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IEEE Healthcom 2010: "Ambient Assisted Living" for Better Health

By Norbert Noury, Healthcom 2010 General Chair, University of Lyon, France

Telecommunications and networks are well recognized enabling technologies for telemedicine applications in remote and rural locations, but are also more and more becoming facilitating technologies for continuous health monitoring out of hospital, for p-health at home, and during various human activities, professional, leisure, or sports.

A new field of investigation, never entered before, is now made possible: to continuously collect health information with context awareness. The field of e-health is also a remarkable melting point which gives the opportunity to bring together interested parties from around the world working in the various fields of healthcare and engineering to exchange ideas, discuss innovative and emerging solutions, and develop collaborations around operational projects.

The 12th International Conference on e-Health Networking, Application & Services, Healthcom2010, was held in Lyon, France, on 1–3 July 2010. It was an important forum for discussions on e-health projects sponsored by world bodies such as the European Community (FP6 and FP7 European projects on AAL and e-inclusion, etc.).

Each year, a broad variety of topics are presented at Healthcom, addressing the different levels of e-Health, from technologies to applications:

- Network and Communications Infrastructures and Architectures for Healthcare Delivery
- New Models for Healthcare Delivery
- e-Health for Public Health
- e-Health for Aging
- m-Health
- Field Applications
- Education
- Ethics

The conference gathered more than 130 attendees, coming from 35 countries, including clinicians, IT professionals, researchers, healthcare solutions vendors, and consultants. About 90 papers were presented, addressing a broad variety of topics within e-Health. The submission rate was high, with 122 papers out of which 62 were selected for presentation, included in the *Proceedings* accessible through IEEEXplore, and six selected papers are to appear in a special issue of the *International Journal of e-Health and Medical Communications* (Professor Joel Rodrigues, Editor-in-Chief).

The first keynote speaker, Professor Louis Lareng, Director of the European Telemedicine Society, reviewed the history of developing telemedicine in Europe since the 1950s. Dr Loukianos Gatzoulis, from the European Commission in Brussels, presented the goals of the EU in supporting e-health, societal and economical. Jean Schwoerer, from Orange Labs, depicted the current normalization efforts in the field of body sensor networks. Professor André Dittmar from CNRS in Lyon demonstrated the need for new ubiquitous body sensors to support e-health efforts and deployments.

The HC10 was articulated around three main sessions, "Enabling Technologies," "Enabling Information Systems," and "Enabling Applications." The variety and density of information were very high. Some main points are the followings.

Body sensor networks allow collecting and aggregating data from several sensors in a mobile context. This mobility offers continuous monitoring of patient status, imrpoving patients' quality of life. Existing femtocellular network resources, already available on site, may be used for rapid provisioning of mobile broadband data connectivity indoors for emergency telemedicine applications. This approach results in a reduction in service outage rates.

Remote telemonitoring of elderly people in their own homes is a major challenge to face the fast growing population of elderly people. Health Smart Homes allow monitoring the behavior of a person with non-intrusive sensors. The major trends in the activity reflect the global homeostasis of the subject. High-level decision tools are used to classify scenarios of daily living and eventually to build an index of activities of daily living. As these smart homes will benefit people in preventing loss of autonomy, disabled people or elderly people with cognitive deficiencies, it is essential to facilitate their interactions with Smart Homes through dedicated interfaces, such as systems reactive to vocal orders. Audio recognition is also a promising way to ensure detection of distress situations.

E-healthcare and telemedicine applications, when deployed to provide healthcare to remote locations in developing countries, must carefully take into account the existing healthcare and communications facilities, but also socio-economic conditions of populations.

Telemedicine can also allow deployment of real-time disease surveillance and notification systems in developing countries. The communication technologies, adopting global standards for structured messages (SMS, email, web), will reduce the delays in communicating field data to central epidemiology units, which can therefore detect disease outbreaks in a timely manner, and allow health system to effectively respond and mitigate the consequences for populations.

