EURESCOM mess@ge 2/2010
The magazine for telecom insiders

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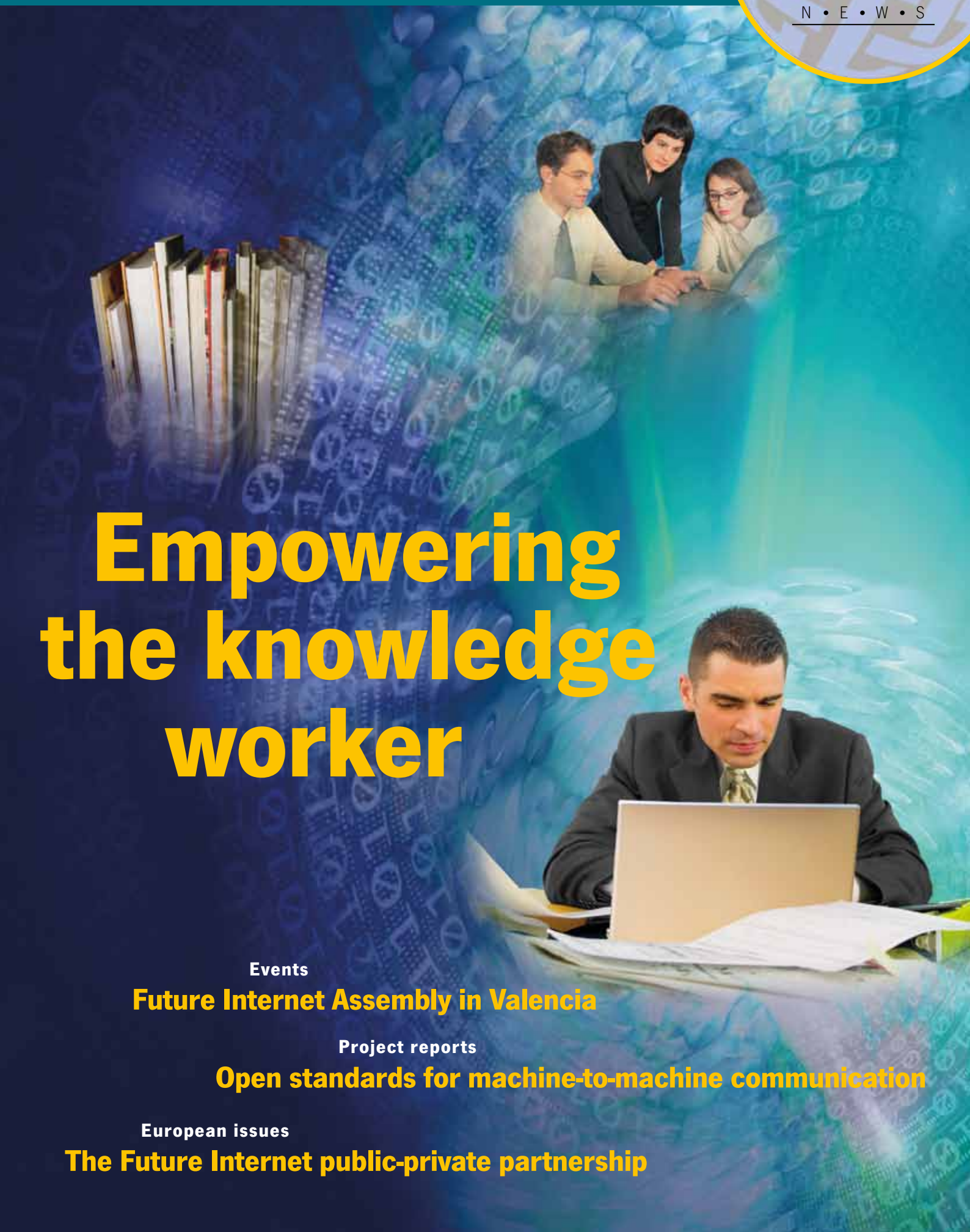

Empowering the knowledge worker

Events
Future Internet Assembly in Valencia

Project reports
Open standards for machine-to-machine communication

European issues
The Future Internet public-private partnership

eMobility
(Connect to the network community)

eMobility General Assembly 6

Venice, Italy

16 September 2010

The 6th General Assembly of the eMobility Technology Platform will take place in Venice on 16 September 2010. All members and non-members are cordially invited to attend.

At the General Assembly, members of eMobility will discuss selected activities of eMobility Working Groups and the Steering Board on the ICT sector and the preparation of EC Framework Programme 8 for future collaborative research.

The programme includes:

- Messages from the eMobility Community – Conclusions of the eMobility Steering Board planning activities (eMobility position papers).
- Participation in public consultations of the EU Commission.
- Presentation by the EU Commission of the updated FP7 Work Programme for the period 2011 – 2012 on the forthcoming Calls 7 and 8.
- Preparation of Framework Programme 8 and potential new instruments for research funding.
- Networking opportunities for the
  - forthcoming FP7 Calls 7 and 8 for consortia building and
  - Future Internet activities for the first Call for Proposals for the Future Internet Public-Private-Partnership.
- The further evolution of the Steering Board's vision on mobile communications evolution by 2022.
- The updated Strategic Research Agenda including the Strategic Application Agenda.
- The liaison with the Photonics 21 European Technology Platform.

Planned keynote presentations:

- Ruprecht Niepold, EU Commission, DG Information Society and Media – Advisor to the General Director on "Radio Spectrum Policy in Europe: Shared use of spectrum" as a new paradigm for spectrum management to understand potential impacts on future mobile and wireless communications and
- a representative of the Photonics21 ETP on the convergence and mutual dependency of broadband mobile and fixed networks.

In the afternoon the meeting will split into parallel sessions, each having the focus on contributions to grand societal challenges such as Energy, Transport, eHealth and Future Networking.

The meeting provides a good networking opportunity e.g. for the preparation of new research consortia for upcoming FP7 calls 7 and 8 and the Future Internet PPP.

Further information

Further information, including the agenda, is available on the eMobility website at *www.emobility.eu.org.*

Registration

All participants have to register and pay the registration fee before the meeting. The registration form is available on the eMobility website at *www.emobility.eu.org.*

For queries please contact Ms Ellen Tallas from Eurescom at *tallas@eurescom.eu.*

Dear readers,

We live in a paradoxical world: never before had knowledge workers as much information and as many knowledge tools at their fingertips as today. However, despite this, at first sight, paradise-like situation, some knowledge workers don't feel they are thriving in a world of easy access to knowledge, but rather feel like drowning in a sea of information. And this is indeed the root of the problem: today's information and communication technologies have so far mainly increased the volume and accessibility of information. But information is not knowledge.

So after the information revolution we need a knowledge revolution, which moves from ubiquitous access to a plethora of – sometimes useless – information to context-based access to the knowledge needed to perform the task at hand. Only then will knowledge workers be really empowered.

In order to empower knowledge workers, technology will play a crucial role. In this issue of Eurescom mess@ge we will present some of the technological trends currently explored in European research and industry. One of the major European ICT projects in the area of knowledge management is ACTIVE, which is prominently featured in our cover theme. As a knowledge-driven company and partner in the ACTIVE project, Eurescom has a vested interest in the progress of knowledge management technologies.

Although you need more than technology to empower knowledge workers, information and communication technologies can be regarded as the foundation of knowledge management, according to knowledge management expert Tom Young (see the interview in this issue). The important point is that technology adapts to the knowledge workers and their processes. The technologies presented in this issue aim exactly at this, and it will be exciting to see how these technologies will change knowledge work in the coming years.

One of the important enablers of knowledge management is the Internet. Thus, it fits that the future of the Internet is the second major theme in this issue. Eurescom mess@ge editor Peter Stollenmayer reports about the recent Future Internet Assembly workshop in Valencia, and Eurescom director David Kennedy presents the latest status of the Future Internet PPP (public private partnership).

I hope you find this issue of Eurescom mess@ge informative and maybe even thought-provoking. My editorial colleagues and myself would appreciate your comments.

Milon Gupta
Editor-in-chief

Events calendar

6 – 8 July 2010
Eighth International Network Conference (INC 2010)
Heidelberg, Germany
www.inc2010.org

13 – 17 September 2010
3rd Summer School on Network and Information Security (NIS 2010)
Crete, Greece
www.nis-summer-school.eu

15 – 17 September 2010
DYMARCOM 2010 – 1st International ICST Conference on Dynamic Markets for Communication Resource Management
Edinburgh, United Kingdom
http://dymarcom.org

16 September 2010
eMobility General Assembly 6
Venice, Italy
www.emobility.eu.org

20 – 23 September 2010
CIP 2010 – 1ST IFIP International Conference on Critical Information Infrastructure Protection
Brisbane, Australia
www.wcc2010.org/cip

27 – 29 September 2010
ICT 2010
Brussels, Belgium
http://ec.europa.eu/information_society/events/ict/2010/conference

20 – 22 September 2010
3rd Future Internet Symposium 2010
Berlin, Germany
www.fis2010.org

13 – 15 October 2010
2010 NEM Summit
Barcelona, Spain
http://nem-summit.eu

27 – 29 October 2010
eChallenges e-2010 Conference
Warsaw, Poland
www.echallenges.org/e2010

6 – 10 December 2010
IEEE Globecom 2010
Miami, Florida, USA
www.ieee-globecom.org

13 – 15 December 2010
ITU-T Kaleidoscope event: Beyond the Internet? Innovations for future networks and services
Pune, India
www.itu.int/ITU-T/uni/kaleidoscope/2010

13 – 17 December 2010
Future Internet Conference Week
Ghent, Belgium
www.fi-week.eu

16 – 17 December 2010
Future Internet Assembly, Ghent 2010
Ghent, Belgium
www.fi-ghent.eu

Sn@pshot

Geek wedding

The photo shows the world's first wedding which was conducted by a robot. I-Fairy, as the robot is called, oversaw the wedding of Tomohiro Shibata (left) and Satoko Inoue in a rooftop restaurant of the Japanese capital, Tokyo, on 16 May 2010.

The decision to use the robot came naturally to the couple, as they both work in the robotics industry – he is a robotics professor at the Nara Institute of Science and Technology and she is an employee of Kokoro, a Japanese animatronics company, which has built the I-Fairy robot.

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Eurescom mess@ge on the Web: www.eurescom.eu/message

Thoughts of a dissatisfied mobile service user

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Looking at the ads of service providers, you might think we are already living in something close to communication paradise, where mobile services are available anytime, anywhere. Well, today's reality is different.

Connectivity on the train

I am writing this in a train and, for the fourth time in as many train trips, the much advertised WLAN connectivity in the train doesn't work. I can connect to the network in the train and get an IP address, but the server does not respond. It is impossible for me to log in and then get out to the rest of the Internet. This is not a good example of German engineering from Deutsche Bahn and T-Mobile. The nice lady from Deutsche Bahn has just explained that they have tried a hard reset on the T-Mobile device, and it did not fix it, so they have to call out the T-Mobile technician. However, he is hardly likely to catch up with us, as we are going north at about 250 km/h right now.

This is frustrating because I had planned to catch up with the many unanswered e-mails in my inbox during this train trip. Now I am annoyed, as I can't do the work planned and must find time later in the day to do this.

Back-up option

Not to worry – I have the back-up option of using the modem in my computer and connecting via GPRS, but here I have two different problems. My first problem is that I have two SIM cards: one for data within Germany and another for outside Germany, because the data roaming prices are so confusing. But now I am not sure, which one is in the computer. If I use the wrong one in the wrong context, it costs an absolute fortune to read a few e-mails.

The second problem is that the train keeps going through tunnels which interrupt the connection, causing many of the programmes in my computer go into a sort of suspended animation mode where they have lost contact with the server. They keep trying to regain contact, like good little soldiers, but they don't understand that the battle is lost. By the time the train comes out into the open and the connection is reestablished and all the programmes have found their servers again, the train either enters another tunnel or the network has changed from GPRS to HSDPA, and the reconnection story begins all over again.

Lessons to be learned

So the question is: have we really solved mobile data communications? If we cannot depend on the connectivity in a train, where the route and speed are known in advance, can we consider our technology effective and reliable?

There are probably many of you reading this now who can refute my experience and tell me it works. But I don't care! It is not working for me now when I need it, and my experience is that I have the same problems on the Thalys to Brussels as on the ICE to Cologne.

What can we learn from this? Well, simply that the theory is often a lot better than the practice and that we need to make sure the practice keeps up to date.

I don't know what caused the WLAN not to work in the train today and the other days I have travelled, but the frequency of its failure makes me feel slightly stupid for having depended on it. I should have known better.

And here is the heart of the problem: if we cannot rely on the services of today, because the Deutsche Bahn lady cannot fix the T-Mobile box, we must understand that future systems must have much more robust services.

Providers must be able to contact their box and make it work without the customers on the train ever having realized there was a problem. The future could come sooner than we think, if we can make the technology we have work effectively.

As the great engineer Bob the Builder says: Can we fix it?

Eurescom study programme

New studies in 2010

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Almost two decades after the Eurescom study programme was started, this unique way of performing collaborative research between telcos has kept its high appeal for major European industry players. Three more studies have started in 2010 that address some of the most burning issues in the telecoms sector.

Quick study results

The Eurescom study programme continues to be popular among the engineers and scientists of its member organisations. Especially in view of the Public Private Partnership on Future Internet the members of the programme can benefit by the programme. It can help them to quickly and flexibly define work items on topics that emerge and which need to be discussed and elaborated with engineers and scientists in other telecoms companies to develop a common opinion, position or statement. The programme is financed by its subscribing member companies, and their commitment is underwritten by their upfront payments to the programme's budget.

Competitive advantage

The fundamental working principle within the Eurescom study programme is collaboration. Any network operator or service provider may become a subscriber of the study programme and participate in it, if they share the interest of addressing the substantial issues facing the telecoms industry in a collaborative way. The results of the studies are exclusively available to the members of the programme so that the study subscriber organisations benefit from a direct competitive advantage from collaborative work. Following the first call for proposals in 2010, a number of very interesting study proposals were evaluated. These have started or will start shortly and deliver by the end of 2010.

