

5G System Overview – 3 days

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The 5G System Overview provides a solid technical understanding of the 5G System as defined and standardized by 3GPP.

The course accounts for the various aspects of the 5G System (Radio Access Network, 5G Core), nodes / functions, interfaces / reference points, basic procedures and main architectural ideas. The course explains concepts important to 5G like network slicing and edge computing, and how these are used to make the 5G System more efficient and flexible than earlier generations of 3GPP networks. The ITU 5G Use Cases (eMBB, URLLC and mMTC) are outlined in terms of services and technical aspects. The course also gives an overview of the NG-RAN (Next-Generation Radio Access Network) including New Radio (NR).

PREREQUISITES

General technical knowledge of LTE/EPS/4G is required.

5G System Overview

- What is 5G and why?
- ITU 5G Use Cases – eMBB, URLLC and mMTC)
- 4G evolution into 5G – Non-Standalone NR
- NG-RAN and the 5G Core – Standalone NR

5G Core Network

- The new Service-Based Architecture (SBA)
- NF Services and Service Based Interfaces
- New 5GC Networks Functions (NFs): AMF, SMF, PCF, AUSF, UDM, UPF, NEF etc.
- Virtualization of Network Functions
- Basic traffic cases: Registration and PDU Session setup

PDU Sessions

- PDU Session types – IP, Ethernet and Unstructured
- Session Attributes
- Session and Service Continuity
- User Plane Options; Splitting and relocating the user plane – why and how?

Network Slicing

- Dividing physical resources into logical networks
- Network slicing using NFV and SDN
- Network slice data model – NSSAI, slice instances, slice selection
- Network slicing for different use cases

Edge Computing and Local Area Data Networks (LADN)

- What is Edge Computing
- How 5G enables edge computing
- ETSI MEC (Multi-access Edge Computing)
- What is a Local Area Data Network
- Deployment options for LADN

NG-RAN and New Radio (NR)

- NG-RAN Architecture, nodes, interfaces, reference points, protocols
- Frequency bands – mmWave radio
- New Radio (NR) features, NR Numerologies
- C-RAN – Centralized RAN and O-RAN
- 5G RRC States

5G QoS – Quality of Service

- PDU Sessions and QoS Flows
- 5G QoS parameters
- QoS handling in UE, gNB and UPF

Network Exposure

- Why Network Exposure – what can be exposed and to whom
- Monitoring, Provisioning and Policy/Charging capabilities
- Role and NF Services of Network Exposure Function (NEF)

5G Security Overview

- 3GPP 5G Security Architecture and Security Domains
- 5G-AKA (Authentication and Key Agreement)