EURESCOM mess@ge
1/2008
The magazine for telecom insiders

includes CELTIC N • E • W • S

The Future Internet

In focus

NEM – Networked Electronic Media Technology Platform

Project reports

Eurescom study on IMS 2.0 – Constitution of a circle of trust

European issues

FP7 project Omega – Gigabit home network without cable clutter

Panlab Seminar

Testbed Federation in Europe

Dinard, France
13 – 14 May 2008

Purpose of the seminar
The seminar will present the main project results of Panlab on testbed federation for next-generation networks as well as best-practice examples of testing services in Europe.

Target audience
The seminar is targeted at anyone interested in testbed federation, particularly senior R&D managers and experts who provide or use network testing facilities.

Venue
Grand Hotel Barrière, 46 avenue George V,
35800 Dinard, France (Brittany)

Registration
Participation is free of charge, but registration is mandatory to facilitate logistics.
If you would like to participate, we ask you to register by 28 April 2008 via the registration form:
http://www.panlab.net/events/panlab-seminar-2008/registration-for-panlab-seminar-2008.html

About Panlab
The seminar is organised by the EU-funded project Panlab (http://www.panlab.net). The vision of Panlab is to identify the long-term requirements of the ICT industry for end-to-end testing and to satisfy these requirements by providing on-demand access to federated testing facilities via a Pan-European Laboratory organisation. The Pan-European laboratory is based on the concept of federation of distributed test laboratories and testbeds that are interconnected and provide access to required platforms, networks and services for broad interoperability testing.

Website: http://www.panlab.net

Agenda*

Day 1 – 13 May 2008

Opening

Session 1:
European and regional testing service concepts
including presentations by the European Commission, the Panlab project, and ArcLabs, Ireland

Session 2:
Collaboration of testbeds
including presentations by Fraunhofer Fokus and the FEDERICA project

Day 2 – 14 May 2008

Session 3:
Testing services for different stakeholders
including presentations by eMobility, VITAL, Celtic, NetLab, and Keletron

Session 4:
Creation and deployment of testing services
including Panlab presentations by RAD, Dimes, and Fraunhofer Fokus

Session 5:
Case studies of testing services
including presentations by OneLab, ImagineLab, and Easy-C

Session 6:
Panel – pros and cons of testbed federation

Panel participants:
- Anastasius Gavras, Panlab coordinator
- Brigitte Cardinael, France Telecom, head of eMobility working group on testing
- Christiane Schwartz, President of the Media and Networks cluster, France
- Michael Caragiozidis, APEX AG
- Moderator: Milon Gupta, Eurescom

Summary and outlook / closing of the seminar

* The detailed agenda is available on the Panlab website at http://www.panlab.net/events/panlab-seminar-2008.html

Dear readers,

The need to address the shortcomings of the current Internet is becoming ever more important. Worldwide, researchers are discussing concepts of a Future Internet that will overcome the current deficits and enable new services. Europe is particularly active in this field. By now, more than 60 EU-funded research projects are already working on issues related to the Future Internet under the Seventh Framework Programme (FP7).

Thus, we deemed the time to be right for a cover theme on the Future Internet. All the more, as Eurescom and the editors of Eurescom mess@ge are directly involved in some of these EU-funded projects, namely EIFFEL, OMEGA, Panlab, TA2, and Trilogy as well as the European Technology Platforms NEM and eMobility.

There is no doubt that the Future Internet is very high on the European agenda. At a conference held at the end of March 2008 in Bled, Slovenia, high-level experts and decision-makers will discuss the future of the Internet, and how Europe will help to shape it. The two responsible EU Commissioners for ICT and for research, Viviane Reding and Janez Potočnik, are scheduled to open the event. Interestingly, three out of the eight gold sponsors of the event are US companies. This can be seen as an indication of Europe's importance in the area of Future Internet R&D, at least in the eyes of some major players in the US.

The articles in our cover theme give you some selected European views on the Future Internet, including contributions by experts and decision-makers from the European Commission, the telecoms network operators France Telecom and Telenor, FP7 research projects EIFFEL and Trilogy, as well as an interview with an online media expert representing the content provider perspective. These contributions are by no means comprehensive or representative of the European Future Internet activities. However, we hope that they provide some inspiring insights and stimulate a fruitful discussion.

In addition to the cover theme, we have many more interesting topics. Our "In focus" section features an article on NEM, the European Technology Platform on Networked and Electronic Media, which is contributing to the Future Internet discussion as well. The theme of the 2008 NEM Summit in October is "Towards Future Media Internet", underlining the importance of electronic media and content for the Future Internet.

Another important subject related to the Internet is IMS, the IP Multimedia Subsystem, which is an architectural framework for delivering Internet protocol (IP) multimedia to mobile users. Under our "Project reports" section, Philippe Bouillé from Orange Labs writes about Eurescom study "IMS 2.0 – Constitution of a Circle of Trust", which explored a future IMS framework.

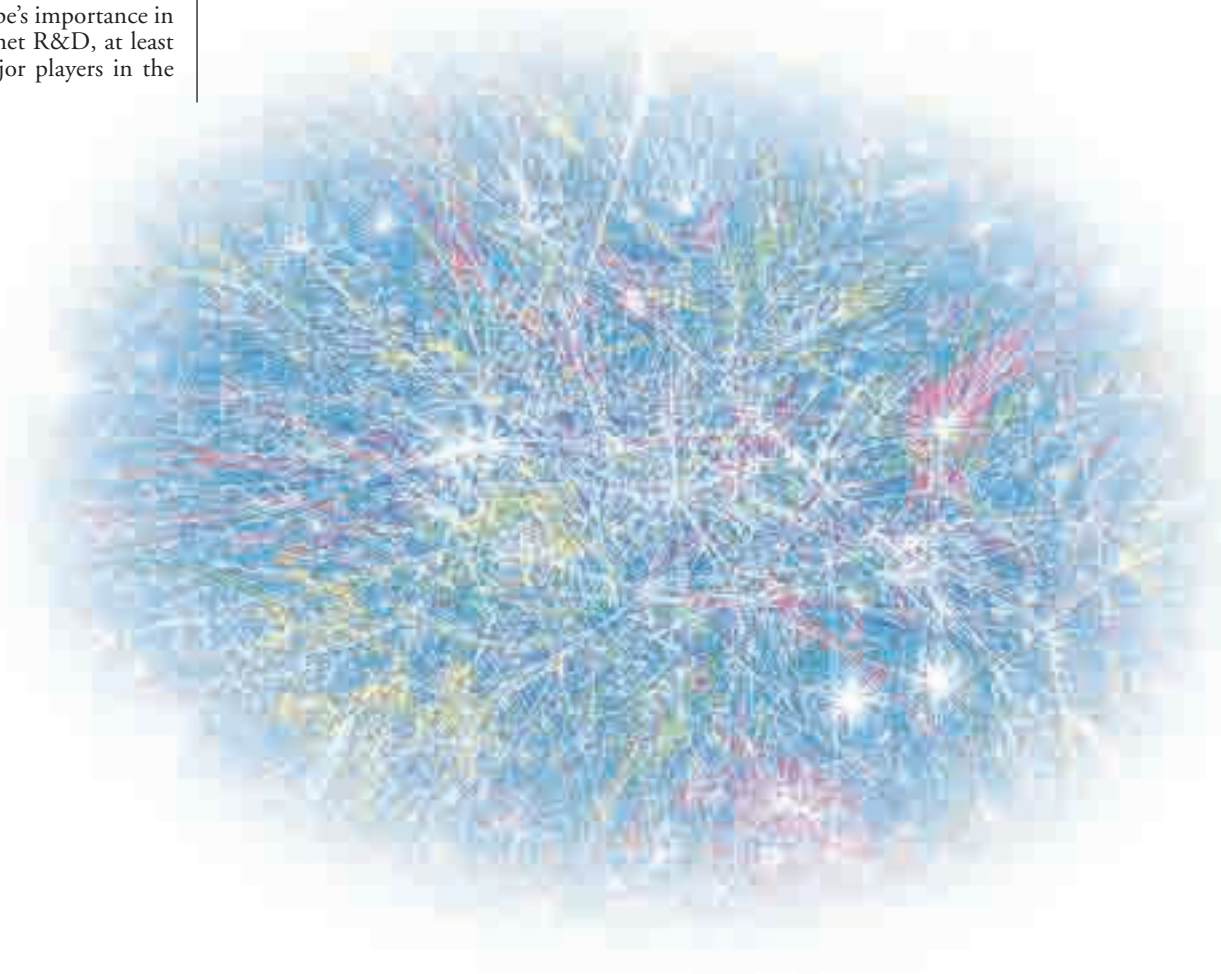
Going from the mobile environment to the home, we feature under "European issues" a report on the vision and goals of the new FP7 project OMEGA, which aims for a user-friendly gigabit home network.

Finally, the "A bit beyond" article presents umbrellas turned into Web 2.0 devices.

We hope you will find some contents in this issue of interest, and we would appreciate your feedback on any of the articles. If you would like to suggest a topic or offer a contribution to Eurescom mess@ge, this is equally welcome.

Enjoy reading this issue.

Your
Eurescom mess@ge editorial team
message@eurescom.eu



Events calendar

31 March – 4 April 2008
The Future Of The Internet
Bled, Slovenia
http://www.fi-bled.eu

22 – 24 April 2008
Wireless World Research Forum, Meeting 20: Future Networks – Cross-Layer Design
Ottawa, Canada
http://www.emobility.eu.org/events.html

23 – April 2008
India & South Asia Com
Mumbai, India
http://www.gsm-3gworldseries.com/newt/l/gsm/events/india/index.html

13 – 14 May 2008
Panlab Seminar – Testbed Federation in Europe
Dinard, France
http://www.panlab.net/events/panlab-seminar-2008.html

14 – 16-May 2008
IST-Africa 2008 Conference & Exhibition
Windhoek, Namibia
http://www.ist-africa.org/Conference2008

10 – 12 June 2008
17th ICT Mobile Summit 2008
Stockholm, Sweden
http://www.ict-mobilesummit.eu/2008

13 – 15 October 2008
2008 NEM Summit – Towards Future Media Internet
Saint-Malo, France
http://www.nem-summit.eu

20 – 23 October 2008
ICIN 2008
Bordeaux, France
http://www.icin.biz

4 – 5 November 2008
Net-atHome 2008
Bordeaux, France
http://www.icin.biz

6 – 7 November 2008
4th International FOKUS IMS Workshop 2008
Nice, France
http://www.net-athome.com

25 – 27 November 2008
ICT Event 2008
Lyon, France
http://ec.europa.eu/information_society/events/ict/2008

Sn@pshot

Attack of the robo-phones

Japanese telecommunications and media company Softbank has launched a mobile phone that can be turned into a humanoid robot, known as Mecha or Transformer.

The SoftBank 815T PB is produced by Toshiba and was created for the new Japanese TV drama "Ketai Sousakan 7", Although it looks like and serves as a toy, it is a real 3G phone, including a 3.2 mega-pixel camera.

Imprint

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Study programme topics 2008

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The Eurescom community continues also in 2008 its commitment to engage in short and focused collaborative studies. The instrument that enables an efficient setup and execution of such studies is the Eurescom Study Programme. During a workshop in December 2007, the subscribers of the Study Programme re-confirmed the value of the programme for its subscribers and outlined the main topical areas for studies in 2008.

During the workshop, which was held in Heidelberg from 10–11 December 2007, with the participation of study programme subscribers and invited guests, two main topical areas were discussed. The first topical area that was rather "dry" but necessary dealt with the revision and update of administrative and operational matters concerning the study programme. The second topical area, which was by far more exciting, dealt with the overall mission and objectives of the programme and contained foresight presentations by Bernard Barani from the European Commission and professor Paul Müller from the University of Kaiserslautern.

