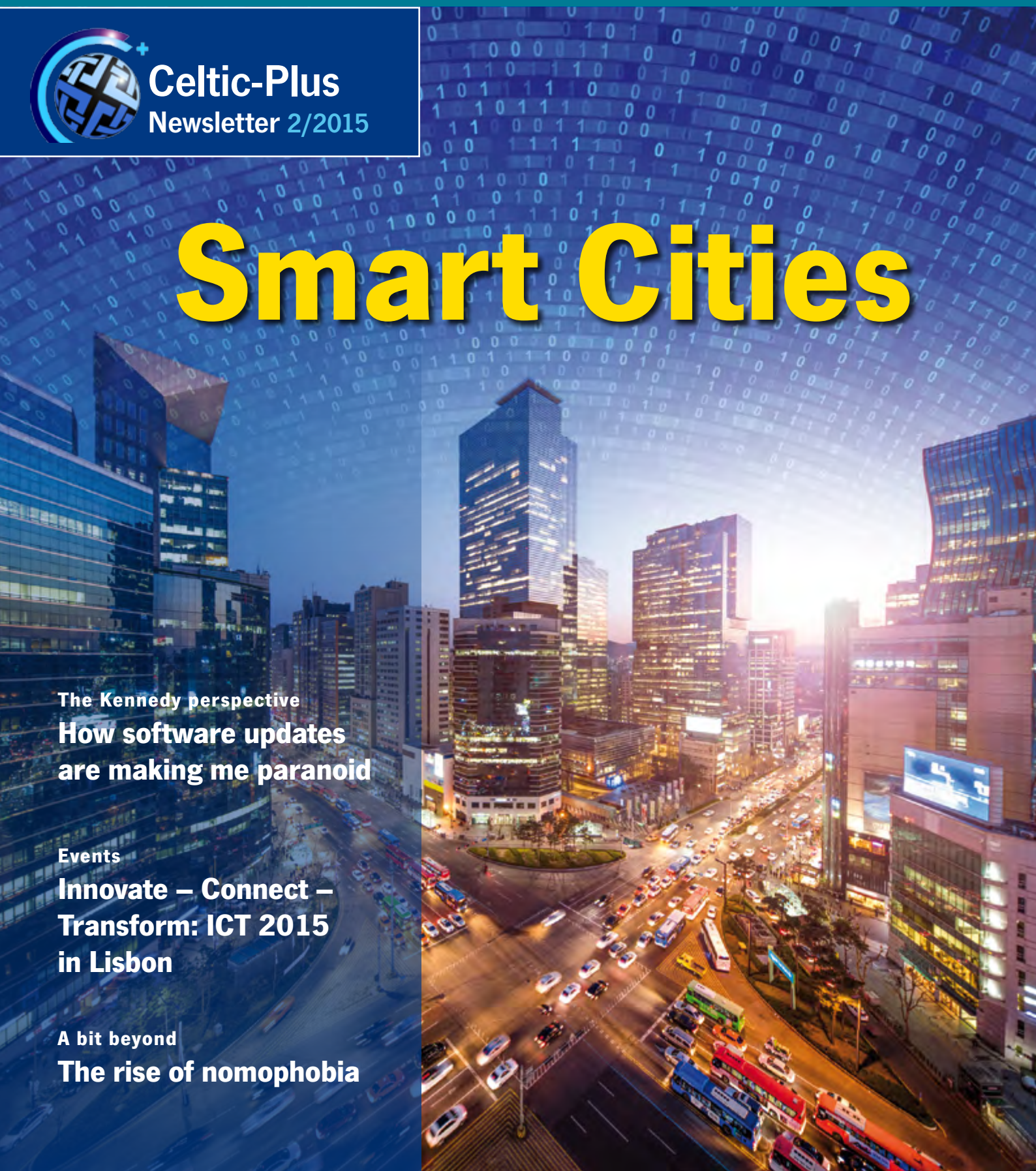
Winter 2015

EURESCOM message

The magazine for telecom insiders

Celtic-Plus
Newsletter 2/2015

Smart Cities



The Kennedy perspective

How software updates are making me paranoid

Events

Innovate – Connect – Transform: ICT 2015 in Lisbon

A bit beyond

The rise of nomophobia

Celtic-Plus Event 2016

Co-located with EUREKA Innovation Week 2016

Stockholm, Sweden, 28–29 April 2016

The Celtic-Plus Event 2016 will be organised on 28-29 April 2016 in Stockholm, Sweden, co-located with the EUREKA Innovation Week 2016 from 25-29 April 2015, organised and hosted by the Swedish EUREKA Chairmanship at the Stockholm City Conference Centre.

Networking with proposers and experts

The event will include a session on innovative project ideas for experts from the ICT community to discuss emerging R&D needs and proposals for related collaborative projects. This is an extraordinary opportunity for participants to present their companies and expertise, to offer project ideas for collaboration and to find partners.

Exhibition and demos

Results of about 15 commercially important Celtic-Plus projects will be presented at the related exhibition. The prototypes evolving from these projects will allow the audience to experience in an interactive and playful way the technological progress made in those projects.

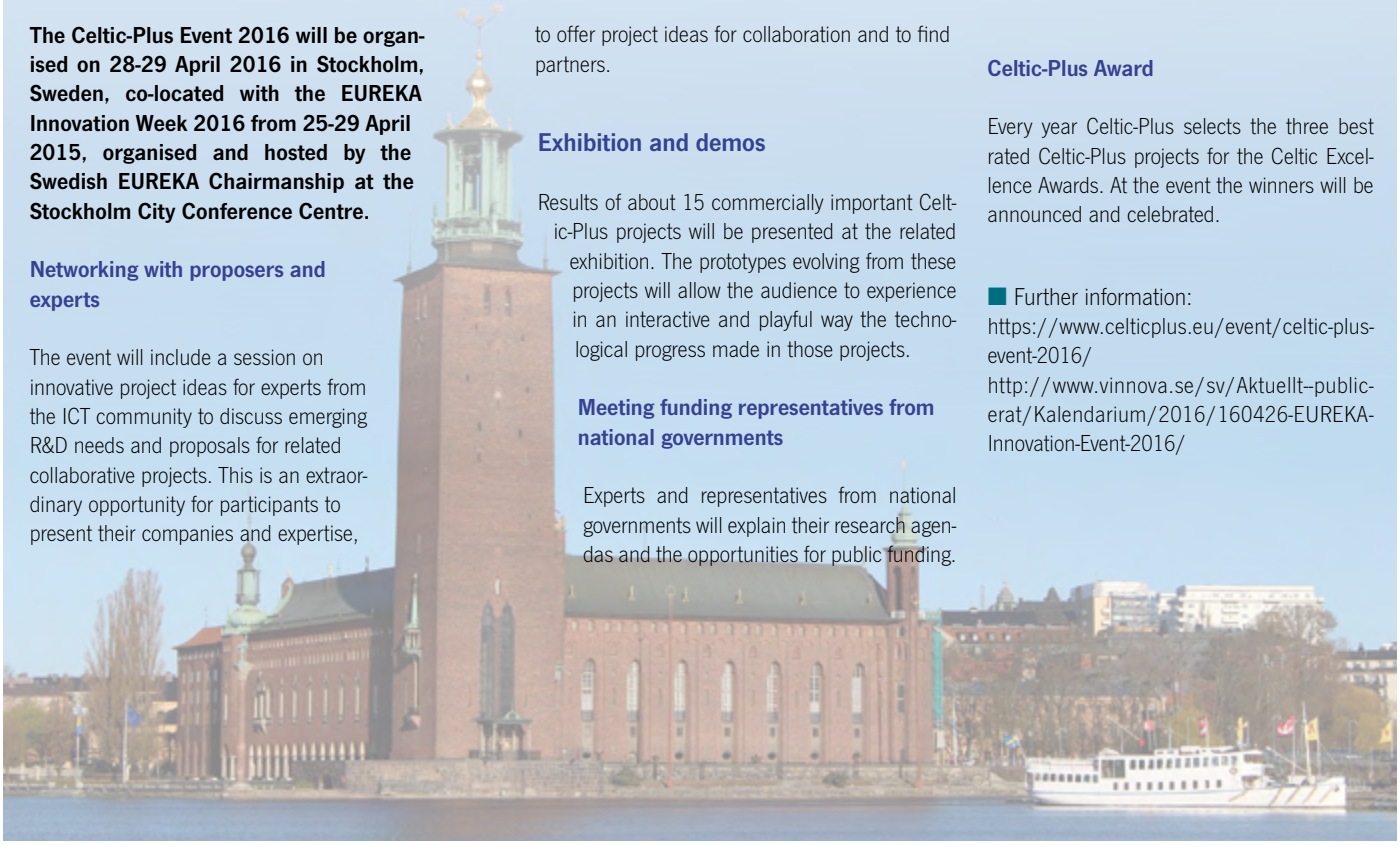
Meeting funding representatives from national governments

Experts and representatives from national governments will explain their research agendas and the opportunities for public funding.

Celtic-Plus Award

Every year Celtic-Plus selects the three best rated Celtic-Plus projects for the Celtic Excellence Awards. At the event the winners will be announced and celebrated.

■ Further information:
https://www.celticplus.eu/event/celtic-plus-event-2016/
http://www.vinnova.se/sv/Aktuellt--publicerat/Kalendarium/2016/160426-EUREKA-Innovation-Event-2016/



Join the Industry-Driven Research Programme for a Smart Connected World

Celtic-Plus Call for Project Proposals – Deadline: 25 May 2016

Don't miss the opportunity to participate in Celtic-Plus, the industry-driven European ICT and telecommunications research programme under the umbrella of EUREKA. Deadline for the next Call for Project proposals is 25 May 2016.

Celtic-Plus projects are collaborative private-public partnership R&D projects. All EUREKA member countries and associated countries can financially support them. More information on public funding and national contacts per country can be found on the Celtic-Plus Public Authorities Website. Please talk to your national contact early in the process.

Easy proposal process

Preparing and submitting a Celtic-Plus project proposal is easy. Just register on the Celtic-Plus online proposal tool, fill in the Web forms, and upload your proposal in pdf. Access to the proposal tool and to a proposal template is available via our Call Information page (https://www.celticplus.eu/call-information).

Benefits of participating in Celtic-Plus

- You are free to define your project proposal according to your own research interests and priorities. Your proposals are not bound by any call texts, as long as it is within the ICT/telecommunications area.
- Celtic-Plus projects are close to the market and have a track record of exploiting their results soon after the end of the project.
- High-quality proposals have an excellent chance of receiving funding, with an average success rate of 70 %.
- The results of the evaluation will already be known in June 2016.

Contact:
Peter Herrmann, herrmann@celticplus.eu or
Peter Stollenmayer, stollenmayer@celticplus.eu

Celtic-Plus
Smart Connected World

www.celticplus.eu

Dear readers,

More than 3.6 billion people, half of the world population, already live in urban areas today, according to UN estimates. By 2030, just 15 years from now, it will be 5 billion. Especially in developing countries the growth of megacities will continue at a breath-taking pace. And also in Europe, despite stagnating or low population growth, environmental, social, and economic challenges will put more pressure on cities.

The big question in view of these challenges is how cities can cope with them. One of the answers is Smart Cities. A Smart City uses information and communication technologies to enhance the quality and performance of urban infrastructures and services. The goal is to increase efficiency, reduce the carbon footprint, and achieve overall economic, social, and environmental sustainability.

In this issue of Eurescom message, we will have a close look at how the Smart City concept has evolved in Europe. The European Union has been very active in progressing the concept and the implementation of Smart Cities. In 2012, the European Commission launched the European Innovation Partnership on Smart Cities and Communities, which has brought together European cities, industry leaders, and representatives of civil society to accelerate the development of Smart Cities in Europe. In addition, a number of research and innovation projects under Horizon 2020 are directly or indirectly dedicated to the development of Smart City solutions.

Our cover theme presents selected views on achievements and developments of Smart Cities in Europe. In the introductory article to the cover theme, Maria Barros Weiss, project manager at Eurescom, gives an overview on the Smart City concept. This is followed by an article on the Greek city Heraklion and its roadmap towards becoming a Smart City. In an exclusive interview, Xavier Trias, former mayor of Barcelona, shares his insights on the opportunities and challenges he experienced on the way towards making Barcelona a Smart City. Finally, Joachim Schonowski from Telekom Innovation Laboratories explores the value grid of Smart Cities.

This edition of Eurescom message also includes a variety of further articles on different, ICT-related topics. See, for example, the new opinion article by Eurescom director David Kennedy in his column "The Kennedy Perspective", where he describes how software updates are making him paranoid. See also our events section, which covers three recent events: the NEM Summit at the Frankfurt Book Fair, the ICT event in Lisbon, and the 5G workshop co-located with the ICT event. Finally, in the latest "A bit beyond" article you can learn whether you suffer from nomophobia.

My editorial colleagues and I hope you will find value in this edition of Eurescom message, and we would appreciate your comments on the current issue as well as suggestions for future issues.

