5G Security Architecture and Operations

5G_209x | Expert-Led Live | 5G Core | Expert
Course Duration: 1 day

In an all-digital world, 5G wireless is a key enabler for fundamental transformation for many industry segments. Therefore, security is of utmost importance for successful adoption. This course is designed to provide a broad technical overview of vulnerabilities in 5G, mitigation measures designed into 5G networks, responsibilities of various components of 5G networks as well as end-to-end security architecture. We show how different security solutions at various layers and components come together to facilitate secure 5G networks to achieve authentication, encryption, data integrity, network availability and secure mobility.

Intended Audience

This course is intended for planning, engineering, operations and systems performance teams.

Objectives

After completing this course, the learner will be able to:

- List threats and vulnerabilities in 5G networks
- Match various mitigation measures with vulnerabilities
- Sketch the end-to-end 5G security architecture
- Detail end-to-end 5G security procedures
- Explain how 5G networks provide authentication, encryption, data integrity, network availability
- Describe security procedures while roaming

Course Prerequisites

Welcome to 5G

Outline

1. 5G Security Threats and Vulnerabilities
1.1 Types of threats (STRIDE Model)
1.2 RAN and Core network specific threats
Exercise: Match threats and impact

2. 5G Security Architecture Framework
2.1 End-to-end security architecture
2.2 Roles of AUSF, UDM, NEF, NSSAF and NRF
2.3 Control plane vs. User plane security
2.4 Key architectural concepts (Zero Trust, Microsegmentations, etc.)
2.5 Identity and Authentication (SUPI/SUCI, authentication algorithms)
2.6 End-to-end encryption framework
2.7 Security for SBI and non-SBI interfaces (3rd-party services)
2.8 Zero Trust Architecture in 5G networks
Exercise: Match threats to mitigation framework

3. 5G Security Procedures
3.1 Life of a device in 5G networks
3.2 Air interface and RAN security logs analysis
3.3 Core network security flow
3.4 5G interworking with networks (4G, Wi-Fi)
3.5 Security while roaming
Exercise: End-to-end 5G connection security flow

4. Network and Infrastructure Security
4.1 gNodeB security
4.2 Infrastructure access security
4.3 Virtual workload security
4.4 PNF, VNF, CNF security evolution
4.5 Network availability and monitoring
Exercise: Match infrastructure vulnerability with mitigation

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