Study Management Group

During the workshop, a number of administrative matters were discussed and agreed, such as the framework agreement, the intellectual property handling and the approval process for deliverables. All these issues remain largely unchanged, a fact that confirms the effectiveness of the instrument. The Study Management Group (SMG) was expanded to include representatives from all subscribers of the programme and continues to hold the main responsibility for the technical direction of the programme. Mr. Oddvar Risnes from Telenor was re-elected as chair of the SMG.

Mission and objectives of the programme

The second topical area during the workshop dealt with the revision of the study programme framework document, the so-called stimulus paper, which provides the context for the study proposals and the overall activities within the study programme.

The broad topics of the programme will continue to focus on new service opportunities, convergence and interoperability, business models and, last but not least, the socio-economic dimension and political drivers.

In particular a number of technological research drivers have been identified that should be addressed by studies in the near future. These research drivers include:

- Convergence emphasises the need to provide varieties of differentiating services
- Limitations of vendor service platforms
- Limitations of reference frameworks (OSA/Parlay, Liberty Alliance, and others)
- The need to equally serve business and individual environments
- Intertwined network and service layers
- Context awareness and personalisation
- Limitations of the static characteristics of service configurations
- Platform-independent service execution environments
- Virtualisation of networks and computational resources
- Understanding user behaviour
- Semantic service platforms

A further group of issues is emerging from the currently ongoing discussion on the fundamental architecture of the future network, also termed Future Internet. A particular issue is that the future network must not make any presuppositions about how it will be used. The main characteristics should be flexibility, scalability and application neutrality. These characteristics may lead to new business models and value-chains, which the study programme aims to identify as early as possible.

About the study programme

The Eurescom Study Programme continues to be financed by its subscribing members, and their commitment is underwritten by their upfront payments to the programme's budget. Collaboration remains the fundamental working principle underlying the study programme. Any network operator or service provider may become a subscriber of the study programme and participate in it, if he shares the interest of having the substantial issues facing the telecoms industry addressed 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.

For more information on the Eurescom Study Programme, or if your company is interested to subscribe to the programme, please visit the Eurescom website at *http://www.eurescom.eu*

The Future Internet

Challenges and initiatives

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In the last three decades, the Internet has developed from an arcane network for scientists into the global hub for information and communication, permeating all areas of public and private life. The Internet can be compared to a log cabin built for woodcutters, which has been expanded to a multi-storey building for businessmen and shoppers, without changing the foundation. So, not surprisingly, the need has arisen to review the architecture of the Internet in order to address its current problems and make it viable for the future.

The development of the Internet

When Charley Kline, student programmer at the University of California in Los Angeles, sent the first text message via the ARPANET on 29 October 1969, he could not have known how the networking of distant computers would lead to a change of global communications, society, and economy three decades later. Especially not, if you look at the humble results of this first effort: the transmitted message was "lo" – the system crashed before he could finish typing "login". The term "Internet" was coined five years later, in 1974, by Vinton Cerf, whose group at Stanford University created the TCP/IP protocol suite, which is still the basis of the Internet.

In the late 1980s, the Internet gained momentum in Europe, driven by the CERN in Switzerland, which opened its first external TCP/IP connections in 1989. In the same year, CERN researcher Tim Berners-Lee invented the World Wide Web. However, the real Internet boost started only after the Mosaic Web browser was introduced in 1993, a graphical browser developed by a team led by Marc Andreessen at the University of Illinois.

These developments are reflected in the rapid growth of the Internet starting in the late 1980s. According to the Internet Systems Consortium, the number of Internet hosts grew from 213 in 1981 and 159,000 in 1989 to 3.9 million in 1993 and 541,7 million in January 2008. The number of Internet users reached 1.3 billion in December 2007, which equals about one fifth, or 20 percent, of the global population.

Challenges

The rapid growth of the Internet, both in terms of data traffic and in terms of diversity of services, has led to a high complexity of the Internet architecture, which is ever harder to manage, the more the Internet grows and the more new services are added. Over time, a number of additional protocols have been put on top of the TCP/IP protocol suite, in order to accommodate the increased requirements of fixed and mobile Internet services. There are currently close to 40 different protocols on the data plane and more than 40 protocols on the control plane of the Internet.

The entirety of these protocols looks more like a patchwork than a consistent architecture that addresses current and future challenges. In the course of deploying these patches, almost all of the original architectural principles have been breached. This has led to a number of urgent problems, particularly in the areas of security and scalability. Some pundits even speculate that the Internet may soon be on the brink of collapsing, if its rapid growth continues.

The challenges resulting from the current patchwork architecture are manifold, and the goals for the envisioned architecture are sometimes conflicting. Although there is no common and agreed vision yet, most experts would probably agree that the Future Internet should be dependable, scalable, manageable, sustainable, and flexible in order to integrate new services yet unknown.

The main challenge is to develop an Internet architecture that has all these attributes. Will it be possible to protect users from spam and malicious code, yet retain the openness of the Internet? How can privacy and accountability be reconciled? Can the Internet be open for a multitude of new services while at the same time ensuring high reliability?

So far, the experts are still struggling to comprehend the scope of the challenges. The right approach for addressing these challenges is even more unclear yet.

Clean slate versus evolution

How the Internet should be brought into shape is currently the subject of a controversial discussion among experts. The two main approaches to engineering

the development of the Internet are the clean slate design and the incremental evolution. The proponents of the clean slate design want to re-design the Internet from scratch and replace the current patchwork with a new Internet architecture. Advocates of the incremental evolution approach consider the clean-slate approach as not feasible and compare it to replacing the engines of a jet airliner in mid-flight. Instead, they suggest incremental improvements, addressing one challenge at a time.

European and global initiatives

Plenty of research will be needed to solve all the challenges related to the Future Internet. This time, Europe aims to have a bigger say in the directions of the Future Internet than it had in the first edition. The European Commission has already committed several hundred million euros to collaborative research projects in the Seventh Framework Programme (FP7). In addition, a comparable level of research funding for Future Internet research is distributed by European countries through programmes like Celtic, the Eureka Cluster dedicated to telecommunications, and through national programmes.

However, competition for defining the Future Internet outside of Europe is strong, and, thus, Europe needs to do more, if it wants to achieve a strong position in the further development of the Internet. Future Internet activities are taking place in the United States, where the research initiatives FIND (Future Internet Design) and GENI (Global Environment for Network Innovations) have been launched. In Asia, the Photonic Internet Forum in Japan and the Future Internet Forum in Korea are noteworthy.

In addition, there are the international activities of the Internet Engineering Task Force (IETF) and the Internet Research Task Force (IRTF). European researchers have continuously contributed to the work of both IRTF and IETF. However, critical voices say that these organisations have not significantly advanced the basic architecture of the Internet in over 15 years.

In view of initiatives from other regions and the lack of innovative drive at the relevant international bodies, Europe is under pressure to act in a more coherent and determined way to ensure that European research results on the Future Internet will have a global impact.

This includes increasing European funding for Internet-related work and moving faster in establishing European views on the Future Internet. Otherwise, the European communications industry will miss the chance to be competitive on the global market. If Europe fails to achieve a common view on the future networked society, and the future network at the core of it, Europe will be forced to adopt concepts suitable for other regions of the world, whose requirements are very different from those in Europe.

The recent proposal by the European Commission to start a European Future Internet Assembly can be regarded as a first step towards building a common European view. The success of ensuing steps will depend on how closely and creatively European industry, academia, and funding bodies will work together to develop a vision of the future networked society and the future network enabling this society. In this context, ideas are emerging for creating a European Future Internet Joint Technology Initiative or a European Future Internet Forum, or both.

Whatever steps Europe will take, the race for defining the Future Internet has started, and its outcome will have a deep impact on society in the next decades.

Further information is available on the European Future Internet Portal at *http://www.future-internet.eu*

EU approach towards the Future Internet

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As part of the preparatory process leading to the definition of the ICT activities of the 7th Framework Programme of R&D, the European Commission took steps towards the creation of a Future-of-the-Internet Think Tank, which was tasked to provide a position paper that could help framing future co-ordinated actions at EU level. It was indeed felt that the activities under FP7 would benefit from a more systematic and co-ordinated approach notably in what concerned the Future of the Internet.

A number of drivers framing the future technological developments were identified such as:

- The increasing pervasiveness of mobility and wireless technologies.
- The soaring number of connected devices, eventually leading to sensor networks and the Internet of Things.
- The insatiable demand for bandwidth, and underlying "unlimited capacity" core networks.
- The accelerated race for processing power and memory increase, continuing to support the trend of more and more intelligence at the network periphery.
- The expected heavy increase in digitized media, user generated content and associated service requirements for data search, handling, and organisation.
- Location determination, as an important enabler for new categories of context aware services and of multi network services.
- End-user-provided infrastructure and services, possibly driving a user-generated infrastructure, similarly to the trend towards user-generated content.
- Security and resilience of the infrastructures, associated to growing concerns for privacy in an environment where users (or their attributes/avatars) will have multiple identities and identifiers:
- More and more intelligent devices with self-adaptation/context awareness characteristics.
- Service dynamic adaptation and service configurability, with service platforms providing the agility for ad-hoc coalition of resources.

The approach taken from the outset was to encourage an academic industry partnership leading to coherent industrial research roadmaps in partnership with university research. Four European Technology Platforms active in the domain of networked systems and technologies (eMobility, NEM, NESSI, ISI) were, hence, called upon to assist in the process.

The result of all these efforts is now clearly visible with over 60 research projects having been contracted further to the first ICT Call for proposals. Additional projects arising out of the second Call of FP7 are currently in the negotiation phase. The variety of perspectives taken by these projects is well in line with the technological and societal drivers identified by the Think Tank whilst providing a visible European counter part to Future Internet initiatives started in other regions of the world.

Towards a collaborative platform

The magnitude of the effort, much beyond that of other regional initiatives, should provide a unique opportunity for Europe to investigate a number of technological and associated policy domains that have a bearing on the network and service infrastructure elements of the Internet of tomorrow. Reaping the maximum benefits of such a comprehensive portfolio of projects, however, requires the emergence of cross-domain synergies, holding the potential for disruptive and innovative change. Indeed, whilst other "Future Internet" initiatives in the world are primarily focusing on "network architecture" issues, the ICT programme has adopted a holistic approach, tightly embedding the network, content, objects, service and security dimensions.

The European Commission has, hence, called for the launch of an ambitious collaborative platform between the R&D stakeholders representing academia, research institutes and industry, represented notably by the European Technology Platforms active in the field, such as eMobility, NEM, NESSI, ISI and EPoSS. The multiple facets of the issues surrounding the further evolution of the Internet must be tackled in such a way that Europe's knowledge base and competitiveness are enhanced and bold steps are taken to shape and drive the Future Internet. Amongst the many questions that may be raised in the context of cross-domain research, the following provide a mere illustration of the issues at stake:

- How will the developments in the content and (3D) media sphere impact the network and service architectures? Which limitations will these architectures impose?
- What will be in the network and what in the service layer? How will virtualisation of storage and processing power impact on service delivery?
- What are the new security, privacy and trust requirements to be expected as a result of the new media Internet? Which are the implications on content arising out of developments in security? Where to focus attention on? Identity, privacy, trust, reputation?
- How will the virtual worlds and content services be influenced by the developments on the Internet of Things? Which critical search-and-find solutions need to be developed?
- What needs to be done to lower the barriers for service development? Is there scope for an open service framework for mobile media services? How fast will the mobile Internet evolve? What are the implications?
- How will the infrastructure be influenced by the developments on the Internet of Things? Which architectural issues for a future Object Name Service (ONS)? What are the likely developments beyond Near Field Communication (NFC), and which critical operational and management solutions need to be considered to cope with sensor-based edge networks?
- What are the requirements for large-scale testbeds and experimental facilities as seen notably from a content and media and service perspective? Which are the key elements of such large-scale European facilities?

