v 2.101

# IMS from A-Z Reloaded

**Course Duration:**

- 2 days

**Course Description:**

- This course addresses the needs of everybody who needs to understand the technology and services of the IMS as the heart of an NGN.
- The course starts with an animated presentation of some new services which offering is enabled through the IMS. After this, we present the involvement and role of the different standard bodies like TISPAN or 3GPP.
- This part concludes with the presentation of the different IMS-layout and design options (TISPAN, 3GPP, …).
- The following chapter is dedicated to the IMS-related protocols and their presentation. This part introduces the student into protocols like SIP, SDP, DIAMETER or H.248, to name a few important ones.
- The course continues with the description of the logical elements within the IMS. This description is not as detailed as in our IMS system engineering course but provides for a good understanding of the IMS-internals.
- The final part of this chapter is dedicated to the illustration of services (again animated) and how they are realized through the IMS (also animated).
- All kinds of potential IMS-issues like operation in NAT-environments, security threats, QoS-issues are described in the following part. Of course, we also provide possible solutions to address these problems…
- The course concludes with the presentation of a real-life implementation of an IMS.

**Prerequisites:**

- The student needs to have a reasonable background of the IP-protocol stack.
- Previous exposure to the operation, planning or maintenance of telecom or IT networks is required.

**Course Target:**

- After the course the student will have a clear understanding of the IMS-internals and how the different IMS-network elements interact among each other and with the user.
- The student will be able to list the IMS-related protocols and to describe their functions.
- Most importantly, the student is enabled to contribute to IMS-related discussions and work assignments.

**Some of your Questions that will be answered:**

- What are typical IMS-specific applications and services like “See what I see” and how do they work?
- Which differences are there among the different IMS-implementation options, say TISPAN and 3GPP?
- What are the functions of the different network nodes inside the IMS?
- How is mutual authentication achieved in the IMS?
- How can IMS-services be charged?
- What are the differences between different SIP-server types like proxy, B2BUA and SBC?
- How do real-life implementations of the IMS look like?

**Who should attend this Course:**

- Engineers, technicians and everybody else who requires solid background knowledge about the IMS.
- Network Operator and vendor staff who needs to be prepared for any IMS-related job assignment. In that respect, this course is the basis for our other NGN-related courses.

# Table of Content:

## Introduction to the IMS

- **Where are we with IMS today?**

  ⇒ … and why is LTE becoming a driver for IMS?

  ⇒ IMS Deployment by 2010 – Some Figures

  ⇒ Planned Network Evolutions / Deployments
  Short term deployments in Western Europe (2011 / 2012), Short term deployments in North America (2011 / 2012)

## Protocols of the IMS

- **An Overview**

  ⇒ Protocols of the IMS (Perspective of User Agent)

  ⇒ Protocols within the IMS-Control Plane

  ⇒ Protocols within the IMS-User Plane

- **SIP and SIP-Operation**

  ⇒ Scope of SIP

  ⇒ Session Setup Example through SIP

  ⇒ Some SIP-Terminologies

  ⇒ Session Description Protocol

- **Introduction to other important IMS-related Protocols**

  ⇒ Introduction to the DIAMETER Protocol
  IMS-specific Amendments to DIAMETER Protocol, Overview of IMS Specific Messages , 2.3.1.3 DIAMETER Operation Example, Command Code, Application Id, Attribute Value Pairs, Vendor Id, Real Life Message Example – MAR - MAA

  ⇒ RTP / RTCP

  ⇒ The H.248- / MEGACO-Protocol
  Context and Terminations, Example of Media Gateway Operation through H.248

  ⇒ DNS-Queries in the IMS-Environment

  ⇒ ENUM

  ⇒ IPsec
  IPsec in Tunnel Mode, IPsec in Transport Mode

## Inside the IMS and Service Examples

- **Logical Elements within the IMS-Environment**

  ⇒ Typical User Agents of the IMS

⇒ IMS related User Identities

⇒ Server Types (generic)

⇒ Special Server Types (generic)

⇒ Operation of Registrars

⇒ Detailed Consideration of SBC and B2BUA
Example: VoD for a Mobile Client with limited Access Rates, Example: SBC for Traffic Inspection

⇒ Operation of Event Servers

⇒ Generic Servers vs. IMS-specific Servers

- **Description of the IMS-Network Architecture**

⇒ P-CSCF Tasks & Functions
Characteristics

⇒ I-CSCF-Tasks & Functions
Characteristics of I-CSCF

⇒ S-CSCF-Tasks &Functions
Characteristics of S-CSCF

⇒ BGCF-Tasks &Functions
Characteristics of BGCF

⇒ MGCF and MGW-Tasks & Functions
Characteristics of MGCF

⇒ Characteristics of IMS-MGW

⇒ MRF-Tasks & Functions
Characteristics of MRFC, Characteristics of MRFP

- **IMS Service Examples - “See what I see” and “Intelligent Addressbook”**

⇒ See What I See - Overview

⇒ See what I see – Technical Realization

⇒ Intelligent Address Book (Presence Service) – Overview

⇒ Intelligent Address Book – Technical Realization

⇒ IMS-Originating Voice Call – Technical Realization

⇒ IMS-Terminating Voice Call – Technical Realization

⇒ Use Case of the BGCF

⇒ Dedicated EPS Bearer Establishment
Network Initiated (IMS triggered during Call Establishment) , Initial Conditions, Detailed Description, Detailed Description

- **Service Delivery Obstacles**

  ⇒ Different possibilities for the UA to find “its” Registrar
- **Security related Obstacles**

  ⇒ IMS-Access from different types of Access Networks

  ⇒ IMS-Registration with Authentication

  ⇒ QoS-Awareness of Intermediate Entities

  ⇒ Real-time Capability
- **IPv4/ IPv6 Interworking**
- **Is there any NAT/NAPT or even NAT/NAPT Cascading between UA and P-CSCF?**

## Case Study: A deployed IMS-Implementation

- **Architectural Overview**
- **Overall Network Design**
- **Physical Topology Design**
- **Customer Premises with WIMAX Access**
- **Summary of the Main Components of Network Architecture**
- **Distribution of IMS-Core Network Entities**
- **Physical Layouts of IMS-Hardware**

  ⇒ CSCF Cabinet-Front & Rear View

  ⇒ HSS and SBC - Front & Rear View

  ⇒ AS’s hosted on SUN Boxes - Front & Rear View