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Preface

The First International ICST Conference on Communications Infrastructure, Systems and Applications in Europe (EuropeComm 2009) was held August 11–13, 2009, in London. EuropeComm 2009 brought together decision makers from the EU commission, top researchers and industry executives to discuss the directions of communications research and development in Europe. The event also attracted academia and industry representatives, as well as government officials to discuss the current developments and future trends in technology, applications and services in the communications field.

Organizing this conference was motivated by the fact that the development and deployment of future services will require a common global-scale infrastructure, and therefore it is important that designers and stakeholders from all the systems stacks come together to discuss these developments. Rapidly decreasing costs of computational power, storage capacity, and communication bandwidth have led to the development of a multitude of applications carrying an increasingly huge amount of traffic on the global networking infrastructure. What we have seen is an evolution: an infrastructure looking for networked applications has evolved into an infrastructure struggling to meet the social, technological and business challenges posed by the plethora of bandwidth-hungry emerging applications.

Developments in optical communication technologies have shown the potential to meet the technological challenges for bandwidth demands. Various solutions have been proposed so far for the discrete parts of the optical network infrastructure; however, the most fundamental challenge at this point of the optical networking evolution, apart from enhancing these solutions and inventing novel ones, is to combine these parts under a unified control and management framework. Although wireless technologies have undergone massive improvements, wireless is far from meeting mobility, bandwidth and other QoS challenges posed by the current and future applications and services. With an increasing number of collocated personal, local and cellular wireless communication systems, the questions of optimum coexistence and internetworking are being raised.

While bandwidth, mobility and QoS requirements for many existing applications are on the rise, new applications and services are emerging, such as in the healthcare and transportation sectors. These emerging services are making the design space for infrastructure developers even more challenging. Privacy, security and trust are increasingly critical and are adding significantly to the challenges posed to the development of global networking infrastructures and services. The search for appropriate business models and innovation platforms to kick-start the process has begun globally.

We organized this conference on communications encompassing mobile, optical and converged technologies as well as services and applications. We focussed on two key application themes of these technologies for the discussions during the event: intelligent transportation systems and healthcare services. We also foresaw Future Internet Infrastructure and Services, Open Models and Innovation Processes as the
key cross-cutting subjects for the conference. Our vision is to establish, in the next few years, the EuropeComm event as the meeting place for European telecommunication infrastructure and services, an annual event where stakeholders meet from different communities and where business can be done.

**Future Internet infrastructure:** Progress in the field of Future Internet infrastructure is crucial to support new bandwidth-hungry applications and hence sustain the growth of the European knowledge-based society. We envision ubiquitous data access to end-users with bandwidth and connectivity adapting to specific application requirements and dynamically changing network and context conditions. The key challenges along the way that we have identified are (a) coexistence and cooperation of different access technologies, (b) self-organization and reconfigurability of communication networks, (c) converged optical-wireless systems and (d) control and management of service-oriented plug and play next-generation optical networks. The aim is to develop innovative solutions for cooperating wireless and optical communication systems in order to provide ubiquitous broadband access to end-users offering them seamless and adaptive connectivity in a cost-effective manner. Specifically, solutions toward flexible self-x network infrastructure for the Future Internet are sought. In our view, cognitive and reconfigurable paradigms are enablers toward true heterogeneous cooperating and coexisting communication systems, that eventually will merge the properties of short-range with wide-area, mobile with fixed, wireless with optical into one underlying network infrastructure with only services and applications visible to the end-user.

