

IPv6 Fundamentals Course Overview

5 Days

Learn the fundamentals of the IPv6 protocol and its implementation.

The next generation Internet Protocol, IPv6, will take the TCP/IP protocol into the 21st century. IPv6 provides larger addresses, simplified address configuration options, optimized routing and support for new applications designed to overcome current limitations. In this course, experienced internetworking professionals gain the knowledge and skills they need to understand the basics of the functionality, implementation and migration from existing IPv4 networks to the new IPv6 protocol.

This course provides an overview of the core functions of the IPv6 protocol. The Introduction to IPv6 course is a combination of lecture based training and practical exercises that provide the course attendees with the opportunity to apply the concepts that they are learning.

Course Contents

Why IPv6?

Problems with IPv4

- Size of the Address space
- Lack of Mobility & Static addressing
- Lack of Security
- No QoS

Why not just change IPv4?

- CIDR, VLSM, NAT, DHCP
- Mobile IPv4
- IPSec
- QoS

What is Driving the Market for IPv6?

IPv6 Protocol Overview

Main Features of IPv6

Address Architecture

Review of IPv4 Addressing

IPv6 Address Architecture

Unicast addresses

- Global unicast
- Unique local unicast
- Link local unicast
- Special addresses

- Unspecified
- Loop back
- Transitional addresses

Anycast addresses

Multicast addresses

Packet Formats

IPv4 vs. IPv6 headers

IPv6 Extension Headers

Benefits of IPv6 Header streamlining

IP Control Plane Protocols

ARP vs. Neighbor Discovery

ICMP vs. ICMPv6

IPv6 MTU discovery

IGMP vs. Multicast Listener Discovery

Address Autoconfiguration

Stateful vs. Stateless Autoconfiguration methods

Duplicate Address Detection

Using DHCPv6

Automatic Renumbering

Enabling IPv6

Configuring Windows Hosts

Configuring Routers

DNS and IPv6

Differences between DNS for IPv4 and IPv6

IPv6 Routing

The Routing process

Static Routing

IPv6 Dynamic Routing Protocols

- RIPng
- OSPFv3
- M-BGP

IPv6 Mobility

Mobile IPv4 operation

Mobile IPv6 operation

IPv6 Security

AH & ESP Headers

IPSec Tunnel & Transport modes

IPv6 QoS

Traffic Class & Flow Label

Transition Scenarios

Dual Stack

Tunnelling

- Manual
- Automatic - 6to4, ISATAP
- Semi-Automatic - Tunnel Broker

Translation

- NAT64 & DNS64

Deploying IPv6 in Service Provider Networks

Dual-Stack Lite

6PE, 6VPE

Configured CE Tunnels

Deploying IPv6 in the Enterprise