
Global Communications Newsletter

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Academic Networking in Alps-Adria Countries

By Dinko Begusic, Nikola Rozic, Ignac Lovrek, Croatia

Algirdas Pakstas, UK

The featured topic of the 8th IEEE Conference on Software, Telecommunications and Computer Networks (SoftCOM 2000), which was held aboard the ship Marko Polo cruising along the Adriatic coast on the route Split (Croatia) - Rijeka (Croatia) - Trieste (Italy) - Venice (Italy) from October 10-13, 2000, was Academic Networking in Alps-Adria Countries.

The conference was sponsored by the University of Split, Croatian Telecom, Telecom Center Split, and IEEE Communications Society. Besides the conference itself a number of accompanying events took place aboard the ship, including the Business Forum and Exhibition, which was organized on the car deck.

The special session was divided into two parts and held on October 13 aboard the ship Marko Polo, which was anchored in Venice, Italy. The first part of the session was chaired by professor Algirdas Pakstas from the University of North London, United Kingdom and the second part by Professor Ignac Lovrek from the Faculty of Electrical Engineering and Computing of the University of Zagreb, Croatia.

The featured topic attracted authors and participants from government institutions dealing with academic networking as service/infrastructure providers, and teachers from universities and researchers from institutes as users. A total of 12 papers were presented by authors from Italy, Hungary, Germany, Slovenia, Switzerland, and Croatia:

- Advanced Solutions for Distance Learning via Satellite, by M. de Blasi, University of Lecce, Italy; C. des Dorides, Alenia Spazio, Italy.

- Trends in Networked Collaborative Virtual Environments, by S. Pandzic, C. Joslin, N. Magnenat Thalmann, University of Geneva, Switzerland.

- Homer II: Man-Machine Interface to Internet for Blind and Visually Impaired People, by N. Pavesic, J. Gros, S. Dobrisek, F. Mihelic, University of Ljubljana, Slovenia.

- Academic and Research Network of Slovenia, by A. Jauk, M. Bonac, ARNES, Slovenia; I. Ozimek, G. Kandus, Jozef Stefan Institute, Slovenia.

- The LAN of TUB and its Links with other Universities in Budapest, by G. Nemeth, G. Remzso, L. Szandi, G. Varga, University of Budapest, Hungary

- Collaboration between Academia and Industry: Telecommunications and Informatics at the University of Zagreb, by I. Lovrek, M. Kos, B. Mikac, University of Zagreb, Croatia.

- The Role and Strategy of an ARNet in a Developing Country, by Z. Bekic, J. Gojsic, P. Pale, CARNet, Croatia

- The Implementation of Broadband Network Technologies in CARNet, by N. Bartolincic, I. Pezelj, I. Velimirovic, A. Zigman, CARNet, Croatia.

- CARNet: Educated Users for Effective Utilization of IT, by M. Milinovic, J. Tingle, V. Vrga, CARNet, Croatia.

- The Italian Academic Network GARR: Evolution in the Gigabit Era, by Claudio Allocchio, Claudia Battista, Massimo Carboni, Luca dell'Agnello, GARR — Italian Academic and Research Network, Italy.

- DFN Gigabit Network — The Backbone for Teleteaching/Telelearning in Higher Education: Status Report, by Ralf Paffrath, DFN, Germany.

The presented papers cover main topics of academic networking including national strategies and network architectures, the role of academic networks in education and collaboration with industry, technological aspects, particularly applications of broadband and satellite systems, and user aspects including services for impaired persons.

The Italian academic network Gruppo Armonizzazione Reti di Ricerca (GARR) was presented including various aspects, particularly its evolution, described through GARR-B and GARR-G phases. The GARR-B phase deals with increasing access bandwidth, introduction of new services like a computational GRID, a large dedicated mesh of VPNs for a user group, and increasing connectivity in southern and Mediterranean regions. GARR-G phase represent a GARR gigabit pilot project with SDH and WDM transmission systems in a multicarrier and multi-operator reality. The idea of expanding GEANT service to Italy and possibly beyond Italy toward the Mediterranean area is explored through the GARR-G phase.