As an initial step towards the setting in place of such a collaborative platform, a conference is currently being organised by the Slovenian Presidency in Bled (31 March – 2 April 2008), which, no doubt, will create the much needed European momentum towards the Future Internet. Opportunities for action at European level will be explored with the intention of further facilitating and mobilising the relevant research constituencies, be they at European or national level.

Steps toward the next FP7-ICT Work Programme

As we consider the future FP7-ICT Work Programme, on the basis of which further calls for proposals will be launched, it becomes clear that the research effort in this field will have to be further refocused and reinforced to ensure European leadership in developing the Future Internet.

A federating approach needs to be developed around the following themes:

- The "Network of the Future" with a focus on solutions to cope with the issues of capacity, mobility, scalability and flexibility of the ICT infrastructure.
- The "Internet of Services" with a focus on issues such as virtualisation, dynamically composed service overlay over a modified network structure and joint service execution environments.
- The "Internet of Things" with a focus on networked object management and associated service and data discovery architectures, with integration in generic business environments.
- The "Security of ICT infrastructures and services" with a focus on secure, resilient and trusted networks and service architectures and composite end-to-end services, as well as identity management and business and personal data protection and privacy.
- The "3D Media Internet" with a focus on the architectural and related technological implications of 3D virtual environments over networked platforms.
- The "Experimental Facilities" with a focus on experimentally-driven research projects, which cut across several layers from connectivity via service architectures to applications, thereby addressing the Future Internet from a broad system perspective.

A wide ranging consultation with the concerned actors has been planned over the first semester of 2008, to devise a Work Programme that best responds to the major transformations expected in the coming decade – notably in what concerns the industrial and business landscape, and in ICT technologies and infrastructures.

The discussion on the elements of the Work Programme that pertain to the Future Internet are clearly of utmost importance in this regard, as tomorrow's networked world, ever more pervasive and more ubiquitous, will have profound economic and social impact while becoming more essential for everyday life. Our response to the globalisation of markets, keener competition, the ever-faster pace of technological change, and new value chains is a key challenge for the EU.

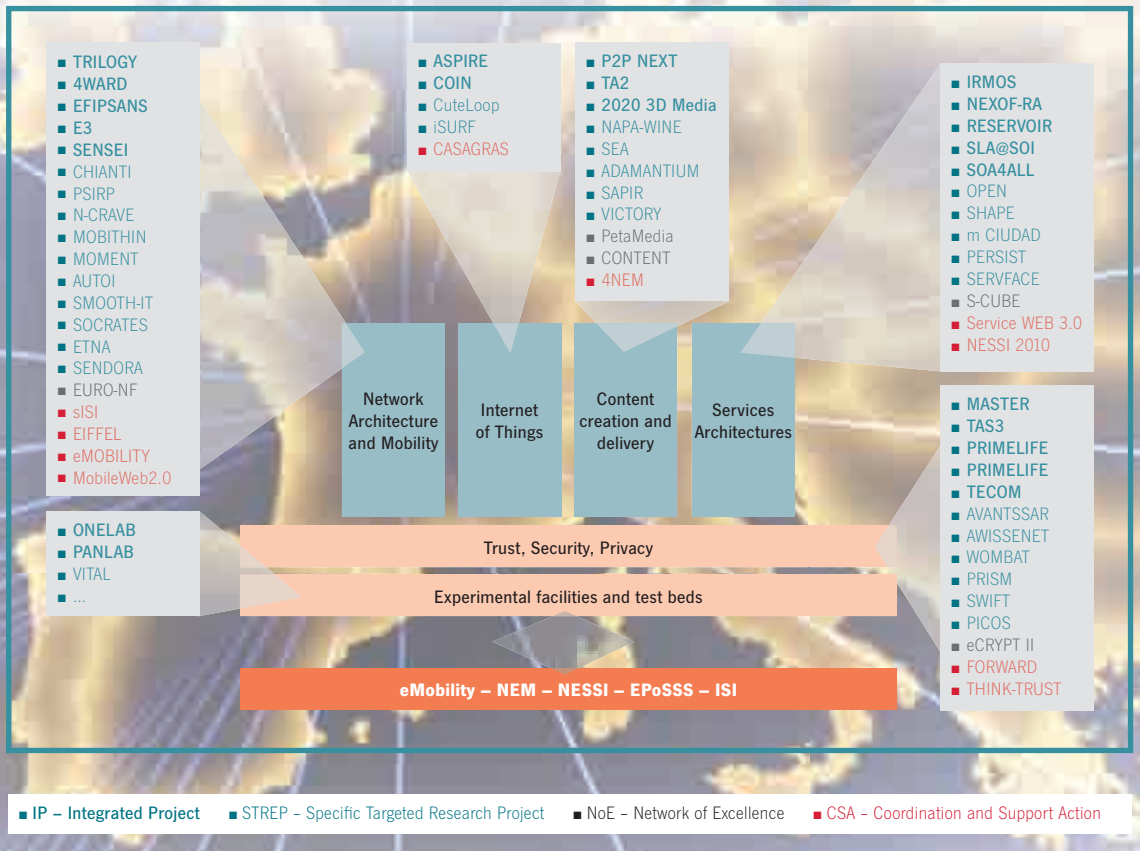

Figure: EC-funded projects in the Future Internet area

Shaping the Future Networked Society

How EIFFEL supports the Future Internet

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We are heading inevitably towards the Networked Society. It is important that different actors, including citizens, participate in making it a successful and desirable outcome. The European Union has identified this opportunity and has so far already committed hundreds of millions of R&D funding through different instruments to enable the development of the Future Internet. Among the new projects funded by the EU is EIFFEL, a Support Action that aims to facilitate a high-level think-tank and encourage a collaborative R&D approach of European stakeholders from industry, public institutions, and academia towards the Future Networked Society.

Today's Internet was never designed to be a critical part of the worldwide economy's infrastructure and an integral part of our society, but it has become exactly that. The Future Internet must not be seen as a mere technical entity, but as an enabler of the Future Networked Society. This leads to the logical conclusion that new research initiatives and approaches are needed to cover all aspects and more interdisciplinary research is required in this domain.

It is of key importance to achieve a balanced research agenda towards the Future Networked Society. There is a clear need to further support evolutionary, applied, engineering research, based on present industry projections towards the future. But this is not going to be enough to ensure that Europe grasps the great opportunities offered by the Future Internet. The evolutionary path has to be complemented by a portfolio of radical exploratory research activities that will push beyond the limits of existing ideas, architectures and technologies.

The EIFFEL Support Action is designed to ensure that there is enough interaction between the community undertaking exploratory, fundamental-type research and the more engineering based approaches, including the possibility that interdisciplinary approaches are considered and debated outside of the limits of narrow technical projects. The EIFFEL project will set up a pan-European discussion forum and an international technical think-tank for enabling discussions on the future of the Internet, particularly on network architecture and governance issues. Although EIFFEL leverages European experts, it is uniquely an international, peer-recognition based think-tank, which will be embracing experts from around the world.

Technical experts will explore and debate areas relevant to the shaping of the Future Networked Society, study the fundamental challenges of improving the Internet architecture and related technologies, and develop a vision for the Future Networked Society. EIFFEL will facilitate and cross-fertilise scientific investigations targeted at deployable Internet design principles. It aims to be a catalyst through its debates and white papers; it will not do fundamental research, nor coordinate research activities. It will provide a platform for different experts to debate, exchange ideas and build common roadmaps.

Furthermore, EIFFEL will identify research areas that are crucial for the transformation of the current Internet towards the Future Networked Society and support holistic, multi-disciplinary approaches for these investigations.

There are many questions on how the Internet will develop in the future. What has been clearly identified is that the Internet must progress and that the rate of progress must be revolutionary. Once we determine what sorts of transformations are needed, we could start working on how to migrate from today's Internet to the forecasted Future Internet, or the Future Networked Society.

The Networked Society in 2025

A major result of the EIFFEL project will be a vision of the Future Networked Society in the 2025 timeframe, as well as an outline of the technical areas of importance for realizing it. EIFFEL will also build bridges across disciplines and between the different communities in order to shape the Future Networked Society as well as establish the European voice in exploratory research towards it, eventually aiming at constituting the European arm in any international activity.

EIFFEL will also support the coordinated exchange of information between the European research community working in the area and research programmes in other regions of the world, thus contributing to the future harmonisation of viewpoints in technology, governance, privacy and societal aspects related to the Future Internet.

Europe has the opportunity to make a major contribution towards the Future Internet and set the stage for the Future Networked Society. The challenge is now to reach out to build a common European view and act together internationally in shaping the Future Networked Society.

Further information is available on the EIFFEL project website at *http://www.fp7-eiffel.eu*

Architecting the Future Internet

The Trilogy project

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The Internet is out-growing its original design. Evidence for this is widespread and the problem is affecting all the various stakeholders in different ways. End-users are plagued by spam and security worries; operators are spending ever more effort to mitigate the effects of address space depletion and the limitations of current inter-domain routing protocols; enterprises face complex trade-offs when trying to ensure resilience through multi-homing or protection from distributed denial-of-service attacks, and application developers have a mountain to climb in order to circumvent the presence of middleboxes in the end-to-end path. It is now the right time to develop a new design that is cognisant of the competing technical, economic and social demands that must be met by the global information network.

To re-architect the Internet in this way is no small undertaking, but that is precisely what the Trilogy project has set out to do. Launched at the beginning of 2008, Trilogy has a vision of a coherent, integrated and future-proof architecture that unifies the heterogeneous network, offering immediate deployment rewards coupled with long-term stability.

The Trilogy concept: architecture for change

There are two key ideas behind the Trilogy concept. The first is technical: the traditional separation between congestion control, routing mechanisms, and business demands (as reflected in policy) is the direct cause of many of the problems which are leading to a proliferation of control mechanisms, fragmentation of the network into walled gardens, and growing scalability issues. Re-architecting these mechanisms into a more coherent whole is essential if these problems are to be tackled (see figure 1).

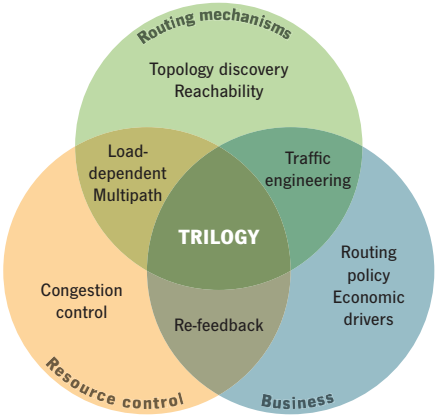

Figure 1: Trilogy concept: architecture for change

The second key idea is more abstract, but fundamental. It recognises that the success of the Internet derives not directly from its transparency and self-configuration, but from the fact that it is architected for change. The Internet seamlessly supports evolution in application use and adapts to configuration changes; deficiencies have arisen where it is unable to accommodate new types of business relationship. To make the Internet richer and more capable will require more sophistication in its control architecture, but without imposing a single organisational model. Therefore, Trilogy's key principles are to retain the ubiquity enabled by the hourglass model (see figure 2), and take the self-configuration philosophy one level further: we seek a control architecture for the new Internet that can adapt in a scalable, dynamic, autonomous and robust manner to local operational and business requirements.

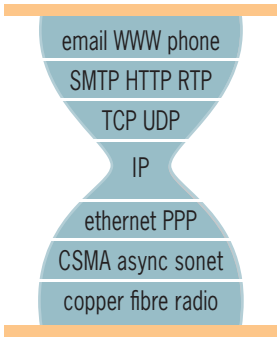

Figure 2: The Internet's hourglass

Conclusion: an Internet hourglass for control

The design principles that have enabled the ubiquity and robustness of the Internet are simplicity and transparency: IP over everything and everything over IP. It has thus been simple to link any new network to the Internet, providing instant benefits resulting from the interconnectivity with a huge range of communicating peers; and the transparency of the Internet has facilitated the deployment of successively more complex network-agnostic applications and services. Together, these two attributes characterise the hourglass approach to network architecture. For the Internet, this hourglass approach has led directly to a virtuous circle of increased network reach enabling new styles of usage and vice versa (see figure 3).

