

# Global Communications Newsletter

December 2009

## ICT Mobile Summit 2009

By Paulo de Sousa, European Commission, and Thomas Michael Bohnert, SAP Research Zurich

The IST Mobile Summit is an IEEE-sponsored conference and the prime annual event of the European Commission that showcases results and directions of ICT projects in the mobile domain. This year it took place in Santander, Spain, 9–12 June. The theme was extended to future Internet issues, fixed communications, and also to the mobile application and software space. As such, this edition was an excellent opportunity to gather a consistent impression on issues ranging across the entire spectrum covered by Directorate D of the European Commission's Directorate-General INFSO.

About 450 experts attended the conference representing a broad spectrum of the research community in Europe, the Americas, and Asia.

This year's Summit featured five plenary sessions. Besides the "Welcome Address and Keynote," the latter by Antti Peltonmäki, Deputy Director General DG INFSO, and entitled "Mobile Future Internet," there were "Towards a Mobile-Friendly Internet," "New Generation of Handset Operating Systems," "Spectrum without Boundaries," and "Sustainable Communications." Furthermore, 29 sessions covered a broad range of topics in mobile and fixed communications.

Over 20 project demo booths were present, a significant increase compared to past editions and an indicator of a steadily rising profile. These demos, besides others, confirmed good progress made by ultra wideband (UWB) projects in demonstrating short-range broadband in several industrial environments. Another notable fact is that several WiMAX projects have been reoriented toward Long Term Evolution (LTE), principally aimed at increasing performance.

Very valuable contributions were also provided by six pre-conference workshops (partially covered in other GCN issues). Complete information (including papers and presentations) can be accessed online at <http://www.ictmobilesummit.org>. A selected summary is presented here.

### Plenary: "The Mobile Future Internet"

The opening speech, "The Future of Telco. Where Will the Customer Take Us?" by Cristina Álvarez, Telefónica, confirmed the radical transformations operators go through. It was notably indicated that the size of the advertisement and telecom markets are very different, and substitution is not possible without major havoc. This requires operators to find other ways of monetizing services. This was more generally outlined in subsequent presentations with concepts to expose network services to application developers. The FP7 Project "SmoothIt" (<http://www.smoothit.org>), SEA, and NapaWine (<http://www.napa-wine.eu>) are investigating this issue, which is also the subject of the Internet Engineering Task Force (IETF) Working Group (WG) on Application-Layer Traffic



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Optimization (ALTO). In essence, the idea of cooperation between overlay and networks is gaining momentum.

Another problem pointed out was blossoming of development platforms for mobile terminals. An application frequently works perfectly on one mobile while being unusable on another. Operators experience high portability costs and therefore look for some rationalization in this field.

### Plenary: "Towards a Mobile-Friendly Internet"

This panel featured prominent speakers like Dr Sabnani, Alcatel-Lucent. He indicated why the Internet does not inherently support mobility but comes as an unscalable overlay add-on. It entails complicated access networks with cascaded functionalities that do not scale and are capital and operation expenditure costly. Mobility needs to be considered natively and through a much flatter structure for packet handling. The proposed approach, also supported by Dr. Stuttgart, NEC, is based on a new category of Domain Name Service (DNS) location servers advertising the connection point address. Notably, from the speaker's perspective, this does not require specialized routers.

Dr. Stuttgart confirmed the approach and outlined NEC work supporting media independent handover in IEEE working groups. He indicated that this is being significantly supported by ICT project work, like Daidalos (<http://www.ist-daidalos.org>, FP6), Geonet, Carmen, and Ambient Networks (<http://www.ambient-networks.org>). In particular, Ambient Networks has been very important in pushing the concept of a location plus host identifier as two complementary entities.

