Mastering 5G: Comprehensive Technical Training

Who Should Attend?

- Network Engineers and Architects working on the deployment and management of mobile networks.
- Technical Managers and Decision Makers overseeing the transition to 5G technology.
- R&D Professionals involved in the development of 5G technologies and solutions.
- Security Analysts focusing on the telecommunications sector.
- Anyone with a technical background interested in understanding the intricacies of 5G technology.

Course Content

1. Introduction to 5G
   - Expectations and Key Objectives of 5G
   - Challenges in Achieving 5G
   - Security Threats in 5G Networks
   - 3GPP & GSMA Key Recommendations for 5G
2. Overview of 5G Access Network Technology
   - Evolution of LTE to 5G
   - Introduction to New Radio (NR) Technology
3. 5G Network Architecture
   - Functional Split between NG-RAN & 5G Core
   - Architectural Overview of Access Networks
   - Deployment Strategies: Non-Standalone (NSA) vs. Standalone (SA)
4. Deep Dive into 5G Core (5GC) Architecture
   - Core Principles of 5GC
   - Network Slicing in 5GC: An Overview
   - Introduction to 5GC Network Functions
   - Various Representations of 5GC Architecture
   - Interworking with EPC in 5G Networks
   - Policy and Charging Control in 5G
   - 5G Roaming Architecture
   - Quality of Service (QoS) Models in 5G
5. Signalling in the 5G Core
   - Protocol Stacks in 5G Networks
   - Basics of HTTP, HTTP/2, and JSON
   - Framework for Network Functions
   - PLMN Interconnection in 5G
   - Core Network Security in 5G
6. In-depth Analysis of 5GC Network Functions
   - Comprehensive Discussion on Key 5G Network Functions
7. Security Procedures in 5GC
   - Detailed Overview of Security Mechanisms
8. Signalling Procedures in 5GC

- ○ Communication Between Network Functions
- ○ Procedures for NF Service (Registration, Deregistration, Registration Update)
- ○ Mobility Management Procedures
- ○ Session Management Procedures
- ○ SMS over NAS in 5G Procedures
- ○ SM Policy Association Management Procedures
- ○ Interaction Procedures between SMF & UPF
9. Practical Workshop
- ○ Analysis of Signalling Traces
10. Q&A, Open Discussion
- ○ An open forum for questions and discussion on the covered topics

Course Objectives

- To provide a comprehensive understanding of the 5G network, including its architecture, technology, and core components.
- To explore the evolution from LTE to 5G, focusing on new radio technologies and deployment strategies.
- To delve into the 5G Core (5GC) architecture, examining network functions, network slicing, and the interworking with EPC.
- To understand the security threats and recommendations for 5G networks as proposed by 3GPP & GSMA.
- To gain insights into the signalling protocols, procedures, and security mechanisms within 5G networks.
- To analyze the Quality of Service (QoS) models and policy and charging control mechanisms in 5G.
- To provide hands-on experience through a workshop on signalling traces analysis, enhancing troubleshooting and network optimization skills.

Prerequisites

- A basic understanding of mobile telecommunications and previous generations of mobile networks (3G, 4G/LTE).
- Familiarity with networking concepts and protocols.
- A general understanding of IP networking and network architecture principles.
- Prior experience in telecommunications or a related technical field is beneficial but not mandatory.

Training Structure

Three-day training divided into logical sessions.

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Methodology

The course employs a mix of theoretical lessons and practical sessions. Participants will engage in detailed discussions on mobile network architecture, signaling protocols, and their applications. The training includes case studies, call flow analysis, and open discussions to encourage interactive learning and real-world problem-solving.