Milon Gupta
Editor-in-chief

Events calendar

6 – 10 December 2015
IEEE Globecom 2015
San Diego, United States
http://globecom2015.ieee-globecom.org/

9 December 2015
FIRE Forum 2015: European Experimental Infrastructure Driving Innovation
Brussels, Belgium
http://www.ict-fire.eu/events/fire-forum-2015.html

27 – 28 January 2016
ETSI Workshop on Future Network Technologies
Sophia Antipolis, France
http://www.etsi.org/news-events/events/1005-workshop-on-future-radio-technologies-air-interfaces

22 – 25 February 2016
Mobile World Congress – MWC 2016
Barcelona, Spain
http://www.mobileworldcongress.com

20 – 21 April 2016
Net Futures
Brussels, Belgium

28 – 29 April 2016
Celtic-Plus Event 2016
Stockholm, Sweden
https://www.celticplus.eu/event/celtic-plus-event-2016/

23 – 27 May 2016
IEEE International Conference on Communications ICC 2016
Kuala Lumpur, Malaysia
http://icc2016.ieee-icc.org/

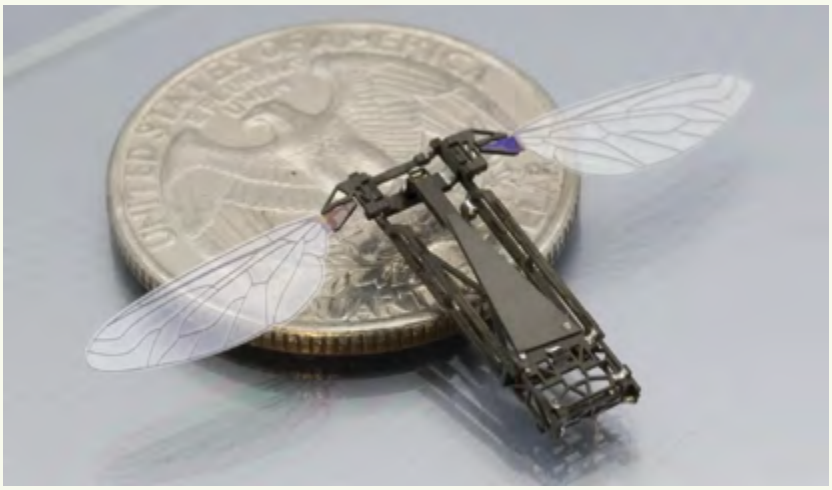
27 – 30 June 2016
European Conference on Networks and Communications – EuCNC 2016
Athens, Greece
http://www.eucnc.eu/

Snapshot

RoboBee

RoboBee is a tiny robot capable of tethered flight, which has been developed by a research team at Harvard University. The three-centimeter wingspan of RoboBee makes it the smallest insect-like device to achieve flight. The goal of the RoboBee project is to make a fully autonomous swarm of flying robots for applications such as search and rescue and artificial pollination.

For further information see the project website at http://robobees.seas.harvard.edu



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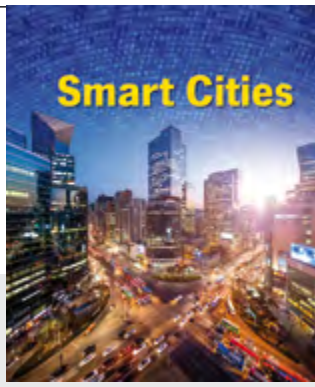

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How software updates are making me paranoid

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Recently, I was thinking that it is time I should change my iPad, as it is a few years old, very battered, and short on memory. Furthermore, the new iPad can do so many things so much better. And then I wondered, if my concerns about the age and performance of my old iPad are heightened by the upcoming availability of a bigger better iPad. Actually, my first series one iPad is still alive at home in very good condition with lots of memory but is of limited use, as the operating system is out of date and cannot be upgraded.

New technology, it seems, has us in a trap, where we are attracted by the new devices and their sexy features. At the same time we are threatened by the risk of our current devices becoming obsolete. We may be triggered to change by the pretty features of new releases, but if we resist, we are eventually compelled by the lack of support for our older devices.

The trap of free software upgrades

A new variation of this pressure now comes about through the passive-aggressive trick of offering you new software for free. I have upgraded my iPad2 to OS8, and the damn thing is going slow ever since. Of course, if I had the newer model with the better processor, things would run fine. If I suggested they did this deliberately to help me decide to move on to the newest model, would I be verging on paranoia?

Now Microsoft has started feeding my potential paranoia monster too. They have confirmed that they are downloading Windows 10 files to computers, just in case users decide to upgrade. It may be that Microsoft wants to make the migration to Win10 as efficient as possible, but the files take up somewhere between 3.5 to 6 GB of disk space, and they are consuming users' monthly download limits or mobile connections without permission. Check your Win7 or Win8 PC – you probably have the unrequested downloads and don't even know it. Apple were also guilty of unrequested downloads, when we all woke up and found Bono and his friends singing on our iPhones.

Further feeding my suspicion is the fact that once you have Windows 10, as a home user you cannot turn off automatic updates unless you are pretty tech savvy and able to find workarounds to block Microsoft. Worse still is the revelation that Win10 will still regularly contact Microsoft, even if the user chooses not to share anything with Microsoft at all.

Thoughts on a happy customer relationship

The sneaky way in which Microsoft and others are pushing software updates to you is hardly respecting the user's choice and right to decide. In a private relationship, suspicion, lack of trust, and checking each other's personal devices and contacts could be considered grounds for divorce. Do these companies really want to divorce their customers?

We need to pause a little here and think where we are going. I fully agree that today's systems are getting more and more complicated, and many users need help to configure and maintain their systems.

However, the same level of automation and artificial intelligence that is confusing and frightening the users today could easily be constructively used to reassure them their information is private, their communications are secure, and their devices and safe. If you could add to this a little more respect and consideration to those of us, who do not want to change devices every two years, we might even have a bright future together.

Smart Cities – An overview

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Smart Cities is a concept for the adoption of smart digital solutions to efficiently deal with today's challenges of a city in any of its dimensions. This includes governance, infrastructures, resources, and people using capabilities that information and communication technologies make possible.

Smart City initiatives are a response to urbanization issues. They have evolved from digital economy ecosystems which build on technologies like smart data, Internet of things (IoT), and cloud computing to solve major challenges cities across the globe are facing today. Smart City requirements play also a role in shaping the fifth generation wireless communications systems (5G).

Concept and definition

Smart City is a term for a city using digital technologies to transform and enhance services, optimize use of resources and infrastructures, and support citizens.

The common denominators of Smart Cities are optimised solutions, based on ICT technologies, involving multiple stakeholders, sustained by different business models.

In the Digital Agenda for Europe, the European Commission defines a Smart City as "a place where the traditional networks and services are made more efficient with the use of digital and telecommunication technologies, for the benefit of its inhabitants and businesses" [1].

The European Parliament's Economic and Scientific Policy Department produced in 2014 a report mapping Smart Cities in the European Union, in which a Smart City is defined as "a city seeking to address public issues via ICT based solutions on the basis of a multi-stakeholder, municipally based partnership"[2].

Driven by application domains

The Smart City concept is based on digital solutions, involving broad application areas in the value chain using cloud computing, IoT, and processing towards smart data; furthermore promoting among others the need of a future Internet and the next generation communications. But the main drivers of Smart Cities are the application domains, typically non-ICT domains, also known as vertical sectors.

The above-mentioned European Parliament's report examined cities from all 28 member states (EU-28) with at least 100,000 residents, where Smart City initiatives including at least one of the following characteristics were considered: smart governance, smart people, smart living, smart mobility, smart economy and smart environment. The report says that there are Smart Cities in all the EU-28 countries. Most of the European Smart City initiatives focus on smart environment and smart mobility.

Having the environment and mobility on the list of top drivers for Smart City initiatives in Europe is not a surprising finding, given the importance of the environment sustainability, the low carbon and energy efficiency, and the climate change on many of the European and global political agendas. Big cities certainly need innovation for managing city infrastructures like energy, water, transportation, and waste.

But there are other equally important drivers of Smart City initiatives: in the health domain, the sustainability of the health systems can be highly increased from e-health solutions, and the ageing population is an incentive for smart initiatives in the healthcare domain. In the education domain virtual learning environments can enhance learning at all levels, and decrease the level of investment needed in education. The costs of the public services and governance, and the benefit of using smart solutions to engage with the cities are other incentives to smart solutions.

Sustainability of Smart City initiatives

Even if many Smart City initiatives have been promoted by funded projects or municipalities' investment, the cost savings and revenues that these solutions represent to the cities, or benefits they bring to the citizens, may alone not guaranty the sustainability of the systems.

There is the need to elaborate business models for the different stakeholders to drive the success of the initiatives in the long run. Different stakeholders are interested in this new playground, but they are facing serious obstacles to the sustainability of many of the new business models originated by smart city concepts and ideas. These obstacles are the legal norms and the technical standards that still need a high degree of harmonization to bring the new concepts of Smart Cities into compliance with the different regulations and to make the solutions a reality for the future.

References

[1] https://ec.europa.eu/digital-agenda/en/smart-cities
[2] http://www.europarl.europa.eu/RegData/etudes/etudes/join/2014/507480/IPOL-ITRE_ET%282014%29507480_EN.pdf
Source of graphics: European Commission

Heraklion – Roadmap towards becoming a Smart City

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Heraklion is the administrative capital of the region of Crete, Greece, and one of the Mediterranean region's most vibrant and lively cities. A strategic goal of the Municipality of Heraklion is to attract international interest and turn this region into a sustainable Smart City and a centre for creativity and development. For this reason, the city council has worked towards establishing a specific plan for transforming the city into a place for economic growth, development, and sustainability.

The ultimate goal for Heraklion is to become a true Smart City, using ICT technologies both for providing advanced electronic services to the citizens and for empowering the citizens to contribute to the local decision making process.

The Municipality of Heraklion is a member of the networks "Eurocities" and "Balkan cities". They promote the exchange of information and good practice between their participants, facilitating the organization of joint events and the implementation of joint projects. The Municipality of Heraklion has participated in a number of European projects related to urban development, social cohesion, tourism, culture, and more. Heraklion is one of the two European cities that participate in the EU-FP7 project RERUM (Reliable, Resilient and Secure IoT for Smart City Applications [1]) that aims to develop a framework for developing secure, reliable and privacy preserving smart city applications.

Figure 1: Heraklion's Smart City Plan

However, the road towards becoming a Smart City is not easy. Heraklion has worked for many years in order to create a "brand" for the city's name, not only within Greece, but also worldwide. To achieve this, the city council has established a committee named "Heraklion: smart city". Its main responsibilities are the definition of a strategy as well as the promotion and the support of the city council's action plan for making the city "smart". This committee includes representatives from all city stakeholders, namely the city council, the educational and research organisations (FORTH, University of Crete, Technological Educational Institute, and the Hellenic Centre for Marine Research), the Chamber of Commerce of Heraklion, the Urban Transportation Organisation of Heraklion, and more. The main result of this committee is the definition of the municipality's "Smart City Strategic Agenda".

The Strategic Agenda of Heraklion is structured around six priority axes as shown in Figure 1: (i) energy and environment, including smart buildings, smart resources management and viable urban planning; (ii) mobility, including efficient transportation, multimodal access and technological infrastructure; (iii) e-governance, including online services, smart infrastructure, open and smart e-governance; (iv) economy, including entrepreneurship and innovation, productivity and local and global connection; (v) citizens, including digital social inclusion and participation, education and creativity; and (vi) living , including culture, safety and health [2].

Challenges

In the era of deep economic crisis, it is not realistic to depend on state budget for improving the city's services and addressing issues of citizens' everyday lives. There is an urgent need for mobilising all available resources and invest on innovation, smart processes, and ICT-based solutions. The municipality has invested in promoting and supporting innovation, entrepreneurship, improved quality of life, and participatory e-governance. The latter is partly addressed with the recent addition on the heraklion.gr website of a framework to allow the citizens to state on the map of the city where problems exist so that the municipality can resolve them as quickly as possible (see Figure 2).

The challenges that the municipality aims to address span a variety of areas, for example improving the quality of the environment in urban areas, minimizing traffic in the main road arteries of the city, improving the water management for minimizing the consumption, contributing to local economic growth and supporting disabled citizens and those in need of monetary support. Other challenges are related to improving the air quality in urban areas, minimizing the energy consumption and increasing the city's energy efficiency, and encourage the participation of the citizens in decision making bodies. The city council has acknowledged that most, if not all, of these challenges can be addressed if the municipality invests in ICT-based technologies that can make the city "smart".

Achievements

The city council of Heraklion has worked very hard towards realizing the targets set out in the city's strategic agenda. Although just a small portion of the vision is realised until now, the municipality has already received worldwide recognition. One of its achievements is the participation for three (3) years in a row (2012, 2013, 2014) in the list of the 21 smartest cities in the world, as they are awarded by the Intelligent Community Forum.

