The **Technische Universität Berlin** - **UniFi project**, in collaboration with **Universidad de Chile,** would like to invite you to participate in the following event:

UniFi Lecture
9:00 – 12:30, March 24-26, 2014
Auditorium (to be disclosed), Av. Tupper 2007, Santiago, Chile
By Invitation ONLY

Future Internet Impacts on Next Generation Telecommunication Service and Network Infrastructures

Prof. Dr. Thomas Magedanz, TU Berlin

Due to the ongoing convergence of telecommunications, Internet and entertainment, and the increasing adoption of internet technologies in our daily lives, we are moving rapidly into a world of total interconnection of humans and machines. This means that after fixed mobile convergence (FMC) and voice data integration which has coined the evolution of telecommunication infrastructures in the last decade under the banner of the Next Generation Network (NGN), we are now witnessing the start of a much broader convergence of quite different application domains with different value chains and technologies. This new convergence is driven by the adoption and extension of Internet technologies in various application domains under the banner of the Future Internet (FI), which today is getting a lot of attention by the increasing notion of Smart Cities as a typical use case for the three key domains of FI research, namely, the Network of the Future (NoF), the Internet of Things (IoT) and Machine to Machine (M2M) communications, and the Internet of services (IoS).

This three-day lecture course will address three key innovation areas in Next Generation Telecommunications, which are closely related but nevertheless represent different research domains, namely:

- *Network of the Future (NoF) driven by Mobile Broadband evolution towards high bandwidth heterogeneous access networks, single core network architectures, and the notion of Software Defined Networks (SDN) and the Openflow protocol;*
- *Internet of Things (IoT) and unified Machine to Machine (M2M) communications enabling the convergence of a broad spectrum of monitoring and control applications; and*
- *Cloud-based Networks and Service Delivery Platforms (SDP), enabling much more scalable and cost efficient realizations and rollouts of networks and innovative applications.*

Knowing that information technologies represent since more than 3 decades the key enablers for the programming of advanced networks and dynamic service platforms, especially the last domain will result in the most important impacts onto the existing telco infrastructure and the efficient implementation of emerging Smart City eco systems as it also affects the two previous domains substantially.

In this lecture we will start to look briefly at the current state of the art in telecommunications, namely existing Next Generation Networks driven by converging fixed and mobile broadband IP-based access networks controlled by the IP Multimedia Subsystem (IMS) for providing secure and quality of service enabled multimedia communication services. From there we will briefly look at the research performed in the context of the Future Internet within the last decade, which today is considered as to provide the technological foundations for the realization of Smart Cities around the globe. It will be illustrated, that the convergence of fixed and mobile networks in the past is just the tip of the iceberg compared to the envisaged convergence and changes ahead of us related to the establishment of common ICT infrastructures for supporting a rich set of innovative Smart City applications, such as E-Health, Smart Energy, Smart Home, Intelligent Transport Systems, e-Government, etc.

During day 1 we will look at the motivation, design, architecture, and operation of the 3GPP Evolved Packet Core (EPC) representing the common packet core network for all IP-based mobile broadband networks, such as 2G/GPRS, 3G/UMTS, 4G/LTE, as well as WiFi hotspots. We will look on the unified provision of Quality of Service for IP-based applications on top of the EPC, ranging from Over the Top internet applications up to IMS-based operator services, such as VoIP. In the second part of this day we will look on the NoF research and look at Software defined Networks (SDN), the related Openflow (OF) protocol, and the emerging concept of Network Function Virtualization (NFV) representing currently hot topics in research and standardization. At the end of Day one we will look on the impacts of SDN, OF, and NFV on EPC evolution and introduce the FOKUS OpenEPC platform designed and used for early prototyping of virtualized EPC concepts.

Day 2 is addressing the motivation, design, architecture, and operation of unified machine to machine (M2M) communication platforms representing – similar to IMS for human to human communications - a flexible and efficient infrastructure for the rapid implementation of many different M2M applications, such as e-Health, Smart Energy, Smart Home, etc. We will look at the current IEEE, ETSI and OneM2M specifications in regard to the overall architecture, functional capabilities and protocols. In the second part we will position M2M communications into broader context of the emerging Internet of Things. At the end of Day two we will look on the impacts of IoT on M2M platform evolution and introduce the FOKUS OpenMTC platform designed and used for early prototyping of different M2M applications within the context of Smart Cities.

