

# Course : Network virtualization SDN, NV, NFV

Seminar - 2d - 14h00 - Ref. VTU

Price : 1850 € E.T.

★★★★☆ 4,4 / 5

We offer a comprehensive overview of the emerging field of network virtualization and its impact on the digital transition and Cloud Networking. After an introduction to the market and the changes taking place in Cloud virtualization, the seminar will provide an in-depth study of SDN (Software Defined Network) networks, as well as the current standardization of NFV (Network Function Virtualization).

## Teaching objectives

At the end of the training, the participant will be able to:

- ✓ Define the fundamental principles of network virtualization
- ✓ Understand and evaluate the main aspects of software networks
- ✓ Identify the problem and the inherent technical solutions
- ✓ Discover and implement existing solutions
- ✓ Understand the economic and innovation opportunities offered by SDN

## Intended audience

IT or production managers. Operations, relations and applications managers. System or network administrators. Project managers, users...

## Prerequisites

Basic knowledge of networks.

## Practical details

### Demonstration

This seminar will be based on practical case studies and numerous examples, which will be implemented using an SDN model based on the mininet emulator and FlowVisor controller.

## Course schedule

### PARTICIPANTS

IT or production managers. Operations, relations and applications managers. System or network administrators. Project managers, users...

### PREREQUISITES

Basic knowledge of networks.

### 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.

## 1 Virtualization and networks

- The market and virtualization needs.
- The shift from in-house to outsourced information systems.
- The impact of broadband technologies on network virtualization (fiber optics, broadband cellular networks, etc.).
- From supercomputers to data centers.
- SDN's precursor academic and industrial research projects.
- Virtualization: concept, models and principles.
- Hypervisors (Xen, VMware/vSphere, OpenVZ, Linux VServer, Hyper-V, KVM).
- Cloud solutions (SaaS, PaaS, IaaS).
- Network integration in the cloud: Neutron in OpenStack.
- Virtualized equipment.
- Characterizing Quality of Service (QoS), and the mechanisms for guaranteeing it.
- Examples of network functionality virtualization (Firewalls, Switches, Routers, PCs, etc.).

## 2 Architecture and standardization

- Standards bodies.
- Ongoing standardization with NFV (Network Functions Virtualization).
- ONF (Open Network Foundation) architecture.
- North, south, east and west interfaces.
- Cloud architectures (Central Cloud, Cloudlet).
- Uses (Infrastructure, Service, Mobile...).
- Sensitive data hosting constraints and regulations.

## 3 SDN (Software Defined Networking) techniques and applications

- SDN network architectures.
- Decoupling the transmission-control plane.
- Layers of abstraction.
- Physical and virtual controllers.
- SDN in local networks.
- LAN and application controllers.
- SDN players: Open Networking Foundation, IETF, operators.
- Infrastructure control (centralized or distributed).
- Automated network management.
- The coexistence of virtualized and traditional networks.
- Virtual network migration.
- Security virtualization (virtual firewalls): what's possible?
- Access control management (authentication, identity management, etc.).
- High availability, load balancing.
- Managing energy consumption: how to reduce consumption?

## 4 OpenFlow networks

- Controller-transfer node coupling.
- OpenFlow features and frames.
- OpenFlow and Open vSwitch switches.
- OpenFlow, NOX, FlowVisor compatible controllers.
- Open Source developments, OpenDaylight, OpenContrail.

### 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.

## 5 Protocol levels

- Frame and packet level. Advantages and disadvantages.
- Interconnection solutions for data centers.
- Ethernet compatibility.
- Level 2 routing.
- QoS: MPLS/GMPLS.
- Overlays: NaaS.
- Level 3 technologies: NVGRE, VXLAN.
- VXLAN (Virtual Extensible LAN) encapsulation protocols.
- Trends: STT, NVGRE, SPB.

## 6 Wireless network virtualization

- Virtualization in mobile networks: HLR, VLR, virtual antennas.
- The coexistence of virtualized and non-virtualized mobile networks, the Cloud-RAN.
- IMS (IP multimedia Subsystem) virtualization.
- Passpoint virtual access points.
- Migration of virtual access points.

## 7 New network paradigms

- Limits and drawbacks of current architecture.
- SDN and support for new network paradigms.
- SDN in the Internet of Things.
- The TRILL (TRansparent Interconnection of Lots of Links) protocol.
- LISP (Locator/Identifier Separation Protocol).
- The ICN (Information Centric Network) model.

## 8 SDN equipment manufacturers and new trends

- Standard OEM products.
- CISCO's ACI (Application Centric Infrastructure).
- NSX from VMware, FlexNetwork from HP.
- Other proposals: Brocade, Juniper, Alcatel-Lucent/Nokia.
- Performance: hardware gas pedals.
- Operator trends, first deployments : Google, Orange...
- The maturity of SDN solutions.
- Positioning Cloud Networking.
- Network convergence (Mobile and Cloud).
- The impact of virtualization on applications and services.
- Deployment forecasts.
- The chances of success for new-generation protocols.
- Market trends.

## Dates and locations

### REMOTE CLASS

2026 : 2 June, 17 Sep., 8 Dec.

### PARIS LA DÉFENSE

2026 : 2 June, 17 Sep., 8 Dec.