The Academic and Research Network of Slovenia (ARNES) is described as part of the TEN-155 EU project for high-speed pan-European interconnection between national research networks. ARNES participates in a number of international projects dealing with advanced networking. It is a full national member of the Trans-European Research and Educational Networking Association (TERENA). ARNES joined TF-Cashe activities and was one of the proposers of the so-called 1.5-level cache hierarchy concept.

Croatian Academic and Research Network (CARNet) was presented in a wider way than only as an Internet provider for the academic community. As it has stated, an Academic and Research Network (ARNet) should not only provide communication and information infrastructure for the academic community, but also be a research testbed and even a pilot for other nationwide networks, thus taking the role of organizer and motivator for the community. To accomplish this, ARNet's strategy should be to ensure connectivity and provide content through reference information, referral information, common databases, centralized databases, and information services. The development of CARNet was slight-

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Third-Generation Mobile Communications in Europe: Light and Shadows

By Pablo Pavon-Mariño and Joan Garcia-Haro, Spain

Third-generation mobile communications in Europe and its brightest star standard, Universal Mobile Telecommunication System (UMTS), has become a dangerous source of financial, technical, and regulation problems for European carriers, users, and governments. The current scenario is the result of a sequence of events that has converted an expected smooth evolution from 2G to 3G into a hard and risky race. To understand why, some review of technological and market issues should be introduced.

For the past few years, the UMTS Forum (1996) and the Third Generation Partnership Project (3GPP) (December 1998) have invested considerable effort aimed at achieving worldwide standardization. Strong economic interests exist, since 3G mobile telecommunications systems are foreseen as a gold mine for future access to advanced multimedia services like mobile Internet or videoconferencing. Additionally, many things have changed and are still changing in European telecommunications markets as a consequence of the liberalization process applied to fixed and mobile telecommunications. A group of recently privatized operators entered the scene, hurrying to assert themselves as pan-European carriers: BT, Vodafone, Deutsche Telekom, France Telecom, Sonera, and Telefonica are some examples. Also, several extra-European operators were interested in finding an entry to the valuable European market. For all, UMTS appeared at the right moment.

At the end of 1999, the first release of UMTS presented key decisions on technology: wideband code-division multiple access (W-CDMA) for UMTS Terrestrial Radio Access (UTRA), IP packet switching for voice and data, and an asynchronous transfer mode (ATM)-based core network with strict quality of service (QoS) control. A gradual evolution from 2G digital telephony Global System for Mobile Communications (GSM) to 3G was envisioned by telephone carriers as the logical step, and a set of extensions to GSM data services were designed and standardized, giving rise to 2.5G systems (HSCSD, GPRS, and EDGE). High Speed Circuit Switched Data (HSCSD), or a "multislot" standard, was thought the easiest way to increase available binary rate for data over GSM. It proposed grouping GSM time slots in a virtual channel, but maintaining the circuit switching concept. However, packet switching opens the door to a scalable mobile data system and a billing policy based on the amount and type of data. General Packet Radio Service (GPRS) faced the problem, providing channel bandwidth sharing and an IP packet switching extension to GSM. Enhanced Data Rate for GSM Evolution (EDGE) offers faster, less noisy, more robust modulation and an adaptive voice codec, which allow GPRS and HSCSD to achieve a maximum binary rate of 384 kb/s for data connections. However, while GPRS and HSCSD services are already available, EDGE is still in a preliminary stage.

In the year 2000, 2.5G technologies were conceived as a rational future short-term evolution, and the air was full of good vibrations about the imminent UMTS business. This caused many European governments to exploit as much as possible the interest of competing operators in UMTS licenses. In Great Britain, the auction method for license award resulted in more than 37.5 billion Euro. Good news for the British Government, which then was afraid that the high costs would be passed on to users. This fact was even more evident in Germany, where about 50.6 million Euro were paid. In addition, extra funds for UMTS infrastructure has to be computed (3–6 billion Euro/network). Other countries, such as

Spain and Finland, resolved UMTS licenses according to a contest method, evaluating issues such as candidates' financial ability, technical know-how, speed of rollout plans, and commitment to coverage. These governments collected a much smaller amount of money, trusting that lower prices and faster deployment would then be achieved. Nevertheless, globalization played its role; since the same telco carriers competed in several European countries, economic losses in one country could be compensated for by other countries' users. This motivated, in the case of Spain, an additional tax of about 900 million Euro/year being applied for each license.

