

# Networks and the future of Internet

Seminar of 3 days - 21h

Ref.: RNG - Price 2025: 2 950 (excl. taxes)

## THE PROGRAMME

last updated: 03/2024

### 1) Internet and the upcoming generation of protocols

- The Internet Society. Standardization.
- The main features of IP : addressing, routing (BGP, RIP, OSPF)...Issues and solutions.
- Local networks/Public networks : NAT/PAT. IPv6.
- The transport layer in TCP/IP : UDP, TCP.

### 2) Mobility in networks

- The first generation of mobile networks.
- GSM and its breakthroughs. Packet mode in GSM networks : GPRS/EDGE. GPRS networks routing.
- 3G : UMTS, CDMA2000 ; architecture, throughputs, applications. Evolutions to 3G/3G+ : HSDPA, HSUPA, HSOPA, MIMO.
- Next generations : throughputs, characteristics (LTE and UMB).
- Inter-networks mobility : vertical handover and cognitive radio.
- IP mobile architecture in heterogeneous networks.

### 3) Prospective for the mobile Internet

- Mobility, UMTS, 4G and wireless routers.
- Contrôle. Content Distributed Networks. Signaling. Control.
- Quality of Service for fixed and mobile networks.

### 4) Evolution of the technologies in the access networks

- Switching : high throughputs, label and contents.
- Content-based routing and XML routing.
- Overlay networks, CDN and P2P networks.
- Services-based architectures.

### 5) Controlling the Quality of service (QoS)

- Definition of the QoS : from design to state machines.
- Traffic engineering. Source-to-destination boundaries.
- Access control. Packets sequencing.
- Queues handling : RED, RIO.
- QoS results for different technologies.
- Application-based traffic shaping. The RTP/RTCP proposition.

### 6) Technologies and evolutions of the access networks

- ATM, a possible universal network ?
- ATM for ISP and telcos.
- Data control and services classifications.
- Ethernet-for-all !
- From 10Mbps/s to 10Gbps/s.
- From LAN to long-distance core network. 802.17. Ethernet First Mile for FTTH.
- IP for a new generation.

#### 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.

- IPv4 and IPv6. Advantages of IPv6 for fast networks and multimedia.
- IP multicast routing. IntServ and DiffServ models.
- Different class of services : EF, AF and BE.
- DiffServ and MPLS. DiffServ and IntServ : differences.
- MPLS and the new generation of core networks for Internet.
- Label switching. Origins and reasons.
- LDP Protocols , CR-LDP, RSVP-TE, G-MPLS for new generation.
- MPS vs IP. Déployments and key players.

### 7) Local lopp

- Optical fibers access networks (FTTC, FTTH).
- Cable-TV access networks. Cable-TV modems.
- Twisted pairs access networks. DSL modems. Throughputs. Other solutions : xDSL, DSLAM.
- Upcoming triple-play and quadruple-play.
- Architectures. Home networking : The Wi-Fi and PLC (PowerLine Communications) technologies.

### 8) Wireless networks

- WPAN networks
- Newer generations and the 802.15 standard.
- UWB (Ultra Wide Band) and the very high throughput.
- Bluetooth 3.0, WUSB products and WINET. ZigBee.
- WLAN networks.
- WiFi environment with IEEE 802.11a/b/g/n.
- Handovers, Quality of service and security.
- Fast handover and mesh-networks.
- WMAN networks.
- WiMAX. Metropolitan networks and IEEE 802.16. WDSL, mobile ADSL and IEEE 802.16e.
- WRAN networks.
- Usage of the UHF/VHF bands for wireless regional networks and IEEE 802.22. Smart antennas and cognitive radio.
- Wi-xx solutions for networks.
- Wireless networks and IEEE 802.21.
- Wi-xx networks vs 4G.

### 9) Voice over IP

- Convergence.
- Voice over IP, ToIP and VoIP.
- Towards a full-IP telephony network.
- Standards, industrial key players.
- H323 : close the original PSTN.
- Architecture and deployment using compatible signalling with PSTN.
- SIP approach and unified communications.
- An open-system of signalization to build-up services. The SIP Forum. SIP within a 3G mobile network.
- Comparison of SIP and H323.
- MGCP and gatekeepers.
- Interconnexion of ToIP and PSTN devices. Integration of heterogeneous services.

### 10) Security and the next generation of Internet

- Internet security model : still available ? Authentication, RADIUS and IEEE 802.1x.
- Encryption and electronic signature.
- Data Classification for security usage.
- New generation of firewalls. Authentication with chips.
- Certificates architectures (PKI).

- Autonomous networks. Networks managment. Smart networks. Virtual networks. After IP.

## DATES

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REMOTE CLASS

2025 : 23 sept.