Furthermore, Heraklion was one of the 58 cities evaluated by the European Union for the contest of iCapital of Europe 2014. Also, in the

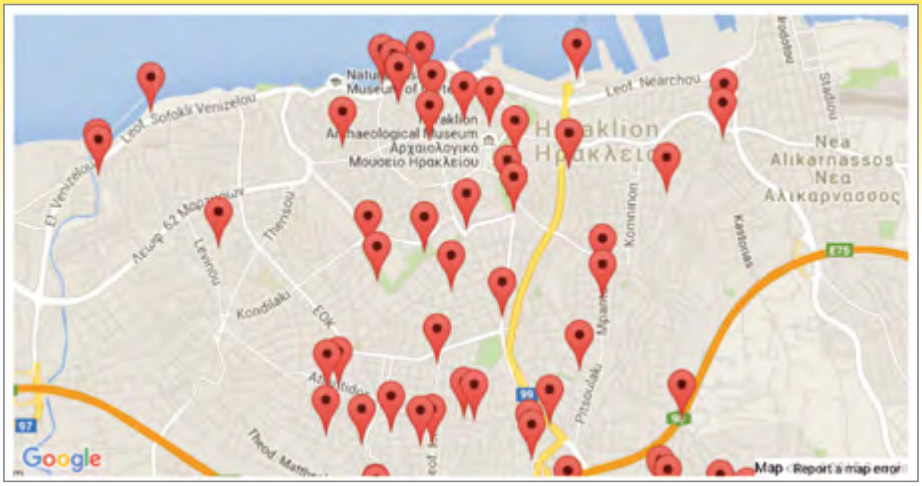

Figure 2: Map of the City of Heraklion

"Mapping Smart Cities in the EU" document of the European Parliament, among the 468 cities in the EU with a population of at least 100,000, Heraklion was one of the 240 cities that was deemed "smart". This was the case in three of the six axes: governance, economy and people. These achievements show not only the results of the activities until now, but also the potential that the city has in order to become a truly smart city.

Heraklion within EU project RERUM

Aiming to overcome the financial problems due to the economic crisis, but also to exploit the EU opportunities for funding, Heraklion has participated in many European projects. RERUM is a project funded under the Smart Cities call of FP7 in 2013 aiming to enhance the Internet of Things (IoT) for providing secure and privacy preserving smart city applications. The Municipality of Heraklion, exploiting its excellent cooperation with FORTH (the technical coordinator of RERUM), saw the participation in such a project as an excellent opportunity for acquiring an IoT framework to be used as the foundation for building a plethora of smart services for the citizens. On the other hand, RERUM acknowledged the city of Heraklion as a key stakeholder that would be able to provide the project with the necessary requirements that would be used for driving the technical work of the project.

Within RERUM, Heraklion will deploy four (4) smart city applications that correspond to four out of the six axes of the strategic agenda [3]. These applications have been selected after many discussions between Heraklion, the project partners and Tarragona, which is the second city that participated in RERUM. The specific technical nature of RERUM will allow the city to provide guarantees to the citizens that their private lives will remain private, that their data will be protected and that all communications will be secured, thus increasing the trust of the citizens on the city's IoT deployments.

Smart City applications

The first application is for environmental monitoring, which includes the deployment of several sensors around the city area in order to measure the environmental pollution and the weather within the urban areas. This will help the municipality to improve the quality of the environment in city areas, which is very important for improving the quality of life and the health of the citizens. The council will be able to identify polluted or noisy areas and raise alerts for the citizens or design actions to minimize the pollution. Within this period the activity of the installation of the sensors in key points within the city is ongoing and will finish soon.

The second application is related to traffic monitoring, which is executed with the cooperation of the transportation organisation in Heraklion. As a first step, mobile phones are installed on the city buses and gather information for traffic in the main arteries of the city. As a second step, the application will be released to the general public and everyone will be able to contribute to the traffic data, but with his identity, location and all other private data to remain private. RERUM ensures that private data will not be gathered or become available for third parties.

Heraklion is a city with very small roads, and the city centre is quite frequently congested. The Municipality of Heraklion aims to utilize statistical traffic data in order to improve urban road planning. Live traffic data can also be used by all citizens in order to avoid congested streets. Currently, there are pilot installations of the application in a few buses and a couple of volunteers. It was expected that until the end of October 2015, almost all buses in Heraklion will have a mobile device with the RERUM application running so that the necessary amount of data to extract a correct traffic estimation are gathered.

The other two applications are related to smart buildings and contribute to the monitoring of the energy consumption of building appliances and to the monitoring of the air quality within buildings. The municipality gives priority to sustainable energy management and the promotion of sustainable energy in buildings, and this was set as a main requirement for the participation in RERUM. The municipality, in cooperation with the regional energy agency of Crete, has implemented the integration of the new expanded municipality in the Covenant of Mayors committing to increasing energy efficiency and use of renewable energy sources. It is expected that with the RERUM framework installed in city buildings, the municipality will be able to save a significant amount of money by minimizing the wasted energy, while at the same time, the work environment will be improved.

Conclusion and outlook

For the social and economic development of the city of Heraklion, the city council has chosen to focus on two areas: on the advantages of the specialisation of the economy and on the urban quality of life. Heraklion's Smart City identity is a strategic and developmental goal that will allow the city to realise successes in these areas. With the Smart City strategic agenda, the city council has set the foundations for the city's smart development in six important axes. Heraklion has also embraced the opportunities stemming from its participation in RERUM and aims to exploit the project's results for introducing more smart applications for the citizens' benefit.

The municipality aims to have the RERUM framework as a basis and extend the pilot deployments by adding more sensors for i.e. water management, smart lighting and smart parking, providing new applications for the citizens. Furthermore, the Open Data initiative of the municipality will investigate the provision of the data generated from city deployments as "open data" so that interested companies or individuals can utilize them for creating new services. This will provide more opportunities for improving the local economy and create new jobs within the local city area. The strategic plan, the commitment of the city council and the participation of the city stakeholders in the vision are key factors that the municipality of Heraklion carries in its roadmap for becoming a Smart City, and there is certainty that this goal will be reached in the coming years.

References

[1] FP7-SMARTCITIES-RERUM, GA 609094, www.ict-rerum.eu
[2] C. Mochianakis, Presentation on Heraklion Smart City experience https://ec.europa.eu/futurium/en/system/files/ged/20150629_gl_greece_panel_iii_3_k_moxianakis.pdf
[3] R. Munne, et. al. "RERUM Deliverable D5.1: Trial scenario Definitions and Evaluation Methodology Specification", May 2015.

Becoming smart is a transitional process

Interview on Smart Cities with Xavier Trias, former Mayor of Barcelona

The city of Barcelona is at the forefront of Smart Cities. One of the drivers of Barcelona's transformation to a Smart City has been Xavier Trias, who was Mayor of Barcelona from July 2011 to June 2015. Eurescom message editor-in-chief Milon Gupta asked him about his insights on the development of Smart Cities in Europe and worldwide.

What is your definition of a Smart City?

Xavier Trias: During my tenure as Mayor of Barcelona I firmly supported that a Smart City strategy is essential to foster economic progress and improve people's wellbeing and quality of life. Being a Smart City is about providing better public services and developing a more sustainable and efficient use of the city's resources. I understand technology to be part of the urban revolution of the 21st century, and we are in a good position to lead this transformation in the management and planning of cities. Barcelona organizes every year the Smart City Expo, one of the major world congresses in this sector. Barcelona is also the Mobile World Capital, which gives us the possibilities to develop a new economic ecosystem based on new technologies and mobile applications.

Are there any cities in Europe or worldwide which are fully operational as a Smart City? If yes, which?

Xavier Trias: It is not a matter of developing a comprehensive strategy to fully operate as a Smart City. We need to design solutions to our current challenges. Barcelona leads together with other cities, like New York, London, Copenhagen, Vienna or Singapore, the international rankings of Smart Cities. I define becoming smart as a transitional process, as we are not building a new city from scratch. The historical neighbourhood El Born, for example, is the test bed for some of the smarter solutions in Barcelona – a good example of how technology is perfectly integrated into everyday life while maintaining the area's architectural heritage.

What are the major benefits of Smart Cities for citizens?

Xavier Trias: As I have said, it is important to place technological innovation at the service of the people to improve their well-being and quality of life. In Barcelona, we develop innovative solutions with sensors and mobile applications in areas as diverse as safety, public transport, lighting, parking, water and waste management, health and social care. All these areas are important to provide better services and benefits for all citizens, but Smart Cities also provide the opportunity to help citizens to personally interact with their cities through Open Government and Open Data.

Xavier Trias, former Mayor of Barcelona

Which business models are being used for Smart Cities, and which of them appear promising?

Xavier Trias: In Barcelona we realized the potential that technological solutions and international collaboration will have in the development of Smart Cities. This is the reason we promoted an active policy of public-private partnerships with some of the more advanced and innovative technological companies in the world to guarantee the success of Smart City projects. Additionally, Barcelona participated in the launch of the City Protocol Society, an alliance of cities, companies, universities and research centres from around the world, who work together to define quality standards for Smart Cities. We believe that all cities face common challenges nowadays and that it makes sense to try to solve them in a collaborative way, so everybody can benefit and learn from each other.

What are the economic, political, and administrative challenges for a city like Barcelona on its way to becoming a Smart City?

Xavier Trias: Barcelona is now at a turning point for consolidating its strategic approach to become a Smart City. I hope that the new city government understands the critical importance of maintaining this approach. As I have said, becoming a Smart City is a transitional process, and it requires the involvement of all the city's relevant actors. There are many challenges ahead, but it is important to follow a clear set of priorities and to fulfil them in coherence with the Smart City strategy. In Barcelona's case, this includes the city's economic recovery and job creation; due to the Mobile World Capital Barcelona is becoming a digital hub for tech companies and start-ups. It also includes providing care and attention to people, especially those most vulnerable, for example through developing socially and technologically innovative projects like Telecare and the Vincles social network, which won the 2014 Grand Prize of Innovation by Bloomberg Philantropies. And finally, it is about making Barcelona work more effectively, with top quality services like the new intelligent bus network, public Wi-Fi, and the Open Government apps.

What are the plans of Barcelona and other Smart Cities for securing their critical infrastructures?

Xavier Trias: In Barcelona there are three main technological programmes that we understand as pivotal to all other areas: the Telecommunications Network, the Urban Platform and the Smart Data programme. These programmes have a very high potential to be truly transformative, as they are becoming the base for many other solutions to be developed. It is important to understand the city as a network in which all elements are integrated. Barcelona aims to progressively evolve to become a coordinated system in which information flows freely across its different areas, enabling city officials to make the best possible decisions.

What is your outlook on progress and trends of Smart Cities in Europe within the next ten years?

Xavier Trias: Scalability and replicability are two of the more important challenges Smart Cities in Europe are facing within the next ten years. Current projects, prototypes and visions need to follow and converge on common criteria so they can be discussed, shaped and, ideally, adopted by other cities. This is why Barcelona is actively participating in the City Protocol Society, in order to support the projects and approaches to Smart City development which have the potential to transform cities worldwide.

Celtic-Plus Newsletter 2/2015

World record transmission field trial – Celtic-Plus Flagship Project SASER-Siegfried

How to incubate project ideas – Celtic-Plus Proposers Day in Antwerp

How France fosters international cooperation within Celtic-Plus

Editorial

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Dear readers,

Celtic-Plus is currently revising its "Celtic-Plus Purple Book". This book outlines the scope of Celtic-Plus and describes topical research challenges for potential Celtic-Plus projects. Its main objective is to serve as a stimulus for organisations planning their strategic research topics. It is not prescriptive, because Celtic-Plus is a bottom-up programme where proposers can submit any project proposals, as long as they are within the wide scope of ICT and telecommunication.

The revision of the Purple Book inspired me to have a closer look at societal and economical megatrends and the related disruptive developments in the different sectors. Keeping an eye on disruptive developments is important, because they determine which technology will flourish, and which will become irrelevant – sometimes incredibly fast. I am curious to see how disruptive the currently hot ICT topics Internet of Things (IoT), Cloud Computing, Big Data, 5G, Software Defined Networking, Smart Cities, Smart Homes, and Industry 4.0 will be. Particularly IoT has a high potential of changing our lives. Making a vast number of things communicate with each other could lead to a revolutionary leap and a new quality of networking. Boston Consulting Group sees IoT as one of the main drivers for the next wave of economic growth, contributing almost 330 billion euro in Europe by 2020.

Back to daily business: after a drop in Celtic-Plus project proposals in 2013 and 2014 due to the new EU R&D Programme "Horizon 2020" we had very successful Calls in 2015. In our three Calls this year, a total of 15 project proposals were submitted, of which about 10 (at the time of writing the exact number was not yet sure) have obtained the Celtic-Plus Label, a condition to start the project. In addition the new large Celtic-Plus Flagship Project SENDATE (Secure Networking for a Data Center Cloud in Europe) received the Celtic-Plus Label. SENDATE will probably start in the first half of 2016 with various sub-projects, and more than 50 partners from several European countries. This high percentage of labelled proposals proves again the excellent quality of proposals and the high success rate in the Celtic-Plus programme. The next chance to submit project proposals to Celtic-Plus is our Spring Call with a submission deadline on 25 May 2016.

In this issue, we present to you results and success stories of our projects, and information on our activities. This year we had four so-called Proposers Days in Vienna, Oulu, Paris and Antwerp, where in total 42 project ideas were presented and discussed with potential partners. Many of these project ideas have developed or will develop into project proposals and later into Celtic-Plus projects. If you are interested to participate in the proposal process, you are invited to have a look at these project ideas on the Celtic-Plus Website at www.celticplus.eu/project-ideas-from-proposers-days/.

Our next annual Celtic-Plus Event, where we will hear about the success of our running projects and see their demos in an exhibition, will be in Stockholm on 28-29 April 2016, co-located with the EUREKA Innovation Week and hosted by the Swedish EUREKA Chairmanship.