Almost two years later, a lot of operators have expressed many doubts concerning the profitability of UMTS services. Mass market UMTS terminals and network equipment are still not available, affecting infrastructure deployment and applications development. Therefore, some governments have delayed the starting date to offer UMTS services (in Spain from August 2001 to June 2002). The failure of auctions to assign UMTS licenses in France and Belgium have impressed analysts. With the extraordinary exception of Japan, with NTT DoCoMo iMode service, 3G implantation is far from fulfilling its terms. Currently, new trends complicate the scenario: GPRS commercial deployment during this year (offering almost same functions as UMTS, but with less bandwidth), network sharing, and the model mobile virtual network operator (MVNO). Network sharing has its main examples in Germany and Great Britain. Several operators have submitted proposals to the regulator showing their availability to share antennae, towers, and local networks to save costs (rational and environmental reasons are also claimed). Although this option was not contemplated in the license award, it was accepted by the German government. On the other hand, a virtual model enables an external virtual operator to establish commercial agreements with existing network operators, to access part of their available frequency spectrum and infrastructures. Network and license costs would then be alleviated, at the price of greater competition. Estimations indicate that the number of virtual operators may grow exponentially in the course of a few years. However, added value and service differentiation is key: virtual operators with a competing offer with real operators will not be accepted.

Therefore, the present market situation is governed by 2.5G services, which are even a real alternative to UMTS. While uncertainty remains, operators would like to minimize the costs and risks in the new nets and technologies. This, indeed, is the opportunity offered by GPRS today and EDGE tomorrow, with similar binary rates to those estimated for first-stage UMTS. Also, operators that have been out of the UMTS licenses have in 2.5G a way to compete in the short–mid-term with lower investment and similar service. Anyway, first GPRS services are still entering the market, UMTS implantation is occurring almost simultaneously to EDGE, and financial conditions can persuade some general managers to abandon the race.

The license concession process and additional taxes caused operators to lose too much money on the stock exchanges. Now, it is possible to consider buying an operator with UMTS licenses rather than directly acquiring a license. The process should have been harmonized, perhaps, by Brussels. It is unacceptable that losses be billed to potential users. Delaying the deployment of UMTS seems inconvenient, and it could be the end of the initial advantage of Europe over the United States in mobile telecommunications. However, the final UMTS scenario is far from being written yet.

Report on St. Petersburg Chapter Activities

By Dmitry Tkachenko, Russia

Activity of the Chapter in 2000

About 10 new members of the IEEE Communications Society (COM) joined the Chapter in 2000. Most of them are members of the Organizing Committee for IEEE ICC 2001 in St. Petersburg. Three members of the Circuits and Systems (CAS) Society joined the Chapter.

The status of the Chapter was changed from a joint BT/COM Chapter to a joint BT/COM/CAS Chapter on 27 July 2000. This change was made due to meetings of active Chapter members with CAS Society Past President Prof. Rui de Figueiredo during his distinguished lecturer tour to St. Petersburg 5–10 July.

The Second International Conference on Cable and Satellite Television of the XXI Century was held in the framework of the exhibition Cable & Satellite Russia — 2000 (Moscow, Exhibition Center “Sokolniki,” 16–18 February 2000). About 50 papers were presented at the conference and about 700 specialists visited it. The Chapter was responsible for the Technical Program of the conference.

The First International Workshop on Perspectives for Implementation of VSAT Technologies was held on 17 February 2000 in the framework of the above-mentioned conference. Sixteen papers were delivered and about 250 people visited it.

The Second Seminar on Advanced Systems of Mobile Communications was held in St. Petersburg on 16 February 2000 in the framework of the NORWECOM 2000 exhibition (the largest annual exhibition on communications in Northwest Russia). Twenty papers were presented at the seminar and about 200 specialists attended it. The Chapter was responsible for the technical program of the Seminar.

The meeting of representatives of the Chapter, IEEE ICC 2001 St. Petersburg organizing committee, IEEE Finland Section, and ICC 2001 organizing committee took place in Helsinki, Finland, on 13 March 2000. As a result, a Memorandum of Understanding was signed by the IEEE St. Petersburg Communications Chapter, IEEE Finland Section, and ICC 2001 Chairs. The Memorandum describes the conditions of holding IEEE ICC 2001 St. Petersburg and details of sponsorship.

