

## Wednesday, May 2<sup>nd</sup> – Tutorials

### Morning Sessions (9:00 AM to 12:30 PM)



Peer-to-Peer Networking: State of the art and  
research challenges  
*Prof. Raouf Boutaba*  
**University of Waterloo - Ontario, Canada**



Coffee break from 10:30 to 11:00 AM

**ABSTRACT** The past few years have witnessed the emergence of Peer-to-Peer (P2P) systems as a means to further facilitate the formation of communities of interest over the Internet in all areas of human life including technical/research, cultural, political, social, entertainment, etc. P2P technologies involve data storage, discovery and retrieval, overlay networks and application-level routing, security and reputation, measurements and management. This tutorial will give an appreciation of the issues and state of the art in Peer-to-Peer Networking. It will introduce the underlying concepts, present existing architectures, highlight the design requirements, discuss the research issues, compare existing approaches, and illustrate the concepts through case studies. The ultimate objective is to provide the tutorial attendees with an in-depth understanding of the issues inherent to the design, deployment and operation of large-scale P2P systems.

#### **BIOGRAPHY OF Raouf Boutaba**

Raouf Boutaba is currently an Associate Professor in the School of Computer Science of the University of Waterloo. Before that he was the Director of the Telecommunications and Distributed Systems Division of the Computer Science Research Institute of Montreal. He held Visiting Professor Positions at the University of Toronto (Canada), the University of Pierre et Marie Curie (France), the University of Versailles (France), POSTECH (Korea), and ENST-Paris (France). Dr. Boutaba has published more than 200 papers in refereed journals and conference proceedings. He is the recipient of the Premier's Research Excellence Award, two NORTEL research excellence Awards and several Best Paper awards. He is a distinguished lecturer of the IEEE Communications Society. He is the Chairman of the IFIP Working Group on Networks and Distributed Systems, the Chair of the IEEE Communications Society Technical Committee on Information Infrastructure and the IEEE Communications Society Technical Sub-Committee on Autonomic Communications, and the

Director of the Related Societies Board of the IEEE Communications Society. He is Past Director of the standards board of the IEEE Communications Society, Past Vice Chair of IEEE Communications Society Technical Committee on Information Infrastructure, and served as a distinguished lecturer of the IEEE Computer Society. He is the founder and Editor in Chief of the IEEE Transactions on Network and Service Management, on the advisory editorial board of the Journal of Network and Systems Management, on the editorial board of the KIKS/IEEE Journal of Communications and Networks, and the editorial board of the Journal of Computer Networks. He acted as the program chair for the IFIP Networking conference and the IEEE CCNC conference, and a general or program co-chair for the IEEE/IFIP NOMS, IFIP/IEEE MMNS, IEEE FIW, IEEE ACC, IEEE ICC and Globecom symposia among others. Dr. Boutaba teaches computer networks and distributed systems and conducts research in the area of resource management in wired and wireless networks

## First afternoon session (14:30 to 18:30)



Cognitive Radio Networks  
*Prof. Ian F. Akyildiz*  
Broadband and Wireless Networking  
**Lab School of Electrical and  
Computer Engineering**



Coffee break from 15:30-16:00


**ABSTRACT :** Today's wireless networks are characterized by a fixed spectrum assignment policy. However, a large portion of the assigned spectrum is used sporadically and geographical variations in the utilization of assigned spectrum ranges from 15% to 85% with a high variance in time. The limited available spectrum and the inefficiency in the spectrum usage necessitate a new communication paradigm to exploit the existing wireless spectrum opportunistically. This new networking paradigm is referred to as cognitive radio networks. In this tutorial, the novel functionalities and current research challenges of the cognitive radio networks are explained in detail. More specifically, a brief overview of the cognitive radio technology is provided and the network architecture is introduced. Moreover, the cognitive network functions such as spectrum management, spectrum mobility and spectrum sharing are explained in detail. The influence of these functions on the performance of the upper layer protocols such as routing and transport are investigated and open research issues in these areas are also outlined.