Growth of intelligent terminals and mobile clouds

With the increased usage of smart-phones and other intelligent devices, the introduction of mobile broadband networks and the emergence of mobile cloud platforms and architectures, there is a foreseeable escalation of traffic load and other new challenges for the mobile network operators.

These operators must prepare for this impending development, not just on the network level but equally on the service level. Mobile network operators are facing new threats that must be addressed timely and strategically. The study will focus on identifying and assessing the development and state-of-the-art of intelligent devices in mobile broadband networks, its forecasted impact and the effects of mobile cloud adoption, mainly directed at smartphone usage. The expected results of the study are a solid basis for strategic recommendations.

Energy efficiency

The increasing awareness of the climate-changing impact of greenhouse-gas emissions to the atmosphere and its direct relationship with energy production and usage has given high priority to energy efficiency as a topic, waiting urgently for a global response.

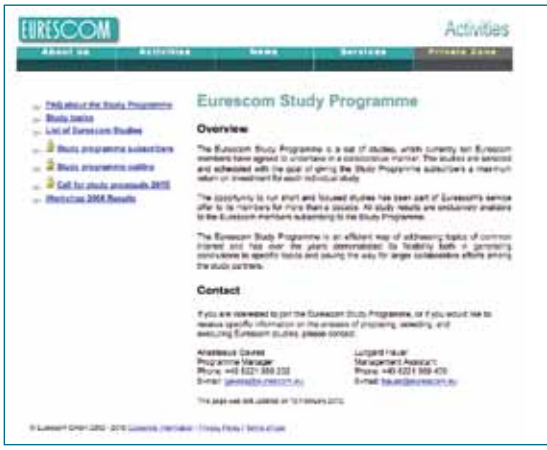
With the continuing increase of new products and services, such as mobile telephony and Internet access, ICT itself is responsible for about 2% of the total of CO_2 emissions. The European Commission has agreed on a target of 20% carbon footprint reduction for the ICT industry until 2015. Several international reports identify a potential for ICT to induce a decrease in CO_2 emissions in other areas of the economy over five times of its own footprint.

This study aims to provide the telecommunications industry, and operators in particular, with a set of recommendations on how to best make use of ICT in improving energy efficiency and reducing carbon emissions. Furthermore, the study will identify – through market segment characterisation and business modelling analysis – the main sectors of the economy in which the use of new telecommunications based services and applications would lead to significant energy efficiency gains. This study proposal is under negotiation.

Dynamic service discovery and use

Dynamic service discovery and use was thoroughly tackled when service-oriented architectures and related technologies emerged, but the adoption of these technologies was not as widespread or revolutionary as initially thought and advertised. Now, with Cloud computing, these old challenges are renewed, as this new generation of services becomes a reality, and as service synergies become more interesting. The service creation dynamics are of special interest for telecommunications operators, because this allows on-demand creation of added-value services.

The operators' positioning, business models and interactions with other stakeholders, such as service or content providers, have to be clearly identified. In this study it is intended to devise these services



of the future, as well as associated business models and technical requirements for service description, discovery, charging and billing, positioning the operators as an important stakeholder that creates, manages and deploys added-value services to the end users. This study proposal is under negotiation.

Conclusion

These new proposed studies complement earlier studies on various topics that provide a competitive advantage for the member organisations of the Eurescom study programme.

More information about the ongoing programme as well as past studies can be found at *www.eurescom.eu/activities/studyprogrammes.*

Knowledge work in the 21st century

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The great 20th century management scientist Peter Drucker realised that, just as increased productivity of manual work was a distinguishing feature of successful organisations in the 20th century, so increased productivity of knowledge work would be a distinguishing feature of successful 21st century organisations. As we moved from 20th to 21st century, knowledge work became the business differentiator, and with this came a set of tools and technologies to support knowledge work. Yet, increasing information and complexity, combined with globalisation, have made knowledge work more difficult.

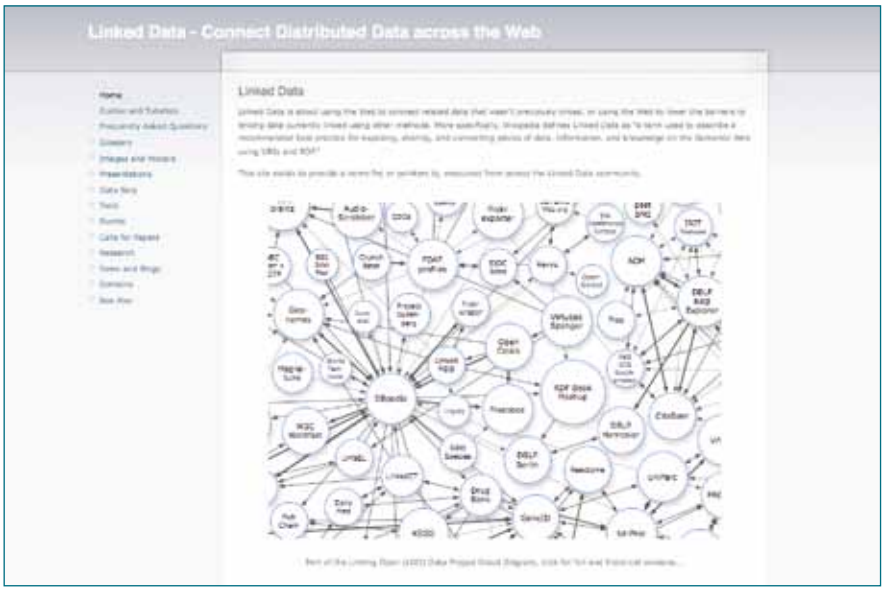
Complexity and inter-dependence

Technology has given us access to more information and to a more complex world. It has simplified the process of creating information, but rarely succeeded in making access to that information easy. It has made possible rising complexity but often not helped us, as people, to cope with that complexity.

Globalisation means that we all work and do business with people we rarely or never see. Separated by great physical distances, yet we are completely inter-dependent. Again, technology has made this possible; but technology has not always made it easy.

Connecting people and information

Most fundamentally, the development of networking technologies, in particular the Internet Protocol, has led to the death of geography and contributed vastly to globalisation. When we visit a web page, it really does not matter where the web server is. Yet, connecting people to information is the easy part. Connecting people to people is harder. The rise of video and audioconferencing is born of necessity; the experience is still not always a natural one.



Data banks in the cloud – *http://linkeddata.org*

Connecting people to the right information and the right people – that is, to valuable knowledge – is really hard. The people who take knowledge most seriously are often the consultants. They know that knowledge is what they sell. The knowledge management systems they put in place are impressive, but often time-consuming to use. To overcome this, Web 2.0 technologies have recently infiltrated from the personal world into the organisational world. The benefits these technologies bring are only just beginning to be realised.

Information in the cloud

Meanwhile, the individual is left combating information overload and complexity with a set of tools which would have been magical 50 years ago but now seem inadequate. Most of us interface to the world of knowledge through a conceptual model loosely known as the desktop paradigm. Whether the model has much connection with our physical desktops, or whether it would be helpful if it did, are open questions. In any case, dissatisfaction with the model has spawned research to find an alternative – so far with no real success.

But we don't just want information from within our own organisations, we want to tap into a global information cloud. Encouraged by several governments, the Linked Open Data Initiative (*http://linkeddata.org*) is offering the vision of data banks in the cloud, for scientist and citizen alike.

Just-in-time knowledge

With so much knowledge available, we are increasingly selective in what we seek to know. Of course, we all need a core of knowledge, related to our professional competence. Beyond that we need knowledge just-in-time. The development of e-learning systems, enabling tailoring of knowledge to the demands of a particular situation, is a response to this need.

We also want knowledge at any time and anywhere, which means appropriate to the situation we are in – driving or relaxing at home – and the device we are using, iPhone or PC.

Above all we need knowledge, and systems to deliver knowledge, tailored to the needs of human consumers of knowledge. It was Peter Drucker who coined the phrase 'knowledge worker' to indicate someone whose job is chiefly about using and creating knowledge. I would argue we are all, or mostly all, knowledge workers now. The challenge is to create the tools to empower us.

ICTs are "the foundation of knowledge management"

Interview with knowledge management expert Tom Young

Despite all the hype, knowledge management in most organisations still leaves much room for improvement. What are the challenges and obstacles to effective knowledge management? And what is the role of technology? Eurescom mess@ge editor-in-chief Milon Gupta asked Tom Young, who is a director and co-founder of the British Knowledge Management consultancy Knoco Ltd and author of a book on "Knowledge Management for Services, Operations and Manufacturing".

How effectively is knowledge managed in European companies today?

Young: The situation is very patchy. There are still large areas where knowledge is not treated as something of high value. If you approach any company today and ask them whether they manage their knowledge, they will say, yes we do manage our knowledge. They will then describe all the processes and technologies they have put in place. Probably 100 percent of European companies have a lessons-learned process. However, if you look deeper, you will often find out that the documented lessons learned go into a database and are not used in daily work. Only a few companies in Europe, including for example the BBC, Nokia, Telefonica, and Siemens, effectively manage knowledge today.

What are the major challenges in knowledge management?

Young: One of the major challenges is to get the focus right. European governments encourage companies to have a part in the knowledge economy, but often the focus is on transferring academic knowledge to businesses. Instead, the focus should be rather on reusing the knowledge the companies already have.

Another challenge is to justify investments into knowledge management. There are no hard measures for the return on investment knowledge management generates. However, if you look at the companies that do have knowledge management processes in place, you will find out that they create four to six times more value than the average Fortune 500 company.

There is also the challenge to appreciate the individual's perspective and not only the organisation's perspective. You can equip people with the best technologies, but it all comes down to the value for the end user. You have to answer the employee's question "What's in it for me?" if you want knowledge management in your organisation to succeed.

Tom Young

What is the role of information and communication technologies for improving knowledge management processes?

Young: Information and communication technologies are the foundation of knowledge management. You may have the best processes in place, but unless you have the right technologies, it won't work. Some people call information and communication technologies the enabler, others call it the lubricant or glue of knowledge management.

Let me illustrate this point using the example of communities of practice and questions-and-answers forums. Such forums allow someone in the organisation to ask a question to the forum and get back qualified answers by subject matter experts. At the end you can compare what responses you have got. For many this was a major breakthrough. Originally, these communities of practice were based on e-mail communication. Later the exchange took place via web-based platforms.

The next phase is marked by the use of wikis. Within the coming two to three years you will see wikis becoming extremely popular. Up to now, people wanted the freedom to search and collect knowledge. In the future, they will be looking more for filtering of knowledge and opinions. This filtering will be either manual, performed by other people, or it will be automated using intelligent algorithms.

Which technological advances do you envisage for the near future, which would enable the more effective use of tacit knowledge?

Young: The rise of the smartphone will provide new opportunities for knowledge management. In the future you can type a question into your smartphone and get an immediate answer while you are on the move. This will allow much better access to the tacit knowledge of others.

I predict that people will soon start to realise how valuable tacit knowledge is. They will start looking for it and sell it.

What are the non-technical obstacles to be considered in the implementation of new knowledge management technologies?

Young: There is a gap between people who want to use knowledge and those who create it. Take, for example, Wikipedia. Less than one percent of its users are editing articles. There are several reasons why people in organisations are reluctant to share knowledge. One of them is that knowledge is seen as power, and sharing it is perceived as loss of power. This is why in many organisations with a functioning knowledge management particularly senior back-office staff close to retirement are creating material which others can use.

One way to overcome non-technical obstacles is to create incentives. BP has recently introduced awards to recognise employees actively sharing knowledge. Another incentive driving knowledge management can be peer recognition. The key to successful knowledge management is trust, and trust takes time to build. Sharing knowledge via technologies makes it even more difficult, as trust is more fragile in the digital world than in face-to-face interaction.

What is you vision of a working day in the life of a knowledge worker in the year 2020?

Young: In ten years, knowledge workers will be able to work when and where they want. Their work is facilitated by automated processes in the background. Some digital agent would filter and sort your e-mails before you see them, like an old-fashioned secretary. Knowledge workers of the future also wouldn't have to care about software updates and bug fixes, as self-diagnostic systems would take care of that. Archives will be fully backward compatible. Over night, bots would find information that is relevant to the knowledge worker.

Increasing the productivity of knowledge work – The ACTIVE approach

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If knowledge work is a key business differentiator in the 21st century, then the tools with which we manage knowledge are vital. To varying degrees, all organisations realise this and provide their people with a range of tools, chiefly centred around the personal computer, to make their knowledge work more efficient. Yet, while indispensable, these still leave problems in the way of effective and efficient work.

The barriers to knowledge work

The ACTIVE project is concerned with surmounting these problems and helping the corporate employee, working individually or in a team, to get the job done.

One problem, that of sharing knowledge across the organisation, has been well-known and well studied for decades. Yet despite this, the problem only grows in complexity, as more and more information is available to be shared. The organisations who take knowledge sharing most seriously, often consultancies whose business is knowledge, frequently implement knowledge-sharing systems based on the categorisation of knowledge using some sort of schema. These systems can be highly successful, but at a price. The price is the time penalty to store and retrieve information.

Another problem is also growing with the availability of information. This is the problem of information overload. The individual wants information at his fingertips, but he doesn't want to feel he is drowning in information. He wants the information which is key to whatever he is currently doing.

Our third concern is with informal processes. By this we mean not the processes which the organisation mandates, but the working processes which individuals create to get their job done. Because these processes are rarely written down, they are not shared between colleagues. Because they are not shared, they are constantly being re-invented. Moreover, they are not subject to the peer-review and to the exchange of ideas which would improve them.