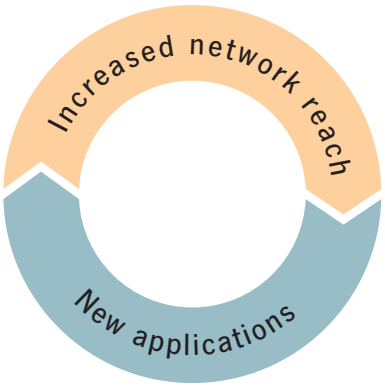

Figure 3: A virtuous circle of new applications and network reach

Unfortunately, this hourglass picture omits the mechanisms needed for control, and while such mechanisms have proliferated, they are typically imprecise and inelegant solutions that work against the original benefits of the hourglass approach. Trilogy therefore seeks to design an hourglass control architecture for the Internet supporting extremes of commercial, social and technical control. The objective is bold: to re-architect the world's ICT infrastructure by delivering a coherent set of changes solving technical and commercial problems together.

You can find more information on Trilogy at *http://www.trilogy-project.eu*

CELTIC N • E • W • S
Telecommunication Solutions

CONTENT

EDITORIAL

Dear reader,

Celtic has now really taken off the ground and has become a very successful EUREKA ICT cluster since it started in 2003. After the already very successful 4th Call an even better Call 5 followed, where in total 26 project proposals received a Celtic label.

In 2008, we expect to have around 70 projects launched, totalling to a budget of more than 500 million euro and over 5,000 person years of effort. It is also interesting to note that the success rate for project proposals to become a labelled Celtic project is around 70%. Very satisfactory for Celtic is also the fact that the participation of small and medium sized companies has increased to over 30%.

In this issue, we will focus a bit closer on the success factors of Celtic. These are, at first, the very satisfactory projects that finished in 2007, and, secondly, the very much appreciated Celtic Event, with presentations and showcases of running projects. In the following articles, these points will be further described. Finally, we will present the newly launched 100GET project and the achievements of two recently finished projects.

Heinz Brüggemann
Director Celtic Office

Celtic Excellence Award

Six projects selected for their outstanding achievements

For the first time, 6 completed Celtic projects of call 1 and call 2 have been granted the Celtic Excellence Award for their outstanding achievements.

The award candidates had been selected on the basis of the outcomes from their mid-term and final reviews, where 10 of the most successful projects had been identified. These projects were then asked to provide additional achievements on the usefulness and further use of the produced results, their impact on new products, new income sources, and new jobs. In addition, influences on standards, patents and the return on investment had been taken into account.

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Finally, the following six projects were identified as award winners:

- FIDELITY, which is also selected as "Project of the Year 2007"
- BANITS
- GANDALF
- BUGYO
- Wing-TV
- MADEIRA

In addition, the following projects have been identified among the 10 best Celtic projects:

- ECOSYS
- MACS
- ENCOMPAS
- QUAR2

Award ceremony in Helsinki: Celtic Chairman José Jimenez, Dr. Zwi Altman from the GANDALF project, and Celtic Office Director Heinz Brüggemann (from left)

Conclusion

It was impressive to learn how successful several of the finished projects were at the end. Their results were, in some cases, directly used to develop new products or to create new jobs. Furthermore, the return on investment, as far as this could already been estimated, indicated a clear case that the investment in those research activities generated a good return and new income.

All selected projects were already presented in earlier issues of Celtic News. On the Celtic Website at www.celtic-initiative.org, you will find further information on the awarded projects, including the final project leaflets.

The challenges of the Future Internet for the telecommunications industry

Third Celtic Event in Helsinki

From 27 to 28 February 2008 the third Celtic Event took place in Helsinki, Finland. Under the title "Telecommunications and Next Generation Internet" 250 international experts discussed the latest Celtic results and challenges for the future business at the Marina Congress Centre in Helsinki.

Keynotes on innovation

The Celtic Event was opened by Petri Peltonen, Director-General from the Ministry of Employment and the Economy in Finland. In his talk he discussed the new dimensions in the Finnish innovation policy. According to Mr Peltonen, the Finnish innovation policy is currently moving from a more knowledge-based innovation policy ("knowledge-push") to a more demand-based innovation policy ("demand-pull"). The strongest incentive for innovation is competition and new business opportunities, said Mr Peltonen. He expects that by 2015 the number of innovative firms in Finland will have doubled.

In another keynote speech, Hannu Nurmi from Tekes presented the new strategic centres for science, technology and innovation in Finland. In the first phase there will be five non-profit strategic centers: the forest cluster, metal products and

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mechanical engineering, energy and environment, health and well-being, and ICT industry and services. The mission of these strategic centers, which are currently defined and set up, is to create new global ICT-based business ecosystems. A strong international collaboration is considered as essential and will be supported.

The Celtic chairman José Jimenez from Telefónica gave an overview on the current status of Celtic. He explained three major research lines, focusing on the challenges of telecommunications and the next generation Internet. These research lines should concentrate on new income sources from new multimedia services, on new personalised services by looking at new service platforms, and on better operations by investigating new infrastructure solutions including mobile. He explained how far these research lines are already covered by Celtic projects and which gaps still need to be filled.

Dr. Aleš Mihelič, the EUREKA Chairman of the Slovenian EUREKA Chairmanship, presented the position of EUREKA towards the new challenges. EUREKA has strong advantages of being close to the market, responding faster and easier to the needs of the industry, among other aspects, also related to the bottom-up approach, said Dr. Mihelič.

Luuk Borg, the head of the EUREKA secretariat, presented the new EUROSTARS initiative, which is particularly targeted at providing funding for SME-driven projects.

On the second day, Daniel Kofman, professor at Telecom ParisTech and CTO of RAD Data Communications in Israel, presented his thoughts on the next-generation Internet and its impact on telecommunications.

His talk was followed by the speech of Dr. Joao Schwarz da Silva, Director of Converged Networks and Services in the Information Society and Media DG of the European Commission, who discussed the European view on the Future of the Internet and the currently planned activities in this important field.

Panel discussion

At the panel discussion, chaired by the EUREKA chairman, Dr. Aleš Mihelič from Slovenia, representatives of the Public Authorities and of some successful projects discussed how the results could be better transformed into products, and how the return on investment could be further increased.

Tiina Nurma from Tekes stressed that the main focus on research within EUREKA is expected to be industry-driven, focusing on the shorter-term needs of the industry. Exploitable results are therefore essential. Innovation needs network actions; no innovation without sufficient and international consortia.

Jonas Wallberg from Vinnova Sweden reminded the audience that it generally takes more than five years until results are turned into products. Experiences of Celtic are positive, as it offers a good framework for co-operation, involving many small and bigger organisations, which can gain a lot.

New strategies of Celtic are very important, and there is a need to align the strategies with the national research programmes. Jésus Caňadas from the Spanish Public Authority gave a presentation on the Spanish experience with Celtic projects and their results. The highest interest of the Spanish government is the generation of products as important outcome from projects. Celtic is a way to create synergies between the ETP. There will be again substantial increases in funding.

Dr. Effi Bergida from the Israeli Public Authority gave an overview on Israel's Celtic participation. Israel has a very high investment in R&D, which is over 4.5% of the GDP. As the local market is very small, the international aspects, in particular international R&D, have a high priority; cooperation with Europe is the highest.

One particularly important requirement for commercially exploiting project results is a short time to market. The weak point in EUREKA is particularly the long duration of occasionally over one year, which is sometimes required to agree on funding and to start a project. This long duration needs to be shortened, if Celtic wants to stay close to the immediate market needs, said Dr. Bergida.

Furthermore, the views from the industry, expressed by successful project participants, on the positive and negative aspects of R&D within the EUREKA framework were presented in the panel discussion. Bertrand Marquet from the BUGYO project explained that his first experience of a EUREKA-type project was extraordinarily positive. He proposed that projects should consider an advisory board to assure cross-domain collaboration. Luis Perez Roldan from Telefonica, responsible for the BANITS projects, presented results on newly generated business, new jobs, and new products. These positive outcomes have strengthened the competitive positioning of the project companies. Ilari Welling from Nokia Siemens Networks, responsible for the project ECOSYS, provided the experiences from his projects. The results were of more immaterial nature and were not intended to directly lead to new products.

In the panel the question of providing some kind of "after-sales service" beyond the projects' lifetime was discussed. There is obviously a lack of information provided to the public and to tax payers.

After the panel discussion, speakers from two of Celtic's largest projects, B21C and 100GET, gave an introduction on their work. B21C is dealing with the validation of digital broadcast standards based on DVB-H and on the elaboration of DVB-SH (hybrid satellite/ terrestrial broadcast) as well as on the next generation terrestrial standard DVB-T2. The project is very large with 35 organisations from 9 countries involved, covering a budget of about 20 million euro.

The largest ongoing Celtic project is 100GET, working on 100Gb/s carrier grade Ethernet transport networks. This project has a budget of around 60 million euro, and it includes 37 partners from 4 countries. In his presentation, Kurt Loesch from Alcatel-Lucent explained the project plan and the expected results.

In the final presentation, Anastasius Gavras from Eurescom, coordinator of EU-funded FP6 project Panlab, provided an overview on the current status of the Panlab activities and the future expectations and concepts for using the Pan-European Laboratory as a flexible platform for Future Internet research.

Exhibition

In the parallel exhibition, 20 Celtic projects, including some Finnish projects of the Tekes GIGA programme, presented their results. The outstanding Celtic project results shown at the exhibition included, among many other items, a medical robot operated over a DSL connection and a HDTV multicast distribution service and a P2P HDTV service over a RPR ring (BANITS-2). Furthermore there was a demonstration of recovery mechanisms and network performance (TIGER), a real-time demonstration of the performance of the DVB-SH air interface (B21C), and a wireless traffic service platform for linking cars (CARLINK).

Several Finnish organisations and companies, largely included in the Finnish GIGA programme, also joined the exhibition by presenting their results and contributions to Celtic projects.

Further information is available on the Celtic Event website at *http://www.celtic-initiative.org/Events/Celtic-Event08-Helsinki/welcome.asp*

New Celtic project 100GET develops 100 Gigabit Ethernet

More bandwidth and security for the Internet of the future

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A new Celtic project has started to work on innovative technical solutions that will lead to more bandwidth and security in the Internet backbone networks. Celtic project 100GET works on a giant leap in the evolution of transport technology – the development of 100 Gigabit Ethernet.

100GET is currently the biggest Celtic project. It has only recently been launched and is organised as four connected subprojects, coordinated under the 100GET umbrella.

"The strong growth of traffic in data networks and high pressure on transport costs will soon lead to a strong demand for next-generation Ethernet technology. 100 Gigabit Ethernet is the next logical step after today's 10 Gigabit Ethernet," said 100GET's project coordinator Kurt Loesch from Alcatel-Lucent.

The traffic on the Internet is increasing at a rapid speed. More bandwidth in the metro and core networks isrequired to cope with this steady increase.

From mid-2006 to mid-2007, Internet traffic grew by more than half (57 percent). Bandwidth-hungry applications in areas like music or video downloads, e-commerce, web-based training, and telemedicine will further push Internet traffic to its limits, requiring more capacity in the Internet backbone. New Internet services and applications are increasing the demands on transmission capacity, security, robustness and quality of network connections in core, metro, and access networks.

Celtic project 100GET addresses this challenge by expanding the capacities of the Ethernet networking standard, which will be the dominant transport technology of next generation metro and core networks. The main goal of 100GET is to develop carrier-grade transport networks based on a data transmission rate of 100 billion bits per second over Ethernet at high quality.

