



Ingeniería Eléctrica
FACULTAD DE CIENCIAS
FÍSICAS Y MATEMÁTICAS
UNIVERSIDAD DE CHILE

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Departamento de Ingeniería Eléctrica (DIE)

UNIVERSIDAD DE CHILE
Avda Tupper 2007
Santiago
Chile

The Department of Electrical Engineering (<http://www.die.uchile.cl>) cordially invite you to attend a three days course entitled:

Next Generation Network (NGN) to Future Internet (FI) Evolution - The role of SDPs, EPC, IMS, MTC for Smart City Communication Needs

**BY PROF. Dr. THOMAS MAGEDANZ
VISITING PROFESSOR AT THE UNIVERSITY DE CHILE AND FULL
PROFESSOR AT THE TECHNICAL UNIVERSITY OF BERLIN, GERMANY**

Motivation and Overview

In the light of converging telecommunication networks and the internet, the delivery of advanced multimedia communication and information services is getting complicated. From a technical point we can recognise a convergence of networking technologies towards fixed and mobile broadband all-IP networks. On the service platform layer we can also witness an adoption of innovative information technologies and internet service principles, which are driven by the rapid pace of innovation in the Web 2.0 context. Here buzzwords, such as fixed mobile convergence, triple play, communities, rich communications, and interactive IPTV are describing a new notion of integrated applications, in which (group) communications and content storage and delivery are merging.

Additionally, these days we can recognise the notion of the future internet, which often is used in the context of the internet of services, the internet of things, and the network of the future. Most recently the buzzword Smart Cities is used to describe the emerging interconnection of everybody and everything for an open set of applications within our daily live, which is regarded as an future internet showcase.

In this three days lecture we want to understand the major buzzwords and related technologies in fixed and mobile next generation networks (NGNs), the future internet (FI), and related service delivery platforms (SDPs) and communication control platforms, such as EPC, IMS and MTC.

In the SDP context we want to look at relevant service enablers, open network application programming interfaces (APIs), and related policy controlled access control via service brokers, which are getting of key importance for realising different business models in order to provide innovative seamless multimedia applications to the end users.



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We will introduce the 3GPP IP Multimedia Subsystem (IMS) concept, architecture and standards, which today are regarded globally as the uniform control platform for IP-based communication services above fixed and mobile networks. In addition we will look at various IMS-based multimedia applications, such as PSTN emulation services, rich communications, and IPTV. As IMS can be considered as a uniform “docking station” for different application platforms and is not addressing any SDP aspects, we will shift our focus subsequently to SOA-based SDPs.

Taking into account the recent industry interest in mobile IP-based broadband networks, such as LTE, the next part of the tutorial is devoted to an introduction of emerging mobile NGNs as defined by the NGMN alliance, and related standards defined by 3GPP under the banner of the Evolved Packet System (EPS). Here we focus most particularly onto the Evolved Packet Core (EPC), which provides similar to the IMS concept for NGNs, a generalized control overlay for mobile IP networks. We will also show how EPC and interrelate, such as using IMS for providing Voice over LTE (VoLTE). In this context we will introduce the FUSECO playground and the related OpenEPC toolkit from FOKUS.

Afterwards, we will look at the emerging field of machine to machine (M2M) communications and study the current trends and relevant ETSI, 3GPP, and OMA standards in this field towards a common M2M communications platform, known as Machine Type Communications (MTC) in 3GPP. We will also look at the upcoming FOKUS OpenMTC toolkit, which is also working like OpenIMS on top of OpenEPC for innovative M2M and Smart City applications.

Finally we will address the emerging notion of the future internet. In this regard, we will provide a brief overview of future internet concepts and introduce global FI research frameworks, such as the German G-Lab initiative, the European FIRE initiative and the US GENI initiative and most importantly the European FI Private Public Partnership Program and in which NGN technologies, such as IMS, EPC, MTC and Open APIs are fundamental ingredients of pan European FI platform to supporting many different application domains in the next 3 years. A final look is devoted to the FOKUS NGN2FI evolution lab used for prototyping smart city applications.

The detailed lecture plan follows.

DATES: November 20 – November 22, 2012

VENUE:, University de Chile. Faculty of Physical and Mathematical Sciences.

Electrical Engineering Department. Auditorium of Electro Technologies, 4th floor. Av Tupper 2007.

TIME: 13h00 to 16h30 every day

PRESENTER:

The course will be presented by Prof. Dr. Thomas Magedanz, TU Berlin/FhG FOKUS, Germany

TARGET AUDIENCE:

The course is offered to pre and postgraduate students at the Department of Electrical Engineering of the University of Chile and to staff/students from other Universities.

FEES:

There are no fees associated with the course.

REGISTRATION:

To register, please contact: Mrs. Liliana Zepeda (until November 10th, 2012)

Email: Liliana.Zepeda@die.uchile.cl to request bookings by e-mail; acceptance to be confirmed by email.