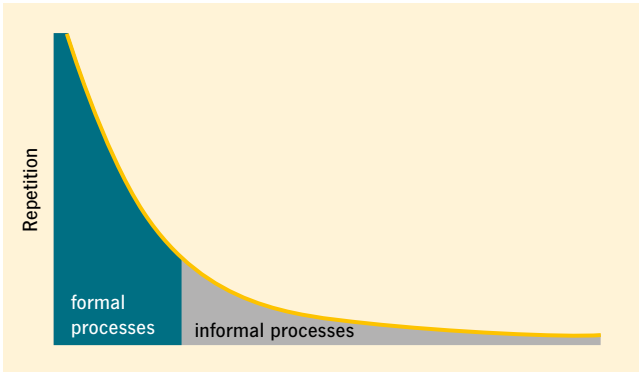

Figure: The long tail of informal processes

The ACTIVE response

These are the three problems that the ACTIVE project set out to address. On knowledge sharing, our response is to find the sweet spot between the power of formal approaches and the accessibility of Web-2.0 techniques such as tagging. On information overload, we believe the key is an understanding of the user's context, i.e. what the user is doing at any given time. To do this we combine what the user tells us about his context with what we can learn from advanced machine learning algorithms. For informal processes we combine tools which enable the user to easily record and describe these working processes with algorithms which can learn the frequently used processes by observing user actions.

ACTIVE in the enterprise

ACTIVE tools are designed to be used in the enterprise and are being trialled in three major enterprises: Accenture, BT and Cadence Design Systems. The lessons learned from these trials are being fed back into the project to improve the design of our tools, and also to understand how to best deploy them. In Accenture and BT we are seeking to improve knowledge work generally; for example improving the quality and speed of production of customer proposals. In Cadence we are using ACTIVE to aid the management of the electronic design process and also to capture and share best practice in electronic design.

ACTIVE for all

An early prototype of the ACTIVE software is now available for download from the ACTIVE website (*www.active-project.eu*). The software is free for research purposes and I encourage anyone interested in improving the effectiveness of their organisation's knowledge work to download the software and experiment with its possibilities. I and my colleagues look forward to your feedback.

ACTIVE information

ACTIVE is a collaborative project, funded in part by the EU (IST-2007-215040). It is coordinated by BT and managed by Eurescom. More information is available on the website at *www.active-project.eu*.

Helping BT helps its customers

ACTIVE technology at the customer front-line

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In BT, ACTIVE technology is being trialled with people who work at the front line, facing customers. The people themselves have titles such as solutions consultant, technical consultant, ICT specialists, and sales manager. What they all share is a job which involves working closely with customers, understanding customers' needs, preparing customer proposals and, when those proposals are successful, working to deliver to customers.

At home and on the road

Another characteristic they share is that they are mostly homeworkers. So when they are not out with customers, they are usually at home, often preparing proposals or doing technical designs for customers. In any week, typically two days will be spent at home and three on the road. A day on the road might start at 07.00 by logging on to BT's intranet and accessing e-mail before travelling to the first appointment. Then it will be off, perhaps to meet a couple of customers during the course of the day, spending around two hours with each customer and quite a few hours behind the wheel of a car. On returning home, then it is back to accessing e-mails and updating BT systems with information about the customers met during the day.

This means they rarely get together as a community to share ideas. Yet they are each one dependent on shared expertise to be able to deliver to customers. That is why electronic knowledge sharing is important. The view of one of BT's solutions consultants sums it up: "Being in contact with colleagues by phone and by e-mail is vital – but it's still not enough. We need better ways of sharing knowledge and expertise."

Sharing knowledge

Our triallists are having their knowledge sharing capabilities enhanced through the ACTIVE Knowledge Workspace. This enables users to tag information objects for sharing, just like photographs are shared on flickr. Users can create their own tags, and the system also suggests tags. The ACTIVE Knowledge Workspace also enables information to be managed according to its context. This not only helps with information overload, by focussing at any given time on the information the user really needs, but it also supports knowledge sharing. Where two or more users share the same context, then that supports the sharing of information related to that context. One user commented: "By using contexts I get the information I really need for my current task, and can see how it relates to information held by others."

Quicker and better

One important task they all have to face is getting proposals to customers. They need to respond to customers in a timely way and also in a quality way. This means sharing information. The ACTIVE Knowledge Workspace helps here. In addition, BT is using the Semantic MediaWiki as a tool for creating the proposals. The Wiki helps people to work together to create the proposal; while the use of semantic technology enables searching for information and facts to include in the proposal.

Understanding users' needs

Through ACTIVE technology we are helping BT people to help their customers better. Right at the beginning of ACTIVE we spoke to the future users to understand what they really needed. Now we have a system in place, we are going back to those users to get their feedback. That way we can further fine tune our ACTIVE tools so that organisations like BT can get the best out of them.

ACTIVE
Knowledge-Powered Enterprise

The ACTIVE project is funded by the European Commission under the 7th Framework Programme in the ICT area (ICT-2007-215040).

More information is available at *www.active-project.eu*.

Improving knowledge management at Accenture

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For knowledge workers it is important to be supported by effective knowledge management systems. This is particularly true at a global management consulting, technology services and outsourcing company like Accenture. Their consultants heavily rely on sharing and reuse of knowledge to accomplish important tasks. In FP7 project ACTIVE, Accenture performs a case study in which knowledge management tools developed by the project are being used and tested by a large number of Accenture consultants.

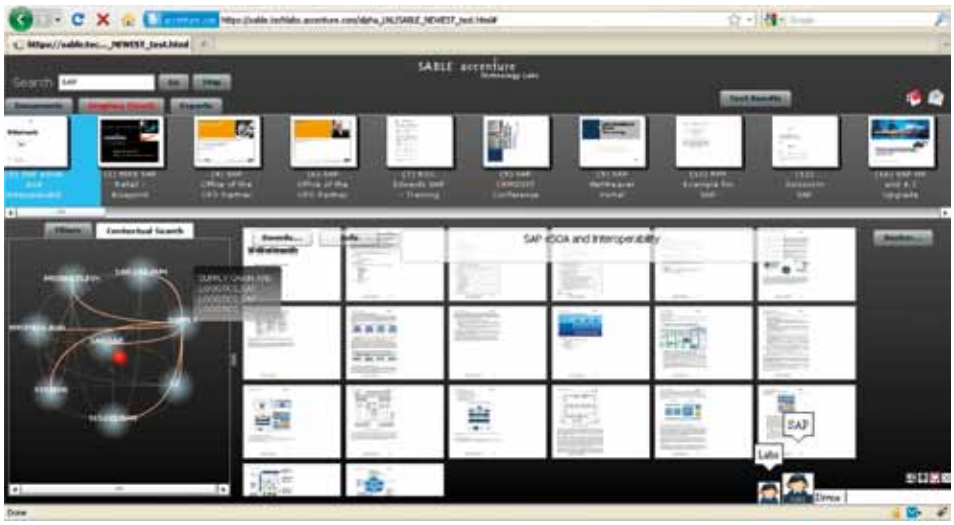
FP7 project ACTIVE aims to increase the productivity of knowledge workers in a proactive, contextualised, yet easy and unobtrusive way. The Accenture case study is one of three case studies that have been designed to influence and validate the knowledge management technologies being developed in ACTIVE. Based on extensive interviews and research, two use cases were identified: improving enterprise search through process and context mining and improving collaborative proposal development.

Improving enterprise search

The first use case is aimed at improving the productivity of large numbers of knowledge workers in a variety of tasks and business contexts. We have targeted a broad base of consultants who currently use enterprise search tools to perform everyday tasks, ranging from finding information about certain products, to finding a corporate policy, to finding the organizational chart of a department within the company. The goal is to enhance and build upon work already underway in Accenture labs to improve general-purpose enterprise knowledge management systems. The work specifically concentrates on providing support for a wide variety of knowledge processes and testing the scalability of ACTIVE technology when used by tens of thousands of users. We have just started deploying the initial prototypes and are validating the effectiveness and scalability of ACTIVE technology as part of this use case.

Improving collaborative proposal development

Developing project proposals is a key activity for Accenture as part of the sales process. The second use case deals with improving project proposals developed at Accenture in response to "Request for Proposals" by clients. Our goal is to eventually increase the success rate of proposals by providing deep support for proposal development. Currently, this task involves the use of standard processes on the one hand, but also a variety of ad-hoc mechanisms on the other. This makes Accenture an ideal ground for validating ACTIVE technologies that support formal and informal processes by providing users with the right context and task sensitive information. We are focusing on two kinds of support tools: firstly, helping knowledge workers find the right information given their current context and task; and secondly, helping large project teams work collaboratively to develop the proposals.



Issues addressed by ACTIVE technology

We have been addressing two major issues in knowledge management identified by our interviews: firstly, the difficulty of finding information; and secondly, the need for more proactive and context-sensitive access to content.

For the first issue we are developing solutions that allow more fine-grained access to content, allowing the user to search and access individual sections and graphics within documents. In our validation experiments this resulted in two- to ten-fold increase in chances of finding the right content when compared to the classical document-ranking approach.

We also address the need for context-sensitive access to content by using context mining technologies currently being developed in ACTIVE. The figure depicts the enterprise search prototype with context modelling and contextual information delivery. Using event logs produced by users of our system, the contextual service discovers existing contexts and allows the end user to modify his current context and get more relevant results.

Conclusions

All of the technology developed in ACTIVE for the Accenture case study is being made available to Accenture consultants for testing and validation. We are improving collaboration, knowledge sharing, and reuse in Accenture using ACTIVE technologies and at the same time, influencing the research being done in ACTIVE to focus on problems that knowledge-intensive enterprises are facing today.

Further information is available on the ACTIVE website at
www.active-project.eu

CELTIC N • E • W • S
Telecommunication Solutions

CONTENT

EDITORIAL

Dear reader,

This issue presents new results from Celtic projects which are about to complete work soon and our latest public activities aimed at showing Celtic's work to a broader audience.

The Celtic Event 2010 in Valencia was based on a new concept; it was linked, for the first time, with a main conference, organised by the Spanish EU presidency. This concept led to an increased number of visitors for the Celtic Event as well as for the project exhibitions, which even lasted the whole conference week.

As already mentioned in an earlier issue, Celtic is currently applying for an extension of the Celtic cluster, which then will run as "Celtic-Plus" for another eight years. In one of the following issues, we will present Celtic-Plus and its new research programme in more detail, once the decision is official.

Finally I would like to spend a few words about the status of the Call 8 submissions. By the submission deadline of 14 May, we have received 13 proposal outlines, which will now be further assessed, selected and invited to submit a full proposal (FPP) by mid October 2010.

It should be mentioned that Celtic may accept additional proposals, which could be submitted as a full proposal even though no project outline was submitted. This would, however, only be possible if such an approach was authorised beforehand by the Celtic Core Group. This possibility allows important and urgent project ideas to be submitted without long delays, thus speeding up the overall call process. In case you are interested, please contact the Celtic Office.

Heinz Brüggemann
Director Celtic Office

Towards a Smart Connected World

5th Celtic Event in Valencia

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Celtic held its fifth annual Event in Valencia from 12 to 13 April 2010. Over 200 high-level experts and decision-makers from industry, politics, and research attended the event. The main objective of the event was to present the current status, results and developments of the ongoing Celtic projects.

Embedded event

For the first time, the Celtic Event was embedded within the conference week "From Economic Recovery to Sustainability", also named as "FP7 European Innovation and RTD Transforming Sectors Week". Conference and Event were co-organised by the Spanish Ministry, the EU Commission, the Future Internet Assembly (FIA) and Celtic. The conference week took place from 12 to 16 April 2010.

This concept attracted around 1,500 participants during the whole week. The Celtic exhibition, together with the exhibition of NESSI, was also run during the whole week. Thus, many more people had the opportunity to visit the Celtic booths than during earlier events.

In addition, the Event and the Celtic information and brokerage day benefitted from this arrangement and attracted new interested experts and decision-makers.

Day 1 – Keynotes on innovation

The Event was opened by Julia Climent Monzó, Director of the Council for Industry, Commerce and Innovation in Valencia.

In a keynote speech about their research strategy, Carlos Gavilanes, Director, Corporate Strategy at Telefónica, presented the coming technological challenges and the plans of Telefónica to provide appropriate answers to these challenges.

Klaus Uckel from the German ministry of education and research (BMBF), who is also EUREKA High Level Representative of Germany, provided the EUREKA perspectives for the coming years, particularly related to the cluster work. He stressed the high importance of the Celtic clusters and the willingness to support and promote the cluster in its follow-up as Celtic-Plus in the future. He also highlighted the need for Celtic and Celtic-Plus to cooperate with new research activities, such as the Future Internet PPP, as this will be important to strengthen and combine the forces to provide important results and achieve high impact on these challenges. For the rest of the first Event day, several selected project highlights, including the Celtic Award winners, had the opportunity to present their results to a broad audience.

Day 2 – Network visions

The second day of the Event started in the morning with several very interesting and stimulating keynote presentations. Paul Friedel, Director of Research and Strategy at Orange/France Telecom, spoke about the technological challenges to ensure quality of service in the world of Internet everywhere.

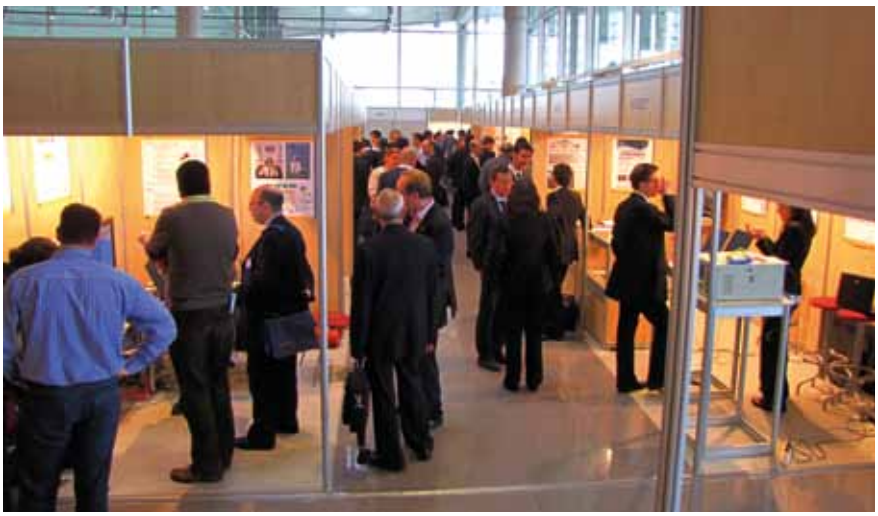
Lauri Oksanen, Head of Research and Technology at Nokia Siemens Networks, provided his future vision, the "Network of One". He pointed out that the Internet is becoming the heartbeat of the modern society with broadband everywhere, a multitude of services and business models where everyone is connected with everything.