Our "Views from Public Authorities" article features this time the R&D activities of France, one of the most active players in the Celtic-Plus programme.

We hope you enjoy reading this issue of our newsletter and would welcome your comments.

Peter Stollenmayer
Editor

Co-operative mobility services of the future

Celtic-Plus project CoMoSeF

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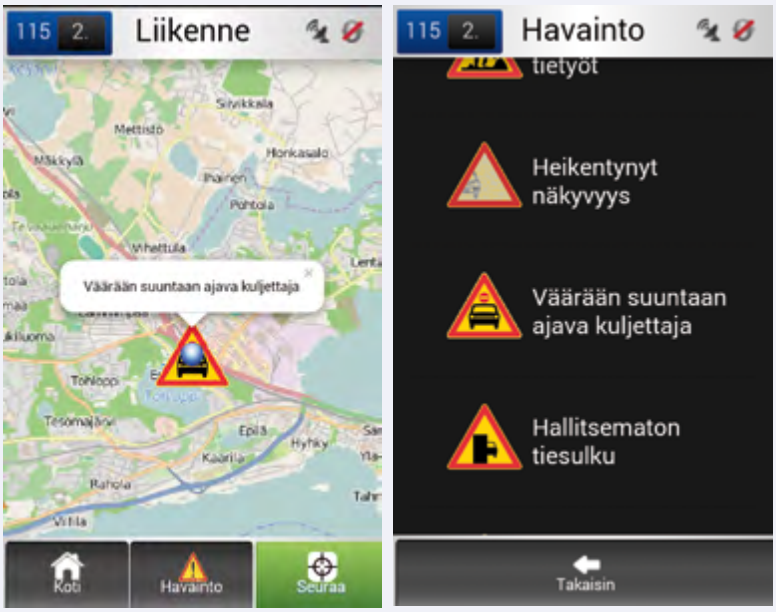

Figure: Tampere Mobile User Interfaces

The Celtic-Plus project CoMoSeF (Co-operative Mobility Services of the Future) developed commercial co-operative mobility solutions and services that were deployed in late 2014 and early 2015. With these solutions CoMoSeF made an important step towards providing ready-to-market traffic information systems for current and future mobile ecosystems in the intelligent transportation systems (ITS) market.

The consortium developed various new solutions able to disseminate traffic-related information between cars, the road infrastructure, transport agencies and others to warn drivers of upcoming hazards and keeping the traffic flow smooth. CoMoSeF services are easy to use and can be deployed in all kinds of vehicles and environments.

Technically CoMoSeF focused on services utilizing both embedded systems and data from CAN-Bus (Controller Area Network vehicle bus) as well as lower-cost nomadic devices. The systems were based on the existing and emerging standards. Indeed standardization is crucial, when bringing ITS (Intelligent Transport System) technology to the mass market.

Benefits of CoMoSeF solutions

With CoMoSeF services, drivers are able, for example in foggy weather situations, to have a clear view of the street and get warned of pedestrians crossing the road ahead via the driver's mobile device. Traffic authorities are able to exchange their traffic information directly with the road participants, and vice versa. Taxi fleets in Finland use the CoMoSeF equipment, for example, to distribute their information about traffic jams or obstacles for cost-reduced trip planning to the next client. Buses from Otokar in Turkey are equipped with mobile devices updating the driver with speed recommendations and general traffic information.

Successful pilots around the world

The big strength of CoMoSeF is that it has deployed solutions and services in real-life environments, which have proven their usefulness and viability. 21 partners from Finland, France, Luxembourg, Romania, Republic of Korea, Spain and Turkey developed and deployed 11 pilots, based on the common CoMoSeF architecture, taking the latest standards into account. The CoMoSeF pilot sites were:

- Tampere, Ylivieska and Sodankylä in Finland
- Compiègne in France
- Luxembourg City in Luxembourg
- Cluj in Romania
- Sochi 2014 Winter Olympics in Russia
- Seoul in Korea
- Basque Country in Spain
- Istanbul and Sakarya in Turkey

Main issues

CoMoSeF dealt with various research and deployment items. The most important of these were based on sensor and observation data and dealt with road weather and traffic information. The communication technologies used were C-ITS, 3G and 4G/LTE. One of the major challenges of car-to-car communication for many years has been that a critical mass of communication infrastructure needs to be reached to avoid accidents in critical situations. CoMoSeF's solutions showed that the combination of centralized and decentralized communication technologies is a good approach to enable traffic information distribution for safer and smoother trip planning already today.

The figure shows the mobile user interfaces of the CoMoSeF pilot in Tampere, Finland, where probe data were collected from bus and taxi vehicle fleets and transmitted to the data integrator. Real-time traffic data were used as one of the sources of traffic situations, incidents and road condition information. The information was delivered to the end-user service provider's server and further as traffic information service to end users through a web page and Android phones. The refined information was also delivered back to the fleets and used in the existing fleet management systems.

The pilots also contributed to other important European projects and national strategic initiatives in participating countries.

Conclusion

CoMoSeF provided results that can help to increase traffic safety and fluency and decrease congestion by providing traffic information, weather forecasts, warnings, and other relevant notifications. Thus, it helps to reach the ambitious objectives set by the European Commission.

- Further information: https://www.celticplus.eu/project-comosef/

World record transmission field trial

Celtic-Plus Flagship Project SASER-Siegfried

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The Celtic-Plus Flagship Project SASER-Siegfried achieved a world record transmission capacity of 38.4 Terabit per second (Tbps) over the Lyon-Marseille-Lyon fibre link, with 1.2 Tbps super-channels and low-cost hybrid Raman-Erbium amplifiers.

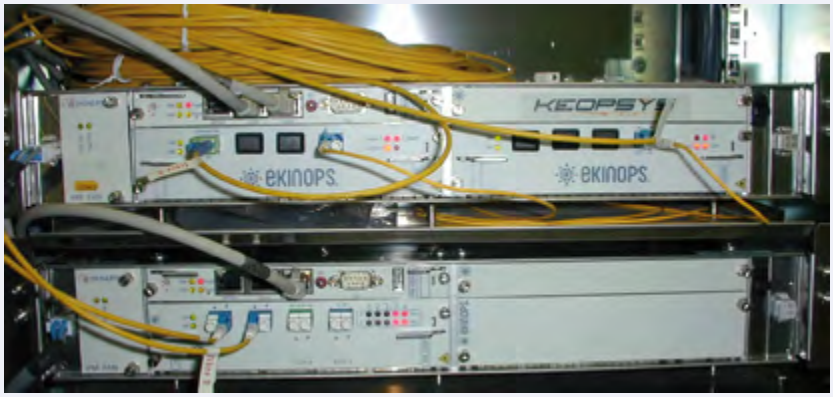

Figure 1: Receiver side and low-cost hybrid Raman-Erbium optical amplifier deployed in the field on the Lyon-Marseille-Lyon link

The Lyon-Marseille-Lyon legacy fibre link (762 km) has been used in May 2015 to transport 24, 32 and 38.4 Tbps with several tens of ≥1 Tbps super-channels using 16-QAM, 32-QAM and 64-QAM modulation formats, respectively. That constitutes a world record over a live transport network in terms of aggregated capacity and transmission reach.

Technical premises

These results have been obtained thanks to the excellent quality of the fibres as well as the reduction of losses between the line equipment (Tx/Rx and amplifiers) and cable heads, the advanced digital signal processing technologies (including spectral shaping, hardware components' imperfections mitigation, and soft-decision FEC) enabling higher-order QAM with spectral efficiencies of 8 bit/s/Hz (for 64-QAM), and the implementation of low-cost and energy-efficient hybrid Raman-Erbium optical amplifiers.

Answer to increasing bandwidth requirements

The continuous traffic increase over transport networks due to bandwidth-consuming services and new customer services put long-distance optical transport networks under pressure. Wavelength Division Multiplexing (WDM) systems currently deployed over such networks use 100 Gbps wavelengths and are able to carry more than 8 Tbps in one fibre. However, the saturation of these systems will be reached in 4 or 5 years, and it is thus necessary to prepare the next generation of systems able to carry a threefold or fourfold higher capacity.

Despite this high bandwidth demand, it is imperative for operators to keep the legacy fibre infrastructure of optical transport networks for many more years. Enabling these networks to carry several tens of Tbps without major modifications of the existing infrastructure will result in significant CAPEX (Capital Expenditure) savings for the operators.

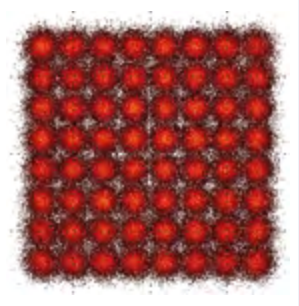

Figure 2: 64QAM constellation carrying 1.2 Tbps

Conclusion

With the Celtic-Plus Flagship Project SASER-Siegfried, Orange, Coriant, Ekinops and Keopsys have reached a world record optical transmission capacity, transporting 38.4 Tbps over 762 km. This record-breaking capacity approaches the limit of single-mode optical fibre (estimated around 100 Tbps). By increasing the amplification bandwidth from 35 nm (the bandwidth used into the field trial) to 90 nm (by using the L-band), we would have reached this capacity limit.

This field trial is a crucial step towards permitting the involved equipment vendors and operators to keep their leadership in the competitive race among the actors in the optical communications domain.

- More information on SASER-Siegfried and the trial:
  https://www.celticplus.eu/project-saser-siegfried/
  https://www.celticplus.eu/saser-siegfried-record-breaking-transmission-field-trial

How to incubate project ideas

Celtic-Plus Proposers Day in Antwerp

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On 28 October 2015, Celtic-Plus held its fourth and last Proposers Day of the year in Antwerp, Belgium, kindly hosted by Alcatel-Lucent. Celtic-Plus Proposers Days are incubators of ideas for Celtic-Plus project proposals. They offer excellent opportunities for innovative people to explore public-private partnership collaborations in the area of ICT and to discuss ideas with peers from other organisations. Furthermore, Proposers Days provide the opportunity to find required partners, liaise with funding agencies, and get visibility in the Celtic-Plus community.

The Celtic Office organises three to four Proposers Days per year in different EUREKA countries. In 2015, before the Antwerp event, Proposers Days had already been held in Vienna, Paris, and Oulu, Finland. In addition, an online Proposers Day was held via Web conference.

Welcome and sparkling keynote

For the Proposers Day in Antwerp, more than 75 people had registered, which nearly perfectly corresponded to the room capacity. The host, Alcatel-Lucent, provided a perfect local organisation and created a friendly atmosphere for open and constructive discussions in their newly refurbished meeting area. The audience was welcomed by Ingrid Van de Voerde, Executive Director Bell Labs Belgium, who showed several concrete cases of commercial benefits of participating in the Celtic-Plus Programme, and by the Celtic-Plus Chairman, Jacques Magen, who invited all Belgian ICT organisations to actively participate in Celtic-Plus.

The welcome was followed by a sparkling keynote address by Dr. Fahim Kawsar, leader of the Internet of Things research at Bell Labs. He asked interesting questions like "If everything is connected why would you need a device?", and pointed out that the battery is the most important item on the ICT Maslow Pyramid. Pekka Eloranta from Mobisoft reported about the impacts of the successful Celtic-Plus project CoMoSeF (Co-operative Mobility Services of the Future). He stressed that working within the Celtic-Plus environment gives the right framework and the freedom for projects aiming at exploitable results providing real added value.

The core contents of the Proposers Day was the presentation of ten interesting project idea pitches, which were well received and thoroughly discussed.

Welcome speech by Ingrid Van de Voerde, Executive Director Bell Labs Belgium

The Celtic-Plus Chairman, Jacques Magen welcomes the participants of the Proposers Day

Pekka Eloranta from Mobisoft talked about Celtic-Plus project CoMoSeF

Dr. Fahim Kawsar, leader of the Internet of Things research at Bell Labs, giving a sparkling keynote speech

IoT, Cloud Computing and Big Data

Amongst the presented project ideas at this and at earlier Proposers Days in 2015, IoT, Cloud Computing and Big Data were the most popular subjects.

For example, at this Proposers Day in Antwerp, we had IoT-related ideas regarding Smart Cities, Cloud-based video analytics, and Big Data for Earth observation. At the last Proposers Day in Paris, for example, we had ideas about "Smart & energy-efficient end to end security deployment platform for IoT", "Service oriented smart IoT", and "Utilization of NFV to support IoT services in heterogeneous networks and clouds".

Celtic-Plus Proposers Day, Antwerp, 28 October 2015

Public funding in Belgium, France, and Israel

Representatives from the public funding authorities of Belgium, France, and Israel attended the Proposers Day and explained the funding in their countries. In Belgium there are two funding authorities for ICT-related projects: one is in charge of the Brussels region (Innoviris), and one for Flanders (IWT – Agency for Innovation by Science and Technology). Good projects are welcome to apply for funding without being bound by specific calls or subjects. France (DGE, Direction Générale des Entreprises) is continuing to fund Celtic-Plus projects in a bottom-up way, and has during the last years actually been the country with the most funded Celtic-Plus projects. Important for French participants are the tax benefits in addition to grants. In Israel (OCS, Office of the Chief Scientist) the main goal of funding participants to Celtic-Plus projects, is to strengthen the industry and enable markets.