Lars Eggert, Nokia, then outlined how multiple mobile

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# Recent Milestones of Thailand Broadbanding

By Kamol Kaemarungsi and Keattisak Sripimanwat

National Electronics and Computer Technology Center (NECTEC), NSTDA, Thailand

Along with the growth of Thailand's telecommunication development, the country's regulator, the National Telecommunications Commission (NTC), was established on October 1, 2004. NTC is responsible for regulating all telecommunication services, setting related policies and criteria, regulating the use of spectrum, and granting licenses. Thailand's broadband networking is currently propelled mostly by private sectors and two major state enterprises. The status of broadband communications in Thailand in the middle of 2009 was as follows.

The broadband services becoming more popular are Internet access, voice over IP (VoIP), music streaming, video on demand, and online gaming. As of June 17, 2009, there were 225 licenses, which consist of 14 international Internet gateway (IIG) and national Internet exchange (NIX) operators, 8 network providers, 17 network and service providers, three service providers, 97 Internet service providers (ISPs), four public telephone operators, and 82 other types of operators.

The majority of wired broadband Internet access is based on various digital subscriber line (xDSL) technologies such as ADSL2+ carried over public switched telephone networks (PSTNs). In the second quarter of 2009, a battle for market share of broadband communications was heating up. Two major private companies started campaigning with high-speed Internet services for a minimum of 3 Mb/s up to 10 Mb/s in Bangkok (the capital city of Thailand) and other major tourist cities. The TOT Corporation Plc., which is one of the two state enterprises under the Ministry of Information and Communication Technology (MICT), will provide up to 10 Mb/s DSL access on the famous Phuket Island (there was an action plan for making use of ICT on this biggest island during 1999–2011, the Greater Phuket Digital Paradise Project: PhD).

For business and corporate uses, there are several broadband connections available. One of the private companies offers broadband Internet using fiber-to-the-home (FTTH) and hybrid fiber-coaxial (HFC) technologies with data rate up to 12 Mb/s. It also plans to offer 100 Mb/s broadband service in Bangkok. In the core networks of most private operators, multiprotocol label switching (MPLS) technology is deployed, and ISPs advertise that corporate customers can subscribe to 10 Mb/s services with flexible access connections such as broadband ADSL, leased line, or gigabit Ethernet.

On the broadband wireless access side, Bangkok's residents have enjoyed free Wi-Fi access since mid-2008 via 15,000 Wi-Fi hotspots under a service called Green Bangkok Wi-Fi provided by a Bangkok-based private company with support of the Bangkok Metropolitan Administration. In 2008 the NTC issued 18 licenses for private companies to conduct Worldwide Interoperability for Microwave Access (WiMAX) trials for 90 days using 2.3 and 2.5 GHz spectrum. The results of the trials were submitted to the NTC for evaluation and for license bidding later.

Currently, there are two WiMAX pilot projects authorized by NTC in the northern provinces of Thailand. These projects are non-commercialized and granted limited time licenses for pilot spectrum. The first project is currently up and running at Mae Fah Luang University in Chiang Rai province. This project is aimed at tele-education and elearning applications. The second project, "Human Resource Development through Utilizing the Information Technology for Rural Community Vitalization in The Kingdom of Thailand," is in the preparation phase and expected to begin service in Mae Hong Sorn province by 2010. The project aims to reduce the digital divide between urban and rural areas. In this second project the National Electronics and Computer Technology Center (NECTEC) cooperates with the kind support of WiMAX equipment from Japan International Cooperation Agency (JICA).

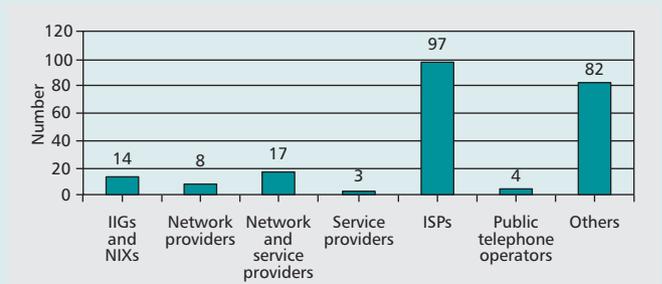


Figure 1. Thailand Telecom's licenses in 2009 issued by the National Telecommunications Commission.