Partners in the 100GET project include leading companies and research institutes in the field of communications technology like ADVA Optical Networking, Alcatel-Lucent, Ericsson, Nokia Siemens Networks, and Deutsche Telekom, and Fraunhofer Heinrich-Hertz-Institute. There are altogether 37 project partners from Germany, France, Sweden, and Finland. 100GET has a duration of three years until 2010 and has a budget of nearly 60 million euro. It is co-funded by the German Federal Ministry of Education and Research (BMBF), the French Ministry of Economics, Finance and Industry, the Swedish Governmental Agency for Innovation Systems (VINNOVA), and the Finnish Funding Agency for Technology and Innovation (Tekes).

100GET project presentation in a video film produced by BMBF, the German Federal Ministry of Education and Research

Further information is available at *http://www.celtic-initiative.org/Projects/100GET*

DeHiGate – Deployable High Capacity Gateway for emergency services

The Deployable High Capacity Gateway empowers the public safety and security authorities with a complete solution for emergency data services. The prototype integrates existing wireless technologies (Wi-Fi, WiMAX, and 3G) with TETRA/TEDS and complements them with innovative applications for network optimization and self-configuration. The broadband features in combination with PMR voice services satisfy the user demands for remote surveillance, tracking, navigation and safety.

Innovative/Usability Aspects

The emergency units are deployed in a clustered manner and they employ existing WLAN technology to provide broadband data services. They are flexible to operate in multiple urban and rural emergency scenarios as well as in building search and rescue. The link quality in the presence of heavy environmental clutter is improved by utilizing directional antennas.

Deployable gateway

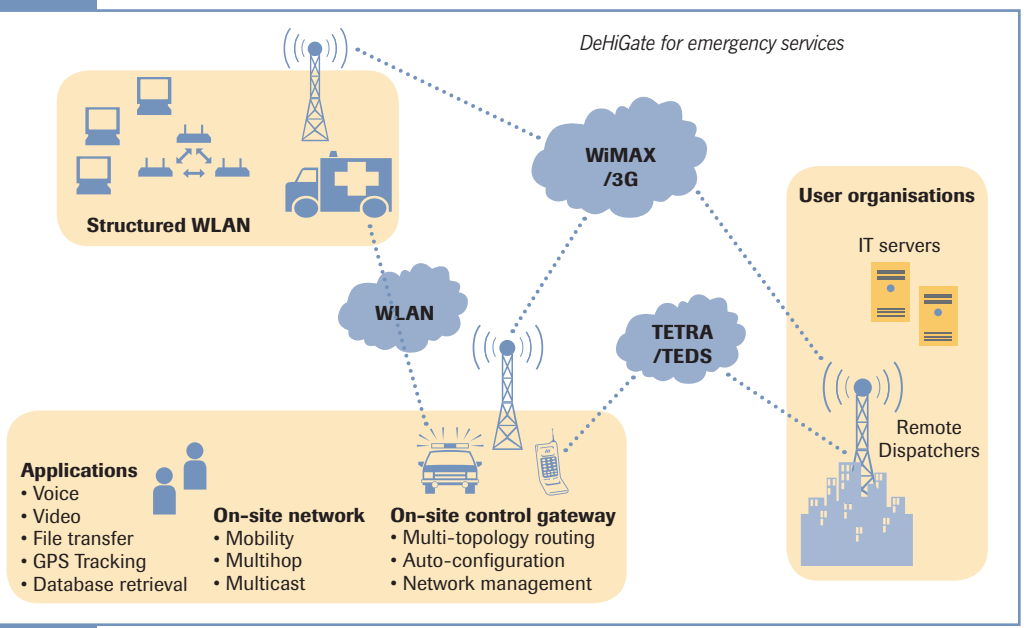
The deployable gateway prototype itself provides auto configuration and multi-topology routing services to the emergency network in order to enhance connectivity with command & control centre and application servers in the backbone. The multi-topology feature of the gateway utilizes a wide range of access technologies that are selected according to the application type and the network availability.

Network management system

The network management application (AQD Software) integrated with GIS collects status information from all entities in the network and improves the situational awareness at the local and remote operational leaders. It also assists in maximizing the network performance and resource utilization by tuning radio parameters and network structure.

Field demonstrations

The usability of the underlying concept will be presented on the DeHiGate demonstration day in Kuopio, Pelastusopisto,



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Deployable gateway prototype

Finland on 18th April 2008, where key public safety users are invited to evaluate the DeHiGate system.

Consortium members

The DeHiGate consortium consists of the following member companies: Thales Norway AS, University Graduate Center (Norway), Applica AS (Norway), Helsinki University of Technology (Finland), EADS Secure Networks (Finland), State Security Networks (Finland), Telefónica (Spain), and Iber-X (Spain).

For further information please visit the DeHiGate website *www.dehigate.org*, or contact the project coordinator *vidar.karlsen@no.thales.com* or *aamir.mahmood@tkk.fi.*

Optimized Transponders For Robust Optical Networks

A video-on-demand architecture with QoS

The OPTRONET project focused on studying efficient optical modulations for advanced optical network design that facilitate the scaling of existing 10Gb/s systems to 40Gb/s and higher. Different scenarios involving challenging fiber impairments, such as dispersion and non-linear propagation, were considered and evaluated against current solutions. The proposed improvements include efficient and adjustable electrical dispersion compensation at the initial and/or final link nodes.

Approach

The main physical limitations for high-speed transmission reside in the properties of optical fibers. Uncompensated (residual) chromatic dispersion, non-linear effects (e.g. self-phase modulation and cross-phase modulation among others) and polarization mode dispersion (PMD) become limiting factors in WDM systems, when 40 Gb/s signals are considered. The OPTRONET project addressed these issues by studying modulation formats that either yield reduced channel spectral occupancy (such as Optical Single-Side Band) and/or facilitate electrical and optical pre and post-processing to mitigate the system impairments In additional, passive electrical compensation solutions resorting to dispersive transmission lines and active solutions based on adaptive post-detection electrical compensators implemented as transversal MMIC devices were evaluated (see figure 1). Experimental implementations of the proposed solutions were performed with results that outperform conventional approaches.

Main results and achievements

Two new optical single-side band modulators were developed based on opto-electrical adaptive filters which suppress one sideband of conventional IM-ODSB signals. Such implementations yield important advantages such as wavelength independent operation, no intensity distortion and significant sideband suppression compared to conventional filtering techniques. The importance of these features resides on the possibility of system upgrading by a simple add-on with minor requirements from the existing equip-

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ment. In addition, due to the innovative step of such opto-electrical proposal, international patents have been submitted. A different area of investigation within the OPTRONET project has been signal processing resorting to electrical predistortion before modulation. Results show that, together with OSSB modulation, significant extension of transmission distance is possible, leading to a system virtually unaffected by the accumulation of optical chromatic dispersion [1].

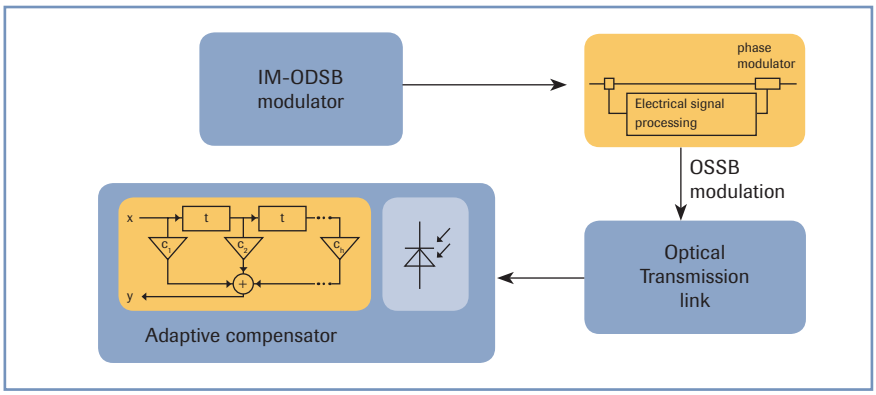

Figure 1: *System setup highlighting main contributions*

On the receiver side, the inclusion of fixed and adaptive electrical compensators allowed for compensating 408ps/nm of GVD or 18ps of DGD with less than 1.3dB optical signal-to-noise ratio penalty to back two back at 40Gb/s, yielding the best experimental results published so far on dispersion impairment analogue mitigation at this bit rate. Experimental results with the adaptive compensators have shown that impairments such as optical bandwidth limitation and signal distortion are also effectively tackled. A detailed reporting and analysis of our findings can be found on [2].

Further research on new methods for implementing fully integrated opto-electrical OSSB modulators and tunable passive/active highly dispersive electrical compensators is currently ongoing.

Conclusions

The OPTRONET project represented an effort to demonstrate, both theoretically and experimentally, that significant increase is possible in transport capacity of installed fiber networks to allow these to cope with 40Gb/s traffic while enabling significant cost saving in required optical infrastructure upgrade. Solutions were proposed for efficient modulation formats that are transparent to the channel spectral occupancy and yield superior results when combined with electrical compensation. Compensation schemes focused on the development of integrated optical and electrical devices that are viable to both WAN and MAN applications.

References:

[1] IEEE/OSA JLT,vol.25, No.8, pp.2175-2186, Aug.2007

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About Celtic

Celtic is a Eureka cluster programme, 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.

A possible vision of the Future Internet

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The Internet has become in the past ten years a central communication tool for business and more generally for the whole society. People are using mails, blogs, and instant messaging. They are connected to social networks and virtual worlds, sharing pictures and music. They want all those features to be accessible anywhere, anytime and on any device. Networked collaborative enterprises and digital manufacturing are already a reality, and e-business is developing fast.

Our societies and culture are inevitably becoming digital. Sooner or later, all human activities will evolve towards their digital era. This concerns all fields of our lives: health, transport, knowledge, culture, and more.

After a first euphoric phase in the late 1990s, the time has come to question the basic principles of the Internet, designed more than 30 years ago to transmit data in an unreliable environment.

Challenges and targeted achievements of the evolution of Internet and society confront us with new challenges: digital culture must be accessible for all, networked enterprises will enable cross-business collaborations and transactions. As a consequence, massive and heterogeneous data flows have to be delivered and stored. Furthermore, there is the need for the orchestration of services which mix telecoms, media and web capacities, and which are characterized by simplicity and user centricity.

To answer these challenges, we have to invent new tools for content and knowledge production, management and exchange, design improved access and core networks, conceive new network architectures that are ubiquitous, flexible, efficient and trustable, design innovation-friendly and open service architectures and frameworks.

Although the original principles have permitted the very fast set-up of a global network and its fast growth, the Internet suffers from weaknesses that now need to be corrected based on the followings pillars:

- Networks and architecture for the Future Internet
- Internet for people
- Internet of knowledge
- Internet of services

Networks and architecture for the Future Internet

This first pillar includes the edge of the Internet, the access network. It should provide higher-bit-rate cost-effective optical solutions. Work is still needed on 4th generation networks (4G), with specific emphasis on the physical layer itself, offering decentralized resource management, command and control as well as seamless mobility.

As for the core network, inter-network service continuity (home, enterprise and public networks) must be further investigated, and high-speed core network design is a key challenge. As an infrastructure extension, the network itself will be providing access to additional on-demand resources.

Internet for people

As concerns the Internet for people, efforts could be put on conversational, interpersonal and community services. This includes inventing new ways of connecting people, new communication means and interfaces, services for workers, and collaborative tools for communities at work and workers on the move as well as interaction between real, digital, and virtual worlds.

Internet of knowledge

To build the internet of knowledge, further work is needed on content creation and production, on content delivery, on search, recommendation and access, on cognition (to pass from content to knowledge) and also on economy and new practice/usages of content and media (with legal, juridical, ethical and business studies and impact).

Internet of services

The next studies for the Internet of services could be focused on user-centric service delivery, with a tight coupling of IMS (IP Multimedia Subsystem) and the Web. New territories of service creation need to be explored: universal marketplaces and semantic frameworks for publishing and discovering services, software as a service, process as a service, business relationship management, and more.

Outlook

Building the Future Internet starts now, and European actors should move together and confirm their current common involvement to respond to initiatives launched for example by the USA, Korea, and Japan. The challenges we face are important. Europe needs to unify its forces to drive the construction of this Future Internet, whose impact will even be bigger, both on economy and society.