Participating in Celtic-Plus is easy

Celtic Office Operations Director Peter Herrmann explained in a best-practise session how easy it is to submit a project proposal to Celtic-Plus. By the different Call deadlines proposals get submitted to the Celtic-Plus online proposal portal. A template for the proposal is available on the Celtic-Plus Web at www.celticplus.eu. Usually within a month, the proposals are evaluated by independent experts and labelled in a special Celtic-Plus Labelling meeting with the Public Funding Authorities. Within less than typically six weeks proposers get a reply whether their projects received the Celtic-Plus Label, and what comments were made by the experts and Funding Authorities. As soon as the public funding is ensured, labelled project can start. The typical success rate is 60-70%. The Celtic Office is happy to provide any required support through all the phases.

Mathilde Reumaux, Innoviris, representing the Brussels region funding authority

Danny Van Steenkiste, IWT, representing the Flemish region funding authority

Conclusion

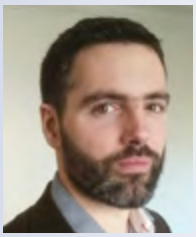
The Celtic-Plus Proposers Days are crucial means to incubate new ideas for new Celtic-Plus projects, to discuss these ideas with interested experts and to network with other organisations to build strong consortia for successful projects. Even organisations and experts not directly participating at a Proposers Days can benefit from the ideas and discussions.

Summaries and contacts of the ideas are available on the Celtic-Plus website at https://www.celticplus.eu/project-ideas-from-proposers-days

Next year we will continue with a series of attractive Proposers Days. Please stay tuned for the location and time via:

- Celtic-Plus website, events section – https://www.celticplus.eu/?post_type=tribe_events
- Twitter – https://twitter.com/CelticPlus
- LinkedIn – https://www.linkedin.com/grp/home?gid=3875389

How France fosters international cooperation within Celtic-Plus



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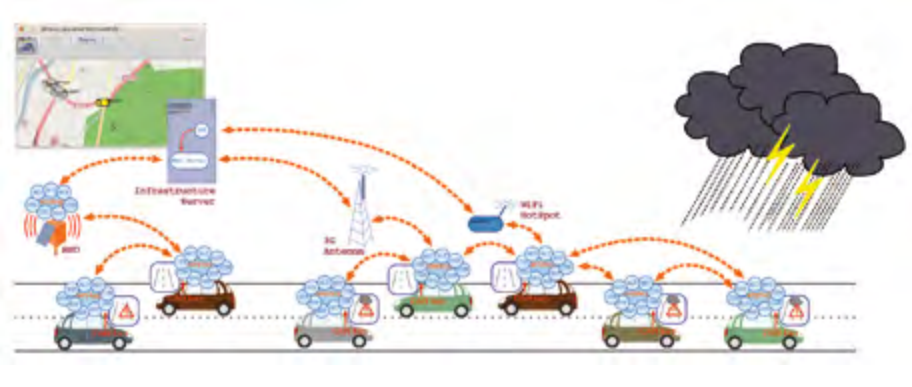


Celtic-Plus project COMOSEF: French pilot scenario: prevention of sudden bad weather by analysis of wipers, fusion of distributed data, alert propagation and opportunistic information ascent on the infrastructure

In France, The French Ministry for the Economy, Industry and Digital Affairs (MEIDA) supports the strategic initiative Celtic-Plus for European cooperation in the telecommunication area, within the framework of EUREKA, and is involved in its management, representation and promotion. MEIDA is a member in the public authority board of Celtic-Plus.

The EUREKA network

EUREKA is an intergovernmental network of more than 40 members and associated members to foster international research, development and innovation projects. The EUREKA Clusters are industry-driven bottom-up strategic initiatives, focusing on topics like telecommunication or software intensive systems. They are complementary to the instruments of the EU, being more flexible regarding the proposed topics, the execution of projects, and the choice of partners from non-EU countries. Projects in EUREKA Clusters are directly funded by the participating countries.

The Celtic-Plus Cluster

Within the different EUREKA Clusters, Celtic-Plus, which is focused on telecommunications including networks, services and applications, is particularly relevant for the French industry as the development of telecommunications infrastructures and of their use contributes critically to the integrated added value. Several French companies are members of the Celtic-Plus Core Group, including Alcatel-Lucent, Orange, Gemalto, Thales and Technicolor.

Celtic projects in France since 2009

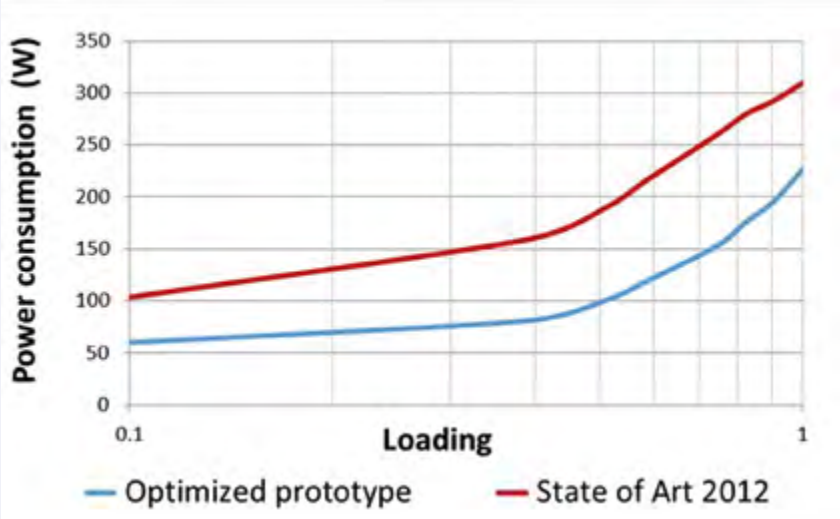
28 Celtic-Plus projects have been funded in France between 2009 and 2014. These projects account for a total funding from MEIDA of almost 42 million euros. This corresponds to approximately 4 funded projects per year, and 1.5 million euros of funding per project. This makes France one of the main contributors of Celtic-Plus.

Flagship projects and successful projects

France has been involved in major successful Celtic-Plus projects like 100GET, finished in 2010, followed by the EO-Net project on flexible optical networks, and SASER (Safe and Secure European Routing), which is the current Celtic-Plus flagship project. SASER comprises 61 partners from 5 countries, including 14 French partners with a French total budget of approximately 12 million euros corresponding to 5 million euros in funding. Among the recent very successful projects where France has been involved are COMOSEF, which dealt with large-scale deployment of Intelligent Transport Systems, and OPERANET 2, which focused on energetic optimisation in mobile networks (see figures).

Funding in France

EUREKA is an international network and not a funding programme. Funding opportunities are different in the various member countries. In France the MEIDA is the national funding body.



Celtic-Plus project OPERANET 2: Power consumption gain of an "envelop tracking" amplifier obtained in the project, as a function of the base station loading rate, compared to the 2012 state-of-the-art

Once a project has been labelled by Celtic-Plus, i.e. confirmed the high quality of the project, the French partners of a project may approach MEIDA to submit a funding application. France is committed to the bottom-up mechanism defining the Clusters and does not restrict its funding to specific topics, insofar as the relevant research areas are already identified by Celtic-Plus. However, an emphasis on energy-efficiency and security in ICT, or useful applications of ICT (like for smart cities or e-health) is appreciated. The funding rates are 25% for large companies, 45% for SMEs if the project is labelled by a French competitive cluster (30% otherwise), and usually 100% of the marginal costs for research centres and universities.

Conclusion

Celtic-Plus is a bottom-up R&D programme that complements other international and national programmes, and offers a flexible international cooperation framework. It is a very interesting and important programme for French companies supported since its beginning by MEIDA.

- More information on MEIDA and its Directorate-General for Enterprises: http://www.entreprises.gouv.fr/home?language=en-gb
- More information on EUREKA: http://www.eurekanetwork.org
- More information on SASER: https://www.celticplus.eu/project-saser
- More information on COMOSEF: https://www.celticplus.eu/project-comosef
- More information on OPERANET 2: http://projects.celticplus.eu/opera-net2

Energy-efficient radio access networks

Celtic-Plus project Opera-Net 2

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After more than three years, the Celtic-Plus project Opera-Net 2 ended in May 2015 with numerous achievements focused on environmental impacts reduction. The 11 European project partners succeeded to manage modelling, hardware and software design in the area of energy, material efficiency, innovating cooling solutions, new power amplifier components, network architectures, off-grid power systems and field trials. This article presents a selection of the achievements.

Combining hardware design and network optimization

The project combined network optimization methods such as Smart Frame Filling with hardware optimizations based on an Envelope Tracking power amplifier.

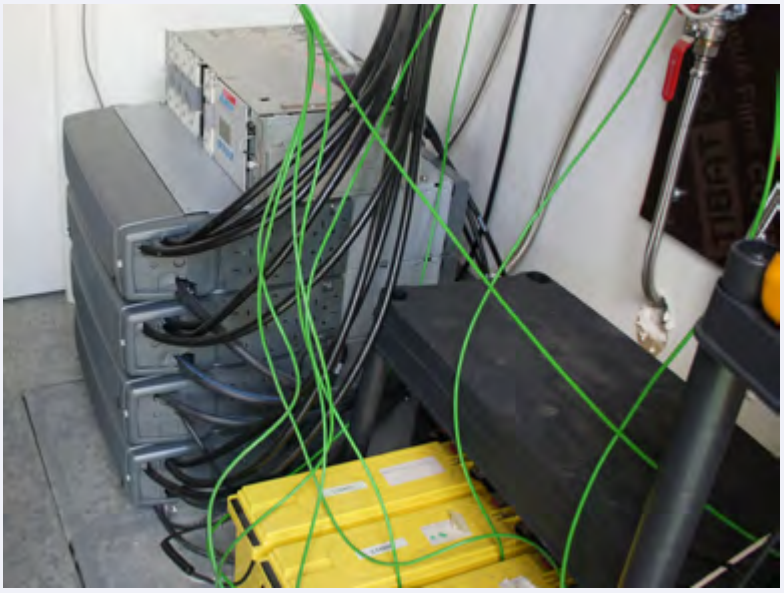

Figure 1: Experimental water-cooled radio base station

Envelope tracking is a high-speed technique that dynamically adjusts the power amplifier energy consumption to the traffic level. Smart Frame Filling is a scheduling technique compliant with the 3GPP standard that dynamically creates silent time frames during low traffic periods in which the base station does not transmit any data. The ability of the amplifiers to be switched off during these silent periods enables a power consumption reduction.

When combining those optimization methods and during low traffic conditions, energy savings could reach about 50% at radio module level.

New cooling techniques

As cooling can consume more than 50% of radio base station (RBS) site energy, new efficient techniques have been developed and demonstrated. A very efficient method is passive cooling: based on a phase change liquid and thermosiphon loop, this system has been experimented in an outdoor telecom cabinet with good performances of up to 800 W and 40°C outside temperature. This system is self-operated using natural fluid circulation without any electricity.

Figure 2: External view of the Hybrid system in Orange Labs in Lannion (France)

Another technique is liquid cooling, which can tackle challenges coming from higher power density needed to handle higher data rates. Liquid cooling enables 45% cooling capacity increase, 75% heat density upgrade and thus 40% cooling volume reduction on the device level. This allows new site locations, as heavy ventilation or additional electrical power is no longer necessary. Similarly, when heat is transferred in a liquid, it is much easier to reuse it for other purposes, which significantly reduces the environmental impact of a radio base station site.

Liquid cooled and legacy air-cooled radio base station sites were demonstrated and their performance was compared at Orange Labs in Lannion, France.

At radio base station level, the liquid cooled energy consumption is 9 times lower as an air–cooled solution, with the additional high potential of re-using the heat for possible non-telecom applications.

Multi–string battery storage for off-grid hybrid power system

Improvements regarding energy storage and charging efficiency in off-grid systems have been experimented on an Orange Labs trial platform using a combined photovoltaic, wind and gas generator system. The lead battery is divided into four strings associated to a new software controller. This power storage architecture and the dynamic management of the charge–discharge current of each battery string have been measured during a whole year. Measurements and theoretical assessments concluded 12% more energy stored on a yearly basis thanks to better battery charging efficiency during low production periods.

Material efficiency

Often forgotten in the considerations about environmental impact reduction is the use of environment-friendly material. The project studied and developed a new material efficient casing of the base station which optimizes the use, reuse and recycling of materials throughout the whole life cycle.

Different to the initial product (Remote Radio Head casing part), the equipment designed by Opera-Net 2 uses 100% of recycled material (aluminium die cast) which leads to 50% decrease in Global Warming Potential (GWP).

Conclusion

Most of the project achievements presented in this article have a short-term industrial development potential. Combined with the standardization activities initiated by the project, the achievements will significantly enhance the energy efficiency of future mobile networks.

Opera-Net 2 project partners: Orange, Alcatel-Lucent Bell Labs France, Arelis-Thomson Broadcast, Freescale, Nokia, Efore, VTT, Alpha Technologies, Telecom Bretagne, Université de Caen, Cardiff University

- More information about Opera-Net 2: https://www.celticplus.eu/project-opera-net2/

QuEEN

Quality of Experience in Networks

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Quality of Experience (QoE) is a concept where the quality of a service is represented in the way an actual user would assess it. Evaluating QoE requires accounting for the intrinsic technical quality of a given service and for its ergonomic performance. Being a user centric concept, it encompasses also aspects ranging from the context of use of a service to the psycho-physical ability of the users, their personal history and motivation for using a service.
The QuEEN project investigated the concept of QoE from various perspectives: the theoretical basis, operational measurements as well as technical, economical and business aspects.