The domain of e-health is currently demonstrating high vitality. It is a living laboratory for cooperation between the fields of health and engineering. It is also a chance to better understand the health of humans in their living contexts.

I want to thank Assistant Professor Pradeep Ray, director of the Asia-Pacific Ubiquitous Healthcare Research Centre (APuHC) at the University of New South Wales, who kindly invited me to organize IEEE Healthcom 2010.

1st FOKUS FUSECO Forum 2010, Berlin, Germany

By Prof. Dr. Thomas Magedanz, General Chair, TU Berlin/Fraunhofer FOKUS, Germany

The First international FOKUS FUSECO Forum (FFF) on "Business and Technical Challenges of Seamless Service Provision in Converging Next Generation Fixed and Mobile Networks" was held in Berlin, Germany, on 14-15 October 2010 and was attended by around 150 experts from industry and academia. The FFF represents a technologically focused follow-up to the famous FOKUS IMS Workshop series, as the future role of IP Multimedia Subsystem (IMS) in mobile and fixed next-generation networks (NGNs) deserves some critical considerations in regard to slow industry adoption and rapidly emerging new control protocols and platforms from the Internet domain. There is no doubt that IMS has consolidated the various views on Session Initiation Protocol (SIP) and Diameter-based NGNs, and many standards have been established for voice over IP (VoIP), rich communications services (RCS), and IPTV. But there is lot of pressure from emerging over-the-top (OTT) applications originating from the Internet, challenging IMS business case calculations and extensive deployments beyond NGN VoIP. In addition, IMS is limited to SIP-based control and thus HTTP (Hypertext Transport Protocol) and other protocol-based applications, forming the majority of current fixed and mobile broadband traffic are out of control. Here the 3GPP Evolved Packet Core) (EPC) has the potential to emerge as a common control platform for any IP application. From the technical maturity and global recognition points of view, EPC stands today where IMS stood five years ago; thus, it is time to launch a new workshop series to create global awareness in academia and industry about this promising technology.

Thus, the FFF discussed for two days the relationship between the EPC, IMS, and OTT approaches. The first day started with a technical tutorial about Long Term Evolution (LTE) and EPC standards, and introduced the Fraunhofer HHI LTE-Advanced Testbed and Fraunhofer FOKUS OpenEPC toolkit, which have been integrated into the Future Seamless Communication (FUSECO) Playground, the globally first open testbed uniting wireless LANs, 3G networks, LTE, and EPC technologies for early prototyping of new seamless applications. Practical demonstrations including seamless handovers of Skype and video services with quality of service assurance from the FUSECO Playground and an OpenEPC Release 2 preview were also provided to the audience. The second day featured a conference with presentations from various international network operators and service providers. A vendor panel session and an associated exhibition presented the state of the art and upcoming products in this field. In the following some more details are provided for both days.

The tutorial "Understanding the Next Generation of Mobile Broadband Communications: LTE and EPC Concepts, Architectures, Protocols and Applications" on the first day was presented by Dr. Thomas Haustein, Fraunhofer HHI, and Prof. Dr. Thomas Magedanz, Fraunhofer FOKUS and TU Berlin. It started by pointing out the continuously increasing mobile data traffic demand and motivated the need for LTE, EPC, and IMS technologies in order to allow smooth evolution from existing circuit- and packet-switched mobile networks to a next-generation mobile network. A session about LTE presented details about the radio part, covering standards and architectures, and gave an outlook on LTE-Advanced. The correlated network part was covered in the following session by introducing EPC terminology, key concepts, and architecture, as well as the related Third Generation Partnership Project (3GPP) standards. Subsequently, potential applications and related platforms were discussed, including operator IMS platforms for voice over LTE (VoLTE), as well as over the top Internet service platforms. An outlook onto global Future Internet research and related application areas has concluded this tutorial section. The tutorial ended with a presentation of the experiences from the Berlin LTE-Advanced testbed, the OpenEPC testbed toolkit, and the FUSECO Playground. Demonstrations during the breaks showed current proof of concept realizations, including seamless handovers between LTE-A and WLAN, service composition, and transparent mobility. The demonstrations covered essential challenges in the scope of LTE and EPC, and illustrated practical solutions based on these emerging technologies.

