

5G ESSENTIALS Course Content



Module 1: 5G Introduction

- Introducing 5G Features
- What a 5G “Service” is not
- Introducing the 5G Network Architecture
- Comparing 5G to 4G

Module 2: Session and Service Continuity

- Session and Service Continuity (SSC) mode 1 and 2
- Session and Service Continuity (SSC) mode 3

Module 3: Message Queuing

- Message Queuing (MQ) in a Nutshell
- Defining 3GPP Exposure
- Subscribe and Publish Message Flow
- Embedding JSON in HTTP Messages

Module 4: The 5G Slice

- User Plane Function
- Why PFCP rather than OF (OpenFlow)
- N4 Interface - Packet Forwarding Control Plane Protocol (PFCP)
- Service Function Chaining (SFC) Architecture RFC 7665
- Network Slicing
- Tunneling
- The GTP Tunnel
- PDU Session Types

Module 5: 5G Infrastructure

- 5G Changes to the Access Layer
- 5G Network Location of elements 1 of 5
- 5G Network Location of elements 2 of 5
- 5G Network Location of elements 3 of 5
- 5G E2E Latency Requirements
- 5G Network Location of elements 4 of 5
- 5G Network Location of elements 5 of 5

Module 6: Registration and Tracking Areas

- Registration and Tracking Areas
- Registration and Tracking Area Rules
- UE Moves to a new Tracking Area
- Network Slice within a Tracking Area
- Vertical and Horizontal Slices



Module 7: 5G Cloud Based Services

- Service operation naming
- Container-based Design of SBA (1 of 2)
- Container-based Design of SBA (2 of 2)
- HTTP Reverse Proxy
- HTTP/2
- JSON
- JSON Algorithm

Module 8: 5G Services

- Namf
- UE Context in AMF (1 of 2) TS 23-502 Table 5.2.2.2.2-1
- UE Context in AMF (2 of 2) TS 23-502 Table 5.2.2.2.2-1
- NSSF
- NEF (1 of 2)
- NEF (2 of 2)
- NRF
- UDR
- Front End and UDC
- UDM
- UDM Subscriber Data Management Data Types
- AUSF Services
- PCF Services
- SMF Services

Module 9: 5G Stacks

- Transport NAS and SMS over HTTP
- PDU Session
- N2 Interface
- NG Application Protocol (NGAP) TS 38.413
- Session Management Function
- N11 Interface
- Interworking with the EPC (TS 23.501 - 4.3.1.1)

Module 10: EU and PDU Session States

- 5GMM main states in the UE
- 5GMM main states in the network
- UE PDU Session States
- SMF PDU Session States



Module 11: New Radio

- Sectors in New Radio
- Beamforming
- Pilot Signals
- Pilot Contamination
- Pilot Contamination Solutions
- SU-MIMO vs MU-MIMO
- Pilot Contamination
- Pilot Contamination Solutions
- Densification
- 5G UE Radio Access Layers
- Small Cell
- Remote Radio Head
- Base Band Unit
- Common Public Radio Interface
- Centralized Radio Access Network (C-RAN)
- To CPRI or not to CPRI?
- Functional Split
- AAU, DU, and CU using the Option 2 Functional Split
- Cloud-RAN

Module 12: Multi-access Edge Computing

- 8 Network Function Virtualization Components
- Why Two Bridges?
- Simple NFV (Network Function Virtualization) Example
- OVS-based openstack “wiring”
- MEC Reference Architecture in a NFV Environment
- Mobile Edge Computing to Multi-access Edge Computing

Module 13: Priority Paging and QoS

- Paging Policy Differentiation (PPD)
- Network Triggered Service Request
- QoS Profile
- QoS Flow Marking
- Service Data Flow (SDF) Filter
- 5QI (QoS Flow ID)
- enhanced Multi-Level Precedence and Pre-emption service (eMLPP)

Module 14: 5G Flow Diagrams



- PDU Session Establishment (1 of 4)
- PDU Session Establishment (2 of 4)
- PDU Session Establishment (3 of 4)
- PDU Session Establishment (4 of 4)
- Registration 1 of 3
- Registration 2 of 3
- Registration 3 of 3
- QoS Triggered PDU Modification (1 of 3)
- QoS Triggered PDU Modification (2 of 3)
- QoS Triggered PDU Modification (3 of 3)

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