**Intelligent Transportation Systems:** We have seen the convergence of telephony and the Internet. ICT is converging rapidly into our lives, and transportation at the moment seems to be the prime target of this convergence, i.e., intelligent transportation systems (ITS). Conventional inductive loops are increasingly being used alongside mobile phones and GPS to devise efficient mobility solutions, and what we see now is the convergence of mobile telephony, Internet and transport infrastructure. Many factors are driving the growth of the ITS industry: congestion costs, energy usage, environment, deaths, injuries and other health effects, mobility, safety and security are the major ITS drivers. Cooperative vehicle infrastructure systems are high on government agendas. FCC has approved 75MHz of licensed bandwidth in the 5.9 GHz band for vehicle-to-vehicle and vehicle-to-infrastructure communications. A number of projects are underway and hopefully the ITS vision of vehicles talking to each other for reduced congestion and improved safety will soon be a reality. However, the ITS community has to address several challenges: aggregation and analysis of traffic data produced by the vehicles in real time, network design for high-speed nodes with rapidly changing topology, security, user privacy and business models are among the prime challenges.

**Healthcare** is perhaps the biggest service sector in many economies of the planet. However, the healthcare industry has been relatively static compared to the rapid developments in ICT and peoples’ changing, highly demanding, behaviours. The developments in science, engineering and computational biology have opened many new opportunities for customized and preventative healthcare, but the healthcare
delivery systems and channels have been unable to exploit these opportunities. ICT developments have led to people having higher demands for quality, value and customization. Ageing populations have created another imbalance in the demand and supply equation for the healthcare sector. Several well-known inefficiencies in the healthcare systems, such as multiple reactive treatments rather than preventative, have further exacerbated the situation. Healthcare is a service industry, it will increasingly be traded and offered on the Internet as we have seen with many other services (marketplace, shopping) utilizing the Internet. Many of the problems in health systems will be resolved by augmenting the healthcare industry with a global Internet. Furthermore, the Internet has increasingly become an accessible and influential medium between the marketplace and consumers, and so it will lead to public adaptability and will resolve some of the social and operational challenges. However, as the next-generation healthcare systems go live on the global Internet, many new social and technical challenges such as privacy, trust, security, safety, and reliability will emerge.

**Open Models and Innovation Processes:** This is a cross-cutting theme overarching all sessions including Internet Infrastructure, ITS, Healthcare and Digital Divide. Much of the innovation in networked distributed systems, such as the Internet, came from their decentralized and open development models. Many open source projects, directly and indirectly, opened the gates to the developments and innovations in science and engineering research. However, we have not really tried to understand and to capture the opportunities offered by open models. With recession looming, it is becoming increasingly important that we give serious thought to our methods and ideals of doing business and developing the economy. In yesterday’s slowly evolving business environment, innovation rendered a reward. Today, innovation is the only way to attain competitive advantage. Tomorrow, perhaps only those businesses will survive that infuse innovation into their fiber and are able to understand and innovate in an increasingly dynamic and complex environment.

The call for papers attracted 52 submissions from several countries around the world. After a peer-review process, 15 full papers and 6 work in progress and short papers were accepted by the Technical Programme Committee (TPC) in order to assure a high-quality programme. We also invited carefully selected experts in their fields to submit papers, and received an additional seven papers, which further improved the quality and diversity of the conference proceedings. The TPC comprised researchers from industry and academia working in wide-ranging disciplines including engineering, computing science, telecommunications, life sciences, sociology and business. It is our sincere hope that the proceedings of EuropeComm 2009 will serve as a valuable reference for researchers and developers. The conference programme also included a one-day business track with invited presentations on the conference themes from leading industry experts.

We would like to thank all authors who submitted their papers for consideration and our congratulations to all those who had their papers accepted after a rigorous peer-review selection process. We express our gratitude to the TPC members and additional reviewers who all worked hard in reviewing the submitted papers. We thank Beatrix Ransburg, Edit Marosi and the ICST team for their invaluable support. We would also like to thank Paulo T. de Sousa, John G. Williams, John Hand and
John Polak for kindly agreeing to give keynote speeches at the conference. Our thanks also go to the invited speakers of the EuropeComm’09 Business Track; Jerry Fishenden, Jeremy Evans, Richard Harris, Bryan Manning, Christopher Reed, Janne Sillanspa, Len Starnes, and Dirk Trossen.

August 2009

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