Jean-François Picquet from Alcatel-Lucent Bell Labs France provided his perspective on the innovation challenges in communication. He pointed to several challenges to be taken into consideration: the need for reliable business models, facing the "Video Tsunami" where video is eating the available bandwidth, the changing paradigms from entertainment to society, the network impact on staying always on, expected new services and the changing ways to innovate, and finally inter-domain innovation and open innovation infrastructures.

Cenk Bayrakdar, Vice-President of Turkcell provided the future Internet perspective of a mobile operator, while Christophe Diot, Chief Scientist at Technicolor, provided a very stimulating presentation on the "Cloudy Internet".

The current state of Celtic in the global telecoms context and the perspectives of Celtic-Plus towards a smart connected world were presented by the Celtic chairman, José Jimenez from Telefónica.

In the afternoon the Celtic Information Day took place, where interested partners presented their ideas and discussed opportunities for new projects.



Exhibition

In the parallel exhibition, 26 Celtic projects presented their results at 21 booths. Among many very interesting projects, there were some particular highlights. One of them were the demos of various approaches by the 100GET project on new and cost-efficient high-speed optical networks that can deliver between 40 to 200 Gb/s over Ethernet based protocols. These solutions are desperately needed to fulfill the requirements of the future Internet.

The Celtic B21C project presented two demos, illustrating some of the numerous outcomes obtained in the field of "Broadcast technologies for tomorrow": OPERA-NET presented mechanisms to decrease the electrical power consumption of radio cellular networks helping to improve the DC to RF energy conversion of base stations.

HDVIPER showed fascinating new service opportunities for three-party high definition (Full HD) videoconferencing based on the SIP (Session Initiation Protocol) open standard. The Celtic gold award winning project, TRAMMS, presented their solutions for immediate IP traffic analysis.

One booth was dedicated to provide information about six new projects which will be launched soon and which may still accept additional partners with required expertise. This booth drew some attention, and several companies showed interest to get into contact with a project.

Further information about the Celtic event is available on the Celtic website at *www.celtic-initiative.org/Events/Celtic-Event10-Valencia/welcome.asp*.

Celtic Excellence Awards 2009

Three winning projects in Valencia

Every year, the Celtic Core Group selects the three best projects, which have finished in the previous year, for a Celtic Award in bronze, silver and gold. The selection was based on the quality of the project and its results as certified at the mid-term and final reviews. Another important criterion is the reported impact by each project participant, e.g. the creation of new business, new jobs and new products as well as influencing world-wide standardisation or new technologies.

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From left: Celtic chairman José Jimenez, TRAMMS project leader Andreas Aurelius, and Celtic Office director Heinz Brüggemann at the award ceremony.

Gold Award Winner 2009: TRAMMS (Traffic Measurements and Models in Multi Service Networks)

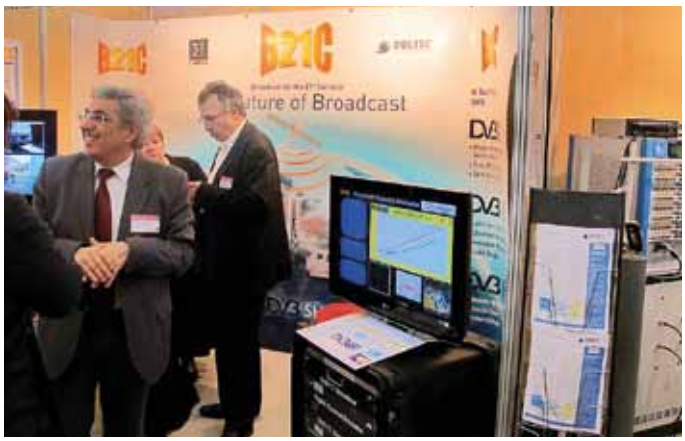
The TRAMMS results prove that it is possible to perform measurements in commercial operator networks without affecting their correct operation and respecting their privacy policies, as well as the privacy of the users.

The project was led by Andreas Aurelius, ACREO, Sweden. In the consortium 11 companies from 3 countries participated.

Silver Award Winner 2009: B21C (Broadband for the 21st Century)

The project achieved the following important results:

- Laboratory and field tests for DVB-H Mobile TV network deployment
- DVB-SH validation through large-scale laboratory and field testing
- Contribution made to the DVB-T2 standardisation
- The project had impact on new products addressing the emerging market of T2 Terrestrial TV.
- Optimised infrastructures and new services for operators.
- Promotion of DVB technologies of its technical achievements on a large scale.



Booth of Celtic project B21C

The HDVIPER project at the exhibition

The project was led by Gérard Faria, Team-Cast, France. 34 partners from 8 European countries participated in the very large project.

Bronze Award Winner 2009: EnComPAs-2 (Enabling Community Communications – Platforms and Applications phase 2)

The project has introduced a Residential Gateway in the home network which provides an intelligent and integrated management platform allowing end-users, operators and service providers to easily and effectively manage the services and connected devices at home.

Speakers at the Celtic Event (from left): J. Jimenez, J M. Leceta, and A. Blanco

The project had impact on new products, like residential gateways for deployment in Spanish households. New products based on project results are currently under development/deployment in Israel and Netherlands.

Finally, EnComPAs-2 was also selected by EUREKA for a Success Story, which was published in their magazines. The project was led by Valentin Alonso Alvarez from Telefónica. The project consortium consisted of 5 partners from 3 countries.

WINNER+

Global Impact on LTE and IMT-Advanced

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Mobile communications is an important means to enable the information society, to increase efficiency in business processes and to ease private life. In the last 20 years since the launch of GSM and UMTS, mobile communications has been a tremendous global success story with further evolutions towards more broadband mobile systems.

Already in 2001 ITU-R started activities on the future broadband systems in order to prepare the identification of additional frequency spectrum in the World Radiocommunications Conference 2007 (WRC 2007). For that purpose ITU-R asked in 2003 in the Recommendation M.1645 "Framework and overall objectives of the future development of IMT-2000 and systems beyond IMT-2000" the global research community to investigate technical means in order to provide broadband access everywhere, anytime.

Project phases, consortium and objectives

The WINNER project was launched as an EU Framework Programme 6 project, which started in January 2004 and continued until December 2007 in two phases. This project was a direct response to the ITU-R recommendation to develop a radio interface concept, the necessary physical layer and lower layer technologies and algorithms for IMT-Advanced based on the ITU-R requirements (Figure 1).

In the third phase the project continued as the Eureka Celtic project WINNER+ from April 2008 to October 2010. In addition, the WINNER project contributed to the preparation of WRC 2007: more than 50% of the European contributions to this process were prepared in the WINNER context.

The WINNER consortium comprises major manufacturers, network operators, R&D centres and universities from EU Member States and during the first two phases also from Canada, China and the US.

Global impact

At the end of 2004 the basic system concept was developed as a consensus view between the major players, which was further refined and evaluated in the later phases. In November 2004 3GPP organised a "Long-Term Evolution Workshop" in Toronto to investigate further developments of UMTS towards broadband mobile communications (called LTE) as

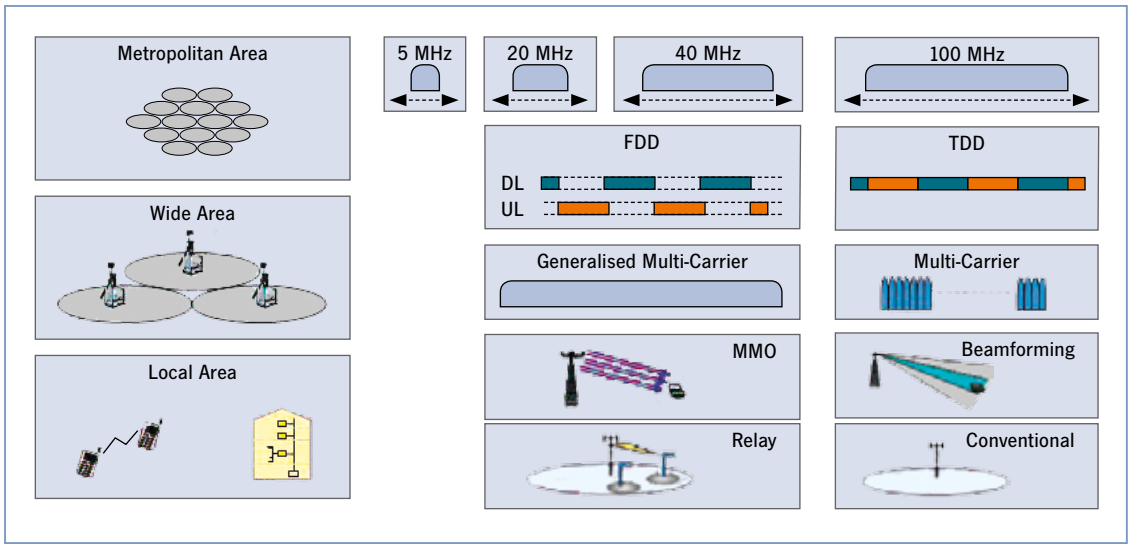

Figure 1: IMT-2000/IMT-Advanced framework

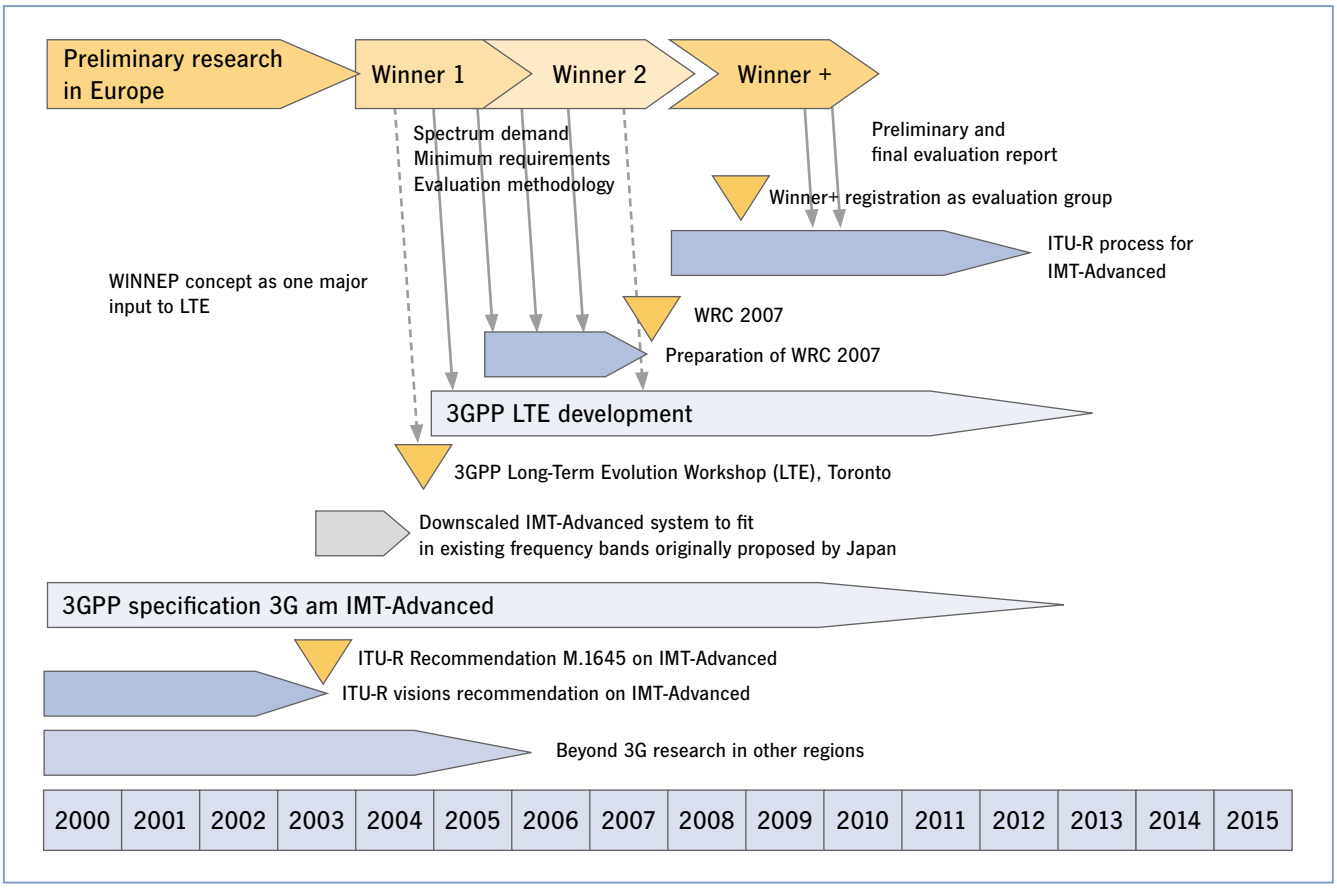

Figure 2: WINNER contributions to 3GPP LTE and IMT-Advanced

the first step towards IMT-Advanced. Based on requirements like peak throughput, flexibility and scarce availability of frequency spectrum, the OFDM-type of radio access concepts were a natural choice. Therefore, the WINNER partners used the developed concept as a starting point for the LTE specification. The WINNER+ project is now continuing its research work on further optimisation and investigation of new concepts for future LTE releases and adapting the concept to the outcome of WRC 2007. It is a registered ITU-R Evaluation Group for IMT-Advanced candidate technology proposals. WINNER+ and ETSI are the only evaluation groups from Europe within 14 globally registered groups (Figure 2).