The cellular phone industry in Thailand became more enthusiastic based on the schedule of license bidding for 3G services by the NTC. Major cellular operators started to upgrade their networks and provided trial services of 3G standards based on HSDPA and 1xEVDO. NTC has been under pressure to license spectrum for 3G services due to high demand for high-speed connections to the Internet which is more convenient than wired counterparts. During the waiting period, a commercial trial of 3G service was done in the major tourist city of Chiang Mai. However, the beginning of 3G mobile service in Thailand is expected to delay to the year 2010.

The Royal Thai Government is also trying to improve internal efficiency and supporting e-government services via its Government Information Network (GIN) which connects local district offices in Thailand under the supervision of the MICT. For non-commercial uses, Thailand Research and Education Network (ThaiREN) joined Trans-Eurasia Information Network 3 (TEIN3) with 622 Mb/s connection on June 15, 2009. The networking between ThaiREN and TEIN3 is aimed for academic, research, and governmental purposes. NECTEC is also promoting the use of IPv6 in Thailand to support the future expansion of the Internet.

Looking into the sky of Thailand, broadband satellite service is also available for nationwide coverage through IPSTAR. It is a service of commercial satellites that provide two-way high-speed Internet access and other broadband applications without any requirement for terrestrial infrastructure. Thailand has one IPSTAR gateway in Bangkok among 13 more gateways in Asia-Pacific region. The IPSTAR service is provided by multiple spot beam bent-pipe satellites with switching and routing performed in a ground network of gateways. Currently, there are five ISPs offering IPSTAR services.

Apart from the industrial side, broadband R&D is currently driven by two major organizations under the Royal Thai Government. Those are the Telecommunication Research and Industrial Development Institute (TRIDI), a subunit under NTC, and NECTEC, which is a research institute under the Ministry of Science and Technology (MoST). With an R&D budget less than US\$7 million in 2009, TRIDI is dedicating it to R&D projects in next-generation networks, VoIP, optical communications, short-range communications, and other broadband services.

Due to the economic recession throughout the world in 2008–2009 and several setbacks of various pandemics such as swine flu, Thailand and its policy makers are more cautious about expanding broadband networks over wireless access, causing delay in spectrum licensing for third-generation mobile and WiMAX. However, it is observed that more growth is still expanding in the area of wired broadband access using digital subscriber lines.

# The Future of 4G Mobile Networks in Spain

By R. Asorey-Cacheda, F.J. González-Castaño and F.J. Gil-Castiñeira

Digital mobile telephony has evolved considerably since the first introduction in 1992 of GSM technology in Spain by Movistar. It was expected that by the end of 1992, this second-generation (2G) mobile cellular network would have a 7 percent penetration share, but this was not reached. The Spanish government argued the lack of market competitors and thus decided to introduce a second mobile operator. By 1995, Airtel, now Vodafone Spain, launched its own network and became the first alternative operator. Since then, each time a new mobile technology was introduced, a new mobile operator was introduced as well. DTS brought Orange, the former Amena, and the Universal Mobile Telecommunications System (UMTS) brought Yoigo.

In 2006 the Spanish government concluded that the existing competition was not enough and, to achieve lower fees, decided to allow the introduction of mobile virtual network operators (MVNOs). Although several national operators got licences, their market shares are still very low. The only exceptions to this rule are regional cable operators (mainly R, Telecable, Euskaltel, and Ono). Their MVNOs have gained an important market share thanks to their capacity to provide integrated telecommunication services.

A good example of a successful MVNO is R Cable (its MVNO brand is *móvil R*), which only offers its services in Galicia, Northwest Spain. By the end of 2008, 16,689 users had ported their mobile number from other operators to *móvil R* and 17,300 had signed a new line. This means that in its first year of activity, *móvil R* became the highest-growing mobile operator in Galicia and the fourth in Spain (the Galician population is 15 percent of the Spanish population). As previously said, these good results were not just a consequence of lower fees, similar to those of most MVNOs, but of telecom service integration and reduction of global costs. Other regional operators with the same model, such as Euskaltel, have obtained good results as well.