Theoretical perspective

The theoretical results of the project are grouped in the so-called QoE framework consisting of:
1. A **terminology** coherently defining the various concepts (service, quality, QoE etc.) necessary to deal with QoE. This terminology is based on an already established set of definitions, but introduces some new concepts, e.g. related to temporal aspects of the QoE.
2. The **ARCU model** (Application – Resources – Context – User): a vector space-like theoretical abstraction allowing modeling QoE.
3. The **QoE-layered model:** an operational approach to the ARCU model. This model is similar in spirit to the standard 7 layers OSI (Open Systems Interconnection) model. It consists of 6 layers (Resource, Application, Interface, Context, Human, User), allowing accounting for the various aspects of QoE.

The relation between the ARCU and the QoE-layered models is depicted in the figure.
Theoretical results of the QuEEN project are not limited to the QoE-framework. Many models related to the various layers of the QoE-layered model have been studied and published.

Operational perspective

The QuEEN-agent specified and developed in the project is a software agent implementing the QoE-layered model. The QuEEN-agent is a distributed SNMP compliant agent. It comes with a set of APIs (Application Programming Interfaces) allowing easy integration of user-defined models in each layer. Using these models, the QuEEN-agent performs evaluations of the QoE as defined in the QoE-layered model. Users' defined models typically require external data as input. APIs are provided in order to inter-connect the QuEEN-agent with external data collection equipment or with applications using the QoE-evaluations.

- The QuEEN-agent Java implementation and documentation are available at https://gitlab.willab.fi/queen/queen-agent.git

Technical, economical and business perspectives

The economic importance of QoE cannot be overestimated. The QuEEN project investigated the impact of a better understanding of QoE, from the theory to the estimation. In the telecommunication domain for instance, the billing of subscriptions is traditionally QoS-based (Quality of Service). Mathematical approaches have been defined during the project to allow new QoE-based billing schemes. Other examples of results include the introduction of QoE into value networks (methodology for understanding, visual-

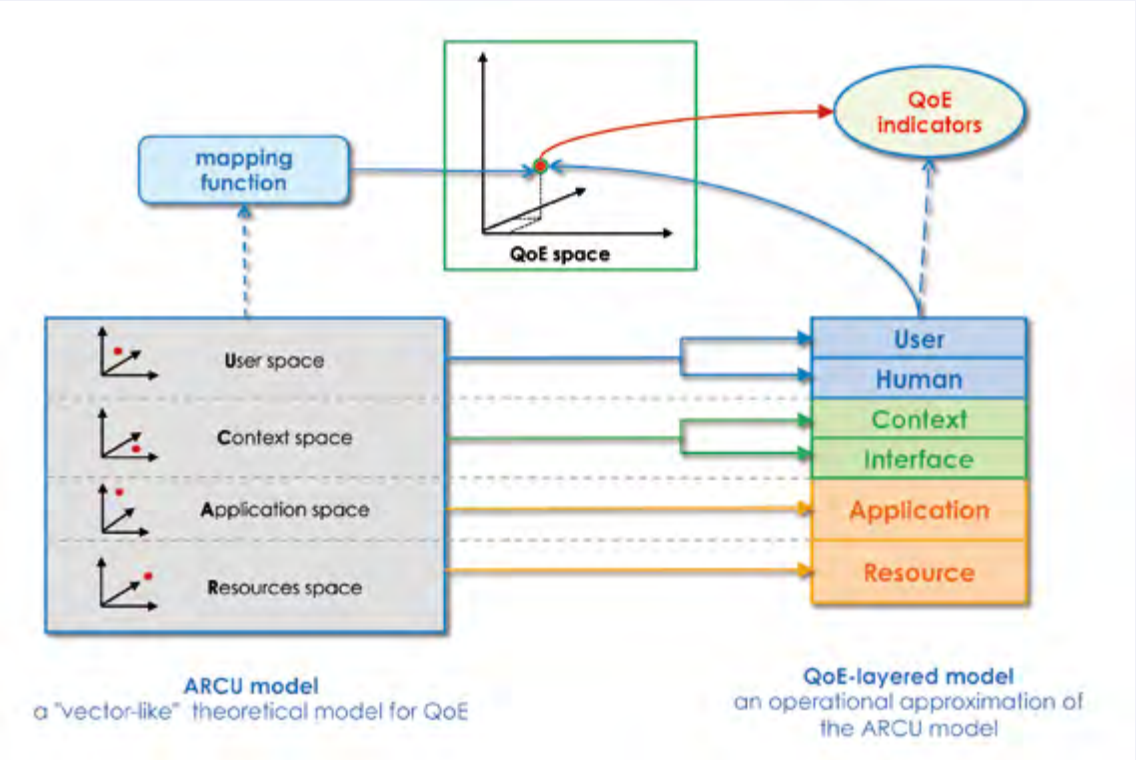


Figure: Relationship between the ARCU and the QoE-layered models

izing and optimizing interactions between economic actors) or the definition of QoE-based Service Level Agreements.

Conclusion

The QuEEN project was extremely ambitious regarding its scope, which ranged from the theory of QoE to technical aspects (the evaluation of QoE) and prospective investigations. Thanks to the coherence and interdisciplinary composition of the consortium (up to 25 partners from 8 European countries), the project has successfully achieved its main objectives.
The QoE framework and the specification of the publicly available QuEEN-agent have been published by ETSI (ETSI TS 103 294). The project produced three other ETSI and ITU-T documents, and contributed to 3 ITU-T recommendations. Project activities led to more than 100 scientific publications on all aspects of QoE and the (co-) organisation of 6 international conferences or workshops.
Results of the project also led to the development of four new products:

- Emotracker and e-commerce recommender by ITAinnova (Spain)
- IPTV GPON Probe by Telnet (Spain)
- The telemedicine system QuoTe by VTT (Finland)

Beyond these results, we hope that the global approach to QoE developed during the project will help the QoE related community and be a source of inspiration for further work.

- More information: https://www.celticplus.eu/project-queen/

Celtic-Plus Event 2016

Co-located with EUREKA Innovation Week 2016

Stockholm, Sweden, 28-29 April 2016

The Celtic-Plus Event 2016 will be organised on 28-29 April 2016 in Stockholm, Sweden, co-located with the EUREKA Innovation Week 2016 from 25-29 April 2015, organised and hosted by the Swedish EUREKA Chairmanship at the Stockholm City Conference Centre.

Networking with proposers and experts

The event will include a session on innovative project ideas for experts from the ICT community to discuss emerging R&D needs and proposals for related collaborative projects. This is an extraordinary opportunity for participants to present their companies and expertise, to offer project ideas for collaboration and to find partners.

Exhibition and demos

Results of about 15 commercially important Celtic-Plus projects will be presented at the related exhibition. The prototypes evolving from these projects will allow the audience to experience in an interactive and playful way the technological progress made in those projects.

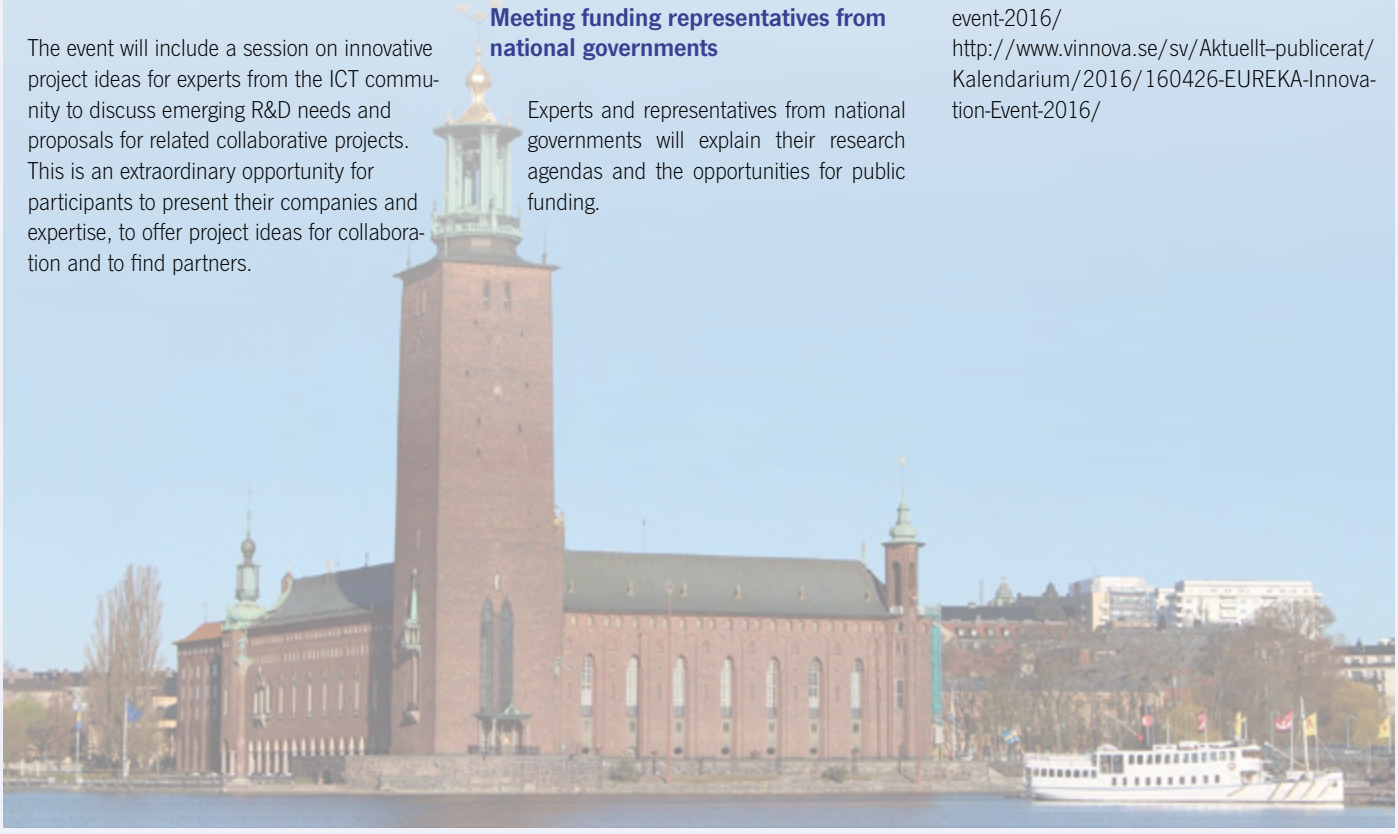
Meeting funding representatives from national governments

Experts and representatives from national governments will explain their research agendas and the opportunities for public funding.

Celtic-Plus Award

Every year Celtic-Plus selects the three best rated Celtic-Plus projects for the Celtic Excellence Awards. At the event the winners will be announced and celebrated.

- Further information:
https://www.celticplus.eu/event/celtic-plus-event-2016/
http://www.vinnova.se/sv/Aktuellt–publicerat/Kalendarium/2016/160426-EUREKA-Innovation-Event-2016/



Celtic-Plus
Smart Connected World

www.celticplus.eu

About Celtic-Plus

Celtic-Plus is an industry-driven European research initiative to define, perform and finance through public and private funding common research projects in the area of telecommunications, new media, future Internet, and applications & services focusing on a new "Smart Connected World" paradigm. Celtic-Plus is a EUREKA ICT cluster and belongs to the inter-governmental EUREKA network. Celtic-Plus is open to any type of company covering the Celtic-Plus research areas, large industry as well as small companies or universities and research organisations. Even companies outside the EUREKA countries may get some possibilities to join a Celtic-Plus project under certain conditions.

EUREKA

The value grid of Smart Cities

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In order for Smart Cities to sustainably add value to the lives of their inhabitants, it is important to look into the value chain of Smart Cities. This article outlines motivation, challenges and an approach for defining a value grid of Smart Cities, which includes value drivers as well as technical and ecological aspects.

The motivation for "smarter" cities across the globe is manifold and depends on the local situation. From a global perspective, the drivers are economical and technical progress as well as pressure for sustainability. On the other hand, trends like the increasing global and urban population and the decreasing amount of natural resources on planet earth available are driving the need for "smarter".

The concentration of people drives the importance of cities, especially in Asia. Tokyo will have 39 million inhabitants in 2025, circa 32 percent of Japan's population. Due to their sheer size, cities develop towards independent ecosystems embedded in nations or continents. To keep the global pace, they need to develop rapidly in various areas, taking different demands, needs, interests and expectations from at least four domains into consideration: Economics, Politics and Citizens, forming the Society domain. On the other hand, technology and environment are acting as backbone. Each of these domains and the backbones follow their own value drivers, leading to a value chain. But which one is dominant, and how do they fit into a city ecosystem and their various entities?

Smart Cities as figurehead of a cyber-physical-planet

According to a United Nations forecast, the world population will rise to around 9.3 billion in 2050, with an urban population of around 6.3 billion. Apart from this overall growth trend, the specific demographic trends look different for each region, e.g. a juvenescent society in Africa and an ageing society across Europe.