Conclusion

From a strategic perspective the international cooperation between major international players in the WINNER project for the development of a new system facilitated consensus building on the basic concepts and algorithms. The results of this work were exploited by 3GPP for a smooth and fast development of LTE for globally accepted standards. Therefore, cooperation in an early, pre-competitive phase in collaborative research projects is an important means for consensus building, which enables future economic growth and new businesses.

Further details are available at *http://projects.celtic-initiative.org/winner+.*

MyMobileWeb

Agile Mobile Web Development Framework

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MyMobileWeb is a CELTIC call 4 project intended to make the Mobile Web 2.0 a reality by providing the technology which enables the creation of compelling mobile, web-based applications that offer a harmonized user experience in disparate delivery contexts.

MyMobileWeb makes the Mobile Web 2.0 a reality by enabling the rapid development of rich applications (AJAX-based) adapted and optimized for every device. On the other hand it provides a powerful, standards-based and open source technology that make it possible the creation of adaptive mobile web applications in time to market without investing a lot of money or hiring specialized (and expensive) developers.

The latest version of MyMobileWeb, version 4, has been developed in a CELTIC project of the same name, which was finished in December 2009. MyMobileWeb v4 is composed by a set of novel technologies:

- the **IDEAL2** language for the declarative description of device-independent user interfaces and adaptation policies.
- The **SCXML** language for describing application flows modeled as state machines.
- the **"Device Description Framework"** concerned with obtaining information about the characteristics of devices and web browsers by interfacing with different Device Description Repositories (DDRs).
- the **"Adaptation and Rendering Engine"**, in charge of selecting and generating the final markup, script, style sheets and other resources (images, audio, video) to be delivered to the mobile device.
- the **"Client-side Framework"** (a.k.a. "Mobile AJAX Framework") which enables rich interactions in different Javascript-enabled browsers.

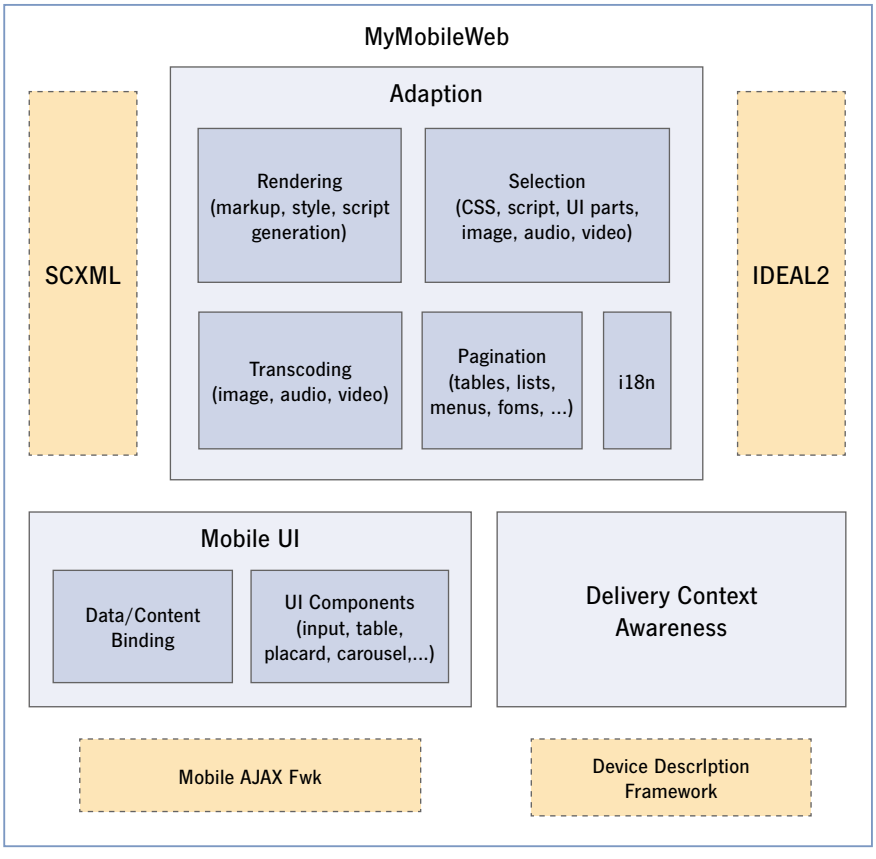

Figure: MyMobileWeb framework

The product is currently used within more than 20 different applications already deployed. The number of downloads increases every day – at the time of writing more than 240 downloads a month on the average. In addition, there are more than 40 developers certified to use the technology. These figures have stimulated the consortium to continue with the development of MyMobileWeb through its open source community. For the next years, we plan to improve the technology to satisfy new market demands, as we believe that the web browser will be the platform for application front-ends in the Future Mobile Internet.

More info is available at *http://mymobileweb.morfeo-project.org*.

MANGO

Management Platform for Next Generation Optical Networks

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The advances in optical technology enable an evolution towards all-optical networks capable of providing light-paths as optical circuits. However, the functionality of all-optical networks remains highly limited, largely due to the lack of an appropriate management platform.

Management software platforms are developed mainly by the companies producing optical network equipment, and are only capable of managing their specific products. Our approach is to consider network management from the service management perspective, which is not limited to the particular manufacturer. The main issues considered within the MANGO project are: inventory, cross-layer fault, performance, service, optical layer monitoring and connection management.

Platform architecture

To provide complete system functionality, certain modules have to be developed or extended. The cooperation of Comarch with the Proximion Company and Acreo Laboratory enabled the development of optical physical performance data measurement and storage. A WISTOM optical performance monitoring platform provided by Proximion supplies the Comarch OSS Suite with the necessary physical signal quality measures that can be used for service monitoring and path computation (a module using RWA algorithms developed by both the KTH and WUT universities).

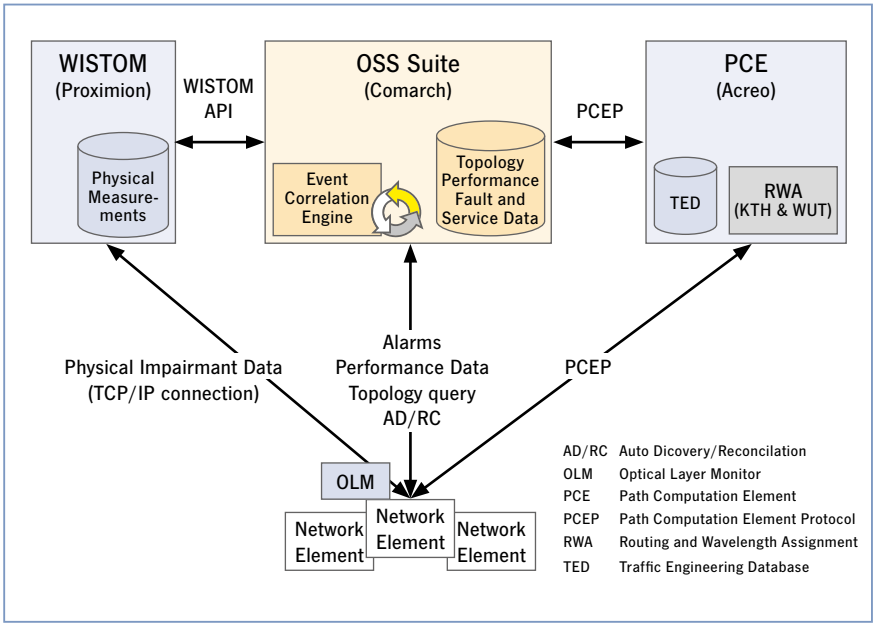

Figure 1: MANGO platform architecture

Optical layer monitoring

In all-optical networks, fiber failure may cause interruption to an extensive number of connections and the loss of a tremendous amount of data. Therefore, rapid fault detection and diagnosis followed by recovery mechanisms is crucial. For this purpose, the Comarch Correlation Engine, successfully verified in the traditional operator environment, is extended.

Services provided by the optical layer require the monitoring of optical signal quality indicators. For this reason, integration with the Optical Layer Monitor (the WISTOM solution) is provided.

Impairments-Aware Optical Path Computation

The transparency of all-optical networks with the absence of electronic signal regenerators imposes the need for taking into account physical (optical) impairment constraints during the Routing and Wavelength Assignment (RWA) phase.

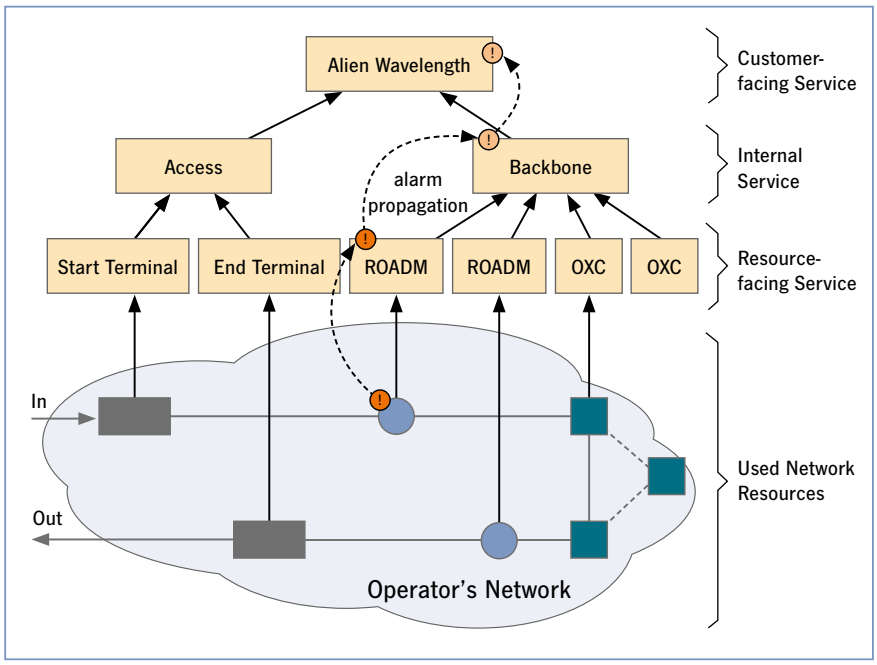

Figure 2: MANGO switching matrix and wavelength converters

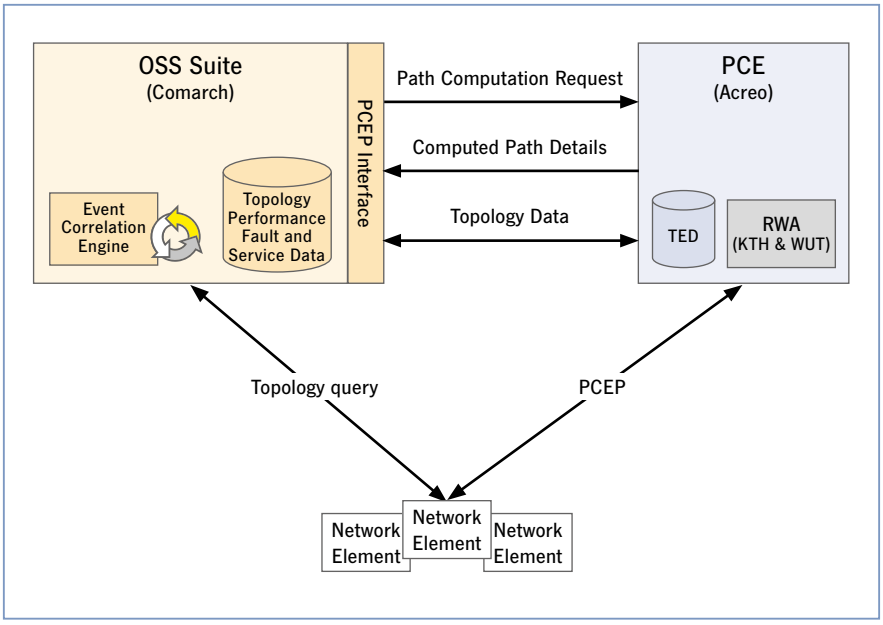

Figure 3: WDM reconfiguration scheme

Two of the most important options considered in the project for node configuration are the limited switching matrix and usage of wavelength converters. Besides physical impairments, the other path computation restrictions considered are: computation of primary and backup lightpaths and WDM reconfiguration schemes. Several types of algorithms, depending on the nature and size of the problem, are used: simulated allocation heuristics for synchronized computations, branch and bound algorithms for the WDM reconfiguration problem, and label setting algorithms for single lightpath computation subject to impairments.

Conclusion

The MANGO solution offers an ideal opportunity to respond to the real-life requirements specified by industry partners and to combine them with the latest research findings. The platform allows operators to manage components and equipment specific to all-optical networking. Furthermore, it enables cross-layer automated fault and performance management, complex service quality management and the organization of optical connections.

Further information is available at *www.celtic-initiative.org/Projects/MANGO.*

ICARUS

Experimental infrastructure for distributed wireless networking

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A diverse wireless networking world where a variety of radio technologies and mobile services coexist in a seamless manner is no longer a far away vision. Users will soon be able attain any service, at any time on any network available, and perhaps even more most importantly, to migrate between networks seamlessly, in order to reduce costs, increase quality of service, or both.

The achievement of this vision, where applications exploit in an efficient way the available wireless system resources requires a unified evaluation platform, supporting cross-layer and cross-system simulations, in which each individual simulator can be provided by a different research group and where ICARUS provides the framework for all simulators to exchange data and cooperate to a common goal. The figure shows the ICARUS architecture.

