

## CS-IPv6F



# IPv6 Fundamentals: A Straightforward Approach to Understanding IPv6

| DURATION | LEVEL       | TECHNOLOGY | DELIVERY METHOD | TRAINING CREDITS |
|----------|-------------|------------|-----------------|------------------|
| 5 Days   | Fundamental | Cisco IPv6 | ILT or VILT     | N/A              |

### INTRODUCTION

Organizations are increasingly transitioning to IPv6, the next-generation protocol for defining how devices of all kinds communicate over networks. This 5-day course will instill the knowledge and skills you need to deploy and operate IPv6 networks.

### AUDIENCE PROFILE

This course is intended for individuals working in an enterprise IT environment.

### PREREQUISITES

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

- Fundamental Routing and Switching knowledge
- Fundamental understanding of networking technologies and network design and deployment
- CCNA Recommended

### COURSE OBJECTIVES

On completion of this course, participants should be familiar with:

- How IPv6 supports modern networks encompassing the cloud, mobile, IoT, and gaming devices
- Comparing IPv6 with IPv4 to see what has changed and what hasn't
- Understand and represent IPv6 addresses for unicast, multicast, and anycast environments
- Master all facets of dynamic IPv6 address allocation with SLAAC, stateless DHCPv6, and stateful DHCPv6
- Understand all the features of deploying IPv6 addresses in the network including temporary addresses and the privacy extension
- Improve operations by leveraging major enhancements built into ICMPv6 and ICMPv6 Neighbour Discovery Protocol
- Configure IPv6 addressing and Access Control Lists using a common topology
- Implement routing of IPv6 packets via static routing, EIGRP for IPv6, and OSPFv3
- Step-by-step through deploying IPv6 in existing networks, and coexisting with or transitioning from IPv4

### COURSE CONTENT

#### Lesson 1: Introduction to IPv6

- Why Transition to IPv6
- IPv4 Address Depletion
- History of IPv6
- IPv6: More Than Just Longer Addresses
- IPv6 Myths

#### Lesson 2: IPv6 Primer

- Hexadecimal Number System
- IPv6 Address Types
- Address Terminology

- ICMPv6 Neighbour Discovery Protocol (NDP)
- Dynamic Address Allocation

#### Lesson 3: Comparing IPv4 and IPv6

- Comparing the IPv4 and IPv6 Headers
- IPv6 over Ethernet
- Packet Analysis Using Wireshark
- Extension Headers

#### Lesson 4: IPv6 Addresses

- IPv6 Address Representation and Address Types
- Prefix Length Notation
- IPv6 Address Types
- Unicast Addresses
- Multicast Addresses
- Anycast Addresses

## Lesson 5: Global Unicast Address

- Structure of a Global Unicast Address
- Manual Configuration of a Global Unicast Address
- Recognizing the Parts of a GUA Address and the 3—1—4 Rule
- Subnetting IPv6
- Prefix Allocation
- General Prefix Option
- Dynamic Addressing Methods with SLAAC and DHCPv6

## Lesson 6: Link-Local Unicast Address

- Structure of a Link-Local Unicast Address
- Automatic Configuration of a Link-Local Address
- Manual Configuration of a Link-Local Address
- Link-Local Address and Duplicate Address Detection
- Link-Local Addresses and Default Gateways
- ipv6 enable: Isolated Link-Local Address

## Lesson 7: Multicast Addresses

- Scope
- Well-Known Multicast Addresses
- Solicited-Node Multicast Addresses
- Multicast Listener Discovery

## Lesson 8: Dynamic IPv6 Addressing

- Dynamic IPv4 Address Allocation: DHCPv4

- Dynamic IPv6 Address Allocation
- DHCPv6 Services

## Lesson 9: Stateless Address Autoconfiguration (SLAAC)

- The RA Message and SLAAC
- Generating an Interface ID
- Autoconfigured Address States and Lifetimes
- Router Advertisement Fields and Options
- Default Address Selection
- Configuring the Router's Interface as a SLAAC Client

## Lesson 10: Stateless DHCPv6

- SLAAC with Stateless DHCPv6
- Implementing Stateless DHCPv6
- DHCPv6 Options

## Lesson 11: Stateful DHCPv6

- Stateful DHCPv6 Messages and Process
- Implementing Stateful DHCPv6
- IPv6 Prefix Delegation Options for DHCPv6

## Lesson 12: ICMPv6 and ICMPv6 Neighbour Discovery

- General Message Format
- ICMP Error Messages
- ICMP Informational Messages

## Lesson 13: ICMPv6 Neighbour Discovery

- Neighbour Discovery Options
- Default Router and Prefix Determination

- Address Resolution
- Neighbour Cache
- Duplicate Address Detection (DAD)
- Neighbour Unreachability Detection (NUD)
- Redirect Message

## Lesson 14: V Routing IPv6

- Configuring a Router as an IPv6 Router
- Understanding the IPv6 Routing Table
- Configuring IPv6 Static Routes
- Verifying IPv6 Static Routes

## Lesson 15: EIGRP for IPv6

- Comparing EIGRPv4 and EIGRPv6
- Classic EIGRP for IPv6
- EIGRP Named Mode for IPv6

## Lesson 16: OSPFv3

- Comparing OSPFv2 and OSPFv3

## Lesson 17: Deploying IPv6 in the Network

- IPv6 Address Plan Considerations
- IPv6 VLANs
- IPv6 First Hop Redundancy Protocols
- Dual Stack
- DNS
- IPv6 Access Control Lists
- Transition Technologies
- Tunneling IPv6

## ASSOCIATED CERTIFICATIONS & EXAM

There is no exam associated with this course.