TUTORIALS

SoftCOM 2003, October 7-10, 2003
Split, Dubrovnik (Croatia)
Venice, Ancona (Italy)

DUBROVNIK, Friday, October 10, 09:00-12:30, (KORCULA)

T1 -INTRODUCTION TO WAN PLANNING AND DESIGN

Algirdas Pakstas, London Metropolitan University, UK

Abstract: Tutorial is providing introduction to WAN planning and design primarily for the capacity planning. Tutorial consists of four parts. The first part of the Tutorial is devoted to the general overview of the network design problem and related issues (design alternatives, evaluating and ordering the designs, trade-off between performance and cost, example of the simplistic solution to the Network Design Problem). The second part looks at the two location problem with example of voice traffic. It starts from the straightforward solution which is far from optimal and gradually improves it by adding PBXs, reducing the trunks at critical locations, analyzing actual voice traffic profile, and evaluating blockings with the help of Erlang-B function. The third part is focusing on example with three locations and data network traffic. Features of data network traffic are discussed and elements of the Queueing Theory needed to analyze link delays are introduced. Designing of the data network itself includes development of the the the traffic model, the traffic table and calculating the link flows. Finally, network routing policies are discussed from the point of view of their importance for capacity planning. Heuristic algorithm called Drop Algorithm is introduced for optimization of initial designs. Limitations of the Drop Algorithm are demonstrated. Part four is devoted to demonstration of the WAN design tool Delite.

Biography: Prof. Algirdas Pakstas received his M.Sc. in Radiophysics and Electronics in 1980 from the Irkutsk State University, Ph.D. in Systems Programming in 1987 from the Institute of Control Sciences. Currently he is with the London Metropolitan University, Department of Computing, Communications Technology and Mathematics where he is doing research the area of Communications Software Engineering and is teaching courses "Network Planning and Management" and "Computer Systems and Networks". He is active in the IEEE Communications Society Technical Committees on Enterprise Networking, Communications Software and Multimedia Communications. He has published 3 research monographs (2 authored and 1 edited) and more than 140 other publications. He is a senior member of the IEEE and a member of the ACM and the New York Academy of Sciences. He is currently a member of the Editorial Boards of the IEEE Communications Magazine, Cybernetics and Systems Analysis, Journal of Information and Organizational Sciences.

VENICE, Wednesday, October 8, 09:00-12:30, (KORCULA)

T2- IP-ORIENTED QOS IN THE NEXT GENERATION NETWORKS: APPLICATION TO WIRELESS NETWORKS

Pascal LORENZ, Universite de Haute Alsace, FRANCE

Abstract: Emerging Internet Quality of Service (QoS) mechanisms are expected to enable wide spread use of real time services for example, VoIP and videoconferencing. The "best effort" Internet delivery cannot be used for the new multimedia applications. New technologies and new standards are necessary to offer Quality of Service (QoS) for these multimedia applications. Therefore new communication architectures integrate mechanisms allowing to guarantee QoS services as well as high rate for the communications. The promising service level agreement to a mobile Internet user is hard to come by, since there may not be enough resources available in some parts of the IP/ATM networks as mobile terminal is moving into. The emerging QoS architectures, differentiated services and integrated services do not consider the network nodes are mobile. QoS mechanisms enforce a differentiated sharing of bandwidth among services and users. Thus, there must be mechanisms available to identify traffic flows with different QoS parameters, and to make it possible to charge the users based on requested quality. Integration of fixed and portable wireless access into IP networks presents a cost effective and efficient way to provide seamless end-to-end connectivity and ubiquitous access in a market where demands on mobile Internet have grown rapidly and predicted to generate billions of dollars in revenue.
The tutorial covers an introduction to QoS in heterogeneous networks, Internet delivery over future wireless networks, the ATM, MPLS, DiffServ, IntServ protocols, … It addresses characteristics of the Internet and its mobility features and how it could guarantee QoS using wireless IP services. It also presents concepts of routing, quality-of-service provisioning and security, baseline architecture of the inter-networking protocols and end to end traffic management issues.

Biography*: Pascal LORENZ received his Ph.D. degree in 1994 from the University of Nancy, France. Between 1990 and 1995 he was research engineer at WorldFIP Europe and at Alcatel-Alsthom. Since 1995 he is associate professor at the University of Haute-Alsace. His research interests include QoS, wireless networks and high-speed networks. He was the Program and Organizing Chair of the IEEE ICATM'98, ICATM'99, ECUMN'00, ICN'01, ECUMN'02 conferences and the Co-Chair of ICATM'00, ICATM'01 conferences. Since 2000, he is Technical Editor of IEEE Communications Society Editorial Board. He is member of many international committees programs and he has served as guest editor for a number of special issues, including Telecommunication System, IEEE Communications Magazine and LNCS. He has served as referee for several IEEE conferences, he has organized several technical sessions and has chaired many of them. He is the author of 60 international publications.*

SPLIT, Tuesday, October 7, 09:00-12:30, (KORCULA)