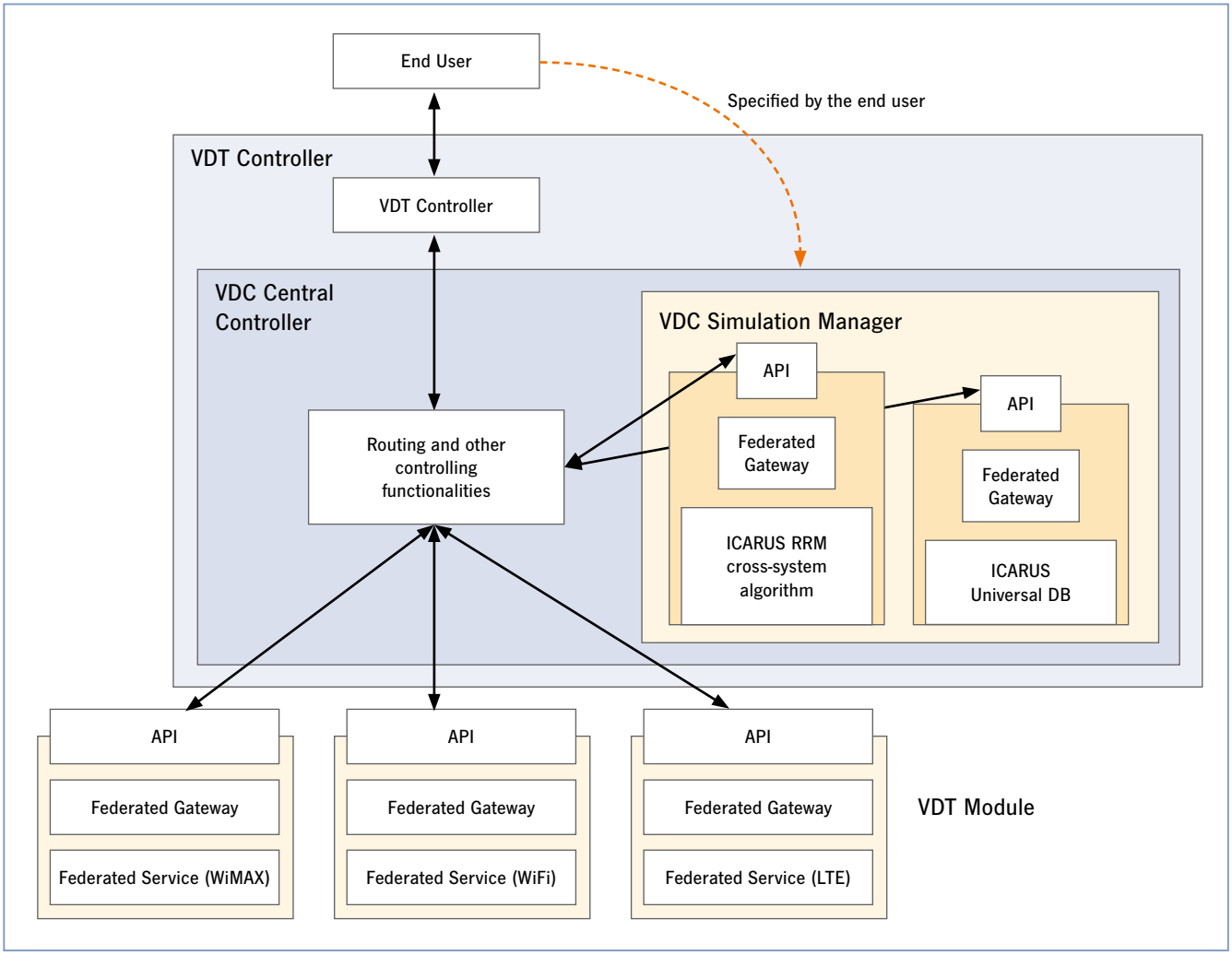

Figure: ICARUS architecture

Virtual Distributed Test-Bed Modules

ICARUS builds on the concept of a federated simulation environment, by providing the mechanisms for researchers across the world to submit their own Virtual Distributed Test-Bed Modules (VDT Modules) to the global repository, after which they are ready to be used by any other researcher (with the right access credentials) in any cooperative simulation. These modules can represent algorithms, or architectures, or visualization tools, or probability distributions representing, e.g., input data. In fact the only requirement imposed on these VDT modules is that they implement the API defined by ICARUS, which is necessary for different modules, independently developed, to communicate in a standard manner. ICARUS provides the "glue" and the mechanisms for this inter-communication between simulators to take place.

There are currently over a dozen ICARUS-compliant simulators, and we expect to reach over one hundred by the end of the year.

Platform scenarios

The ICARUS platform is currently being used by researchers to evaluate a large variety of issues, including: cooperative context-aware Radio Access Technology (RAT) selection between legacy systems (HSDPA, 802.16, 802.11e, 802.11g) and future emerging technologies (IEEE 802.11VHT, IEEE 802.16m, 802.16j and 3GPP LTE); non-cooperative RAT selection algorithms based on game theory to provide service continuity within a heterogeneous operator and access technology environment; efficient inter-system handovers protocols for heterogeneous MBMS enabled wireless networks; transparent service continuity based on methods, procedures and algorithms across MBMS enabled heterogeneous networks; routing techniques for Multi-hop Cellular Networks (MCN); multi-cell dynamic resource allocation protocols; among many others.

Conclusion

The ICARUS project not only significantly improves the current state-of-the-art in several scientific areas related to wireless networking, but also provides an experimental infrastructure that can be used by any researcher and company to easily reproduce experiments performed by others, using the exact same conditions and compare prior results against results obtained using novel algorithms or architectures.

Last but not least, ICARUS is investigating new human-machine interfaces to navigate large datasets, which will be created by the execution of millions of experiments using the ICARUS VDT.

Further information is available at *www.celtic-initiative.org/Projects/ICARUS.*

IMPRINT

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About Celtic

Celtic is a Eureka cluster, which initiates and runs privately and publicly funded R&D projects in the field of telecommunications. The cluster, which runs until 2011, is supported by most of the major European players in communication technologies. Celtic projects are focusing at telecoms networks, applications, and services looking at a complete system approach. The size of the Celtic budget is in the range of 1 billion euro. Celtic is open to any kind of project participants from all Eureka countries.

Future Internet Assembly in Valencia

On the way to a smarter Europe

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This time the about 300 participants of the Future Internet Assembly workshop in Valencia were faced with a double challenge: the first, rather predictable challenge was to make progress in defining the topics for the research on tomorrow's Internet. The second, completely unpredictable challenge was how to get back home despite the volcanic ash from Iceland, which paralysed Europe's air traffic.

The Future Internet Assembly (FIA) workshop was part of the FP7 conference "From Economic Recovery to Sustainability (R2S)", which took place from 12 to 16 April 2010 at the Valencia Conference Centre in Spain. The FIA workshop itself was organised on the last two days of the conference. Although not at the center of the conference week, the workshop discussed matters of high importance to the economic future of Europe, which is increasingly depending on the Internet. The FIA represents more than 100 FP7 projects in the area of Future Internet with a budget of about 1 billion euros.

The overarching themes of the FIA workshop were Future-Internet-related architectures, experimentally-driven research, smart energy, smart health, smart cities, smart enterprises, Future-Internet-related socio economic issues, and, very importantly, trust and security. The meeting was organised in 11 break-out sessions on those themes as well as an opening and a concluding plenary session.

Future Internet architecture

One of the most prominent themes was the Future Internet's architecture with three related break-out sessions. Several reference models are under development by different FIA groups; requirements and research challenges for architectures have been set. The three sessions aimed at consolidating the reference architectures. An important aspect is to ensure that the research results are being standardised at proper standardisation bodies, like ETSI, and get adopted and deployed by relevant communities forming the Future Internet.

Foundations of trust

Another crucial point for the success of the Future Internet is that issues related to trust and security get solved properly. The objectives of the associated session were to explore the human and technical foundations of trust in the Future Internet with the intent of developing a roadmap for future cross-domain research. It was also discussed how to ensure that end users can have sufficient confidence and trust in the infrastructure and services of the Future Internet to readily participate in a digital life and digital society.

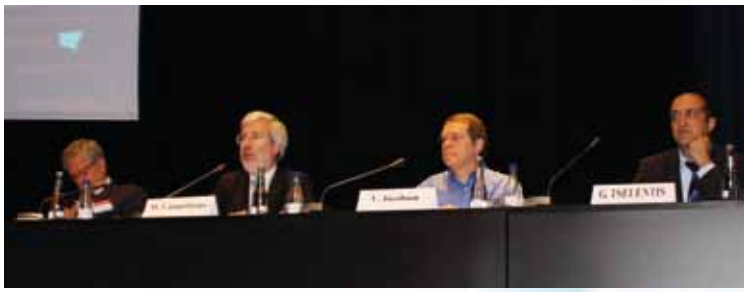
The economics of information and Future Internet for the enterprise

Important for the success of the Future Internet is whether it will be economically viable and how the future business models will look like. There is an inherent tussle between closing and controlling content, and openness and freedom. Most of the abundant contents on the Internet are free. Hence, realistic business models need to aim at offering additional values, such as making information more reliable, exclusive, immediate or tailored to the users' needs.

For enterprises the Future Internet will enable a whole new world of business opportunities, but companies need to be prepared to learn, evolve and change. Miquel Borras of Antara Information Technologies presented SME visions on the Future Internet. He stressed that it is very difficult for the enterprises to ensure proper trust and to assess the risks which could happen with enterprise data, e.g. when using cloud computing. "Is there a risk approaching behind the cloud?" he asked.

Research and experimentation

Future Internet Research and Experimentation (FIRE) had an important place in all the five FIA meetings so far. As a cross-disciplinary theme it tries to create a European market for testing and experimentation facilities around the Future Internet.



Opening session of the FIA (from left): Luis Rodríguez-Roselló, Mario Campolargo (both European Commission), Van Jacobson (PARC – Palo Alto Research Center), Georgios Tselentis (European Commission).

All facility providers are required to work for the common interface and a portal of FIRE experimental services, and to be open for all research customers in a transparent way. FIRE-wide federation and sustainability concerns remain challenges for the new projects and customers.

Conclusion

Since its foundation in Bled in March 2008, the FIA has become much more mature. It has been realised that Future Internet discussions need to go beyond technical issues and include societal, user-related and economic aspects.

It has sometimes been questioned what the tangible results of the individual FIA events are. FIA has brought together hundreds of stakeholders in the area of Future Internet and has achieved good cross-domain information exchange and collaboration between groups which would not have known of each other without FIA. The most concrete results of this collaboration are joint standardisation efforts and collaborative work on implementing, evaluating and testing Future Internet related platforms and components. A new FIA book was presented at the event; title: "Towards the Future Internet – Emerging Trends from European Research". So despite the volcanic ash clouds hanging over most of Europe, the results of the workshop are a good basis for the following steps.

The next FIA will be held as part of the Future Internet conference week from 16 to 17 December 2010 in Ghent.

For more information:
www.r2sconference.eu
www.future-internet.eu/home/future-internet-assembly.html
www.fi-ghent.eu

TridentCom 2010

Conference on testbeds and research infrastructures in Berlin

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From 18 to 20 May 2010, Berlin was the focal point of the community working on testbeds and experimental infrastructures. The German capital hosted the 6th International Conference on Testbeds and Research Infrastructures for the Development of Networks and Communities, better known as TridentCom 2010.

More than 130 experts attended the conference that provided a forum to explore existing and planned testbed concepts, infrastructures, and tools for addressing the research and business challenges of ICT convergence. The technical programme represented a snapshot of the best of breed of international research on testbeds and research infrastructures conducted in Europe, the Americas, Asia, and Australia. The strong technical programme during the three days brought together researchers from across the world that presented and discussed their latest results. Out of more than 100 submitted contributions the programme committee finally selected after a peer review process 15 full papers, 26 practices papers, and 22 posters. Overall, the presented contributions originate from 22 nations, underlining the world-wide scope and significance of the conference.

Dr. Max Lemke, European Commission

Welcome and keynotes

Prof. Thomas Magedanz from Fraunhofer FOKUS and Technical University Berlin, who acted as the general chair, opened the conference by pointing out that the research and development in the areas of converging networks, unified communications, as well as emerging cross-sector smart applications is getting increasingly complex and expensive. For this reason open testbeds and research infrastructures are becoming the enabling infrastructure for achieving innovations in various domains, ranging from networking and services up to various application domains.

In the first keynote session, Dr. Max Lemke from the European Commission presented the European view on the role of experimentation in future Internet research. He gave also an outlook on the future activities in this area that are subsumed under the Future Internet Research and Experimentation (FIRE) Initiative.

Chip Elliott from the GENI project office presented the approach taken in the US towards exploring networks of the future. He presented the current status and plans of GENI (Global Environment for Network Innovations) as well as the programme activities of the GENI project office. Prof. Phuoc Tran-Gia from the University of Würzburg presented in his keynote the concept and federation issues of the G-Lab project, a large German initiative to deploy testbeds and experimental platforms in Germany.

In the second keynote session, Prof. Akihiro Nakao from the University of Tokyo presented the relevant activities in Japan towards the design and development of testbeds for the Future Internet. He devoted particular attention to infrastructures that support virtualisation as one of the fundamental concepts in the area. Finally, Bernard Barani from the European Commission presented the European Public Private Partnership on the Future Internet (PPP-FI). The PPP-FI implicitly had a strong influence on the conference, as it represents a significant effort to demonstrate Future Internet services and applications.

Prof. Phuoc Tran-Gia from the University of Würzburg

Technical sessions

With the emergence of the Future Internet, including the network of the future, the Internet of things, and the Internet of services, the traditional borders of network and service layers are vanishing. Cross-layer experimental platforms are being established around the globe to enable rapid prototyping and validation of innovative ideas, also taking into account migration and interworking with existing network and service platforms. Thus, this year's Tridentcom emphasised testbeds and experimental facilities for the Future Internet and also featured additional testbed highlights from other domains. The accepted contributions resulted in 11 technical sessions, addressing:

- Federated and large-scale testbeds
- Future Internet testbeds
- Future wireless testbeds
- Monitoring in large-scale testbeds
- Network and resource virtualisation for Future Internet research
- Future Internet testbeds for wireless sensors, media and mobility
- Wireless and mobile networking testbeds
- Monitoring, QoS and application instrumentation in large scale testbeds
- Management, provisioning and tools for future network testbeds
- Experimentally driven research and user experience testbeds

The conference programme also featured an interactive panel and three tutorials. TridentCom 2010 was also the site of the second focused workshop on Open NGN and IMS Testbeds (ONIT).