A number of meetings of IEEE ICC 2001 St. Petersburg Organizing and Program Committee members were held in St. Petersburg. Finally, about 150 papers were accepted to the conference.

A meeting for new members of the Chapter was held on 26 April 2000 at St. Petersburg State University of Telecommunications. The meeting was organized in the framework of the Financial Incentive Program for new members of Communications Society. Twelve members of the Chapter attended this meeting.

The Chapter took an active part in organizing a visit of Communications Society representatives (ComSoc President Roberto de Marca, Past President Steve Weinstein, Vice President Alex Gelman, and others) to Moscow on 15–19 May 2000.

Chapter Chair Dr. Dmitry Tkachenko visited ICC 2000 in New Orleans on 18–22 June 2000. During the visit there were a number of meetings with ComSoc Director of Conferences Bill Robinson and ICC 2001 General Chair Kaj Linden, ICC 2001 Program Chair Savo Glisic, and other ComSoc colleagues regarding appropriate organizing of IEEE ICC 2001 St. Petersburg.

The International Symposium on Mobile Communications at the Threshold of Centuries was held in St. Petersburg on 21–23 June 2000. The Chapter was responsible for preparing

the symposium brochure. Seventeen papers were presented at the symposium and about 150 specialists visited it.

Vice Chair of the Chapter for CAS activities Dr. Alexander Korotkov visited a one-day Chapter Chairs meeting for IEEE Divisions I and IV (which includes CAS) in Paris on 1 October 2000. During the meeting a number of new contacts with IEEE colleagues were established. Also there was a talk with Prof. Davies, CAS Vice President for Region 8, regarding preparing an IEEE conference in St. Petersburg on Circuits and Systems for Communications in 2002.

The Chapter took an active part in organizing a Distinguished Lecturer Tour to St. Petersburg of Dr. Sajjad Durrani, IEEE Fellow and Past President of the IEEE Aerospace and Electronic Systems Society (AESS). Dr. Durrani was in St. Petersburg on 30 September–3 October 2000. He gave a four-hour lecture at the Seminar on Satellite Communications at the St. Petersburg State Electrotechnical University. About 40 specialists and students attended the seminar. A number of meetings with IEEE colleagues were also organized in the framework of this visit.

The session on Satellite Internet was organized with participation of the Chapter in the framework of the 4th International Conference and Exhibition on Satellite Communications (Moscow, 26–29 September 2000). Seventeen papers were delivered at the session and about 70 specialists attended it.

Together with other local IEEE Chapters, the Chapter took part in the IEEE seminar held on 1 December 2000 at the St. Petersburg State Electrotechnical University. Ten papers of local IEEE members were delivered at the seminar along with reviewer reports. These papers were recommended for inclusion in a special publication of St. Petersburg IEEE members. The first issue of this publication is going to be printed soon.

Activity in 2001

The Third International Conference on Perspectives for Development of Television, Broadcasting and Telecommunication Services was held at Moscow Exhibition Center, “Sokolniki,” 14–16 February 2001. More than 90 papers were delivered at the conference and more than 1200 specialists visited the event.

The International Workshop on Broadband Access Systems and Services was held in the framework of the above-mentioned conference.

The Second International Workshop on Perspectives for Implementation of VSAT Technologies was also held there.

The Third Seminar on Advanced Services of Mobile Communications was held at St. Petersburg, Morskaya Hotel, 21 February 2001. Nine papers were delivered at the seminar and about 100 specialists visited it.

The Second Symposium on Mobile Communications: Up-to-Date Technologies and Services” (St. Petersburg, Soviet-skaya Hotel, 6–8 June 2001).

The IEEE ICC 2001 St. Petersburg Conference was held in conjunction with ICC in Helsinki at St. Petersburg State Electrotechnical University, 11–15 June 2001, including a session on Next Generation Internet on 15 June 2001 with invited speakers from ICC 2001.

A meeting of the Chapter members with the President of the Communications Society Roberto de Marca and Vice-President Alexander Gelman took place on 15 June 2001.

The First IEEE Conference on Circuits and Systems for Communications will be held in St. Petersburg, 26–28 June 2002.

