

Hands-on course , 4
day(s)
Ref : PVI

Participants

Network administrators,
network engineers.

Pre-requisites

Basic knowledge of
networking technologies and
IPv4.

Next sessions

Introduction to IPv6 deployment and migration

OBJECTIVES

IPv6 (Internet Protocol version 6) was developed to deal with the long-anticipated problem of IPv4 running out of addresses. This course will provide you with the relevant knowledge you need to successfully implement this new Internet Protocol. It presents in a progressive manner what you need to know.

1) Introduction

2) IPv6 overview

3) Addressing scheme

4) Automatic configuration

5) Applications using IPv6

6) IPv6 routing

7) Mobile and Security with IPv6

8) Migrating from IPv4 to IPv6

1) Introduction

- IPv4, a 30-year long success story.
- Problems with IPv4.
- Routing table explosion and addressing space exhaustion.
- Real-time traffic and QoS handling. Efficiency.
- Using CIDR and NAT.
- Using DSCP.

2) IPv6 overview

- IPv4 and IPv6 packet header formats.
- IPv6 extension headers instead of IPv4 options.
- TCP, UDP, and ICMP using IPv6 : what's new ?

3) Addressing scheme

- 128-bit long addresses : address types, address representation, address lifetime.
- Addresses scopes.
- Link local and Global addresses.
- Multicast and Anycast addresses.
- Address allocation, IANA/ICANN, and RIR.

Workshop

Activating IPv6 on a Windows computer. Automatic and manual address configuration. Link local and global addresses. The IPv6 "ping" command.

4) Automatic configuration

- New protocols : ICMPv6 and DHCPv6.
- The enhanced role of the local router.
- Neighbor Discovery Protocol and the RS, RA, NS and NA ICMPv6 messages.
- Redirect ICMPv6 message.
- Stateless and statefull automatic configuration.
- Phases during automatic stateless configuration.
- Building a globally unique address .

Workshop

Configuring routers and servers. Manual and/or automatic workstations configuration.

5) Applications using IPv6

- IPv6 compatible DNS.
- IPv6 transport, AAAA records.
- Reverse address resolution. DNS clients.
- IPv6 software compatibility. Native compatibility. Network API translation.
- Upper layer protocols : Telnet, SSH, TFTP, SNMP, FTP, HTTP.

Workshop

Registering IPv6 addresses within a DNS server. Testing DNS servers and clients for IPv6 address resolution. Using IPv4 and IPv6 applications

6) IPv6 routing

- Static routing vs. dynamic routing.
- RIPng protocol.
- OSPFv3 protocol.
- EIGRP protocol and IPv6.
- MBGP and IPv6.

Workshop

IPv6 static routing. IPv6 dynamic routing with RIPng, OSPFv3, MBGP.

7) Mobile and Security with IPv6

- From mobile IPv4 to mobile IPv6.
- Using bidirectional tunnels. Direct routing.
- IPSec protocol.
- Host authentication with AH. Privacy with ESP
- Establishing dynamic security association with IKE and ISAKMP.
- Internet Security Association Key Management Protocol.

Workshop

Transport mode IPsec between hosts. IPsec tunnels between routers.

8) Migrating from IPv4 to IPv6

- Going from IPv4 to IPv6.
- Using both IPv4 and IPv6 protocols.
- Transition mechanisms. Dual stack, Protocol translation, Tunneling.
- Best common practices.