Prof. Thomas Magedanz, Fraunhofer FOKUS

Chip Elliott from the GENI project office

Conclusion

The TridentCom conference is now established as the main yearly conference of the research and development community for testbeds and experimental infrastructures. The 6th conference this year impressively demonstrated that the community is very active and is taking up the challenge to deploy the necessary infrastructure for supporting Future Internet and future network research.

The conference concluded with the announcement that the next conference, the 7th TridentCom 2011, will take place in Shanghai, the flourishing centre of commerce, finance and business of China, organised by the Chinese National Engineering Research Center for Broadband Networks and Applications.

Further information is available at *www.tridentcom.org*.

Open standards for machine-to-machine communication

Eurescom study P1957

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The European market for Machine-to-Machine (M2M) is growing rapidly. Establishing open standards for M2M, is necessary for creating conditions which foster innovation and remove barriers that might otherwise hamper collaboration in this field. To this purpose, Eurescom study P1957 investigated an open interface for M2M applications.

The rationale is that a common interface around which independent software vendors, device manufacturers and telecommunication providers can build solutions better serves industry than a byzantine array of competing standards, each with their own license fee structure and vertical solution.

The open M2M API

An application interface (API) shields applications from the underlying technologies and reduces efforts involved in service development. Services may be replicated and ported between different execution environments and hardware platforms. At the same time, services and technology platforms are allowed to evolve independently. An open M2M API with network support will ensure service interoperability and allow ubiquitous end-to-end service provisioning. This will provide efficiency in scale and scope, in service infrastructures, service development and service production. The versatile and easy to use functionality of the P1957 API makes it attractive for use in many areas, including environmental protection, healthcare, trade, transportation, home automation, smart metering, industrial control, sensor monitoring, alarms and surveillance.

Eurescom study P1957

Eurescom study P1957 (Open API for M2M applications) was formed to continue the work of its predecessor study, P1856. With the ontology for an M2M system formed and the common architectural elements identified (Figure 1), specifying the interface between M2M applications and both devices and gateways was started (Figure 2). The interface identifies the set of core services and capabilities, as basic or "atomic" services of the network that can be addressed by an M2M application.

M2M service capabilities

The API is described both as pseudo-code as well as in a web description language. The web description details a REST-style (Representational State Transfer) web application interface as well as an XML schema to define the message types to be passed between nodes. The underlying transport for the communications between nodes was agreed to be HTTP. Future endeavours might include allowing for a more lightweight protocol to be used. The recent submission of the CoAP protocol to the IETF, which describes HTTP-like communications using UDP over IPv6, offers considerable promise.

The service capabilities are broken down into the following categories:

- **Grouping**
  A key design capability is the Group. It offers a generic grouping and partitioning mechanism. A group is defined with a common set of attributes (i.e. invariants) shared between member elements. Each group manages its interactions with other groups of the network according to some defined set of rules and policies. A group is an entity which encapsulates and implements scoping, grouping, subdividing, and crossing boundaries of sets of entities. Grouping can separate mechanism from purpose, by providing a single highly optimized and reusable generic mechanism to serve a number of purposes. Groups may have different scopes (e.g. local or global). Actual scoping will define the parties authorized to manage group creation and population. The creator of a group may specify its scope as one of the group invariants.
- **Transactions**
  Service capability features and their service primitives optionally include a transaction ID in order to allow relevant service capabilities to be part of a transaction. This optional tagging allows the following service capability features to take part in transactions: Grouping, Messaging, DO Application Interaction (not Read and Observe), Event notification, Presence registration, Compensation, Sessions. The Transaction Coordinator (TM) would be agnostic to this functional integration, and only manage the final "2-phase" commit for the identified transaction.
- **Application interaction**
  The application interaction part is added in order to support the development of simple M2M applications with only minor application-specific data definitions, i.e. for readings, observations and commands. Application interactions build on the generic messaging and transaction functionality and offer capabilities considered sufficient for most simple application domains.

- **Messaging**
  The Message service capability feature offers asynchronous message delivery with no message duplication.
- **Event notification and presence**
  The notification service capability feature is more generic than handling only presence. It could give notifications on an object entering or leaving a specific group, reaching a certain location area, sensor readings outside a predefined band, an alarm, etc. The subscriber subscribes for events happening at the Target at a Registrar. The Registrar and the Target may be the same object. This configuration realizes a publish-subscribe mechanism with no central point of failure.
- **Compensation**
  Fair and flexible compensation schemes between cooperating and competing parties are required to correlate resource consumption and cost, e.g. in order to avoid anomalous resource consumption and blocking of incentives for investments.
- **Sessions**
  In this context a session shall be understood to represent the state of active communication between Connected Objects (CO), i.e. it is not required to be established by e.g. the Session Initiation Protocol (SIP). Sessions also offer a means to set a common service class for the involved parties, e.g. for expedited data transfer.

Conclusion

The specification of the P1957 API offers an excellent opportunity to bring standardisation to the European M2M market. Ongoing and future efforts involve its submission to official standardisation bodies such as ETSI TC M2M, which is acting as a focal point for standardization activities, gathering consensus on requirements and enabling members to coordinate their activities in other M2M related standardization bodies.

You can find more information on Eurescom study P1957 at *www.eurescom.de/public/projects/P1900-series/P1957*

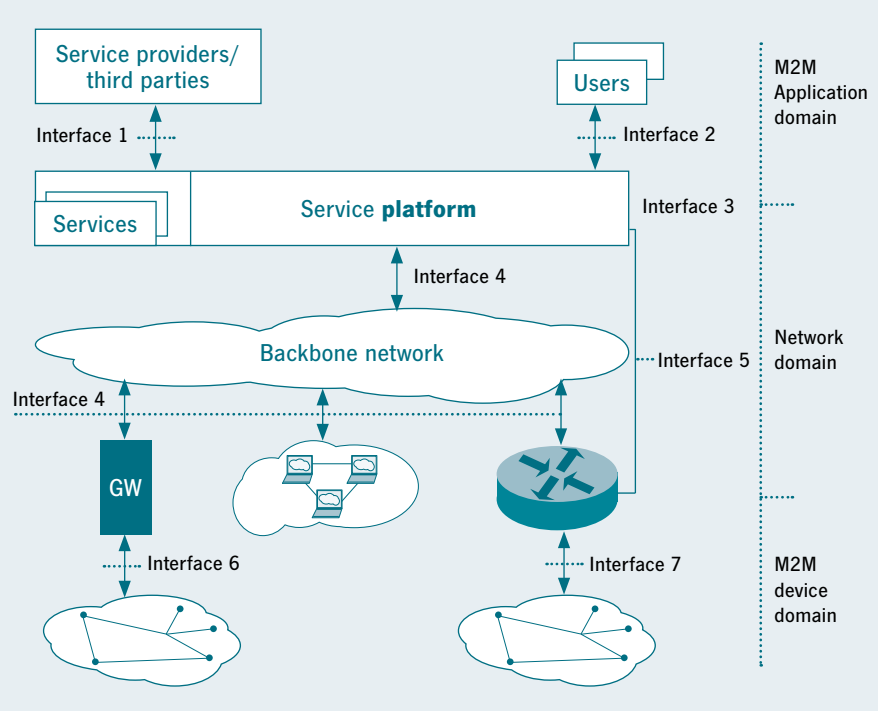

Figure 1: M2M service architecture

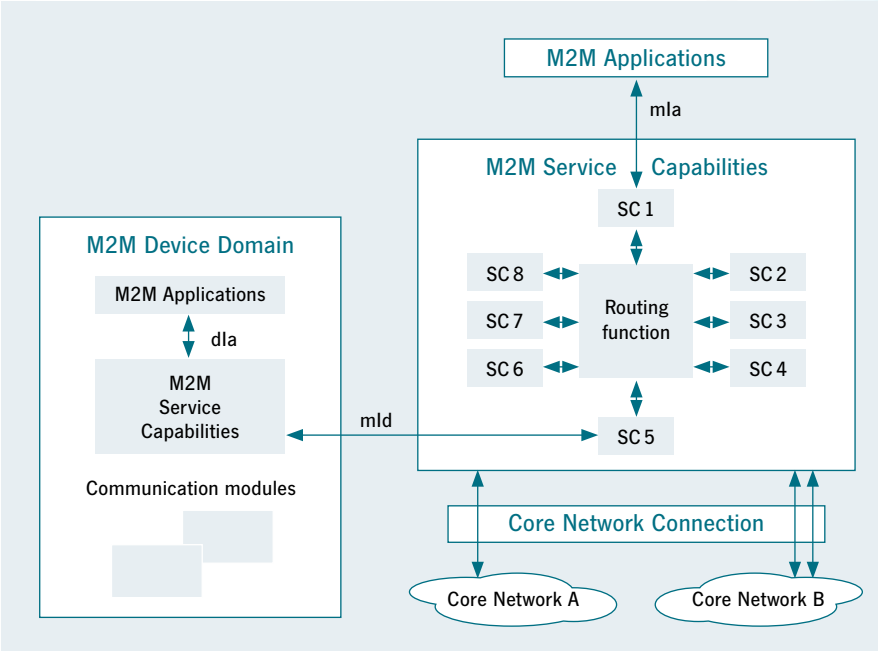

Figure 2: M2M service capabilities

European Future Internet activities gain momentum

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For over a year now there has been much work on creating a new European push on the Future Internet. To be more specific, there has been a call for a coordinated and concentrated set of actions through the various research instruments nationally and internationally to bring together all the results from recent work in the various programmes and convert them into realizable advances with demonstrations of the principles and, more critically, demonstrations of the scalability and viability of the new concepts and services.

The significant difference from existing work is the demand to ensure the work in this new push must have a sustainable societal and commercial impact. This does not mean that we are doing commercial development, but it means that we are working with the validation of the business models in the mind when we trial and demonstrate something. If we can do this well, we will create the confidence in the community that the European view is solid enough, tested and worth investing in.

The status of this work now is that after all the discussions, consultations with the member states, interactions with the industry players and consultations on a large scale with all interested players, we are now heading into a focused call on the future Internet issues, called the Future Internet PPP (FI-PPP), which will open in July 2010 and close for proposal submissions in December 2010.

Future Internet PPP

There are several unique characteristics about the Future Internet PPP for which we are grateful to the Commission and the national authorities for being brave enough to try to make changes. The first one is that the set of projects envisaged need to work closely together as a programme and cannot work in isolation.

The call expects that each project has the commitment, and allocated resources to interact with the peer projects to ensure the sharing of developments, the emergence of standards, and the adherence to one reference architecture. We don't know exactly now what this architecture should be, but we do know that Europe has one opportunity to create the consensus and convergence of ideas for the next-generation service-driven Internet, and we must work hard together to take this opportunity.

European Future Internet Portal – *www.future-internet.eu*

Multidisciplinary approach

The European Future Internet needs to be tackled from a holistic perspective by taking into account all building blocks from users, services and applications down to the networks. This needs a multidisciplinary approach led by strong European industrial stakeholders, supported by innovative academia and entrepreneurial SMEs, to develop the devices, interfaces, networks and services required to support the future networked society and economy.

The challenge requires bringing the competence of the application sectors and the ICT sector together to develop common solutions from an end-to-end perspective in a way that has never been possible before. It will require cross-functional and cross-sector projects which can not be created by the current sector-driven structure of calls for proposals. The PPP approach will also consider the economies of scale that allow for exploitation at a pan-European and global level.

Goals of the Future Internet PPP

The main result of this initiative will be demonstrations of pan-European Future Internet services by 2014. This will facilitate an early uptake of the results in the European marketplace, benefiting European citizens and generating a competitive

advantage for European industry in the global marketplace. The potential to continue this work in some format under the EU's 8th Framework Programme (FP8) will be considered in the future.

The Future Internet PPP has two main **goals**:
firstly, to increase the effectiveness of business processes and of the operation of infrastructures supporting applications in sectors such as transport, health, or energy;
secondly, to derive possible innovative business models in these sectors, strengthening the competitive position of European industry in domains like telecommunication, mobile devices, software and service industries, content providers and media. This requires to

- identify, define and update the Future Internet requirements coming from the different innovative use cases
- specify an open standardised generic framework (specification, standards, implementation and research/usage validation trials) combining the required network, data, computing and services components
- adapt and complement to the specific needs of use cases.

The Future Internet PPP follows an industry-driven, holistic approach encompassing R&D on network and communication infrastructures, devices, software, service and media technologies; and their experimentation and validation in real application contexts. The unique shared cross-sector approach of the PPP will overcome a potential fragmentation in the smart-infrastructure market and ease the efficiency of technological development as the establishment of a competitive industry in the supply of ICT for smart-infrastructure technologies as of the associated web services.

Pragmatic approach

Projects under the Future Internet PPP are required to draw upon the wealth of results already achieved through earlier European research and to valorize them further through a systematic integration with a complete system perspective. The FI-PPP brings together the demand and the supply sides, and also the requirement to involve users early into the research lifecycle. The platform to be developed will thus be used by many actors, in particular by SMEs and public administration services, to validate the technologies in the context of smart applications and their viability to support user-driven innovation schemes.

Three phases of the PPP

The Future Internet PPP is seen as a new instrument to bridge the technologies developed in the EC Framework Programme Challenge 1 and the themes explored in other Challenges, as well as integrating themes not located in any Challenge so far. The concept is that the programme will have three main phases and that within each of these phases there will be a set of interworking projects. Some of these projects will extend across all three phases and some will end after just one phase.

In the **first phase**, we must define and continuously update the Future Internet-related requirements coming from the different application sectors. We need to identify the cross-sector enablers that are not already known and propose the evolution of the sector business models with enhanced ICT services. We must also define the standardisation, regulatory and policy measures to be engaged. The Future Internet System project in Phase 1 will commence development of the predefined enablers and continue to integrate the perspectives developed in the different applications projects which are designed to contribute to the definition of the Future Internet "Generic" Enablers.

