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# IPv6

## Course Description

Although slow to catch on across the global Internet, IPv6 is gaining in popularity, particularly within private IP transport networks such as those used in telecoms and enterprise environments. This course centres around the use of IPv6, from initial migration options through to addressing and header format. The course also covers the extensions associated with IPv6, with focus on security and QoS.

This course has no prerequisites.

1

Days  
(LiveOnsite, LiveOnline)

6

CPD Learning  
Credits



Level: 2  
(Intermediate)

**This course will contain the following sections:**

## 1. The Driving Factors for IPv6

**Topic areas covered include:**

- What's Wrong with IPv4?
- Features of IPv6.
- Deploying IPv6.
- Migration Strategies.
- Dual Stack.
- Translation:
  - Address Translation.
- Tunnelling:
  - Configured Tunnels (6in4, Manual Tunnels).
  - Connection of IPv6 Domains via IPv4 Clouds (6to4).
  - IPv6 Rapid Deployment (6rd).
- IPv6 Deployment.

## 2. IPv6 Basics

**Topic areas covered include:**

- The Aim of IPv6.
- IPv6 Address Space – IANA, RIR.
- IPv6 Base Header Format:
  - Version, Traffic Class, Flow Label, Payload Length, Next Header, Hop Limit, Source and Destination Address.
- IPv6 Extensions:
  - IPv6 Extension Types.

## IPv6 Basics (cont.)

- Additional IPv6 Features:
  - IPv6 Stateless Auto-configuration (SLAAC).
  - NDP.
  - Renumbering a Network.
  - Mobile IPv6.
  - HA, FA, CoA, Route Optimization.

## 3. IPv6 Addressing

**Topic areas covered include:**

- IPv6 Address Space:
  - IPv6 Address Types.
  - Network and Node Addresses.
- IPv6 Address Format:
  - IPv6 Notation (Colon Hexadecimal).
- Unicast Address Types.
- Multicast Addressing.
- Anycast Address.
- IPv6 and Routing:
  - Routing Protocol Architectures.
  - AS (Autonomous System) Architecture.
  - Routing Protocol Algorithms and Metrics.

## 4. IPv6 Options and Extension Headers

**Topic areas covered include:**

- IPv6 Extensions:
  - The Role of the Extension Headers.
  - IPv6 Header Chaining Using the Next Header Field.

1

**Days**  
(LiveOnsite, LiveOnline)

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## IPv6 Options and Extension Headers (cont.)

- Extension Header Types:
  - Routing Header.
  - Pv6 Fragment Extension Header.
- IPv6 Datagram Options.
- IPv6 Internet Control Message Protocol:
  - ICMP Common Message Format.
  - ICMP Message Types.
- DHCPv6:
  - DHCP Message Exchanges.
- Domain Name System and IPv6:
  - IPv6 DNS Extensions.

## Overcoming Problems with IP Transport Networks (cont.)

- Security Association.
- Security Parameter Index.
- Security Association Establishment.
- Summary of Operation.
- IPSec Authentication Header.
- IPSec Encapsulating Security Payload.
- QoS Provision within Packet Switched Networks:
  - DiffServ Overview.
- IPv6 in Mobile Service Provider Networks.

## 5. Overcoming Problems with IP Transport Networks

### Topic areas covered include:

- Modern Day Network Security:
  - The Threat Climate.
  - Defence in Depth.
- IPSec Basics:
  - IPSec Modes of Operation.
- IPSec Management Functions:
  - Security Policy Database.

The logo for NetX, featuring the word 'NetX' in a stylized, light blue font. The background of the entire page is a complex network diagram with various nodes and connections, including labels like MRB, MR, MRG, MRGCF, Mx, M, Mn, Mg, Mm, Mw, Mv, M4, M3, M2, M1, M0, M-1, M-2, M-3, M-4, M-5, M-6, M-7, M-8, M-9, M-10, M-11, M-12, M-13, M-14, M-15, M-16, M-17, M-18, M-19, M-20, M-21, M-22, M-23, M-24, M-25, M-26, M-27, M-28, M-29, M-30, M-31, M-32, M-33, M-34, M-35, M-36, M-37, M-38, M-39, M-40, M-41, M-42, M-43, M-44, M-45, M-46, M-47, M-48, M-49, M-50, M-51, M-52, M-53, M-54, M-55, M-56, M-57, M-58, M-59, M-60, M-61, M-62, M-63, M-64, M-65, M-66, M-67, M-68, M-69, M-70, M-71, M-72, M-73, M-74, M-75, M-76, M-77, M-78, M-79, M-80, M-81, M-82, M-83, M-84, M-85, M-86, M-87, M-88, M-89, M-90, M-91, M-92, M-93, M-94, M-95, M-96, M-97, M-98, M-99, M-100. The diagram is rendered in a dark blue color scheme with various colored nodes and lines.

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