NETWORK SOFTWERIZATION

Technical Teaching

NetSoft

KSENTINI Adlen

ABSTRACT

The architectures of networks and service delivery platforms are subject to an unprecedented techno-economic transformation. This trend, often referred to as Network Softwarization, will yield significant benefits in terms of reducing expenditure and operational costs of next generation networks. The key enablers are Network Function Virtualization (NFV), Software-Defined Networking (SDN), Cloud Computing (mainly Edge Computing).

This course will cover the principle of Network Softwerization by introducing and detailing the concepts of SDN, NFV and Cloud Computing (focusing on the IaaS model and Edge Computing). Besides covering the theoretical aspects, the course will provide an overview of the enabling technologies, and how combining these concepts will allow building flexible and dynamic virtual networks tailored to services, e.g. Anything as a Service (AaaS) and Network Slicing.

Teaching and Learning methods:

- Be able to control a network using a NoS (SDN controller)

- Be able to deploy a virtual network architecture

BIBLIOGRAPHY

- Scott Shenker (UC Berkeley), "Software-Defined Networking at the Crossroads", Standford, Colloquium on Computer Systems Seminar Series (EE380), 2013.

- "Software-Defined Networking: A Comprehensive Survey", Diego Kreutz, Fernando M. V. Ramos, Paulo Verissimo, Christian Esteve Rothenberg, Siamak Azodolmolky, Steve Uhlig; in IEEE Surveys & Tutorials on communications.

- Thomas D. Nadeau & Ken Gray, "SDN: Software Defined Networks", Oreilly publisher

REQUIREMENTS

This course requires knowledge on: networking and computer programming.

DESCRIPTION

Learning outcomes :

- Software Defined Networking: Concepts, Network Operating System (NOS), Northbound API (ex. REST), Southbound API (ex. OpenFlow), network programming languages

- Cloud Computing: IaaS, multi-tenancy, link and node virtualization, OpenVswitch (OVS), Edge Computing.

- Network Function Virtualization: ETSI architecture, Virtual Network Function (VNF) concept, Orchestrations.

- Anything as a Service (AaaS), Network Slicing

Nb of hours:

- 4 lectures , 3 labs: NOS using POX and Python, Network Virtualization with Linux name spaces.

Grading: 50% Written Review, 50% TP. The module is acquired if the average score is >= 10 and the written exam score is >=8.