The 1st International FOKUS FUSECO Forum (FFF) was attended by approximately 150 experts from industry and academia.

On day 2 the conference started with a session on "Competing Mobile Broadband Access Network Technologies" chaired by Thomas Haustein, Fraunhofer HHI, and addressed challenges emerging with the introduction of LTE and EPC. The second session, "Access Network Integration and Service Enabling," chaired by Hans Schotten, University of Kaiserslautern, addressed technical problems during the deployment of EPC into existing network infrastructures, in particular IMS roaming and different QoS signaling, as well as the complex IMS and EPC interoperability, which might take until 2014/2015. A vendor panel, "Standards, Products, and Business Cases for Future Seamless Communication," chaired by Thomas Magedanz, TU Berlin, discussed the LTE business case, voice over LTE, the importance of open application programming interfaces (APIs) for VoLTE and RCS, and so on. The fourth session, "FUSECO Telco Applications: Voice, RCS and More," chaired by Hans Joachim Einsiedler, Deutsche Telekom Laboratories, addressed mobile broadband services and M2M opportunities, and application challenges regarding fast deployment of web services and slow agreement on interoperability. The overall tenor forecasts no LTE/mobile broadband killer application. The last session, "FUSECO OTT Applications: Beyond Smart Bit Pipes," chaired by Thomas Michael Bohnert, SAP Research, presented opportunities for wholesale and enterprise operators, OTT services, and the usability of LTE for vehicles. VoIP in mobile networks is growing in acceptance, increasingly challenging the operators around the globe. As Facebook has now announced interworking with Skype, the question of using Facebook as the main interface for launching new applications in the future has been raised.

Alongside the workshops and conference, vendor exhibitions showed 4G Subscriber Data Management/Communications as a Service, Enhancements of Mobility Management for the 3GPP EPS — smart mobile devices in a dense wireless network environment, IBM Software Strategy for CSPs — start planning and implementing smarter communications systems, and smart networks for user-centric broadband. In addition, the newest

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Internet for Everybody in Spain: The 1 Mb/s Universal Service

By Ana Vázquez Alejos, Rafel Asorey Cacheda and Felipe José Gil Castiñeira, University of Vigo, Spain

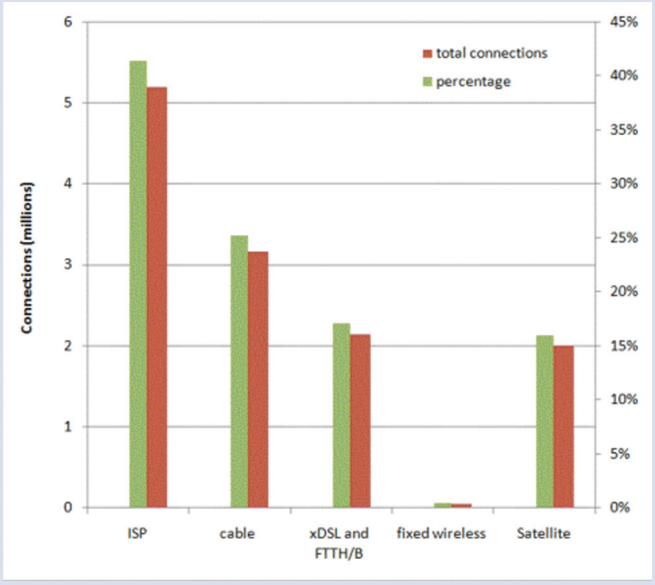
Universal telecom service is a concept defined at the European level with the objective to guarantee all citizens the right of access to a defined set of basic electronic communications services, independent of their geographical location, with a minimum quality and at a reasonable price. Until now, in Spain, only a functional Internet access was considered as a service offered by the public phone wired network, with download speeds of 256 kb/s.