By the end of 2008, in the Spanish mobile market there were four mobile network operators (MNOs) and several MVNOs.

The Spanish government decided to consult the Comisión del Mercado de las Telecomunicaciones (Spanish's telecom regulator, CMT) about the introduction of 4G mobile networks in Spain. The initial considerations were that the technology should be neutral (i.e., LTE or mobile WiMAX), the minimum bit rate should be 50 Mb/s, and the number of licensed operators in any location would be three or four (in the second case the fourth operator would be a regional one so that there would be a regional 4G mobile operator in every Spanish region).

Regarding the technological issue, the current trend for all operators is choosing LTE for network deployment, since it is an evolution of UMTS technology.

Considering the present Spanish market, where Yoigo's market quota is comparable to that of most MVNOs, a realistic decision would be to allow only three 4G MNOs. Decreasing competition at that level would probably boost service deployment. MVNOs would guarantee competition and reasonable connection fees. However, the solution with four 4G MNOs will probably be adopted due to political pressure from the regional governments. In that case, many related issues will have to be solved:

1. Regional roaming: Fees to be paid outside the 4G MNO region. Clearly this differs from international roaming, and it is not clear how it will be implemented.

2. User registration: A new user would typically be a resident in the operator's region. The possibility of registering users from other regions opens the discussion of free regional roaming.

Obviously, one of the four existing national MNOs will not get a 4G licence. Considering its reduced market quota, it is likely that Yoigo will be the loser. Although Yoigo has the possibility to become a 4G MVNO, the current scenario is problematic for this company.

More information about the future of 4G in Spain can be accessed through the CMT website: <http://www.cmt.es> (Spanish language only).

## Highlights of CONVETEL VII 2009, San Salvador, El Salvador

By Arne Guerra, Chair of the Organizing Committee Convétel VII, San Salvador, El Salvador

CONVETEL is a technical telecommunications conference that has been organized for the last seven years alternating between the El Salvador and Guatemala ComSoc Chapters with support from each country's local IEEE Section Board of Directors. This year, CONVETEL took place on September 24 and 25 in San Salvador, El Salvador, at the Sheraton Presidente Hotel with the support of local industry and IEEE and ComSoc volunteers. The main objective of the conference is to provide a space for the telecommunications industry and academia in Central America to share their knowledge of diverse topics in telecommunications and computing through technical presentations and tutorials and also for companies and local industry to present their latest products and services in a product expo. As an additional objective, through activities such as CONVETEL, we work to increase the level of service provided to the Central American IEEE and ComSoc membership, and thus seek to provide more value to our members and recruit new ones.

This year in CONVETEL, the IEEE Computer Society also supported the event, providing volunteers for the organization of the conference and a Distinguished Lecture Tour (DLT) tutorial and presentation given by Dr. Ricardo Llamasa from Santander University of Colombia. The topic of the tutorial was Integrated Software Project Management, and was well received and assisted. Representing ComSoc as a distinguished lecturer for the conference, we invited Stefano



Closing ceremony of CONVETEL VII in San Salvador. Left to right: Arne Guerra, Chair of Convétel VII; Jaime Fuente, El Salvador 2009 IEEE Section Chair; Armando Ruiz, El Salvador 2010 Section Chair; Ricardo Llamasa, Computer Society Distinguished Lecturer; Stefano Bregni, ComSoc Distinguished Lecturer.

Bregni, ComSoc Director of Education and associate professor of telecommunications at the Politecnico of Milano, Italy, who provided two half-day tutorials on Network Synchronization for Next-Generation Networks and Optical Access Net-

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resources (e.g., multiple connectivities) can be pooled through parallel sessions to increase robustness and capabilities. This work was derived from FP7 Trilogy (<http://www.trilogy-project.org>).

