Introduction to IPv6 deployement and migration

Hands-on course of 4 days - 28h
Ref.: PVI - Price 2024: €2 690 (excl. taxes)

THE PROGRAMME

last updated: 01/2018

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.
- Adresses scopes.
- Link local and Global addresses.
- Multicast and Anycast addresses.
- Address allocation, IANA/ICANN, and RIR.
Hands-on work : 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.
- Neigbor 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 .
Hands-on work : 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.
Hands-on work : 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.

Hands-on work : 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.

Hands-on work : 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.

DATES

REMOTE CLASS
2025 : 11 Mar, 01 Jul, 16 Sep, 16 Dec