Figure 1: Smart City "stress field" of most important interdependencies

The Internet has had an enormous influence across the globe and is still developing at high speed towards the Internet of Everything (IoE) or Digitization. Cisco projects around 50 billion connected devices in 2020. The world is increasingly becoming a global village, and cities form the new nations in the 21st century. Besides the traditional demand for security of supply, the increasing density and resource usage in cities, dependency on digital comfort technologies, these and more factors force cities to progress at an accelerating speed. Figure 1 depicts a "city stress field", which shows the current situation from an overall city perspective. Cities need to keep the balance between drivers, trends and different stakeholders involved.

Besides the trends of urbanization, demographic change and digitization, cities need to react to certain drivers. One key driver is the citizens' expectation of a high quality of life, based on different city domains, such as governance, healthcare, mobility, infrastructure, and energy. Each of these domains has subdomains, depending on demand, objectives, and sustainability forecast. Overall this requires an adequate basic infrastructure, social life, and work. Many cities and municipalities have in common that their expenditures are higher than their income, and they are forced to stop rising costs. On the other hand, they need to keep or enhance their economic footprint to stay attractive enough for industries to settle and create jobs. Politics needs to mediate between these different actors by driving efficiency within city administration and by including citizens in urban planning and other city activities via democratic participation.

Finally, climate change and lack of natural resources force all stakeholders to rethink in terms of efficient usage of the underlying natural infrastructure. "Car cities" like Los Angeles, which lack decent public transportation, require a new interconnected digital network, forming a "cyber-physical city", to reduce congestions, resource usage, and CO_2 emissions.

ICT as on top cyber-infrastructure

To cope with the challenges, information and communication technologies (ICT) are needed to manage information across different domains and subdomains. Such an ICT-enabled Smart City provides a horizontal integration of data centrally managed via a Smart City platform.

It enables two new "currencies": real-time interaction and data. Cities need to understand and learn how to manage this new infrastructure. Such a process optimized "cyber city" based on sensors, digital agents and autonomous elements acting on man-made algorithms will develop massive amounts of unstructured and sometimes critical data. In addition, interoperability between the different systems is the key. Compared to Industry 4.0, cities will eventually move into a similar direction. However, in contrast to industry, they need to take into account a higher number of different interest groups, demands and even individual value propositions before they can start to deploy the required cyber-physical city infrastructure like intelligent streetlights, open data, free WIFI, autonomous intermodal (e-)mobility, digital administration and so on.

Value drivers in the smart city value chain

There are a variety of challenges for "Smart-transforming Cities" in general, like the exact focus, development of a sustainable masterplan and long-term support, both politically and from society. In addition, administration and politics need to take the interests of different interest groups and other stakeholders into account. The different interests, demands and requirements add to the complexity of the task and the major challenge to do it "right".

An initial high-level overview on assumed value drivers is given in Figure 2. It depicts four focus elements of each separate value chain for Economics, Politics and Citizens, which shape the Society and its value drivers. These value drivers, which are in focus from a city perspective, are often treated separately.

From an economic perspective, a strategy for growth is required, accompanied by the best fitting infrastructure to deliver the best services and achieve high revenue. Politics needs to convince with a future-proof political programme, to keep a stable and satisfactory political order and effective administration. To keep or enhance attractiveness, politics needs to integrate and improve local industry to achieve re-election.

Citizens require a comfortable infrastructure and room to live in, fulfilment of all basic needs and sustainable, interesting work at high income to enhance quality of life. All three chains, which require stable and increasing economics, form the value drivers of this society. To keep or enhance quality of life in cities, society requires a stable political and economic system, a high-quality infrastructure to make the city resilient, and a fair social system.

Smart City encompasses these current value drivers and interacts with all of them. Therefore, all involved parties tend to search for new sustainable value propositions, new smart services and new business models. This renewal is necessary, as current business models and services are eroding due to new service concepts. These are often based on real-time sharing mechanisms or crowd involvement like Uber, Air BnB or Car2Go. In addition, cities are reluctant, as the development and conception of a Smart City's technical ecosystem requires additional investment.

An important value driver, which influences all others, is mostly forgotten: the natural environment. Interestingly, the surrounding natural physical ecosystem and its value is in most cases not even mentioned. The green boundary should indicate that sustainable effects need to be integrated into each separate value proposition and value chain in the future to develop the "real" value chain. Positive examples are CO_2 certificates, which CO_2 excessive industries have to buy in order to allow additional CO_2 emission.

Conclusion

Smart City initiatives are spread globally. Due to the complexity of such individual ecosystems, all involved parties are searching for the underlying economics to keep or enhance current quality of life. Various analysts, e.g. Frost and Sullivan, estimate the global Smart City market to be worth 3.3 trillion dollars in 2020 – 2025. However, many medium-sized cities across Europe are reluctant to start a Smart City project due to unclear funding, cost structure and business model. This holds especially true, as value drivers and metrics for a city need to be developed in advance and are often unclear. A missing clear benefit is often diluted with a statement like: "We are already doing a lot".

In a next step, further enhancement metrics are required for the combined six domains. In most cases, the challenges to overcome the global ecological crisis are neglected due to additional costs at less comfort, as Naomi Klein describes in her book "Capital versus Climate". Further efforts on value drivers and propositions leading to true sustainable business models are required. They need to include a flexible and service-adjusted sustainability coefficient to be used in every business case calculation.

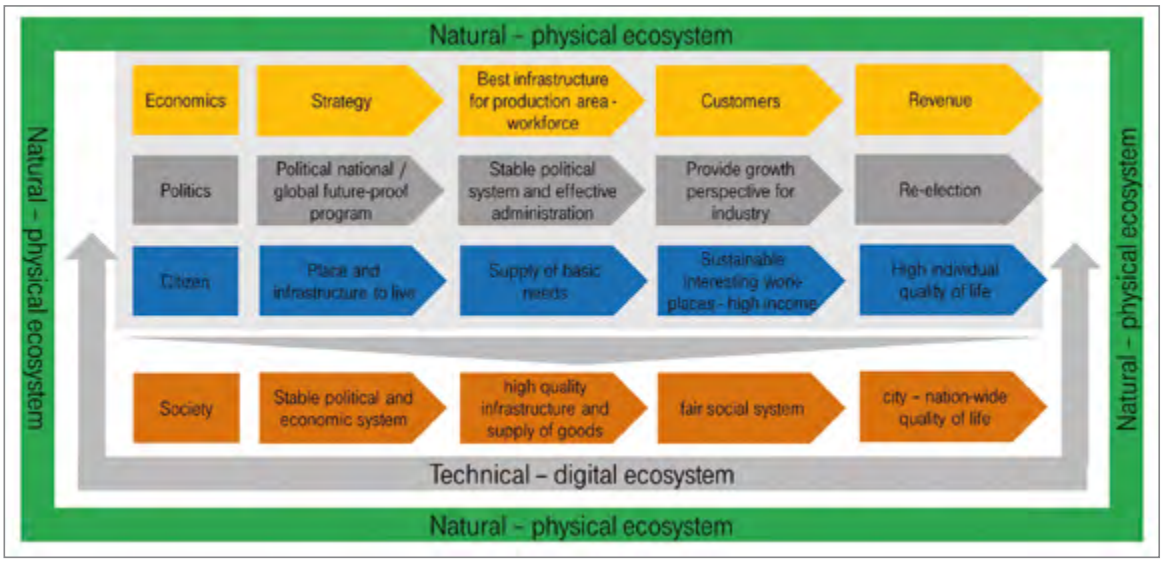

Figure 2: High-level value drivers of four different interest groups

The future of connected digital media in Europe

NEM Summit at Frankfurt Book Fair

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NEM Summit audience

The European New Media Initiative (NEM), one of the European Technology Platforms (ETP), organized the 8th edition of its major annual event in Frankfurt on 15–16 October 2015. The NEM Summit 2015 was organized in cooperation with the Frankfurt Book Fair, one of the world's largest trade fairs in the area of publishing. The bustling atmosphere of the Frankfurt Book Fair was perfectly suited for the attending representatives from the publishing sector and the ICT industry to discuss challenges and opportunities emerging from the rapidly progressing digitisation of publishing.

The NEM Summit 2015 consisted of the NEM Communities Day on 15th October and the NEM Vision Day on 16th October. The Communities Day included NEM Summit tours on Hot Spot Digital Innovation and on the Class Room of the Future as well as an event on Technology and Innovation for Smart Publishing (TISP) to foster interaction between publishing companies and ICT enterprises. Finally, the Communities Day included the 20th General Assembly of the NEM Initiative and an Investment and Entrepreneurship Forum. The NEM Vision Day included a number of interesting keynotes, panel discussions, and a presentation by Günther Oettinger, European Commissioner for Digital Economy and Society.

Mr. Oettinger pointed out the importance of Europe's creative and cultural industries in the new era of the digital society. In this context he highlighted the importance of the EU's research and innovation programme Horizon 2020 and of projects carried out within the programme for implementing of a sustainable inclusive digital society. He also underlined the importance of the communities created around the NEM Initiative and the Frankfurt Book Fair in this respect.

Commissioner Oettinger explained why it is important to establish collaboration and implementation platforms for the creative and cultural industries in Europe, to explore new and innovative business models for the area. Furthermore, Mr. Oettinger stressed that in all these developments, the cultural diversity in Europe should be preserved within a future European Digital Single Market, where an open environment for innovation and for the benefit of consumers should be established.

Mr. Oettinger also talked about the crucial role of copyrights in the European Digital Single Market strategy as a necessity for significantly modernizing copyright rules, to meet the requirements of today's digital society. He said that the EC's intention to change and improve the copyright rules does not mean their weakening and that the new approach will strengthen influence of the authors on copyrights of their own work.

Günther Oettinger, European Commissioner for Digital Economy and Society, speaking at the NEM Summit

One of the main conclusions from the NEM Summit 2015 was that European creative industries as well as media and content industries are entering a new era of modern media and communication. This new era will include much more immersive and interactive services to be provided to the consumers in the next year. Therefore, it is necessary to design and establish an environment for these industries so that the next generation of services and applications in the media and creative sectors can be designed and deployed in an efficient way. In this respect, the NEM Initiative is working on the definition of a focused research and innovation programme, a PPP programme at EU level, to address the creation of the needed environment through an appropriate funding mechanism within Horizon 2020.

The NEM Summit 2015 attracted more than 100 people to attend its full programme during the two Summit days in Frankfurt. In addition, numerous visitors of the Frankfurt Book Fair took the opportunity to join the Summit to share and discuss their views. The next, 9th edition of the NEM Summit is planned to be organized in autumn 2016.

About NEM

The NEM Initiative (Networked and Electronic Media Initiative) was established under the EU's Seventh Framework Programme (FP7) as the European Technology Platform, aiming at fostering the convergence between consumer electronics, broadcasting and telecoms in order to develop the emerging business sector of networked and electronic media. In order to respond to new needs and requirements of the Horizon 2020 programme, the NEM initiative enlarged its focus towards creative industries and changed its name to New European Media.

The NEM constituency includes all major European organisations working in the networked and electronic media area, including content providers, creative industries, broadcasters, network equipment manufacturers, network operators and service providers, academia, standardisation bodies and government institutions. These actors share a common vision and have been producing a Strategic Research and Innovation Agenda (SRIA) as well as position papers, in order to accelerate the innovative development of the new sector in a harmonized and fruitful way and to place European industry at the forefront of the information era.

Further information is available on the website of the NEM Initiative at http://nem-initiative.org

Innovate – Connect – Transform

ICT 2015 in Lisbon

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This year's ICT event in the Portuguese capital of Lisbon was the first after the start of the Horizon 2020 programme. It was therefore interesting to watch the first outcomes of the new programme, and also to see whether the stronger emphasis on innovation in Horizon 2020 has already become visible.

At the 5G PPP exhibition stand visitors got a good overview of the 5G PPP and a number of its projects

On 20-22 October 2015, some of the most important European players in ICT – universities and research centres, industry, SMEs and start-ups – gathered in Lisbon to meet, present, discuss and showcase their contributions towards a fully digitised economy and society in Europe. Originally planned for 4,500 participants, capacities had to be increased in the light of the strong interest, enabling finally 7,000 participants to register. The event included a policy conference presenting the new Commission's policies and initiatives on research and innovation in ICT, an exhibition, many networking sessions and the Startup Europe Forum.

Opening session

In the opening session, Commissioner Günther Oettinger, responsible for Digital Economy and Society, as well as the Portuguese president, Aníbal Cavaco Silva, welcomed the participants. In his opening speech, Oettinger spoke about the Digital Single Market and its importance to Europe's industrial leadership in the digital economy. The biggest asset in Europe for the Digital Single Market to happen, in Oettinger's view, is "our internal market of nearly 510 million customers and over 20 million companies". While

ICT 2015 Exhibition Hall 1

Sunny Lisbon and an excellently prepared venue welcomed the ICT event participants

Networking during the breaks – one of the most important aspects for the participants

Commissioner Oettinger at his plenary speech (source: EC)

"most boundaries and obstacles for the single market have disappeared in the physical world, we see new ones appearing in the digital one." The Digital Single Market is therefore, according to Mr Oettinger, a top priority at EU level.

