IPsec, IKE, and VPNs

IPsec, IKE, and VPNs Basics

IPsec and IKE

VPN Connections Using IPv6

The lesson includes these activities:

Lesson 3: Discussing Security Issues in an IPv6 Transition Environment

Dual-Stack Issues

Tunnel Security Issues

NAT-PT Security Issues

ICMP Traffic Requirements

Lesson 4: Understanding 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

Lesson 5: Configuring Cisco IOS Firewall for IPv6

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

Module 8: Deploying IPv6

Lesson 1: Examining IPv6 Address Allocation

IPv6 Internet

IPv6 Address Allocation

Connecting to the IPv6 Internet

Lesson 2: Understanding the IPv6 Multihoming Issue

IPv6 Multihoming Aspects and Issues

IPv6 Multihoming Status

Lesson 3: Identifying IPv6 Enterprise Deployment Strategies

Enterprise Networks

Impacts of Network Services

WAN Networks

Dual Stack: Advantages and Disadvantages

Tunneling: Advantages and Disadvantages

Translation: Advantages and Disadvantages

Module 9: IPv6 and Service Providers

Lesson 1: Identifying IPv6 Service Provider Deployment

IPv6 Service Provider Deployment

Dual-Stack Deployment

IPv6-Only Deployment

Encapsulation

IPv6 Services

Key Service Provider Strategies

Service Layer Address Allocation

Encapsulation Support

Lesson 2: Understanding 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

Lesson 3: Understanding 6VPE

Cisco 6VPE

Configuring 6VPE

The lesson includes these activities:

Lesson 4: Understanding IPv6 Broadband Access Services

IPv6 Rapid Deployment

Customer Link Encapsulations

FTTH Access Architecture

Cable Access Architecture

Wireless Access Architecture

DSL Access Architecture

Module 10: IPv6 Case Studies

Lesson 1: Planning and Implementing IPv6 in Enterprise Networks

Enterprise Network Definition

Implementing IPv6 in an Enterprise Campus Network

IPv6 in an Enterprise WAN Network

Lesson 2: 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

Lesson 3: Planning and Implementing IPv6 in Branch Networks

Branch Deployment Overview

Branch Deployment Profiles: Single-Tier Profile Implementation

Branch Deployment Profiles: Dual-Tier and Multitier Profile Implementations

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