

# TCP/IP, Implementation interconnexion, administration

**Hands-on course of 4 days - 28h**

**Ref.: INR - Price 2024: €2 590 (excl. taxes)**

This course will provide you with the relevant knowledge you need to successfully implement a TCP/IP network. It presents in a progressive manner what you need to know and to do to implement a TCP/IP network. You will configure a workstation and servers and set up some basic TCP/IP services.

## TEACHING METHODS

Active learning based on examples, demonstrations, experience-sharing, real cases, and an evaluation of what was learned from the training.

Discussions, experience-sharing, demonstrations, tutorials, and real cases.

## THE PROGRAMME

last updated: 01/2018

### 1) Introduction to TCP/IP

- Basic notions. TCP/IP architecture. Networking standards.
- Services and protocol. Communication mechanisms.
- Connection-oriented versus datagram communication.
- Client-server model.
- RFCs. What is IETF?

### 2) IP protocols

- Using the physical networks. From Ethernet to SDH/SONET.
- Network addresses.
- Address classes.
- What a netmask is. How to use it.
- Routing principles. Routing tables. Static versus dynamic routing.
- Subnetting. What for. How to implement them.
- ICMP protocol. How to use it.
- The ping and traceroute commands. How to use them.
- DHCP protocol. How to implement it.

*Hands-on work : Setting up a basic IP network with Ethernet and Windows or Linux workstations. Using ICMP, observing traffic. Setting up DHCP servers and clients. Setting up a DHCP relay.*

### 3) Transport layer : TCP and UDP

- Application addresses: Transport port numbers.
- TCP: Connection-oriented transport protocol. When to use it.
- Setting up a connection. Numbering scheme, acknowledgement and retransmission, Flow control.
- UDP: Connectionless transport protocol. When to use it.
- The socket interface. Network application design principles.

*Hands-on work : Observing TCP-based transfers and UDP-based transfers.*

## PARTICIPANTS

This course is designed for technical persons directly involved in designing, implementing, and managing TCP/IP networks and services.

## PREREQUISITES

Basic knowledge of either Windows or Linux. Mandatory basic networking skills.

## 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.

#### 4) Interconnecting IP networks

- Routers. Functions implemented on a router. Translation addresses and/or port numbers (NAT, PAT).
- Comparing routers with switches.
- Routing. Dynamic versus static routing. Interior Gateway Protocols (IGP: RIP-distance vector routing, OSPF-link state routing)
- IP switching. How to make IP routing faster: from proprietary tag switching techniques to MPLS.

*Hands-on work : Designing and implementing several IP subnetworks. Choosing netmasks, setting up routers. Using RIP and OSPF.*

#### 5) TCP/IP applications

- Domain Name System. Design principles. How to set up and test a DNS server.
- File Transfer Protocol. How it works. Security aspects.
- Another file transfer protocol: Trivial File Transfer Protocol. How it uses UDP.
- WWW HTTP and related techniques.
- Mail related protocols: Pop, Imap, Smt. How to avoid Spam.
- Remote access protocols: Telnet, rlogin, ssh. What is SSL.
- Sharing resources: NFS, SMB and other protocols.
- Multimedia applications.

*Hands-on work : Observing FTP transfers from a command-line client or a browser. Comparison with TFTP transfer. Using Telnet and HTTP.*

#### 6) TCP/IP network management

- What is a network management system: manager and agents.
- Using SNMP (SNMP V1, V2c, V3. SMI. MIBs).
- Analysis tools.

*Hands-on work : Monitoring traffics. Basic SNMP use.*

#### 7) Towards IPv6

- Why to get ready for IPV6.
- Adresses and adresssing structure.
- Statically versus dynamically assigned addresses. Using DHCPv6.
- IPv6 migration : using dual stacks, tunnels.

*Hands-on work : Setting up the IPv6 stack on a Windows workstation. Assigning static adresses. Observing lv6 packets.*

#### 8) TCP/IP security

- What is IPSec.
- Building VPNs.
- Firewall, proxy-servers, NAT and PAT.

## DATES

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#### REMOTE CLASS

2025 : 14 Jan, 08 Apr, 08 Jul, 21 Oct