During October 2009, the Spanish Ministry of Industry performed a public survey [1] to determine the minimum features that would require the Internet universal service to be updated to the growing needs of the Information Society. The survey outcomes concluded that choosing broadband access with a bit rate of 1 Mb/s would conciliate the current demands of the Information Society and the requirements to impel the modernization of the digital infrastructures. As a consequence, the Minister of Industry announced that the universal service would include the 1 Mb/s downlink broadband connection in 2011 as a minimum requirement to increase competitiveness in the broadband business. Recently, during the celebration of CEBIT 2010 in Hannover, Spanish Government President Mr Rodriguez Zapatero confirmed this aim.

The operator in charge of providing the universal service will be selected during 2010. The inclusion of the broadband access with a minimum downlink speed of 1 Mbps makes Spain to go in head of the digital European policies. This actuation can be considered an epilogue to the AVANZA-PEBA plan [2], designed to extend the penetration of the broadband access in Spain and deployed by the Government from 2005 to 2008. Now, that the plan is over, it is time to measure the achievements before designing the new telecom policy.

We can compare the Spanish case to other European countries such as Finland. Traditionally, the latter has been found positioned in first place of the pro-right career in telecommunications, reaching the point of including in its constitution the right of a nationwide 1 Mb/s broadband connection provided by any kind of technology, hoping to reach the speed of 100 Mb/s by 2015. However, it was not Finland but Switzerland that, in 2008, defined broadband access as a connection of 100 kb/s/600 kb/s for up-/downlink speeds. Thus, Spain will become the third European country adopting a quantitative definition of broadband access. Despite this, the reality and the political intentions follow paths dangerously separated.

The European Competitive Telecommunications Association (ECTA) Broadband Scorecard is a recognized benchmark being used regularly by industry, the European Commission, national regulators, and institutions. Biennially, ECTA collates and publishes data tracking the progress on broadband penetration and local loop unbunding in the 25 European Member States [3]. Some of the latest published statistics are plotted in Figure 1. According to this source, goals seem not to be reached, placing Spain under the average of European countries in broadband penetration, with a penetration rate of 21 percent, which is two points under the EU average placed at 23.5 percent. Along the same lines, a recent report published by the Regional Government of Galicia (Northwestern Spain) demonstrated that this situation is even more critical [4]. The determining factor of this circumstance can be found in the situation experienced by rural areas, which present 70 percent nonexistent or low-quality network access, under 512 kb/s, even after an investment of €225,000,000 provided by public funds. The same happens in other Spanish regions, showing a deep imbalance between urban and rural state areas.



2009 April total connections per technology for Spain including radio [2].

Closer insight into tje data provided by ECTA reveals that Sweden remains Europe's fiber leader, with 7.5 percent of the population benefiting from high-speed modern access lines compared to an average of just 0.4 percent across the EU. Despite "regulatory holidays" for incumbents in countries such as Germany and Spain, the survey showed little evidence of increased fiber deployment in those countries. It also highlights a strong link between effective economic regulation and investment levels in the telecom sector, where a regulatory framework helps alternative operators compete against the national incumbent, but also does not encourage investments on new infrastructure since new deployments require many resources and are only profitable in the long term.

The EU presidency by part of Spain in 2010 would seem to be a suitable moment to support the consideration of broadband Internet as an indispensable service in the Information Society. However, 1 Mb/s may not be enough and can hardly be considered broadband Internet in 2010. Moreover, no one has explained how this service will be provided since there are large areas in Spain without any kind of Internet access. And the most important thing is the need to define how the provision of this service will be financed. Probably, without public funds, it will not be possible to accomplish these goals, although achieving them would doubtlessly place Spain on top of the most developed information societies.