Where should the Internet be heading?

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We should join forces for bringing the Internet to the next level. This should include solutions working across domains supporting always-in-touch and seamless services over a fully automated network that enables plug-and-play.

Picture this: while entering a campus area your mobile device receives all driving instructions, rights for parking, access to the meeting room, and video-guidance for finding the meeting room.

Or think of setting up a local business for disseminating tourist-like experiences via high-quality video, stereo audio, corresponding images, and text. You just hook up to a service catalogue, and anyone on the planet with Internet access can enjoy the services and content.

To some extent, these scenarios can already be realised today, although probably in a somewhat fragmentary way. Several critical aspects are lacking for a wide-scale deployment. One example of these aspects is the current lack of proven interoperability across servers and devices as well as across several network domains. Hence, there are some challenges in making the communication fully seamless. There are also some challenges when ensuring the service levels across several domains.

On the business and service levels, times are quite turbulent. On the one hand, a number of business ideas are promoted, such as Facebook, YouTube, and others. And for sure, more are to be expected. On the other hand, the infrastructure also needs to be modernised. Drivers on the infrastructure side are, for example, higher bit rates, increased traffic per user, and diverse requirements by applications and devices. Furthermore, requirements are also stated by governments, such as data retention and lawful interception. These demands put pressure on network operators towards scalability, cost-efficiency, and diversification. Several operators may then ask for the proper incentives for different business roles that need to be in place for a sustained service delivery. All actors involved should see potential for a fair share of the overall business.

Key responses from providers include:

- deployment of broadband accesses,
- automation of processes,
- more service-aware networks, and
- open interfaces for partnering.

There are several operators deploying broadband accesses on local, regional and international scale. In some cases, broadband Internet accesses are seen as increasing living standards. There have also been surveys listing broadband access among the quality-of-living factors. Involving numerous providers requires efficient arrangements. In addition, there is a conglomerate of technical options. All of these demands stimulate modular solutions on several levels – technical, service, and business.

These trends are also supporting environmental policy goals, for example to reduce business travels and promoting distributed collaboration. These items have been on and off the agenda for decades. However, progress regarding pricing, technical solutions and user acceptance seems to work in favour of these goals. From the network point of view, mechanisms for supporting such services are also finding their place. Examples of such mechanisms are multicast, QoS, and security.

Commonly, a first step involves risk-taking by the network operator. Hence, several operators are reluctant to make this happen on an individual basis. Market directives regarding equal access and equal terms may also slow down the development. Some experts claim that this holds back the innovation of the infrastructure. Responsibility is likely to be shared among several parties. However, for success stories to happen in this area, proper incentives for long-term investments should be clearer.

So, as the societal trends are becoming more favourable for unfolding the high telecoms business potential, more forces should be joined to support inter-domain solutions. Such solutions could include automated procedures aimed at plug-and-play that allow users to stay seamlessly in touch.

3D real-time content will drive the Internet

Interview with online media expert Philippe Martineau

Philippe Martineau

Content will be an important factor in shaping the Future Internet. The question is only, which content and which media will drive tomorrow's online world. Eurescom mess@ge editor Milon Gupta asked online media expert Philippe Martineau about his vision. Mr Martineau was director of consulting and support services at Microsoft France until 2004. He is currently board director of French software company Prologue (http://www.prologue.fr) and CEO of IT consulting firm Eureva. One of the core trends he envisions is that there will be a transfer of computational power from the edge of the network to a more network-centric architecture, thus radically changing the way users experience content.

What do users expect from future media, and how will the games industry meet this demand?

Philippe Martineau: Difficult question – maybe kids are more knowledgeable than we are about Future Internet media. They know what is cool and what is not; they are able to re-appropriate technologies and turn them into planetary phenomena. Recent examples of such changes through re-appropriation by younger generations are SMS, instant messaging, and social networks. However, we have barely scratched the surface of what future media could be. Games are also part of the future-media universe, and they particularly leverage interactive 3D networked media.

Accessing tomorrow's networked media with a swift 3D avatar is probably something our kids would give up their smileys for.

How will tomorrow's media impact the Future Internet?

Philippe Martineau: I view contents linked to technologies as the key driver to impact the Future Internet. Take for instance Pixar: originally, it was a firm doing a software rendering technology that turned into a multi-billion-dollar company, thanks to the appropriate contents. In tomorrow's media, 3D real-time interaction, in combination with the appropriate contents, could drastically impact the Future Internet by putting extremely strong requirements on user-dedicated bandwidth, network latency, and quality of service. The two biggest challenges are probably network latency and quality of service, assuming the ever-increasing bandwidth trend continues.

So, the technological challenges to overcome in order to provide truly networked 3D real-time media interaction on a proliferating variety of devices are huge, and gaming will provide the appropriate user experience for the acceptance of such future media.

Which requirements do game developers have towards the Future Internet, and what are the challenges to overcome?

Philippe Martineau: Today, game developers are already pushing the boundaries of the network in terms of requirements.

Tomorrow, as large-scale content providers, the gaming sector will pose formidable challenges: on the one hand, to deliver ever-increased bandwidth, to bring an unprecedented high-definition gaming experience to the user; and on the other hand, bringing this experience in real time and flawlessly to the end-user, impacting scalability, latency and quality of service provided by the network.

Games, because of being the most demanding networked media, also provide the ideal application to benchmark new protocols that guarantee quality of service. Thus, games will help in achieving the ultimate goal of making the network transparent.

In which way will the Future Internet change the business of media, entertainment and telecoms?

Philippe Martineau: Meeting user needs is a complicated process that requires cross-disciplinary research and development, as well as imagination, daring and chance; in the past years, the gaming industry has accumulated successes in that respect, to the level of being an undisputable reference driving innovation and creating a new industry.

The business of media and entertainment shall master content creation with the help and for the benefit of the users, on technological platforms, while telecoms network operators can ensure that the content is delivered in a reliable way.

Such a vision applies very well to games that leverage real-time 3D, because telecoms have the opportunity to monetize a premium service. However, new business models and still deeper industry transformation are yet to come. In order to have more insight on the latter, it might be wise to ask your kids.

Networked Electronic Media
The NEM Technology Platform

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The NEM European Technology Platform is an industry-led initiative aiming at accelerating the pace of innovation to make the convergence between the audiovisual sector and the telecom sector happen and to place the European industry at the forefront of the information era.

The latest general assembly held in Brussels last November 2007 was a good illustration of NEM's first achievements: the initiative is well established, with around 600 members acting in the heart of the convergence, from broadcasters to operators, and with a vision up to 2010 disseminated into a Strategic Research Agenda (SRA) and with topics clearly identified in the first FP7 calls. The results of the first Call 1.5 illustrated the success of NEM participants who submitted a project linked to the NEM SRA.

NEM Summit

The world is moving fast, the technology world is moving even faster. The NEM community needs to accompany this evolution in reviewing its SRA in order to provide inputs for the next FP7 calls, to accelerate its works towards a 2020 vision. The 2008 NEM Summit in France from 13th to 15th October will be a key international event, where NEM initiatives will be organised. The event will present NEM activities regarding projects, platforms, and international lobbying.

It is expected that the 2008 NEM Summit will gather more than 500 representatives from industry and research to share experience and research results, identify future trends, discuss and identify opportunities for research collaboration, including those under the ICT Theme of FP7. The 2008 NEM Summit also aims to feature showcases and exhibitions from key players in the field of networked electronic media and ICT at large. More information is available at www.nem-summit.eu.

R&D challenges

Developing new technologies to answer to societal needs is always challenging. Building new uses and new services utilizing those technologies is even more challenging and is becoming a necessity as soon as we want to develop new business, and therefore, new employment. Those new uses and services now need new technologies: a virtuous circle is created. European Technology Platforms can play a key role in this loop by valorising all the European initiatives in a dedicated field. NEM initiatives in the area of networked electronics media have allowed and will allow European actors to build projects with the ambition of answering to the networking media challenges in front of us: future home, future intranet, and the future way of life. Projects are part of the answer; testing new technologies, new usages, and new business in experimental platforms can be another part of the answer.

By being concrete through dedicated projects and platforms, and by involving European actors on a European scale, the NEM initiative will serve European R&D to take up the global challenges in networked electronic media. Speed is key. The NEM initiative could contribute to this challenge by anticipation (NEM 2015 vision), by sharing efforts (NEM collaborative FP7 breakthrough projects), and by pushing our technologies through international lobbying (Global NEM cluster) and standards (NEM standardization working group).

A vision for 2015

Electronic media in the year 2015 will appear as an ubiquitous service, easily and simply available to all users for professional and recreational purposes. This simplicity may mask many layers of complexity – the point being that the user should not need to care about underlying technologies. For this to happen, fundamental changes will have to take place in the course of the next ten years.

The distinction between today's basic routing technologies – such as unicast, multicast and broadcast – must become invisible, not only to the user but also the media application itself. Media must become networkable, an integral part of any kind of network rather than just something to be transmitted from A to B. Media must become ubiquitous; content will come from any user, with highly sophisticated and user-friendly indexing engines to generate the accompanying metadata.

The infrastructure must become context-aware, recognising users to know their needs, and adapting itself to the environment. Intuitive and multi-modal interfaces must offer

a more natural way to interact with and within media environments. To make networked media communication inclusively available to all, using or consuming any kind of media should be known by its content and not by the technology used ('FM', 'MP3', 'DVB' etc.).
Media retrieval must become affective, using genre-based play-lists representing moods and degrees of user involvement. Networked media should allow new groups to form, for social or business purposes, defined by their media interests. Video must be represented in a much more human way, by realistically modelling entire media environments on an object-by-object basis, offering exciting new creative possibilities.

There must be seamless and intuitive service handover between devices and environments, allowing users to access services wherever they are and whatever terminal they are using. 'Federated' services – complex services built up from multiple elements from different originators – must be enabled, offering valuable commercial opportunities for service differentiation. Service providers must address, in a way that is fair to all, the security and rights issues involved when handling audio-visual material in networked and electronic media.

NEM research topics

A set of horizontal technologies will act as a foundation for the functionality of the entire end-to-end chain, including, among others, security and privacy, rights management, federated services, middleware, and human language technologies. On top of that, three areas of research are addressed: content creation, networking infrastructure and delivery as well as media presentation and content access.

Work on content creation will help to ensure the availability of innovative new services, for example in the areas of representation of content, tools for content creation and manipulation, and automated semantic annotation.

Work on networking and delivery infrastructure will deliver services to users wherever they are. Topics to be explored are intelligent delivery, quality of service, and networking types.

Through work on media presentation and content access, there will be new ways of presenting services to users, and new ways for users to interact with services. Research topics include authentic, true-to-original media reproduction, virtual reality, and dynamic federation of distributed interface devices.

NEM in the world

The R&D activities conducted in other areas of the world have to be taken into account by NEM when fostering R&D within Europe. Global NEM is currently focusing on the following regions of the world: China, India, Russia, Latin America, Philippines, Australia, USA, and Japan.

NEM Cluster of Clusters

In several European countries, the national authorities have created platforms to reflect the activities of the NEM Platform at a national level. National NEM Platforms exist in Spain (http://www.aetic.es/), Romania (http://www.nem-pt.ro/), and Lithuania (http://www.technopolis.lt/index.php?path=/en/ntp); in a wider sense the French Media & Network cluster (www.media-and-networks.com) can also be regarded as a national NEM platform.

NEM Forum

In order to complement the work of NEM, efforts had been undertaken to acquire independent thinking, not constrained by the strategic industrial interests, by launching the Networked Media Open Discussion Forum, or short: the NEM Forum. The NEM Forum will be composed of regular members of NEM and individual experts who will bring their individual knowledge into the discussion.

NEM Future Media Internet initiative

The Future Internet is about content, user generated services, and the Internet of things; it is not about technology convergence. NEM is, thus, the suitable platform on which the Internet of the future should be articulated, because NEM is the only initiative, where the content world and the network world come together.