### **BIOGRAPHY OF I.F. AKYILDIZ IAN**

Prof. Akyildiz is the Ken Byers Distinguished Chair Professor and Director of Broadband and Wireless Networking Laboratory at School of Electrical and Computer Engineering at Georgia Institute of Technology since 20 years.

Professor Akyildiz is Editor-in-Chief of Computer Networks (Elsevier) Journal, and Ad Hoc Networks (Elsevier) journal. Professor Akyildiz is an IEEE Fellow (1995), an ACM Fellow (1996). He received several IEEE and ACM Awards including IEEE Leonard Abraham Best paper award from IEEE JSAC in 1997, IEEE Best Tutorial paper award in 2003, IEEE Harry Goode Memorial Award (IEEE Computer Society), 2003 ACM SIGMOBILE award for his pioneering contributions in mobility and resource management in wireless networks, ACM Best Distinguished Lecturer Award in 1994, Georgia Tech Faculty Research Author Award in 2004 and School of ECE/Georgia Tech Distinguished Faculty Award in 2005. Prof. Akyildiz guest edited several special issues and organized many leading conferences such as IEEE INFOCOM 1998, IEEE ICC 2003, ACM MOBICOM 1996 and 2002 and many others. His current research interests are Wireless Sensor Networks, Next Generation Wireless Networks and Interplanetary Internet.

## Second afternoon session (14:30 to 18:30)

	<p>Mobile Terminal Device Architecture: Present and Future <b>S. Vijay Anand</b> <b>General Manager - TECHNOLOGY, CTO Office,</b> <b>SASKEN COMMUNICATION TECHNOLOGIES</b> <b>LIMITED,</b> <b>139/25, Ring Road, Domlur,</b> <b>Bangalore - 560 071.</b> Coffee break from 15:30-16:00</p>
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**ABSTRACT** This Tutorial will present a comprehensive coverage of Software & Hardware architecture of 2G/3G/B3G Mobile Terminals. The seminar focuses on the following major aspects:

1. Brief Overview on Mobile Handset architecture covering the major blocks and the software layers
2. Detailed functionalities of the Software layers like MMI Framework, Middleware components like BREW, J2ME and their importance in terms of developing Mobile applications.
3. Understanding how to develop personalized services like Messaging, Video and Push-to-X services for 3G and GPRS Mobile Handhelds.
4. Various Operating systems used in the Mobile Handset (Symbian, Windows Mobile 5.0 and Montavista Linux)
5. Functional block diagram on the handset hardware and its functionalities (RF Front-end Transceiver, Baseband, Power Management Unit, Power Amplifier)
6. Wireless Protocol Stack Architecture and its working principles (GSM/GPRS/UMTS/WLAN/CDMA2K/Wi-MAX)
7. Call establishment scenarios like Voice call, Packet call & SMS.
8. NEXT GEN Mobile Terminal Software architecture and its new protocols/layers: a. IMS Client Framework b. Handover Layer c. Cross-layer design d. 4G MAC layer e. Common Data link layer f. Unified Hardware Abstraction Layer
9. How to ensure seamless mobility for continuous data transfer while the subscriber moves across various cellular networks during on-line service.
10. How to provide smooth data transfer switching between various cellular networks based

on user preferences and the available network resources.

11. New Emerging Trends like Re-configuration Technology, NFC, DVB-H etc.,

**BIOGRAPHY of Vijay Anand**

Vijay is currently working as a General Manager – Technology (Office of the CTO) for SASKEN Communication Technologies Limited. Vijay executes on SASKEN’s technical strategy with respect to nextgeneration wireless technologies, focusing primarily on Multi-RAT Protocol Stack, Quality-of-Service Framework with Seamless Handover Support, Next GEN Application Framework, Smart Home Networking and IMS Client Framework for 3G / B3G Mobile handheld devices. Prior to his current position, Vijay worked for L&T Infotech in Corporate R&D Group, where he researched NEXT GEN technologies in Mobile communications. Vijay has 16+ years of experience in the field of Wireless Communications and Embedded systems. Vijay has published 5 Research Papers and filed 3 software patents in Mobile Space.