

Introduction to IPv6

Introduction - After many years of the existence of IPv6, at last the 'killer' requirement of the depletion of IPv4 addresses has resulted in the need to, at least, explore, if not implement IPv6.

This course offers an overview of many of the key aspects of IPv6 that differentiate it from the existing version of IP, namely IPv4.

Who should attend the course? - This course will be beneficial for network managers, technicians, designers and consultants who wish to gain an understanding of IPv6. A reasonable understanding of IPv4 networking is recommended.

Course Length - One day.

Course Agenda

1. Introduction to IPv6
2. IPv6 Addressing
3. The IPv6 Header
4. ICMPv6 (Internet Control Message Protocol) Version 6
5. IPv6 Neighbour Discovery
6. IPv6 Autoconfiguration
7. IPv6 Transition Technologies
8. IPv6 Other Considerations

1 Introduction to Ipv6

- Limitations of IPv4
 - IP address exhaustion
 - Lack of security mechanisms
 - Need for better QoS support
- What happened to IPv5? - Internet Stream Protocol
- IPv6 Features Overview
 - Revised header
 - Larger address space
 - IPv6 autoconfiguration
 - IPv6 Neighbour Discovery
 - IPv6 Router Discovery
 - Required IPsec header support
 - IPv6 extension headers
 - Restoral of end-to-end communications
- Section summary and end-of-section review

2 IPv6 Addressing

- IPv6 address space
- IPv6 address representation
- Address Notation exercise
- IPv6 address types
 - Unicast
 - Multicast
 - Anycast
- IP unicast addresses
 - Global
 - Local use
 - Link local
 - Site local
 - Unique local
 - Special addresses
 - Unspecified
 - Loopback
 - Transition addresses
 - IPv6 Interface identifiers
- Preparing an IPv6 Addressing Plan
- Addressing plan exercise
- Section summary and end-of-section review

3 The IPv6 Header

- IPv6 header structure
- IPv6 extension headers
 - Hop-by-hop options
 - Destination options (with routing options)
 - Routing header
 - Fragment header
 - Authentication header
 - Encapsulation Security Payload (ESP) header
 - Destination options
 - Mobility header
- Section summary and end-of-section review

4 ICMPv6 (Internet Control Message Protocol) Version 6

- ICMPv6 overview
- ICMP error messages
 - Destination unreachable
 - Packet too big
 - Time exceeded
 - Parameter problem
- ICMPv6 informational messages
 - Echo request
 - Echo reply
- Path MTU discovery
- Neighbour discovery ICMP messages
- Section summary and end-of-section review

5 IPv6 Neighbour Discovery

- Neighbour Discovery ICMP messages
 - Router advertisement
 - Router solicitation
 - Neighbour solicitation
 - Neighbour advertisement
 - Redirect
- Neighbour Discovery functions
 - Router discovery
 - Prefix discovery
 - Parameter discovery
 - Address autoconfiguration
 - Address resolution
 - Next-hop determination
 - Neighbour unreachability detection
 - Duplicate address detection

- Redirect
- Section summary and end-of-section review

6 IPv6 Address Autoconfiguration

- Stateless
- Stateful
 - DHCPv6 (Dynamic Host Configuration Protocol Version 6)
- Section summary and end-of-section review

7 IPv6 Transition Technologies

- An overview of and discussion of a number of different 'transition' technologies
 - ISATAP (Intra-Site Automatic Tunnel Addressing Protocol)
 - 6to4
 - Teredo
 - 6rd (rapid deployment)
 - DS-Lite (Dual-Stack Lite)
 - 6over4
 - 6in4
 - SIIT (Stateless IP/ICMP Translation)
 - TRT (Transport Relay Translation)
- Section summary and end-of-section review

8 IPv6 Other Considerations

This section looks at PNNI, which defines a standard for signalling and routing protocols to be used in a large and scalable network environment.

- Routing and IPv6
 - RIPng
 - OSPFv3 for IPv6
 - IS-IS for IPv6
- DNS for IPv6
 - AAAA resource records
 - IP6.ARPA for IPv6 reverse queries
 - Coexistence with IPv4
- IPv6 security
 - IPsec and IPv6
 - Other IPv6 security considerations
- Mobile IPv6
- QoS with IPv6
- Section summary and end-of-section review questions

End of Training Outline

HN Networks

HN Networks delivers training and consultancy in various Datacommunication and Telecommunication technologies.

We offer a range of standard training courses as well as providing a customisation service where we will specifically tailor a course to a particular client's needs.

To find out about our range of training courses, please refer to our web site at:

<http://www.hn-networks.co.uk>

Alternatively, please feel free to call us on +44 (0) 1628 622187 if you wish to discuss your training requirements or simply need further information.