Georges Polyzos, University of Athens, described how research in cognitive radio, interference mitigation, and autonomic operations contributes to a mobile-friendly Internet. He also presented the FP7 PSIRP (<http://www.psirp.org>) that uses publish-subscribe-based internetworking architecture to introduce multicast-assisted mobility.

Some consensus from the panel discussion:

**Clean-slate vs. evolutionary:** We should think clean-slate and not get tied into current Internet restrictions while keeping in mind that clean-slate will take time. The primary challenge is how to migrate from the current state to a clean-slate option.

**One vs. many Internets:** There will be many internets (already the case today), private internets, and some of them will be clean-slate. If internet means a federation of connected networks, the future Internet is still an internet. However, if internet means the use of IP, it is more correct to talk about networks of the future rather than future Internet.

**Mobile vs. Internet revolutions:** The mobile domain goes through clean-slate revolutions each time a new generation of cellular radio is deployed. Business cases make this possible, contrary to the situation in the Internet. However, a clean-slate revolution will no longer be possible in the mobile world either, due to massive deployment and 120 percent coverage.

**What if there is an Internet crisis?** There have been several crises before, many of them solved, even if sometimes with patches. Two looming crises are security and traffic explosion that routers will not be able to handle. One possible solution to look at is core optical circuit switching.

**Standardization:** IETF and the Third Generation Partnership Project (3GPP) are talking now, which is good news for achieving a mobile-friendly Internet — or an Internet-friendly mobile environment.

### Plenary: "New Generation of Handset Operating Systems"

The panelists confirmed the importance of applications for the mobile Internet. A discussion was triggered on comparative merits of operating systems browsers, and cloud applications (minimal embedded software in mobiles). This was, however, inconclusive and requires further investigation. From the operator perspective, a less "software cluttered" environment is better for mobile terminals. In that context, a minimal set of standardized and open primitives could be a way forward, but requires industrial commitment that is not likely to happen.

### Pre-Conference Workshop: Future Internet Architectures

This workshop was organized by the project Euro-NF ([www.euronf.org](http://www.euronf.org)) in conjunction with the Future Internet Cluster. The general objective was to discuss why new architectures are needed and what characteristics they should have. Several papers were presented covering four sessions: Adaptive Networks, Context Awareness and Architectures, Wireless Integration and Frameworks, and Bandwidth Planning.

The conclusion identified three principal statements:

Cognitive networking enables micro-operators and user-provided networks. This implies open spectrum access and highly autonomic operation.

Is network layering obsolete? There is always a need for abstracting the hardware.

Introducing sociology to networking: Benefit (better content dissemination) or threat to humans?

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[www.comsoc.org/pubs/gcn](http://www.comsoc.org/pubs/gcn)

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works. In addition to the two distinguished lecturers from ComSoc and the Computer Society, the technical program consisted of a total of 36 technical presentations provided by local university professors and practicing engineers on diverse topics related to telecommunications and computer networking.

CONVETEL VII had a total of 220 conference attendees, and in the product expo we had a total of 20 booths or stands with representation of local operators, universities, product distributors, and manufacturers such as Tellabs, Agilent Technologies, Commscope, Siemens Enterprise, smf Sunrise Telecom. The product expo was open to the general public and was very well attended.

At the opening ceremony of the conference, Mr. Mario Cerna, Vice Minister of Industry and Commerce, was the inaugural speaker and representative of the Salvadoran government. He emphasized the importance of institutions such as IEEE in promoting technology in El Salvador and Central America through conferences and other events focused on training and education. Conferences such as CONVETEL are an important component in sharing knowledge, which in turn promotes the technological development of El Salvador and the Central American region.

Continuing with the tradition, Convétel VII in 2010 will be organized by the Guatemala ComSoc chapter in Guatemala City. We will keep you all posted!