References

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Distinguished Lecturer Tour of Bhumip Khasnabish in India

By Deergha Rao Korrai, Chair, Communications and Signal Processing Societies Joint Chapter, Hyderabad, India

The Distinguished Lecturer Program is one of the best initiatives of the IEEE Communications Society. It brings distinguished experts to give lectures at Chapters on all continents. A DL tour of Dr. Bhumip Khasnabish, ZTE, United States, was held in India in July 2010. Lectures entitled "Services over IP: Implementation Options and Challenges" and "Converged Services and a New Generation of Networking" were given in India from 9 July to 17 July 2010 with the following schedule: 1) Mumbai, 9 July 2010 (two lectures); 2) Pune, 10 July, 12 July 2010 (two lectures); 3) Hyderabad, 13 July 2010 (two lectures); 4) Kharagpur, 15 July 2010 (one lecture); 5) Kolkata, 17 July 2010 (one lecture).

Dr. Khasnabish's lectures in Hyderabad were organized by the Communications and Signal Processing Societies Joint Chapter of the IEEE Hyderabad Section, and his accommodation and travel within Hyderabad were arranged by TCS Hyderabad. "Services over IP: Implementation Options and Challenges" is a tutorial and was held on 13 July 2010 at the Research and Training Unit for Navigational Electronics (NERTU) auditorium, University College of Engineering, Osmania University, Hyderabad from 9 a.m. to 1 p.m. There were 55 audience members for the tutorial, including students, research scholars, participants from industry, and faculty of colleges. During this lecture, issues related to mouth-to-ear delay calculation or estimation, GPS integration, location services, current status and future infrastructure deployment, speed of IPTV and the status of current compression technology, cooperating multimode devices, net enabled health services, security issues like DRM, Skype, and emerging trends were raised by the participants. These were well answered by the speaker; furthermore, he emphasized the need for interoperability, standardization, and protocol integration.

"Converged Services and a New Generation of Networking" was held on 13 July 2010 at the Gadavari auditorium, TCS, Deccan Park,Hi-Tech City, Hyderabad, from 5 p.m. to 7 p.m. There were 154 audience members for this lecture, including students, research scholars, participants from industry, and faculty of universities and colleges. In this lecture the speaker answered issues raised by participants related to protocols and infrastructure, IETF.org, streaming media, VoIP, IPTV, packet delay, packet losses, acceptable delays (< 150 ms), the difference between Internet phone and IP phone, telemedicine prospects in India, IPv6 adoption, QoS, QoE, WiMAX, LTE, virtual device (embedded) services, and more.

Mr.MGPL Narayana(Hyderabad section chair, third from left), Dr.Bhumip Khasnabish (fourth from left), Dr.Deergha Rao Korrai (chapter chair, fifth from left) and other IEEE volunteers of the Hyderabad section after the lecture at the Godavari auditorium of TCS.

The single biggest phenomenon that is transforming the global telecom industry is convergence. Internet users are now exposed to different modes of communication than basic voice telephony. Communication now includes pictures and videos, and is not limited to person-to-person communication; communities and user groups are being created, and information exchange is not limited to and from people known to each other. Content is driving service subscription, and identifying the right content in the right format at the right cost and delivering it in a secure manner to any kind of business model for the communication industry are the main issues. Convergence has been visible on the horizon for the last couple of years, but has yet to arrive in developing countries in a major way.

The lecture focused on convergence of communication services like data, voice, and video in IP-based networks. The speaker stressed the importance of quality of experience (QoE) apart from quality of service (QoS) in IPTV user judgment and acceptance. Experience needs to be preserved as video traffic is transported across IP infrastructure. Service providers need IP-based next-generation network (IP-NGN) infrastructure solutions that are intelligent and video-aware. An outstanding video experience requires excellent solutions in the customer home to decode, decrypt, share, and display the content the way it was intended.

In feedback, the participants expressed satisfaction with the event organization, suggesting increasing the time for these kinds of lectures, more explanations of security, and some demonstrations using MATLAB interfacing and Labviews.

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toolkits from Fraunhofer FOKUS, the universal client framework myMONSTER TCS (www.opensoaplayground.org/tcs) and the newest release of the OpenEPC toolkit (www.openepc.net), were presented.

This new forum will be continued next year in November 2011 to establish a regular meeting point for international researchers from academia and industry (www.fuseco-forum.org/2011).