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

Social media

Annual seminar of DIMES and Forum Virium Helsinki

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DIMES and Forum Virium Helsinki organised their annual seminar with the theme "Social Media: Odottava Oranssi – Finnish for Anticipating Orange". More than 350 experts and invited guests from different stakeholders attended the seminar and discussed various aspects of services that are directly generated by the end user. The speakers found different innovative ways to grasp the attention of the audience.

Following a poll during last year's event, the organisers decided to put the annual DIMES and Forum Virium Helsinki event under the theme Social Media. The motto of the seminar, "Anticipating Orange", expresses the expectation of the ICT and social media industry in Finland, and certainly in the whole of Europe, about the future shape of the industry.

A technical interpretation of the objective of the seminar is "Waiting for User-generated Services". Social media and user-generated services are the main topics of the ICT industry these days, which was impressively demonstrated by the high number of attendees from different companies and organisations, from large corporations, over small and medium enterprises to academic and research institutes. Another aspect of equal importance is that the seminar attracted experts from different disciplines. This can be easily explained by the fact that the roots of Forum Virium Helsinki lie in art, design and media.

The seminar was opened by the representative of the City of Helsinki, Mr. Eero Holstila, followed by an annual review of the activities of the associations hosting the seminar, Mr. Kimmo Ojuva from DIMES and Mr. Jarmo Eskelinen from Forum Virium Helsinki.

In his keynote, professor Luis Correia from the Technical University of Lisbon gave impulses to the audience about possible future evolution paths in mobile and wireless communications. Among other stimulating statements, professor Correia said: "We should get more disruptive ideas in R&D."

Mr. Hannu Nieminen, director in Innovation Acceleration of Nokia's Office of the CTO, gave a good overview of the mutual dependency of communities and communications through depicting the Nokia Ovi portal. Ovi is an open dashboard that empowers people to link to all of their existing Web communities and Nokia services.

Several presentations from experts in the social media discipline addressed a number of community concerns, such as how to support "causes" using social networking websites, how social media and the living nature would evolve, or how a new era of selling and buying could emerge in the future.

Nico Verplancke from IBBT confronted the audience with a different side of user-generated services, namely antisocial media, reminding the society that it needs to be aware of the possible downsides.

Finland is the birthplace of user-driven innovation, meaning that end users are given the opportunity to use and explore new services very early so that service and application developers learn from the usage patterns and the users' behaviour.

A number of presentations discussed testbeds, such as the Chinese national testbed. Mr. Anastasius Gavras from Eurescom presented the European approach to large-scale testing facilities through federation of existing testbeds. He presented the current plans for implementing the infrastructure that will support the Panlab framework for a Pan-European Laboratory.

The seminar was complemented by a number of demonstrations in an open exhibition space. Overall, the main value of the seminar was a very good opportunity to meet other participants and discuss emerging trends, especially across the borders of different disciplines, a tendency that is becoming a movement towards better understanding the mutual impact of ICT and media on society.

Further information is available at
http://news.forumvirium.com/node/181

IMS 2.0
Constitution of a circle of trust

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Eurescom study "IMS 2.0 – Constitution of a circle of trust" elaborates on the possibilities of how telcos could open and leverage their assets and empower users and partners with a future IMS 2.0 framework to allow access to functions like authentication, billing, identity, single sign on, messaging, and location.

The existing walled garden business model is at risk. Currently, the broadband business is essentially limited to the value of the access network, and if nothing changes, the broadband market will suffer the same revenue and margin squeeze as the voice business.

Furthermore, there may be a rapid rise of non-traditional voice services, as voice will be embedded into the general online experience. Messaging traffic may migrate to IP based solutions.

Open platform business model

The study shows that the open-platform business model should be considered by telcos. Open platform leaves parts of the value chain to other players like content providers, content aggregators, and service operators. By this the network operator would lose some control, but would win a lot more customers and partners, whereby increasing revenues and profit (see figure 1).

New relationships with users should be fostered: the user could also add value that would attract more content and services resulting in a positive feedback loop, creating potential for big communities. For telecoms network operators it would be the first time to see the customer being a partner rather than only a service user.

Current communication services are launched by telcos based on the IP Multimedia Subsystem (IMS). IMS is a multi access, multi service platform that can deliver together with application servers rich communication services such as video sharing on fixed and mobile networks. IMS could be of benefit if it evolved to provide similar innovations that Web 2.0 provides. By adopting Web 2.0 technologies, IMS could provide simple APIs for developers, community-oriented services, and a perpetual beta service model. On top of that IMS could leverage its own assets, resulting in more powerful services.

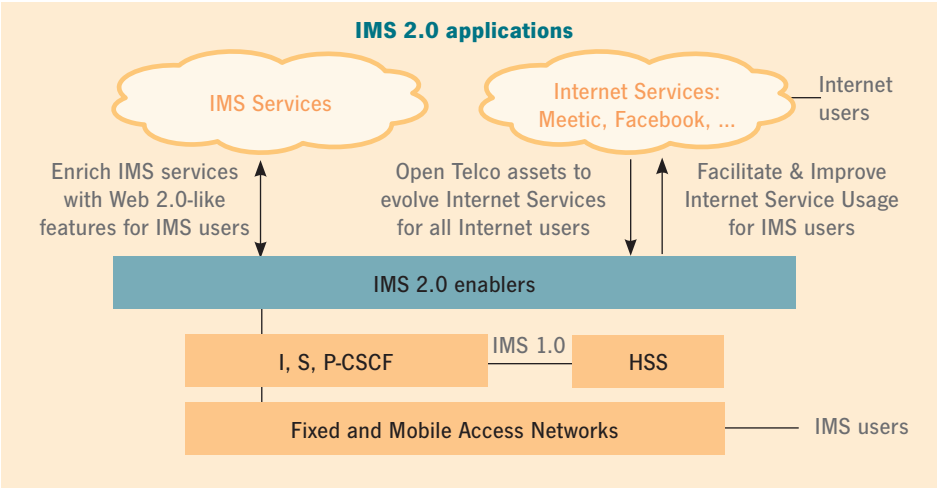

Figure 1: IMS 2.0 application

IMS 2.0 assets

Telcos should expose their voice and messaging capabilities and provide an API for telecoms. Other viable and attractive assets to third parties are those that are intrinsic to the network like QoS, network presence based on HLR (Home Location Register) and HSS (Home Subscriber Server), location, charging, or those that are more valuable when shared across many services like shared address books, group lists, authentication and authorization, personalized delivery policies, parental/content protection and limits, trusted identity, or existing IMS services such as Push To Talk.

IMS 2.0 applications

Thirty use cases have been proposed by the study. The most promising appear to be:

- The IMS 2.0 Internet Service Suite would facilitate Internet services for IMS 2.0 users, by providing single sign on, Internet payments, and communication widgets for communities.
- Remote Application Invocation would facilitate IMS's SIP protocol to immediately start the adequate client application required to display / consume the content and let customers who are not Internet-affine participate in multimedia IP communication.
- ISIM Authentication would allow a user to use his mobile phone as an authentication token to web sites or services.
- IMS Phone as a new interface to Web 2.0 services.

The study has described 20 enablers as well as a global architecture based on the Service Oriented Architecture, a software architecture that allows fast service creation and upgrade through the use of loosely coupled enablers. Several levels of service orchestration have been described,

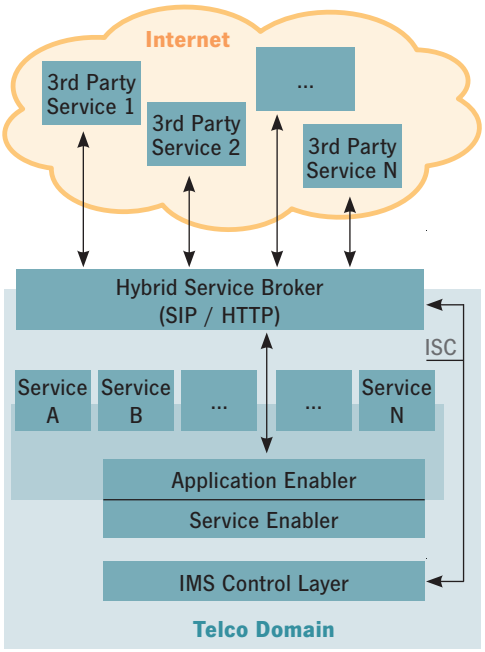

Figure 2: IMS 2.0 application

based on Web Services and SIP. These results are available to members of the Eurescom Study programme.

Conclusion

Leading telcos, possibly partnering with other telcos, will provide ubiquitous APIs and will be a natural partner for Internet applications that will mash up telco communication services and applications. Telcos that don't go for open platforms will likely face declining revenues even for their voice applications.

The results of Eurescom study P1751 are available to subscribers of the Eurescom Study Programme at *http://www.eurescom.eu/Public/Projects/P1700-series/P1751*.

Gigabit speed at home without cable clutter

FP7 project OMEGA

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A high-speed home network without cable clutter – this is the vision of the new European research project OMEGA, which started in January 2008. The project is set out to develop a global standard for ultra broadband home networks. The new standard will enable transmission speeds of one gigabit per second without the need to install any new wires in the home.

The demand for such gigabit home networks is driven by the emerging future Internet services running over new high-speed optical access networks and the rapidly growing number of communicating devices in the home.

Limits of current home networks

Current home networks suffer from the fact that many devices are limited to wireless transmission rates of 54 megabit per second, or require troublesome wiring to achieve higher rates. Thus, current home networks are at risk of becoming a bottleneck, when fed by high-speed optical access networks, which offer 100 megabit per second or more, both down- and upstream.

OMEGA will overcome these limitations by increasing the speed to one gigabit per second and by connecting home devices to the Internet and to each other through power line communications and wireless connections. This will put an end to the coverage limitations as well as the wiring clutter, giving users access to advanced information and communication services anywhere in their home.

Emerging Internet services that require high bandwidth and high transmission speeds include novel entertainment services like telepresence, 3D gaming, enhanced interactivity, virtual reality, high-definition video as well as e-health applications and services for the exchange of user-generated business or multimedia content.

High-bandwidth services as utility

OMEGA's vision is to make access to such bandwidth-hungry services as normal and convenient as getting water from the tap. "Getting information, business, and entertainment services through the home network will become a self-evident utility,

The OMEGA consortium at the kick-off meeting in Rennes, January 2008.

Jean-Philippe Javaudin, OMEGA project coordinator from Orange Labs, France Telecom

like, for instance, electricity, water, or gas," said Jean-Philippe Javaudin, the OMEGA project coordinator from Orange Labs, France Telecom.

In order to get there, OMEGA will not only increase transmission speeds, but also make the new generation of home networks easy to install and operate for ordinary users. For wireless connectivity within the house and even in the garden, OMEGA's home network solution will combine gigabit radio frequency and free-space optical links with power line communications, thus creating a communication backbone without new wires. This approach will also be applicable to flats and small offices. "Users will not need any new wires in their facilities to update towards the gigabit home network," explained Martial Bellec, OMEGA's technical manager from Orange Labs, France Telecom.

Technology-independent MAC layer

At the heart of the new system is a technology-independent media access control (MAC) layer. This layer controls the multiple technology gigabit network and provides services as well as connectivity to any number of devices in any room of the house or flat. Furthermore, this MAC layer will allow the service to follow the user from device to device. In order to make this vision come true, OMEGA will work on substantial technological challenges in the fields of optical wireless and wireless radio technologies, in protocol design, and in system architectures.

As a complement to the next generation of broadband access networks, OMEGA's gigabit home network will empower citizens to use novel services in areas such as healthcare, communication, and entertainment, and offer significant economic opportunities to the European information and communications industry.

About OMEGA

OMEGA is an Integrated Project co-funded by the European Commission under EU Framework Programme 7. It is running for three years from January 2008 to December 2010. The interdisciplinary project consortium consists of 20 European partners from industry and academia.

