

Hands-on course , 5  
day(s)  
Ref : ROC

### Participants

Anyone involved in installing and maintaining Cisco based networks.

### Pre-requisites

Basic knowledge of networking technologies or IPv4 networks.

### Next sessions

# Introduction to Cisco Routers

## OBJECTIVES

*At the end of this practical course, participants will be able to install, configure and maintain a router or switch. Also, to implement a static or dynamic routing, interconnecting LANs via a WAN solution, filter traffic, which model of Cisco router, administering routers in the safest conditions.*

### 1) Cisco router architecture

### 2) Installing and configuring a router

### 3) Installing and configuring a Cisco switch

### 4) IP routing configuration

### 5) Using serial interfaces and WAN

### 6) Security

### 7) Router exploitation and maintenance

## 1) Cisco router architecture

- Hardware components (Flash, NVRAM, network interface cards,...).
- The Internetworking Operating System (IOS).
- Initial configuration.

## 2) Installing and configuring a router

- Preparing the router environment.
- Connecting the console cable and the ethernet connection.
- Using the "enable" mode. The "show" command.
- Showing material and software versions. Using the "configure" mode.
- Basic configuration commands : Time, host name, user names and passwords.
- Interfaces configuration. Preparing VTY access with telnet or ssh.
- Testing the network with "ping" and "traceroute" commands.

### Workshop

*Basic router configuration. Testing network reachability with ping and traceroute.*

## 3) Installing and configuring a Cisco switch

- Cisco switching platforms.
- Frame switching versus packet routing.
- Building a reliable level-2 architecture.
- The Spanning Tree Protocol. Designing VLANs.
- Configuration commands.
- Integrating switches and routers.

### Workshop

*Installing a Cisco switch. Basic configuration. Implementing VLANs.*

## 4) IP routing configuration

- Designing a redundant network topology.
- Defining a routing strategy. Static or dynamic routing. Default routes.
- Understanding routing tables.
- Ensuring service availability with Hot Standby Router Protocol (HSRP). Virtual router.
- Dynamic routing with RIP v1 and v2. Understanding Routing Information Protocol (RIP). Configuration commands. Debugging.
- Dynamic routing with EIGRP. Enhancement to IGRP. EIGRP metrics. Load balancing. Configuration commands. Debugging.
- Dynamic routing with OSPF. Open Shortest Path First (OSPF). Metrics and areas. Configuration commands. Debugging.

### Workshop

*Designing and implementing a redundant topology. Using HSRP Static routing. Dynamic routing with RIP, EIGRP, and OSPF.*

## 5) Using serial interfaces and WAN

- Serial interfaces on leased lines.
- Frame relay interfaces. Physical interface configuration. Virtual serial interface configuration.
- ATM and ISDN interfaces.
- Point-to-Point Protocol (PPP). Basic mechanisms. Password Authentication Protocol (PAP).
- Challenge Handshake Authentication Protocol (CHAP). Using ML-PPP (Multilink PPP).

### Workshop

*Connecting routers with "cross" serial lines. Interface configuration with PPP encapsulation. Managing rates and Maximum Transmission Units (MTU). Analyzing network performances*

## 6) Security

- Private addresses vs. routable official Internet addresses.
- Using Network Address Translation (NAT).
- Using Port and Address Translation (PAT).
- Using Access Control Lists (ACL). Basic ACL. Extended ACL.
- Replacing telnet access with ssh.
- Using HTTPS to configure a router.
- Using the syslog protocol.

#### **Workshop**

*Using NAT and PAT on a router. Using ACL. Configuring ssh.*

### **7) Router exploitation and maintenance**

- Boot sequence.
- Using Cisco configuration register.
- Recovering a lost password.
- Installing a new IOS.
- Managing router configuration with TFTP.
- Configuring SNMP on the router.

#### **Workshop**

*Using the PROM Monitor. Changing the configuration register. Installing a new IOS with the tftpdnld command. Configuring and querying the SNMP agent.*