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ly different from typical National Academic and Research Network (NARN) development in countries in transition, due to a different socio-economic situation as well as the ambitions of CARNet designers. Through a number of pilot projects with its member institutions, multimedia applications of information technologies are investigated and implemented in various areas of human activities.

Collaboration between academia and industry in the area of information and communication technology results not only in qualified scientific results that companies can exploit, but also in improving of undergraduate and graduate studies. University and industry recognize the importance of the research environment for collaboration, problem solving, competence development, and educational process. An example of very fruitful collaboration was presented by professors from the University of Zagreb, Croatia. The principal industrial partner is Ericsson Nikola Tesla, Zagreb, with the participation of Croatian Telecom, Croatian Power Utility, and several small enterprises. The model of collaboration, including joint laboratories and projects, was presented in order to explain the reasons for this successful long-term friendship between academia and industry.

The academic and research network in Germany (GFN) was presented as the backbone for teleteaching/telelearning (TTL) in higher education. The importance of development of a new gigabit network (G-WiN) based on SDH/WDM and ATM technologies with IP access bandwidth up to 2.4 Gb/s was stressed. DFN's approach is based on developing applications for distance education, information, and multimedia services and scientific applications that should be motivators for network development.

Distance learning has recently aroused great interest due to the convergence of several factors, including the growth of education as a key driver of socio-economic development, the remarkable step forward in telecommunication technology, and the number of people involved in the education process itself. The main obstacle is transmission cost. Authors from the University of Lecce in Italy propose SkyplexNet, an advanced satellite telecommunication platform, as a viable solution. They presented the main functions of the system, its operational characteristics, as well as the application layer enabling the creation of a new pedagogical education model.

Academic networking and networked collaboration share common technology and concepts. A group of researchers from University of Geneva have presented an overview of the developments in the field of Networked Collaborative Virtual Environment (NCVE) in the past decade. As a case study a new generation NCVE system called VPARK developed within the frame of the ACTS program is described in more detail.

The system called HOMER II, developed by a group of researchers from the University of Ljubljana in Slovenia, is primarily designed as a voice-driven text-to-speech system for blind or visually impaired persons for reading text in Slovenian. A new version of the HOMER system with even more advanced dialog modules represents an important tool in the distance learning and teaching process for visually impaired persons using academic networks.

Participants and organizers both agreed that the session helped them all to share interesting ideas and concepts in this very special field. This common feeling resulted in an idea to continue organizing special sessions on the subject of academic networking in future SoftCOM conferences.

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REPORT ON IEEE HPSR 2001 WORKSHOP

BY TOM CHEN, U.S.A.

The 2001 IEEE Workshop on High Performance Switching and Routing (HPSR 2001) was held on May 29–31, 2001, in Dallas, Texas, USA, with great success. More than 160 registrants from 26 countries were in attendance. The first day featured four well-attended tutorials: Dr. David Smith on "Transport Issues in All-Optical Wavelength-Switched Networks"; Dr. Juergen Quittek and Dr. Marcus Brunner on "QoS Management in the Internet"; Prof. Hussein Mouftah on "IP over WDM Network Architecture"; and Dr. Pankaj Gupta on "Routing Lookups and Packet Classification: Theory and Practice." On the second day, Ross Callon (Juniper Networks) gave a keynote speech on "High-Speed Nets: Current and Future." Multiple technical sessions covered topics in traffic control and optical networks; other sessions covered ATM, network pricing and planning, and packet classification and scheduling. David Smith (Movaz Networks) gave a well-received luncheon talk on "dBs vs Dollars: The Economics of All-Optical Metro DWDM Transport." A panel discussion on "The Future of Optical Networking" drew a highly interested crowd. At the banquet dinner, Niel Ransom (Alcatel USA) gave a thought-provoking speech on "Discontinuities Driving Next Generation Networking." On the third day, technical sessions dealt mainly with switch architectures, routing protocols, IP routers, and quality of service. The feedback from attendees was universally positive, and most felt the workshop had been focused and well organized. We look forward to the 2002 IEEE Workshop on High Performance Switching and Routing, which will be held in Kobe, Japan, on May 26–29, 2002 (<http://www.ieice.org/cs>).