In the **second phase,** the main focus will be on the implementation of the test and trial infrastructures in the light of the selected demo scenarios. The system work

will focus on core platform and key developments related to the Future Internet technologies and services and developing the technical enablers identified later in phase 1.

Phase three will be the actual performance of the trials and demonstrations relying on specific prototyping facilities, trials on existing networks and the "real" Internet, e.g. through public networks. The system work in this phase will be to support the applications and the platform instantiations.

In technical terms the FI-PPP targets a versatile and open network and service platform, supported by reusable, standardised and commonly shared technology enablers (technology foundation), serving a lot of the use cases in the smart applications (vertical sectors). The Core Platform validation is supported through large-scale trials in environments including smart urban areas and smart regions. The target platform may draw upon resources from several independently controlled domains, which drives strong requirements towards standardised interfaces. Integration of sensor/actuator networks in the platform to provide physical-world information in support of context-aware smart applications and services is an important technological driver.

Further information on European Future Internet activities is available at *www.future-internet.eu.*

+++ News in brief +++ News in brief +++

Office of EU telecoms regulator to be set up in Riga

On 31 May 2010, the EU telecoms ministers decided that the Office of the Body of European Regulators for Electronic Communications (BEREC Office) will be based in Riga, Latvia. The goal of the BEREC Office is to work closely with national telecoms regulators and the Commission to ensure the further development of consistent regulatory practice in the telecoms sector across Europe. In addition, BEREC will advise the EU institutions on establishing a Single Market for telecoms services.

As the first Administrative Manager of the Office, BEREC selected Ando Rehemaa, Director of the Centre of Registers and Information Systems of the Estonian Ministry of Justice. The European Commission expects that the Office will start its work in autumn 2010. BEREC itself had preferred Brussels as the "optimum location", according to BEREC Chair John Doherty, but was overruled by the Member States.

The Body of European Regulators for Electronic Communications (BEREC), which was established in December 2009, consists of the heads of the 27 national telecoms regulators. The BEREC Office provides professional and administrative support to BEREC's work in assisting the Commission and national telecoms regulators on a wide range of regulatory tasks, for example the scope of the universal service provisions and next-generation access networks. BEREC will also give advice to other European institutions. In addition, the BEREC Office will collect and share information from national regulators and share best regulatory practice.

BEREC replaces the European Regulators Group (ERG), a national regulators group that operated on the basis of consensus and was not formally integrated into the EU's regulatory process.

http://berec.europa.eu

Online video: comedy more popular than news

Comedy has replaced news as the most popular online-video content in the US. This is the key result of a survey by the Pew Research Center's Internet & American Life Project. In 2009, more than half of all US adults (52%), or 69% of adult Internet users, have used the Web to watch or download video.

Half of US video spectators (50%) watched humorous videos, compared to less than a third (31%) in 2007. At the same time, the popularity of news videos dropped from 37% to 43% while the viewership of educational videos rose from 22% to 38% of adult internet users. The share of movies and television show videos rose in viewership from 16% to 32%, but also political videos gained in viewership, from 15% to 30% of adult internet users. Viewership of other types of online video also rose in the same timeframe. The spread of broadband, the increased use of social networking and status-update sites like Facebook and Twitter, the popularity of video-sharing sites like YouTube, and the embrace of video features by untold numbers of websites have all contributed to the surge in online video watching.

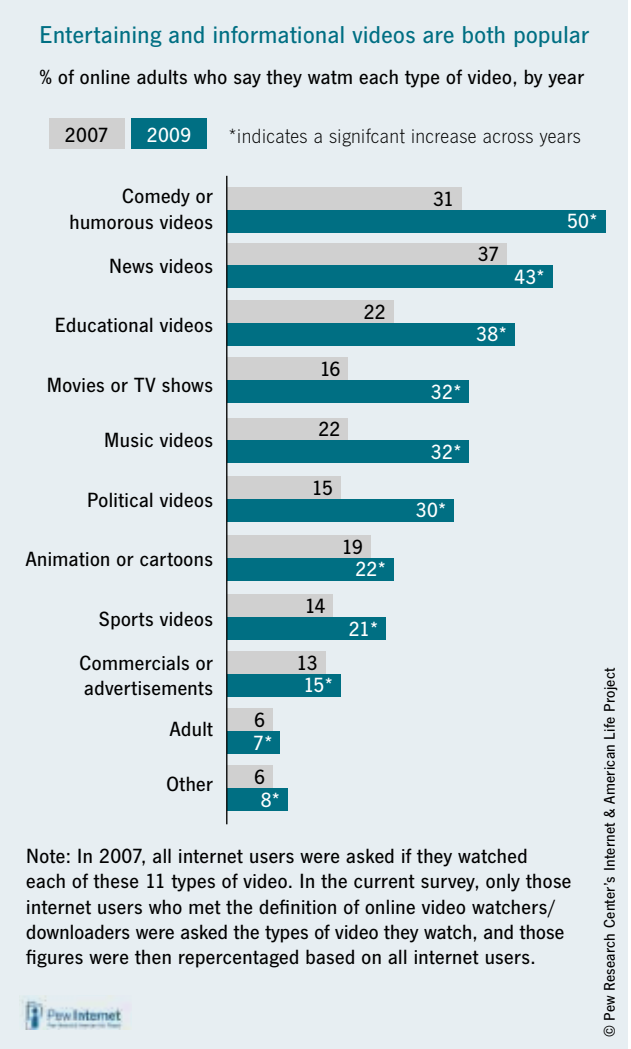
Among online video watchers, 8% have connected their computer to their television so they can watch online video on a television screen. This represents 5% of all Internet users, which is slightly lower than the 8% of Internet users who were watching online video on their television screens in an April 2009 Pew Internet survey. One-in-ten video watchers (10%), or 7% of all Internet users, have paid to watch or download a video. In 2007, 4% of Internet users had paid to access or download video online.

On the other side of the camera, the 2009 survey found that 14% of Internet users have uploaded a video to the Internet so others can watch or download it. That figure is almost double the 8% of Internet users who were uploading video in 2007. Women are now just as likely as men to upload and share videos, and social networking sites such as Facebook are as popular as video-sharing sites such as YouTube as locations for video uploading.

Among video uploaders, there is considerable variation in terms of whom they share their videos with, who they believe is watching and concerns about how their video may be used. One-in-three uploaders (31%) say they "always" place restrictions on who can access their videos, while 50% say they "never" do this. The remaining 19% fall somewhere in the middle.

The Pew survey was released on 3 June 2010 – one day after Internet tracking firm comScore reported that more than 30.3 billion videos were watched online in the United States in April by nearly 178 million Americans.

http://pewinternet.org/Reports/2010/State-of-Online-Video.aspx



Healing vibrations

Therapeutic ringtones from Japan

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For many people in Europe a ringtone is an expression of their individual taste. Even more people regard other people's ringtones as annoying, if they have to listen to them in public. None of them would think that ringtones could be good for your health – except in Japan. There you can now download ringtones that are said to have therapeutic effects.

Ringtones against hayfever

If you go to the Sokuho Music Search (*http://sms.39e.jp*), the mobile ringtone website of Index Corporation, you will find a collection of ringtones designed to cure chronic ailments, like, for example, hayfever. The "Hana Sukkiri Melody" collection promises to clear up your nostrils from nasty pollens. The website claims that the ringtone will resonate in your nose and remove all pollens. There are 27 variations of the ringtone with frequencies ranging from 420Hz to 1070Hz. These vibrations are supposed to shake out cherry blossom and cedar pollens from any nasal cavity.

Asked for scientific evidence, Index Corporation conceded that they have not done any research on the ringtone's effect and that the effectiveness may vary among users. "There is no guarantee that this has real health benefits," a company spokeswoman said.

However, a spokesman of Index said it was "generally understood" that resonance would help hayfever sufferers, if they brought the phone close to their noses. Now, if you happen to visit Japan in spring, don't be surprised to see sniveling Japanese in parks and on the streets holding their ringing mobile phones close to their inflamed noses – instead of answering the call.

Fortunately, not only people with allergies can benefit from therapeutic ringtones. If you suffer from insomnia, the "sleep-promoting ringtone" is for you. Or if you are in a more active mood, try the "make-your-date ringtone". Should you want to beautify yourself before the date, the "make-your-skin-beautiful ringtone" is what you need. The skin cure is done via a mix of electronic Schubert music and woodland noises, such as birdsong and streams. In case you have a hangover after the date, there is also a ringtone for that.

The inventor

All these therapeutic ringtones have been developed by the Japan Ringing Tone Laboratory (JRTL), led by Dr. Matsumi Suzuki. On his website (*http://jrtl.org*) he says that he studies acoustics and analyses voiceprints. Some people regard him as "one of the most famous acoustic scientists globally" (quote from *www.hotdog.com* – online pet store from Singapore). It is said

that his sound analysis has been used to solve crime cases and recreate the trumpeting of the mammoth. In 2006, he even recreated the voice of Mona Lisa, based on an analysis of Leonardo da Vinci's famous painting. For Bowlingual, a computer-based dog-to-human language translation device, he was awarded the humorous Ig Nobel Prize for "promoting peace and harmony between the species".

If this impressive scientific record does not suffice to dissipate any doubts about the seriousness underlying the research of the healing ringtones, the spokesman of Index offers proof which certainly compensates for the shortage of actual experimentation: "The number of downloads suggests the ringtones must be working to a certain extent," he said. In the age of user-driven innovation, this is certainly a remarkable argument.

Attractive noises

Whatever the scientific proof is, the Japanese seem to like therapeutic ringtones. These mobile vibes help the Japanese in almost any situation. There are so-called pherotones with names like Testeroni or El Cuddlero that claim to make you irresistible to the opposite sex. Theres is also a breast-enlarging ringtone, which was successfully launched by a member of the Aum Shinrikyo cult; the ringtone is supposed to make women's breasts grow larger – just by listening. For the more career-focused, Samsung has launched a phone which generates alpha waves that are supposed to enhance memory and concentration.

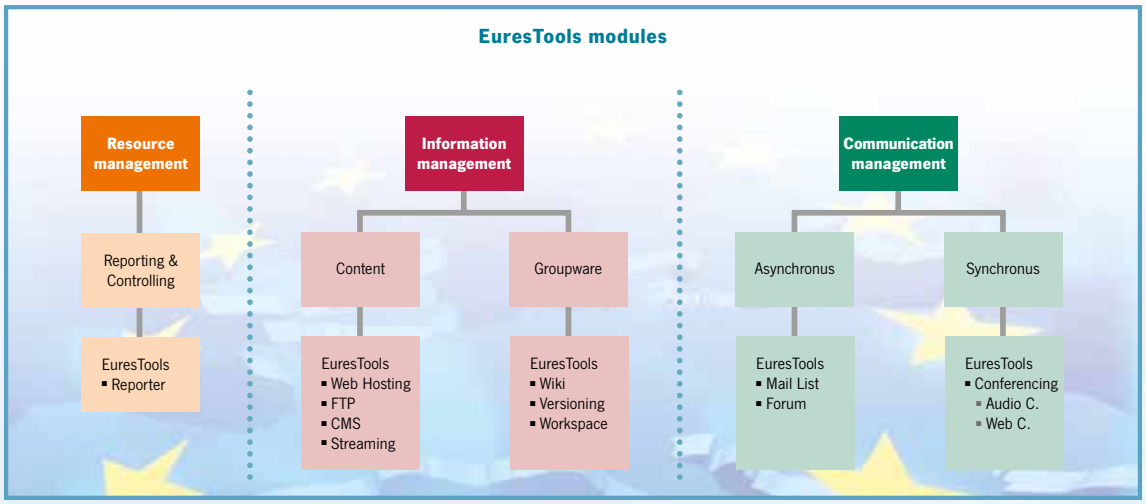
Open research issues

This is all very impressive, and it is really breathtaking to see the advances of mobile applications in Japan. However, there is one thing I cannot fully understand. If these tones have the effect they are said to have, then why only offer them as a ringtone?

Even the most extreme mobile phone addict will sometimes pick up the call and use the phone to talk instead of just listening to the therapeutic or otherwise magic ringtone. Why not just create a nice sound file that you can listen to on an mp3 player whenever you need it? And what about the effects of the ringtone on innocent bystanders? Imagine what could happen if El Cuddlero sounds on your phone and someone you are not interested in gets attracted to you? These are only some of the questions which need to be further researched by Dr. Suzuki and his team at JRTL. And maybe it is now time for Europe to wake up to the Japanese call and do some own research on therapeutic ringtones.

EuresTools

ICT tools for effective management of European R&D projects



The basis for the success of research projects in EU Framework Programme 7 and other European R&D projects are effective management tools which support you in managing resources, information, and communication.

Eurescom offers a comprehensive package of proven management tools, which are tailored to the specific needs of EU projects. The tools are built on Eurescom's 19 years of experience in managing international research programmes and the lessons learned from two dozen FP5, FP6, and FP7 projects as well as around 80 Celtic projects.

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Further information about the EuresTools project management tools is available at **www.eurescom.eu/EuresTools**

Contact us at **services@eurescom.eu** if you would like to discuss the tools you need and to get an offer from us.

"EuresTools, in particular Workspace and Reporter, have been of great help to run the 8 partners and 2.5 years EU FP7 project DAVINCI. The Workspace tool is very convenient. It offers all facilities to organize the project data properly, and allows partners to easily and securely share documents and work together and simultaneously on deliverables. The Reporter tool is another quite useful tool that allows effective planning and tracking of the activities of all partners and work packages in the project on a monthly granularity. The outputs of the Reporter tool go directly into the management reports requested by the European Commission. In conclusion, I genuinely recommend EuresTools for multi-task, multi-partner projects such as EU collaborative projects, as they simply make life easy."

Dr. Alain Mourad, Samsung Electronics Research Institute, Project Coordinator of EU FP7 STREP DAVINCI

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