

# Implementing IPv6 on Cisco IOS (4 days)

How to plan and implement IPv6 on Cisco Routers

## Relevant Platforms:

- Cisco IOS

## You will learn how to

- Plan and manage the migration of your network to IPv6
- Implement new networking software and devices to support IPv6
- Implement auto-configuration to manage IPv6 addresses
- Configure the different IPv6 migration tools such as dual-stacks and tunnelling in order to facilitate the transition.
- Obtain and configure IPv6 on Cisco IOS.
- Install and configure associated network services, in particular DNS, DHCP and routing protocols.
- Update and configure common networking applications, ping, FTP, e-mail, and web-servers.

## Course Benefits

IPv6 is the result of many years of research and activity by the international Internet community. IPv6 provides increased addressing space, improved routing, better security and support for new applications.

The implementation of IPv6 is inevitable and will impact on all companies that maintain, implement or use IP networks.

In this course, you will learn how to obtain and implement IPv6 protocols within your organisation on Cisco routers and other networked devices. This course provides extensive hands-on sessions and in-depth technical analysis.

## Who Should Attend

This course is ideal for network administrators, network support personnel, network designers, networking consultants, IT managers and directors. A good knowledge of general networking concepts is assumed. Experience of IPv4 is necessary.

## Course Contents

### The Need for IPv6

- History of IP
- The problems with IPv4
- The IPv4 header format
- Address space & functionality
- IPv4 Security and QoS
- IPv4 ease of configuration

### The Features of IPv6

- IPv6 datagram header
- IPv6 addresses
- Address representation
- Multicast, unicast & anycast
- The IPv6 datagram format
- IPv6 extension headers
- ICMPv6
- IPv6 multicast group management

### Autoconfiguration of IPv6

- Stateless & stateful
- DHCPv6
- Link-local addresses in IPv6
- IPv6 neighbour discovery
- IPv6 router discovery
- Router renumbering

### Internetworking IPv6

- IPv6 Routing Tables
- MTU discovery
- Neighbour reachability
- IPv6 Router renumbering
- IPv6 Fragmentation

### IPv6 Dynamic Routing

- ICMPv6 Redirects
- RIPng & OSPFv3
- BGPv4 & IPv6
- IPv6 Multicast Routing
- IPv6 PIM
- BGMP and IPv6

### Interfacing to the Lower Layers

- Data-link and physical layer
- Point to point and IPv6
- IPv6 over PPP
- DBMA networks and IPv6
- IPv6 over ATM
- IEEE802 and IPv6

### Transport Layer

- Operation of TCP and UDP
- Ports and sockets
- Changes to TCP and UDP

### IPv6 Transition Mechanisms I

- Overview of transition mechanisms
- Dual stacks
- Compatibility addresses
- 6over4 and 6to4
- Automatic and configured tunnelling
- ISATAP, Teredo & DSTM
- IPv6 Tunnel brokers
- Tunnel setup protocol

### IPv6 Transition Mechanisms II

- Protocol translators
- SIIT
- TRT
- Application layer gateways
- NAT-PT & NAPT-PT
- IPv6 SOCKS
- BIS and BIA
- Transition mechanisms and DNS

### IPv6 Security (IPSec)

- Cryptographic techniques

- IPv6 and IPSec
- IPv6 AH & ESP Headers
- Transport and tunnel modes
- Security associations
- ISAKMP & IKE

### Mobile IPv6

- Limitations of link layer mobility
- Mobile IPv4 vs Mobile IPv6
- Mobile IPv6 in operation
- Home agents
- Binding updates & binding cache

### IPv6 and Quality of Service

- Traffic class in IPv6
- The IPv6 Flow label
- Differential services (DiffServ)
- Integrated services (IntServ)
- Traffic flows in IPv6
- RSVP

### DNS

- Changes to DNS for IPv6
- IPv6 AAAA resource records
- PTR records and IPv6
- Reverse lookups in IPv6
- A6 & DNAME RRs
- ip6.arpa. & ip6.int.
- IPv6 in BIND and MS DNS

### Application Changes

- Basic Internet commands
- IPv6 ping, telnet and FTP
- Mail systems and IPv6
- IPv6 enabled web-servers

### The Programming Interface

- Sockets & Winsock APIs
- Perl, Java, C etc

### Network Management

- SNMP & IPv6
- The extended MIB for IPv6
- IPv6 Protocol Analysers
- Troubleshooting

### Migrating to IPv6

- What when and how to migrate
- The current status of IPv6
- Operating systems and IPv6
- Business applications and IPv6

## Practicals

Each topic has an associated exercise or demonstration. Choose to do exercises on Linux, Windows or Cisco IOS.

Hands-on practicals include:

- Upgrading and configuring IPv6
- Network monitoring of IPv6 traffic
- IPv6 router configuration
- Assigning IPv6 address prefixes
- Configuring IPv6 dynamic routing
- Security configuration using IPv6 IPSec
- Migration testing
- Configuring transition mechanisms
- Mobile IPv6
- Upgrading and configuring DNS

## The Trainers

Trainers are practising IPv6 consultants with extensive experience of IPv6. Further information at [www.erion.co.uk](http://www.erion.co.uk)