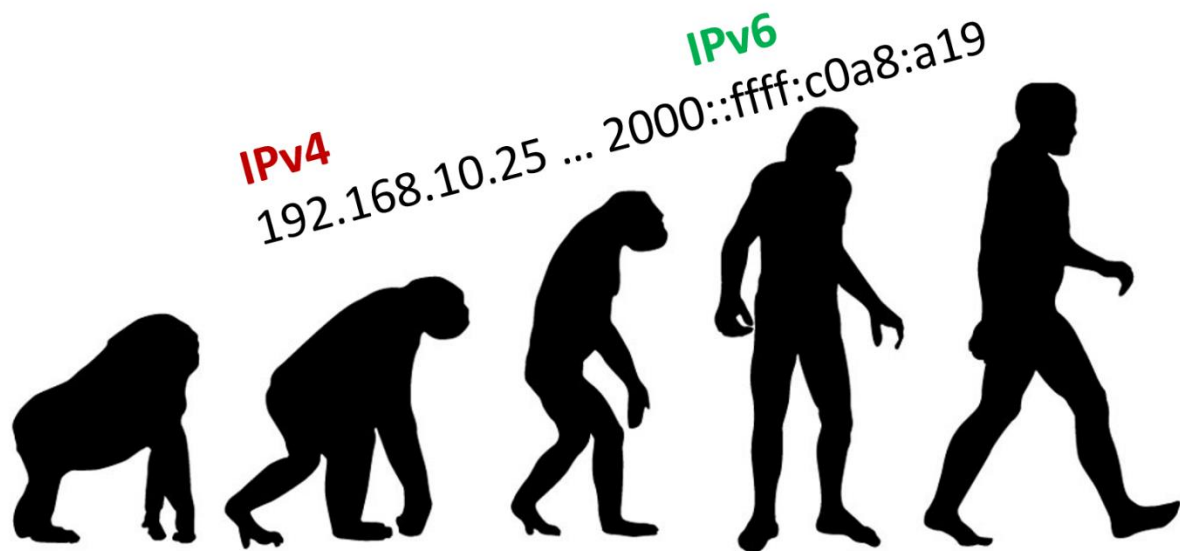


# IPv6 Fundamentals, Design and Deployment



## Overview

The IPv6 Fundamentals, Design, and Deployment (IP6FD) course provides network engineers and technicians who are working in the enterprise sector with the knowledge and skills that are needed to study and configure the IP version 6 (IPv6) features of Cisco IOS Software. The course 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 course also includes case studies that are useful for deployment scenarios and remote labs.

## Pre-Requisites

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

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

To gain the prerequisite skills and knowledge, Cisco strongly recommends knowledge of the following courses:

- Interconnecting Cisco Network Devices 1 (ICND1)
- Interconnecting Cisco Network Devices 2 (ICND2)

# COURSE CONTENT

## Introduction to IPv6

- Explaining the Rationale for IPv6
- Evaluating IPv6 Features and Benefits
- Understanding Market Drivers
- IPv6 Operations

## Understanding the IPv6 Addressing Architecture

- IPv6 Address Format
- IPv6 Address Prefix
- IPv6 Address Types
- IPv6 Address Assignment
- IPv6 Unicast Address
- IPv6 Global Unicast Address
- IPv6 Link-Local Unicast Address
- IPv6 Anycast Address

## Describing the IPv6 Header Format

IPv6 Header Fields  
Description of IPv6 Header Fields  
IPv6 Extension Headers  
Routing Header  
Fragment Header  
ICMPv6 Packet

## Using ICMPv6 and Neighbor Discovery

Neighbor Discovery  
IPv6 Neighbor Solicitation  
IPv6 Neighbor Advertisement  
IPv6 Router Discovery  
IPv6 Router Advertisement  
IPv6 Router Solicitation  
IPv6 Redirect Message  
Stateless Autoconfiguration  
Renumbering of IPv6 Nodes  
Duplicate Address Detection Work  
Path Maximum Transmission Unit Discovery  
IPv6 Path MTU Discovery Work  
Dynamic Host Configuration Protocol Version 6  
IPv6 Domain Name System Operation

## IPv6 Services

- Describing DNS in an IPv6 Environment
- Understanding DHCPv6 Operations
- Understanding QoS Support in an IPv6 Environment
- Using Cisco IOS Software Features

## IPv6-Enabled Routing Protocols

- Routing with RIPng
- Examining OSPFv3
- Examining Integrated IS-IS
- Examining EIGRP for IPv6
- Understanding MP-BGP
- Configuring IPv6 Policy-Based Routing
- Configuring FHRP for IPv6
- Configuring Route Redistribution

## IPv6 Multicast Services

- Implementing Multicast in an IPv6 Network
- Using IPv6 MLD

## IPv6 Transition Mechanisms

- Using IPv4-IPv6 Protocol Dual Stack Devices
- Deploying IPv6 Using Dual Stack Backbones
- Deploying IPv6 over IPv4 Tunnels
- Tunneling Requirements
- Tunneling and Security
- IPv6 Tunnel Mechanisms
- IPv6 Manually Configured Tunnel
- IPv6 over IPv4 GRE Tunnel
- Automatic IPv4-Compatible Tunnel
- Automatic 6to4 Tunnel
- Automatic 6RD Tunnel
- Protocol Translation Mechanisms
- Network Address Translation-Protocol Translation

## IPv6 Security

- Configuring IPv6 ACLs
- Using IPsec, IKE, and VPNs
- Discussing Security Issues in an IPv6 Transition Environment
- Understanding IPv6 Security Practices
- Configuring Cisco IOS Firewall for IPv6

## Deploying IPv6

- Examining IPv6 Address Allocation
- Understanding the IPv6 Multihoming Issue
- Identifying IPv6 Enterprise Deployment Strategies
- IPv6 and Service Providers

- Identifying IPv6 Service Provider Deployment
- Understanding Support for IPv6 in MPLS
- Understanding 6VPE
- Understanding IPv6 Broadband Access Services

## IPv6 Case Studies

- Planning and Implementing IPv6 in Enterprise Networks
- Planning and Implementing IPv6 in Service Provider Networks
- Planning and Implementing IPv6 in Branch Networks