

# Introduction to Networks

## installer et administrer des réseaux locaux

Hands-on course of 3 days - 21h

Ref.: TRM - Price 2025: 2 140 (excl. taxes)

This course, including both theoretical and hands-on exercises, will help you to understand and practice enterprise networking. Most important aspects, including software and hardware parts will be explained. Interconnection devices such as switches and routers, networking protocols such as TCP/IP, and high-level application protocols such as DNS, DHCP, HTTP and others will be examined thoroughly. Following this course, you will be able to set up local area networks and to connect and manage PCs running Windows or Linux.

The exercises and demonstrations in this course are based on the end-to-end construction of a mini enterprise network based on the traditional HQ/branch model. Participants will configure and interconnect servers, workstations, and equipment as the course goes on.

## THE PROGRAMME

last updated: 02/2024

### 1) Introduction

- What can we do with a network ?
- Which parts will constitute our network ?
- What are the typical needs of network users ?
- Architecture : communication, interconnection, administration, and security.

### 2) Networking technologies and general principles

- Types of network.
- Which technologies ? Characteristics of each technology.
- Client-Server communication.
- Sharing resources. What is a " protocol " ?
- Open System Interconnection Basic Reference Model : The seven layers.

### 3) Cabling possibilities

- Twisted pair, coaxial cable, fiber optics.
- Cabling systems : design and principles.
- Wireless networks.
- Standards.

### 4) Local Area Networks (LAN)

- Central role of Local Area Networks in today networking.
- The Ethernet " family ".
- CSMA/CD Medium Access Control in IEEE 802.3 networks.
- From 10 Mbps hubs to 10 Gbps switches.
- Wireless networks (802.11x).

### 5) Interconnection devices

- Hubs and repeaters.

#### PARTICIPANTS

This course is intended for whoever is involved with networking technologies : engineers, software developers, computer scientists as well as non technical persons. Requirements are some practical skills with computer systems. This course is essential as

#### PREREQUISITES

No particular knowledge.

#### TRAINER QUALIFICATIONS

The experts leading the training are specialists in the covered subjects. They have been approved by our instructional teams for both their professional knowledge and their teaching ability, for each course they teach. They have at least five to ten years of experience in their field and hold (or have held) decision-making positions in companies.

#### ASSESSMENT TERMS

The trainer evaluates each participant's academic progress throughout the training using multiple choice, scenarios, hands-on work and more. Participants also complete a placement test before and after the course to measure the skills they've developed.

#### TEACHING AIDS AND TECHNICAL RESOURCES

- The main teaching aids and instructional methods used in the training are audiovisual aids, documentation and course material, hands-on application exercises and corrected exercises for practical training courses, case studies and coverage of real cases for training seminars.
- At the end of each course or seminar, ORSYS provides participants with a course evaluation questionnaire that is analysed by our instructional teams.
- A check-in sheet for each half-day of attendance is provided at the end of the training, along with a course completion certificate if the trainee attended the entire session.

#### TERMS AND DEADLINES

Registration must be completed 24 hours before the start of the training.

#### ACCESSIBILITY FOR PEOPLE WITH DISABILITIES

Do you need special accessibility accommodations? Contact Mrs. Fosse, Disability Manager, at [psh-accueil@ORSYS.fr](mailto:psh-accueil@ORSYS.fr) to review your request and its feasibility.

- Bridges and switches. VLANs.
- Routers
- Gateways
- Firewalls
- Switched Ethernet based architecture.
- What is Spanning Tree ?

*Hands-on work : Connecting workstations and servers to ethernet switches.*

#### 6) Wide Area Networks (WAN)

- When to use a WAN ? What kind of WAN can we use ?
- WAN services.
- Overview of WAN technologies and protocols (From RNIS to MPLS).
- ADSL.

#### 7) The TCP/IP stack

- Interconnection basic needs.
- The IP protocols.
- Addresses and network masks.
- Unicats, multicast, broadcast.
- The ICMP protocol.
- Understanding the Transports protocols : TCP and UDP.
- Applications and transport port numbers.
- Client/server model.
- How to configure Windows and/or Linux.

*Hands-on work : Using some Network Sniffers (Ethereal/Wireshark). Setting up addresses and masks on Windows and/or Linux. What is a MAC address. ARP protocol. Connection test (ping).*

#### 8) Routers : inter-networking principles

- Why use a router ?
- Routing and forwarding principles. Routing tables.
- Static versus dynamic routing.
- Routing protocols (RIP2, OSPF, BGP).
- IP switching.

*Hands-on work : Connecting and configuring routers. Displaying and modifying routing tables. Testing the networks and routers (traceroute).*

## DATES

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### REMOTE CLASS

2025 : 23 juil., 19 nov.