Startup Europe Forum

The event demonstrated that Europe spends heavy efforts to innovate and to stay at the leading edge of knowledge and technologies. And, in line with the objective of Horizon 2020, the event also focused on transforming knowledge and innovation into successful business opportunities. The motto of this year's ICT event, "Innovate – Connect – Transform", was therefore very apt. The Startup Europe Forum, part of the ICT 2015 event, was dedicated to start-ups and SMEs, innovators, private and public investors, and policy makers. The forum enabled participants to engage in a dialogue on innovation and entrepreneurship, participate in accelerator activities, and create close links between Horizon 2020 researchers, innovators, and entrepreneurs.

Exhibition

The interactive exhibition at the Centro de Congressos de Lisboa showcased over 100 results of European ICT research and innovation projects. Among them there were quite a number which showed prototypes or advanced products, many of them benefitting from European funding.

At one of the booths, four projects of the 5G Public-Private Partnership – 5G-NORMA, FANTASTIC-5G, METIS-II and 5G-Crosshaul – presented information about their plans and demonstrated early results. The 5G PPP, a new instrument in Horizon 2020, will deliver solutions, architectures, technologies, and standards for the 5G communication infrastructures and, through this, strengthen the European role in future communication networks.

At the two largest stands in hall 1, the Portuguese village showcased Portuguese ICT results, while visitors could find out more about the European Commission's main digital initiatives in the European village.

Awards

Like in every ICT event, there have been prizes awarded to innovative companies, individuals and stands. The Slovak company Broadbit won the Innovation Radar Prize for its intelligent battery technology developed within an EU-funded project. TripRebel, led by CEO Carlos Borges, was named best European startup 2015 in the Tech All Stars competition. Finally, "USEMP – User Empowerment for Enhanced Online Presence Management" was recognised as the most impressive exhibition stand. This EU-funded project aims to make users of social media more aware of the use and sharing of personal data.

Further information is available on the ICT 2015 website at http://ec.europa.eu/digital-agenda/en/ict2015-innovate-connect-transform-lisbon-20-22-october-2015

Towards a global 5G standard

International workshop in Lisbon

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Commissioner Oettinger (4th from right) with government representatives from the US, China, Japan and South Korea (on the right) and representatives of industrial associations from the same regions (source: EC)

Collocated with the ICT event, five key 5G players from the EU, China, South Korea, Japan and the US met for a workshop in Lisbon on 20 October 2015. The goal was to discuss how different regions can work together to accelerate the definition of 5G standards and to better co-operate on spectrum allocation for 5G.

Since 2013, major national and regional initiatives have been launched to support industrial 5G developments. In Europe, the 5G PPP was officially launched end of 2013. Asia is home to important initiatives such as the IMT 2020 (5G) Promotion Group of China, the 5G Forum of the Republic of Korea, and the 5G Mobile Communications Promotion Forum of Japan. In the USA, 4GAmericas plays an important industrial coordination role.

These initiatives support industrial research and developments, but also address important related issues such as standardisation and spectrum characterisation are parts of their work. The workshop was organised by the EC to facilitate the coordination between these different global 5G actors.

The morning sessions were addressing the standardisation priorities, milestones and approaches from the perspective of governments and related industrial associations and fora, while in the afternoon sessions were addressing the various 5G spectrum related issues.

The workshop was opened with a keynote by Commissioner Oettinger on international cooperation, priorities and expectations in the area of 5G, which was followed by position statements on international 5G cooperation by invited government representatives from China, Japan, the Republic of Korea and the United States. In his speech, Commissioner Oettinger reminded participants of the need for speed. He said: "We need to shift a gear up in our international cooperation on standardization, global spectrum identification and allocation".

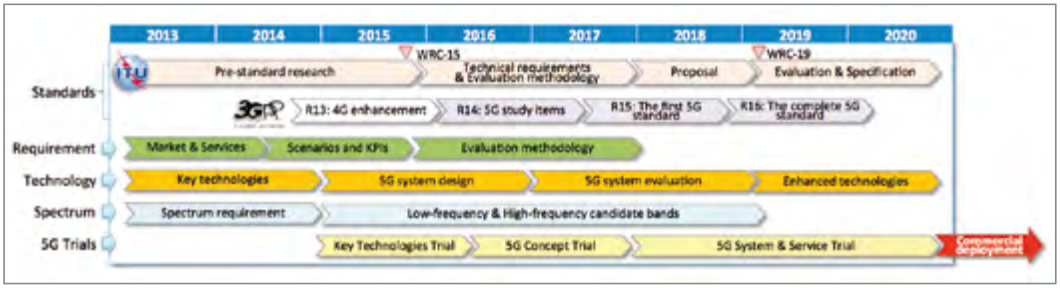
In the morning session on standardisation priorities, Dong Xiao Lu, Director at MIIT in China, highlighted the importance of strengthening the cooperation between vendors, operators, universities, and research institutes to jointly promote R&D on 5G, and to facilitate international collaboration to promote consensus on 5G technology between public and private stakeholders. The session gave also a good overview on the efforts done so far in the regions which included, for example, the preparation of documents on the 5G vision, requirements, objectives and capabilities, first proposals for 5G architectures. It also gave overviews on the various 5G research projects and activities that had been launched in the regions.

Hugo Tullberg explained the approach to research and standardization from the view of the Pre-standards Working Group of the 5G PPP. Based on developed use cases and concepts that address the scenarios, research projects will investigate technology component candidates. After first evaluations, industry partners will select relevant topics to drive in standardization.

The issue of spectrum allocation was discussed in the afternoon sessions in the light of crucial negotiations at the World Radio Conference 2015 that took place in Geneva on 2–27 November 2015. Analyses on potential 5G systems spectrum have been done for the bands below 6 GHz, i.e. in the range that has been used by terrestrial mobile networks so far, but also on bands above 6 GHz up to 100 GHz (mm-waves). These analyses consider, for example, use cases and technical characteristics, use of frequencies by incumbent systems or radio regulation and harmonization. Use of mm-wave should help to achieve even higher network capacity by taking advantage of higher frequency bands.

The respective industrial associations seized the opportunity to sign a Memorandum of Understanding to hold a bi-annual "Global 5G Event". The first event will take place in China in the first half of 2016 under the responsibility of IMT-2020 (5G) Promotion Group. The second event will be organised in Europe in autumn 2016 under the responsibility of the 5G Infrastructure Association; date and venue are still to be confirmed.

Further information: https://5g-ppp.eu



Considerations on 5G schedule (source: Dong Xiao Lu, MIIT)

News in brief

European Parliament vote on roaming and net neutrality

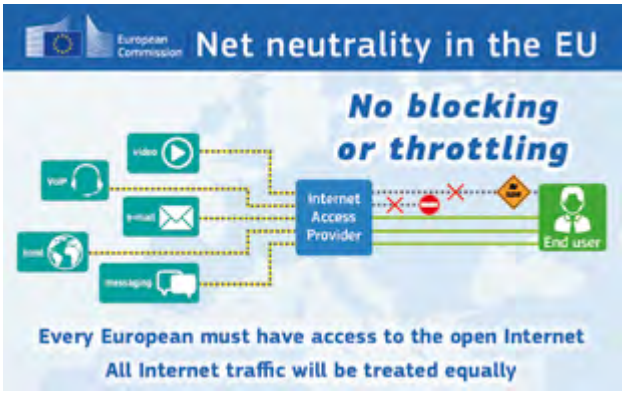
On 27 October 2015 the European Parliament agreed by majority vote to end roaming charges by June 2017 and to set EU-wide net neutrality rules.

Roaming

Roaming charges will end in the EU as of 15 June 2017. Consumers will pay the same price for calls, texts and mobile data wherever they are travelling in the EU.

Already from April 2016, roaming fees will be further decreased. From that date, operators can only charge roaming fees, in addition to domestic fees, of up to 0.05 euro per call minute, 0.02 euro per SMS sent, and 0.05 euro per MB of data, not including VAT.

Net neutrality rules



According to the EC, the rules agreed by the European Parliament enshrine the principle of net neutrality into EU law. It means that all traffic should be treated equally. Blocking or throttling of online content, applications and services are not permitted throughout the EU. The net neutrality rules aim to prevent Internet service providers (ISPs) from blocking Internet traffic, unless they are required by law or need to manage congestion. Critics vehemently attacked exceptions from net neutrality that allow ISPs to offer different Internet quality for "specialised services".

The measures adopted by the European Parliament are planned to be complemented by a revision of EU telecoms rules in 2016, which will aim at more effective spectrum coordination on EU level, and more. All measures are meant to contribute to the Commission's plan for a Digital Single Market, which was presented in May 2015.

Further information: https://ec.europa.eu/digital-agenda/en/news/new-rules-roaming-charges-and-open-internet

Activity for secure JPEG standard launched

In September 2015, a new activity was launched by the JPEG committee under the name "JPEG Privacy & Security". It aims at developing a standard for realizing secure sharing of image information. The new standard is supposed to be capable of ensuring privacy, maintaining data integrity, and protecting intellectual property rights.

The new activity is not only intended to protect private information carried by images, for example in the image itself or the associated metadata, but also to provide degrees of trust while sharing image content and metadata based on individually set policies.

JPEG Privacy & Security will explore how to design and implement the necessary functionality extension to current JPEG standards without significantly impacting coding performance. At the same time the extended JPEG standard is envisaged to be scalable, interoperable as well as forward and backward compatible.

The Joint Photographic Experts Group (JPEG) had presented its first JPEG standard for image file compression in 1992, which was since then followed by a series of widely adopted coding technologies and file formats such as JPEG and JPEG 2000, and more recently the JPEG XR, JPSearch, JPEG XT and JPEG Systems families of imaging standards.

Further information: http://www.jpeg.org/items/20150910_privacy_security_summary.html

Photo of a moth orchid (phalaenopsis) with increasing compression rate and decreasing image quality from left to right.

The rise of nomophobia

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Information and communication technologies have changed our lives. At first glance, there are only benefits. Commercials show us every day a world, in which people like you and me live happier lives, because they can now effortlessly do their work from the beach – thanks to the latest tablets, smartphones or other smart devices. However, as you might have guessed, the bright new ICT world has also its dark corners. New psychological phenomena, you could also call them diseases, are spreading rapidly. The latest, most dangerous one is called nomophobia.

The term 'nomophobia' is an abbreviation for "no-mobile-phone phobia". It was coined in a 2010 study by the UK Post Office. They had commissioned YouGov, a UK-based research organization, to explore anxieties suffered by mobile phone users. YouGov found out that close to 53 percent of mobile phone users in Britain tend to be anxious when they "lose their mobile phone, run out of battery or credit, or have no network coverage". Among the 2,163 respondents, men suffered significantly more: The researchers found out that about 58 percent of men were affected, compared to 47 percent of women.

Dimensions of nomophobia

In a qualitative study of nomophobia through interviews with undergraduate students, researchers at Iowa State University identified four dimensions of nomophobia [1]. These dimensions include the fear of: 1. not being able to communicate with friends; 2. lack of connectedness in general; 3. not being able to access information; and 4. giving up on convenience.

In view of these anxieties, which may occur in combination and reinforce each other, it is not surprising that more than half of the identified nomophobes never switch off their mobile phones.

In order to find out, if you suffer from nomophobia yourself, you may consider doing the Nomophobia Questionnaire (NMP-Q) that the researchers from Iowa developed. Among the 20 questions are, for example: For what purposes do you usually use your smartphone? How would you feel if you left your smartphone at home and had to spend your day without it? Would you feel anxious if you could not use your smartphone for some reason when you wanted to do so?

In response participants indicated the extent to which they would agree with the following statements: "I would feel uncomfortable without constant access to information through my smartphone"; "If I were to run out of credits or hit my monthly data limit, I would panic"; "I would feel anxious because I could not check my email messages"; "I would feel nervous because I would not be able to receive text messages and calls".

The paradox of technology

Among the techno-phobias, nomophibia and other mobile-phone-related anxieties have risen to a top position. Some researchers already call this "possibly the biggest non-drug addiction of the 21st century".

The promise of technology has been to free us from the limitations of our own physical and mental powers. However, addictions like nomophobia make us also dependent on technology. This leads to the paradox situation where some people become at the same time liberated from limitations while they are the slaves of the very tools that liberated them.

Smartphones have helped us navigate through space and time to the point where they are almost indispensable. From managing our busy schedules to getting directions and immediate access to other people as well as helping us find answers to any questions we might possibly have, smartphones have become omnipresent and omniscient servants facilitating our lives.

In the case of nomophobia this can lead to a bizarre relationship, in which those affected suffer severe withdrawal symptoms when their phone is not working. The most concrete manifestation of this personal, sometimes even intimate relationship between user and mobile device is Siri, the friendly assistant sitting in your iPhone, which answers your every question in a calm soothing voice. In an episode of the comedy series "The Big Bang Theory", Rajesh, a relationship-challenged scientist, even developed a love affair with Siri and neglected human relationships.

Conclusion

So far, there are no scientifically validated treatments for nomophobia. However, The Wikipedia article on the subject says that "Cognitive behavioral therapy seems to be effective". Thus, in case you are affected by nomophobia, there is hope. Maybe someone will develop an iPhone app for dealing with nomophobia.

Reference

[1] Yildirim, C., & Correia, A. (2015). Exploring the dimensions of nomophobia: Development and validation of a self-reported questionnaire. Computers in Human Behavior, 49, 130-137 DOI: 10.1016/j.chb.2015.02.059

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