The last day introduces briefly the state of the art in IMS platforms, SOA-based Service Delivery Platforms and related open API and service enabling approaches to extend the telco eco system towards third party developers. Subsequently we will look at Cloud-based

principles, such as Infrastructure, Platforms and Software as a service (XaaS) and their impacts on IMS and SDP evolution. In particular, we will look at virtualized IMS platforms as well as scalable cloud-based SDP realizations. In the second part we will look at the notion of emerging Future Internet Core / Smart City enabling platforms and related interconnected testbeds, being currently under development in Europe and around the globe. We will illustrate how the FOKUS FUSECO playground, providing in a cloud–based way the aforementioned OpenEPC, OpenMTC and OpenIMS platforms for applied research, can be utilized within Future Internet research projects.

The lecture will end with an introduction of the DAAD UNIFI project aiming for the establishment of sustainable interconnected applied research testbeds among different universities in the southern hemisphere.

DETAILED LECTURE PLAN:

DATES: March 24 – 26, 2014
VENUE: Electrotechnology Auditorium, 4th Floor, Electrical Engineering Building.
ADDRESS: Av. Tupper 2007, Santiago, Chile
TIME: 09h00 to 12h30

PRESENTER:
The course will be presented by Prof. Dr. Thomas Magedanz, TU Berlin, Germany

FEES:
There are no fees associated with the course, but it is a **BY INVITATION ONLY** event. There will be a registration process before the event starts.

DETAILED SCHEDULE:

DAY 1 – March 24, 2014:
Smart Cities, Future Internet Technologies and the Network of the Future
9h00 – 10h30: Smart Cities and the Impacts of Future Internet Research
1. Understanding Smart Cities as Evolution of Next Generation Networks and Services
2. Common ICT Infrastructures for Smart City Applications
3. Mobile Broadband Evolution towards 5G
4. The common IP Core network for all Mobile: Evolved Packet Core
(30 minute break)
11h00 – 12h30: The Network of the Future - SDN and Open Flow
1. Software Defined Networks & Open Flow
2. Putting Network Control Platforms into the Cloud/data centers: Network Function Virtualisation (NFV)
3. The FOKUS OpenIMS and OpenEPC Toolkits and the FOKUS FUSECO Playground
4. Towards virtualised OpenIMS and OpenEPC

DAY 2 – March 25, 2014:
Internet of Things and Machine to Machine Communications
9h00 – 10h30: Internet of Things
1. The Rise of the Internet of Things
2. Smart Cities: Relating IoT and M2M and H2H
3. Machine to Machine Applications and Markets
4. Essential M2M Standards (ETSI M2M and OneM2M)

(30 minute break)

11h00 – 12h30: The OpenMTC Platform
1. Overview of the FOKUS OpenMTC Platform
2. Main Functions and Interfaces
3. OpenMTC enabled Projects
4. Outlook: OpenMTC Release 3: Integrating M2M and H2H communications

DAY 3 – March 26, 2014:
Cloud-based Service Delivery Platforms and Networks
9h00 – 10h30: Cloud Impacts on SDPs
1. SDP Evolution: From Service oriented Architectures to Cloud-based Architectures
2. Cloud Service Principles
3. State of the art in Cloud Technologies, e.g. Open Stack
4. Cloud technologies impacts on SDPs and Service Provisioning

(30 minute break)

11h00 – 12h30: Enabling the Telco Cloud
1. Cloud-based Future Internet / Smart City enablement platforms (EU FI PPP)
2. The FOKUS Smart Communications Playground & the OpenXSP cloud toolkit for H2H & M2M
3. The FOKUS OpenSDNCore enabling cloud-based SDP and network control platforms
4. Outlook DAAD UNIFI and ongoing joint projects

PRESENTER'S SHORT BIOGRAPHY:

__Prof. Thomas Magedanz__ (PhD) is full professor in the electrical engineering and computer sciences faculty at the Technical University of Berlin, Germany, leading since ten years the chair for next generation networks (www.av.tu-berlin.de). In addition, he is director of the "next generation network infrastructures" division of the Fraunhofer Institute FOKUS (www.fokus.fraunhofer.de/go/NGNI), which also provides various well recognised software toolkits, namely the OpenXXX series, and testbeds to industry and academia around the globe. He has been working for over 25 years 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 and control platforms. In the course of his research activities he published more than 350 technical papers/articles and guided more than 15 PhDs. In addition, Prof Magedanz is a senior member of the IEEE and editorial board member of several journals.

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