T3 - WIRELESS INTERNET ACCESS

Gottfried W. R. Luderer, Arizona State University, USA

Abstract: The Internet is more and more accessed over air interfaces. Several approaches are competing. The initial industry efforts focused on extending the cellular telephone (GSM) network for data., first by sending data over voice channels, then by augmenting the capacity by bundling several voice channels (HSCSD), eventually overlaying a packet-switched data service (GPRS). In the next generation of the cellular service, UMTS or WCDMA are offering widely increased bandwidth and capabilities. In other areas there were early efforts to add data service to the analog network (CDPD) and more recently advanced data services like DoCoMo's iMode originating in Japan. Meanwhile in the computer networking world, the local area network (LAN) standards have been augmented to allow wireless access. These Wireless LANs (WLAN) have recently gained considerable momentum. Several standard versions of this "WiFi" service have evolved, notably 802.11a, 802.11b, 802.11g; ETSI 's Hiperlan is another competitor. In the short-range area, Bluetooth enjoys increasing popularity. This seminar will give an overview of the underlying technology and review the current status of this rapidly expanding field.

Biography: *Dr. Gottfried W. R. Luderer was appointed Professor, ISS Chair of Telecommunication, at Arizona State University in the Fall of 1990. His current research program in networking includes work in the areas of control of ISDN/Broadband ISDN networks, mobile communication networks, and multimedia communication, which ranges from call processing for intelligent network services to network management.*

Research emphasis is on advanced software technologies for development of telecommunication networks, as used in switches, for signaling and in network management, with a focus on object and component technology and formal definition techniques. Besides the academic involvement at the university, Dr. Luderer has been teaching short courses since 1992 on high-speed networks and telecommunication software architecture in various countries. From 1965 to 1989, Dr. Luderer was with AT&T Bell Labs, at last directing research on next generation switch architectures, based on fast packet switching technology on the hardware side and object-oriented design technology on the software side, resulting in some of the earliest demonstration networks for multimedia communication. Dr. Luderer holds Diplomingenieur (M.S) and Dr.-Ing. (Ph.D) degrees in Electrical Engineering from the Technical University of Braunschweig, Germany. He holds two patents. While at Bell Labs, he taught at Stevens Institute of Technology in Hoboken, NJ, and at Princeton University. He is member of ACM, IEEE, IEEE Computer and Communication Societies.

ANCONA, Thursday, October 9, 09:00-12:30, (KORCULA)

T4 - INTERACTIVE MULTIMEDIA NETWORKING

Mario Baldi, Torino Polytechnic, ITALY

Abstract: Applications that require real-time interaction among their users are gaining importance and diffusion as computer networks become more powerful and ubiquitous. Many such applications impose very stringent requirements on the network; among the applications today widely deployed, videoconferencing is the most demanding.
In order for the participants in a videoconference call to interact naturally, the end-to-end delay should be below human perception; even though an objective and unique figure cannot be set, 100 ms is widely recognized as the desired one way delay requirement for interaction.
Since the global propagation delay can be about 100 ms, the actual end-to-end delay budget available to the system designer (excluding propagation delay) can be no more than 10 ms.
We identify the components of the end-to-end delay in various configurations with the objective of understanding how it can be kept below the desired 10 ms bound.

This tutorial analyzes these components going step-by-step through six system configurations obtained by combining three generic network architectures with two video encoding schemes. We study the transmission of raw video and variable bit rate (VBR) MPEG video encoding over (i) circuit switching, (ii) synchronous packet switching, and (iii) asynchronous packet switching.

Various queuing and scheduling algorithms for asynchronous and synchronous packet networks will be analyzed and compared. The tutorial also studies the implications of bounded delay services on the architecture of packet switches.

Biography:

Mario Baldi is Associate Professor on tenure track at the Computer Science Department of Torino Polytechnic, Torino, Italy and Vice President for Protocol Architecture at Synchrodyne Networks, Inc., New York.

He received his M.S. Degree Summa Cum Laude in Electrical Engineering in 1993, and his Ph.D. in Computer and System Engineering in 1998 both from Torino Polytechnic. He was assistant professor on tenure track at Torino Polytechnic from 1997 to 2002. He joined Synchrodyne Networks, Inc. in November 1999.

Mario Baldi has been visiting researcher at the IBM T. J. Watson Research Center, Yorktown Heights, NY, at Columbia University, New York, NY, and at the International Computer Science Institute (ICSI), Berkeley, CA.

As part of his extensive research activity at Torino Polytechnic, Mario Baldi has been leading various networking research projects, involving Universities and industrial partners, funded by European Union, Local Government, and various companies, including Telecommunications Carriers, such as Infostrada and Telecom Italia, and research institutions, such as Telecom Italia Labs.

Mario Baldi provides on a regular basis consultancy and training services, both directly to companies and through various training and network consultancy centers.

Mario Baldi co-authored over 50 papers on various networking related topics and two books, one on internetworking and one on switched local area networks.