

Cutting Edge Technologies **2008 / 2009**

Course Duration:

- 1 day

Course Description:

- This course addresses the needs of technical staff as well as account managers, consultants, technical sales staff, product- and project managers who need to get familiar with advanced developments in the field of wireline and wireless communication technologies.
- The course is an annual update with the focus on business, service and technical perspective of selected new technologies on the radar screen of design teams or close to implementation.
- This latest version covers technological evolutions in the areas of 3GSM networks, WiMAX- and WLAN-networks, fixed telecom networks and in the applications domain.
- Opposed to previous releases, this course emphasizes and highlights business related threats and chances of technical developments and technologies.
- Very interesting: the course discusses the changing value chain in telecommunication and it highlights potential applications of tomorrow.
- Serious consideration is given to the discussion of the various ongoing trends like mobile TV, WiMAX-network rollout or the Android-system.
- With respect to 3GSM-networks, the course emphasizes the latest extensions like HSPA+ and the so called GERAN-evolution. Focus is also on the introduction of LTE and SAE.
- Another chapter deals with the latest developments in the area of WiMAX- and WLAN-networks. Example: What are the amendments with WiMAX 2.0?
- This part of the course concludes with a comparison of these technologies and we also consider implementation options like Femto-cells or the home hot spot.
- The course also highlights the latest developments in the area of NGN's and MNGN's, with special focus on the IMS.

Prerequisites:

- The student should possess basic technical and business understanding of today's wireline and / or wireless communication technologies.
- A basic understanding of Mobile Communication technologies, such as GSM and / or UMTS is desirable.

Course Target:

- The student is enabled to understand the business aspects, services and technical aspects of the new technological developments and how they fit to the communication roadmap.
- In addition the student will understand the driving forces behind the migration towards an all IP-network and become aware of future technological and business opportunities.
- The student will be enabled to effectively communicate to content and service providers, customers, decision makers etc. when it comes to the design, application and / or introduction of new technology features and services.

Some of your Questions that will be answered:

- Which trends are currently visible in the field of mobile telecommunication?
- What are the most recent news about previously announced hypes and technical developments?
- Which standardization committees like 3GPP or OMA will orchestrate tomorrow's mobile telecommunication environment?
- What are the value chains of tomorrow's telecom networking and how do we have to adjust to still earn money?
- With respect to nomadic and mobile data services: Which are served best through which type of network?
- Does Google have a real chance to become a major player in the telecom arena?
- What are the key features, differences and performance values of new technologies like HSPA+, LTE, WiMAX or "evolved EDGE"?
- How do smart antenna systems *really* work?
- What are typical characteristics of 4G systems in terms of architecture, radio or performance?
- How will the 4G CPE's internally differ from today's devices?
- Which applications may become killer applications within a 4G network environment and how can my organization possibly prosper from this development?

Who should attend this Course:

- Project managers and decision makers who need to understand and interpret the latest technical evolution not in the last detail but in principle.
- Technicians who shall keep on track with the technical evolution.

Table of Contents:

Observable Trends & Latest News

- **Current Trends**

Trends within the Domain of the CPE, The i-Phone, Google's Android, The OpenMoko Project and the NEO 1973, Trends within the Domain of the Access Network, WiMAX gains Momentum, Femto Cell Deployment, Access Network Sharing, Municipal Networks, Progress of LTE, GERAN evolves to the next Generation, HSDPA and HSUPA emerge to HSPA+, Trends within the Application Domain, The Dominance of Voice, Messaging, Mobile Internet, Mobile Payment, Mobile TV / IP-TV, Trends within the Domain of the Backbone and the ASP, Google & Co enter the Market, IMS comes slowly, Everything becomes IP-centric

- **Latest News ...**

- ⇒ Sprint's WiMAX Rollout

Background Information & Interpretation, Conclusions

- ⇒ The Illusion of free Internet Access

Background Information & Interpretation

- ⇒ Unlicensed Mobile Access / Generic Access

Background Information & Interpretation, Alternative FMC-Offering

- ⇒ DVB-H, MBMS and IP-TV

Background Information, Issues, Unclear Value Chain and Scarce Resources, Legal Restrictions and IPR, Handset Liabilities and Screen Size

- ⇒ The i-Phone

Background Information & Interpretation, Conclusions

- ⇒ Google and the Android

Background Information & Interpretation, Conclusions

- ⇒ The OpenMoko Project

Background Information & Interpretation

- ⇒ RFID in the Mobile Environment

- **The Value Chains in Telecommunication ...**

- ⇒ ... today ...

Telecom Operator, Unrelated Services, Money Streams

- ⇒ ... and tomorrow

Split of the Telecom Operator, New Role of "Content / Services" Domain, Money Streams

- **Standardization Committees ...**

- ⇒ ... to be observed

3GPP, IEEE, IETF, NGMN, OMA, WiMAX-Forum

- ⇒ ... that lose Importance

3GPP2, ITU-T, ETSI, ANSI, CDG

Shaping & Defining 4G

- **Characteristics and Properties of 4G-Systems**

- ⇒ Criteria Part 1: Performance, Services and Mobility Management

⇒ Criteria Part 2: Architectural Characteristics

⇒ Criteria Part 3: Procedural and Radio related Characteristics

- **On the Way to 4G**

⇒ Technology Overview

- **Protocol Stack Comparison 3G / 4G at the CPE**

Details of the 4G-Protocol Stack

⇒ What makes SIP so appealing?

Introduction and Overview, Conclusions

- **Shaping the Target Network Architecture**

Operation within this Environment

Applications & Services

- **Potentially Important Applications ...**

Voice, Voice, Voice ..., e-learning and e-conferencing, Mobile Payment, Mobile Gaming, Mobile TV, Plain Video Conferencing

- **... and their Technical Realization (Examples)**

⇒ E-Learning and E-Conferencing

Conclusions

⇒ IP-TV

Conclusions

⇒ Mobile Payment

Conclusions

Access Network News

- **Most Important Assets of GERAN with Release 7**

EGPRS2, Multicarrier Operation, Reduced Latency Operation

- **Moving on to HSPA+**

⇒ Most Important Assets of HSPA+

Use of MIMO, New Modulation Schemes, Advanced Operation

- **Most Important Assets of WiMAX and WiMAX 2.0**

General, Performance, Physical Layer

⇒ Network Architecture

Split into ASN and CSN, ASN-Sharing is imperative, BS layout not standardized

- **Most Important Assets of LTE**

Performance, Physical Layer

⇒ Network Architecture (SAE)

- **MIMO demystified**

⇒ The Basics: Signal Fading Physics between TX and RX

Scattering, Refraction, Reflection, Diffraction

-
- ⇒ Multiplexing Dimensions
 - ⇒ The Multipath Dimension
 - Detailed Description, Macro- and Micro-Diversity, Zoom into RX1
 - ⇒ And finally: Application in MIMO-Systems
 - Adding Receive Diversity, Implementation Options, Diversity Combining to improve Quality
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Conclusions & Lessons Learned

- **Conclusions & Lessons Learned**
 - ⇒ Conclusions and ...
 - ⇒ ... Lessons Learned