November 20, 2012:

NGN 2 FI/SC Evolution	13h00-14h30
<i>Tea</i>	14h30-15h00
SDPs and OPEN API's FOR CONVERGING NETWORKS	15h00-16h30

November 21, 2012:

IMS Architecture and Service	13h00-14h30
<i>Tea</i>	14h30-15h00
Evolved Packed Core	15h00-16h30

November 22, 2012:

Machine Type Communications	13h00-14h30
<i>Tea</i>	14h30-15h00
Future Internet & Smart Cities	15h00-16h30

November 20, 2012:

13h00 – 14h30:

1. NGN 2 FI / SC Evolution – the change of telecommunications

1. The Start: Converging telecommunication and internet worlds
2. The role of common service and control platforms ontop of converging networks
3. Next Generation Networks: From IN to IMS
4. Telco / Web Convergence: SOA based SDPs and Open APIs
5. Mobile Next Generation Networks: From IMS to EPC
6. Internet of Things: The rise of M2M applications
7. Smart Cities as Future Internet Showcase
8. FOKUS Toolkits and Testbeds
9. Q&A

15h00 – 16h30:

2. Service Delivery Platforms (SDPs) and Open APIs

1. The role of SDPs in a converging telecommunication and internet world
2. Telecom SDPs – From IN to SOA based SDPs
3. SDP Principles
4. Parlay and 3GPP OSA APIs
5. Webservice APIs – Parlay X
6. OMA GSM ONE, NGSI APIs
7. Device APIs, BONDI, and WAC
8. Web 2.0 APIs
9. Service Orchestration and Service Brokering in a converged SDP
10. FOKUS Open SOA Telco Playground components and services
11. Q&A



November 21, 2012:

13h00 – 14h30:

3. 3GPP IP Multimedia Subsystem (IMS)

1. IMS Architectural Principles (GSM+IN+VoIP)
2. IMS Basic Protocols (SIP & Diameter)
3. IMS Standards (3GPP, TISPAN, Packet Cable)
4. IMS Core Layer components and interactions (P-CSCF, I-CSCF, S-CSCF, IMS Client, HSS, MS, MG)
5. IMS Application Layer components and interactions (HSS, AS, MS, IMS enablers)
6. IMS Application Server Types (Servlets, JAIN, Parlay) and SDP Relationship
7. IMS Enablers (incl. Relationship to OMA)
8. IMS Applications (MMTEL, RCS, IPTV)
9. IMS challenges and global deployments
10. FOKUS Open Source IMS toolkit and the Open IMS Playground
11. Q&A

15h00 – 16h30:

4. 3GPP Evolved Packet Core (EPC)

1. Relevant fora for mobile Next Generation Networks (NGMN Alliance, LSTI, 3GPP)
2. 3GPP Evolved Packet System (EPS) Overview (LTE & EPC)
3. Longterm Evolution (LTE) in a Nutshell
4. 3GPP Evolved Packet Core (EPC) Overview
5. EPC Functional Capabilities
6. EPC Architecture: Components & Interactions
7. EPC Service Domains (IMS vs. Over the top)
8. IMS over EPC: VoLTE/RCS
9. FOKUS OpenEPC Toolkit and FUSECO Playground
10. Q&A



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November 21, 2012:

13h00 – 14h30:

5. M2M / Machine Type Communication (MTC)

1. The role of Machine 2 Machine (M2M) communication in the future
2. Existing M2M applications and platforms
3. Toward a common M2M communication platform (MTC)
4. ETSI M2M Standards
5. 3GPP Machine type Communication (MTC) Standards
6. The role of OMA in M2M API standardisation
7. MTC over EPC
8. Outlook: FOKUS OpenMTC Toolkit within the FUSECO Playground
9. Q&A

15h00 – 16h30:

6. Future Internet (FI) and Smart Cities

1. Future Internet Definition, Internet of Services, Internet of Things
2. Major Future Internet Research Activities (GENI, Akari, G-LAB, FIRE, EU PPP, FI PPP)
3. FI Testbeds and the need for testbed federation for building Smart Applications
4. Showcase: Smart City Applications as promising Future Internet application domain
5. FOKUS NGN2FI Toolkits and the NGN2FI Evolution lab
6. Q&A

SHORT BIOGRAPHY:



Thomas Magedanz (PhD) is full professor in the electrical engineering and computer sciences faculty at the Technical University of Berlin, Germany, leading the chair for next generation networks (www.av.tu-berlin.de). In addition, he is director of the “next generation network” division of the Fraunhofer Institute FOKUS (www.fokus.fraunhofer.de/go/NGNI), which also provides various software tools and testbeds to industry and academia. Since more than 20 years he is working in the convergence field of fixed and mobile telecommunications, the internet and information technologies, which resulted in many industry driven R&D projects centred on Next Generation Service Delivery platforms. In the course of his research activities he published more than 250 technical papers/articles. In addition, Prof Magedanz is senior member of the IEEE and editorial board member of several journals.

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