Further information is available on the OMEGA website at *http://www.ict-omega.eu.*

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

ICANN moves towards IPv6

In February 2008, the Internet Corporation for Assigned Names and Numbers, ICANN, took another step towards deployment of the IPv6 Internet addressing system.

IPv6 addresses were added to the appropriate files and databases for six of the world's 13 root server networks. According to ICANN, this move allows for the possibility of fuller IPv6 usage of the Domain Name System (DNS). Prior to this step, those using IPv6 had needed to retain the older IPv4 addressing system in order to be able to use domain names.

Name server software relies on the root servers as a key part in translating domains like "icann.org" into the routing identifiers used by computers to connect to one another. In 2007, the ICANN Security and Stability Advisory Committee concluded that ICANN should move forward with the enhancement of the DNS root service by adding IPv6 addresses for the root servers.

As more and more devices connect to the Internet, they require unique Internet Protocol (IP) addresses. The remaining free pool of unassigned IPv4 addresses is being depleted by the growth of the Internet. According to ICANN, Ipv6 increases the unique IP addresses from 4 billion, available in IPv4, to more than 340 trillion trillion trillion.

Further technical information on the move to Ipv6 is available at
http://www.iana.org/reports/root-aaaa-announcement.html

Innovation – EU is catching up

The innovation performance of the EU has improved within the last five years. According to the 2007 European Innovation Scoreboard (EIS), innovation scores in Europe are converging, and the lag towards the US has been reduced. Five EU Member States – Denmark, Finland, Germany, Sweden and the United Kingdom – continue to have a very strong performance as world innovation leaders alongside the US and Japan. Meanwhile, the large majority of other EU member states are catching up with the leaders.

The comparison with the US shows that the EU has particularly caught up in the areas of ICT investments, broadband penetration, early-stage venture capital and international patenting. However, the US increased its lead in the areas of public R&D expenditure and high-tech exports, maintaining a significant overall lead towards the EU.

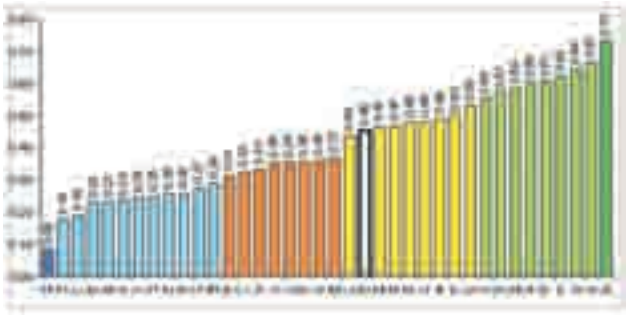

Figure 1: The 2007 European Innovation Scoreboard – summary of the innovation index

For the first time, the annual report, which was presented by the European Commission in February 2008, also assesses innovation efficiency. The main finding is that most EU countries could make improvements in transforming knowledge inputs into innovation output. The most efficient performers are Germany and Luxembourg. All other EU member states have significant scope to improve their innovation efficiency through innovation-friendly policies.

The full report is available at
http://www.proinno-europe.eu/extranet/eis2007

Japan launches high-speed Internet satellite

On 23 February 2008, the Japan Aerospace Exploration Agency (JAXA) and Mitsubishi Heavy Industries Ltd. successfully launched a communications satellite aimed at providing high-speed Internet access across Asia. The Wideband InterNetworking engineering test and Demonstration Satellite "KIZUNA" (WINDS) will allow super-high speed data communications of up to 1.2 Gbps – 150 times faster than an average high-speed ADSL connection rate of 8 Mbps.

"KIZUNA", which means "bond" in Japanese, is expected to begin transmitting and receiving data from its orbit in 36,000 km altitude in July 2008. According to AFP, the 231-million-euro satellite is planned to be in use for five years.

Japan is looking to use the satellite for emergency communication, when a ground-based network is severed by a disaster in any Asian country, in which case it would be used to transmit data to crisis management offices.

JAXA is planning to use the satellite also for remote education and telemedicine. KIZUNA is meant to reach people in remote or mountainous areas, thus reducing the disparities between well-served urban regions and remote, rural areas.

Further information is available on the JAXA website at
http://www.jaxa.jp

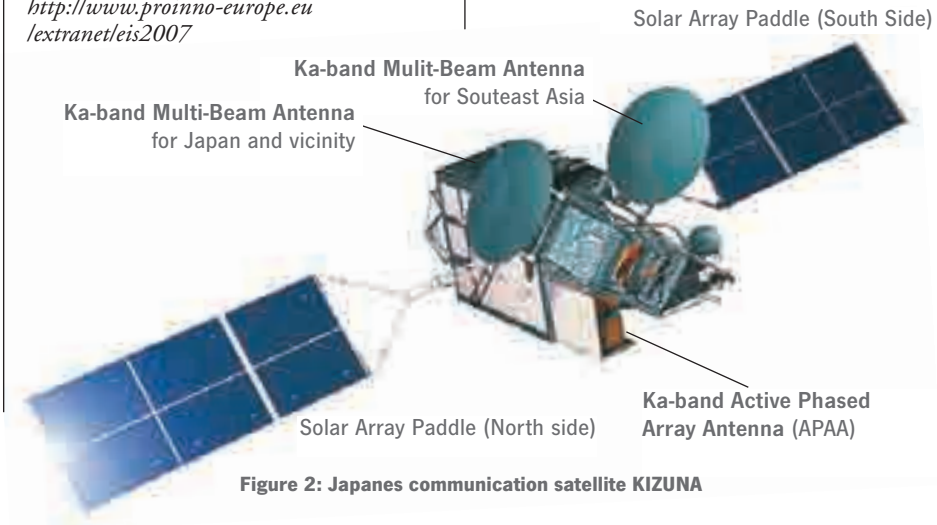

Figure 2: Japanes communication satellite KIZUNA

Browsing in the rain

The Internet of umbrellas

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The World Wide Web entails one major problem: in order to access it, you have to be computer-literate. The personal computer is still the most important device for accessing the Web, and even in a developed region like Europe only half of the people know how to handle a PC. However, other means of access are gaining ground. Web-enabled smart phones, navigation systems, and personal digital assistants are becoming ever more popular. And the next technological wave is already around the corner – the Internet of Things.

Umbrella browsing doesn't come easy – components of Pileus

The vision of the Internet of Things includes that all types of durable and non-durable consumer goods, like cars, washing machines, cameras, milk bottles, and bananas, will be connected. Science Fiction? Not if you ask Sho Hashimoto and Takashi Matsumoto from Keio University in Japan – their media-design research team invented the first Web browser umbrella, called Pileus, the Latin name for cap. Their ideas was to brighten up cloudy days for the user, by giving him a multimedia-based, socially interactive experience, while he is walking through the rain.

Photo-browsing with Pileus

Pileus is an umbrella equipped with a camera, a projector, a laptop, and a Wi-Fi connection. Its main purpose is to share photos with friends via the Flickr photo-sharing Web service. Pictures downloaded from Flickr are projected to the ceiling of the umbrella. On top of the umbrella is a camera, whose pictures are immediately uploaded to the Flickr service in order to share them with friends. The release for the camera is integrated in the handle of the umbrella.

What do you do with such a networked umbrella? The Japanese researchers imagine a scenario like this: you are strolling through the rain, protected by your Pileus umbrella, when you see this fellow coming along with his funny dog that is wearing a red and white, polka dot bodice. You take a picture and send it to Flickr so your friends can share the funny sight. Then suddenly, thunder and lightning appear as images on the ceiling of your umbrella in order to enhance a text alert saying: "Your train leaves in five minutes". Via the Google Maps service and a GPS receiver, you get a surround map and the fastest way to the train station.

Umbrella with adverse effects

So, the Pileus umbrella appears like a gadget with a high coolness factor. However, it is still a prototype, and the current experimental design would certainly cost a few points on the coolness scale. The umbrella weighs 2 kilo, mainly due to the projector. In addition you would have to carry a notebook in your backpack, which adds another 2 kilo. However, the weight problem looks solvable, as miniaturisation of computers and projectors is steadily progressing. More serious design issues are durability, usability, and safety.

Why look on the street? Viewing pictures is much more fun

The built-in devices have to be waterproof in order to survive splashes of rain. Another issue is, how safe our streets and pedestrian zones will be, if everybody is running through the rain, eyes focused to the ceiling of their umbrella. In combination with simultaneous mobile phone calls this could be a safe way of increasing the turnover of doctors. Even without painful encounters, the unnatural neck posture while viewing photos on the umbrella ceiling could help to fill the waiting rooms of orthopaedists. In short: browsing with your umbrella may have some undesired adverse effects, which to avoid may require some more ingenuity by engineers.

Weather forecast umbrella

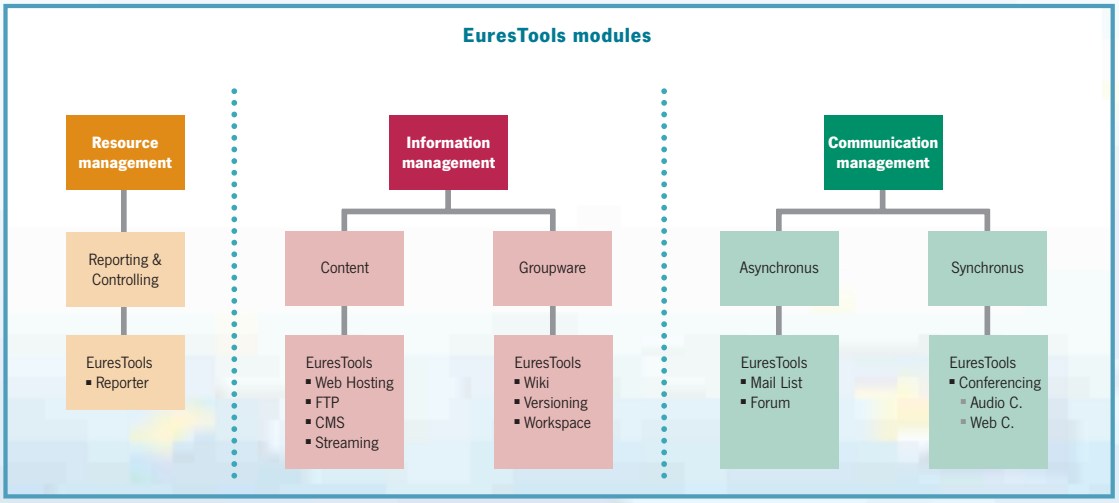
A more modest approach has been pursued by US-based gadget company Ambient Devices. They developed a connected umbrella called Ambient Umbrella that lets you know when rain or snow is forecasted by illuminating its handle. Different light patterns of the blue LEDs at the bottom of the handle indicate rain, drizzle, snow, or thunderstorms. The umbrella automatically receives local weather data from weather forecast service AccuWeather.com through some wireless link that is not specified by the producer. The idea is to see from the blinking pattern, whether it is necessary to take the umbrella with you, before you leave the house.

Glowing – yes, but intelligent? The Ambient Umbrella

The usefulness of this gadget is rather doubtful, and it is unknown how many Americans have already invested the more than 100 dollars for the "glowing intelligence" advertised by the umbrella producer. However, the latest examples of connected umbrellas show that there is a huge scope for connecting everyday devices in order to spread the benefits of ubiquitous network access beyond the limits of those metal and plastic boxes we call computers.

Further information:
Pileus website: *http://www.pileus.net*
Ambient Umbrella web page:
http://www.ambientdevices.com/products/umbrella.html

EuresTools
ICT tools for effective project management in EU Framework Programme 7



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Further information about EuresTools 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.

"The EuresTools have proved invaluable to NM2. They are simple to use, flexible and leave partners with no excuse for not reporting their work promptly and accurately. They have made a significant contribution to the efficient running of this project."

Douglas Williams, BT, Technical Project Manager of NM2

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