EURESCOM mess@ge
3/2007
The magazine for telecom insiders

includes CELTIC N • E • W • S

Interactive media

In focus
The European Investment Bank

Project reports
Mobile online gaming

European issues
Smart cars for safer roads

EURESCOM

Eurescom Study Programme

Workshop

10 – 11 December 2007
Heidelberg, Germany

The Eurescom Study Programme provides the opportunity to initiate and participate in collaborative studies on subjects of strategic interest to the international telecoms community. Through proven and effective management procedures, Eurescom guarantees a maximum return on investment for each individual study.

Since its start in 1991, the Eurescom Study Programme has demonstrated its effectiveness and flexibility in generating conclusions on specific subjects and in preparing larger collaborative R&D activities among the study partners.

A study is normally running for three to six months with an average budget of ten person months and three to six partners involved. The Eurescom Study Programme is financed through annual up-front payment by the subscribers. From this amount, participants in each study get paid for their efforts by Eurescom.

There are two calls for proposals each year, but studies can be proposed and started also outside of the calls. A study is launched, if at least three partners sign up for a proposed topic, and the Study Management Group (SMG) approves it as relevant. All study results are exclusively available to subscribers of the Study Programme.

Workshop objectives

The three main objectives of the workshop are to

- update legal and administrative procedures of the programme,
- discuss potential new study topics, and
- present selected results from recent Eurescom studies.

Target audience

- Decision-makers from Eurescom Study Programme subscribers
- Decision-makers from network operators interested in joining the programme.

Participation

If you are a decision-maker at a telecoms network operator and you would like to participate, please contact:

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Further information on the Eurescom Study Programme is available at

http://www.eurescom.eu/activities/studyprogrammes

Dear readers,

"Interactive media" is one of those buzz terms that evoke associations of exciting new user experiences and vast business opportunities. This issue of Eurescom mess@ge explores what is behind the buzz and which new interactive media applications may enter our homes in the not-so-distant future. The main reason that triggered us to pick "interactive media" as the cover theme is the fact that the results from EU project NM2 – New Media for the New Millennium – are now available. These results have the potential to change our media experience and are a telling example of what interactive media could mean concretely.

The introduction article by Eurescom mess@ge editor-in-chief Milon Gupta provides a general overview on interactive media including an attempt to define what it actually is. The next two articles present some results from EU project NM2. The article by Douglas Williams and Ian Kegel from BT describes NM2's production tools for interactive media. The second article by Terry Wright from the University of Ulster shows the NM2 tools in action, in a prototype production called "Interactive Village". The cover theme is concluded by an interview with a Finnish film director, Mika Tuomola from Crucible Studio, on the future of interactive TV.

Directly related to the cover theme is the Viewpoint, provided by Eurescom mess@ge editor Peter Stollenmayer, who explores what "interactive media" really means and why this is more than just a fashionable buzz term.

In addition to the cover theme, we have many more interesting topics.

Our "In focus" section features an article by and on the European Investment Bank (EIB), whose role in the European innovation process is not widely known among the public. If you are involved in R&D and have not yet heard of the EIB's Risk Sharing Financing Facility (RSFF), this article is a must for you.

The topic of our "Project reports" section has some links to our cover theme, as it is about a highly interactive application. Based on the results of Eurescom study P1655, Eurescom mess@ge editor Anastasius Gavras presents an overview on mobile online gaming.

Under "European issues", we report about the European Commission's Intelligent Car Initiative and the latest developments in this area on the occasion of an Intelligent Car event in Versailles.

Further subjects covered in this issue include the Eurescom Study Programme, a tutorial on radio resource management, the growing e-mail addiction, and some interesting workshops. We hope you will find some information that is of value to you.

As always, we would appreciate your feedback on any of the articles in this issue. If you would like to suggest a topic or offer a contribution to Eurescom mess@ge, this is equally welcome. If you would like to provide feedback on Celtic News, the newsletter of EUREKA Cluster Celtic, please send an e-mail to the Celtic Office at *office@celtic-initiative.org*

Enjoy reading this issue.

Your
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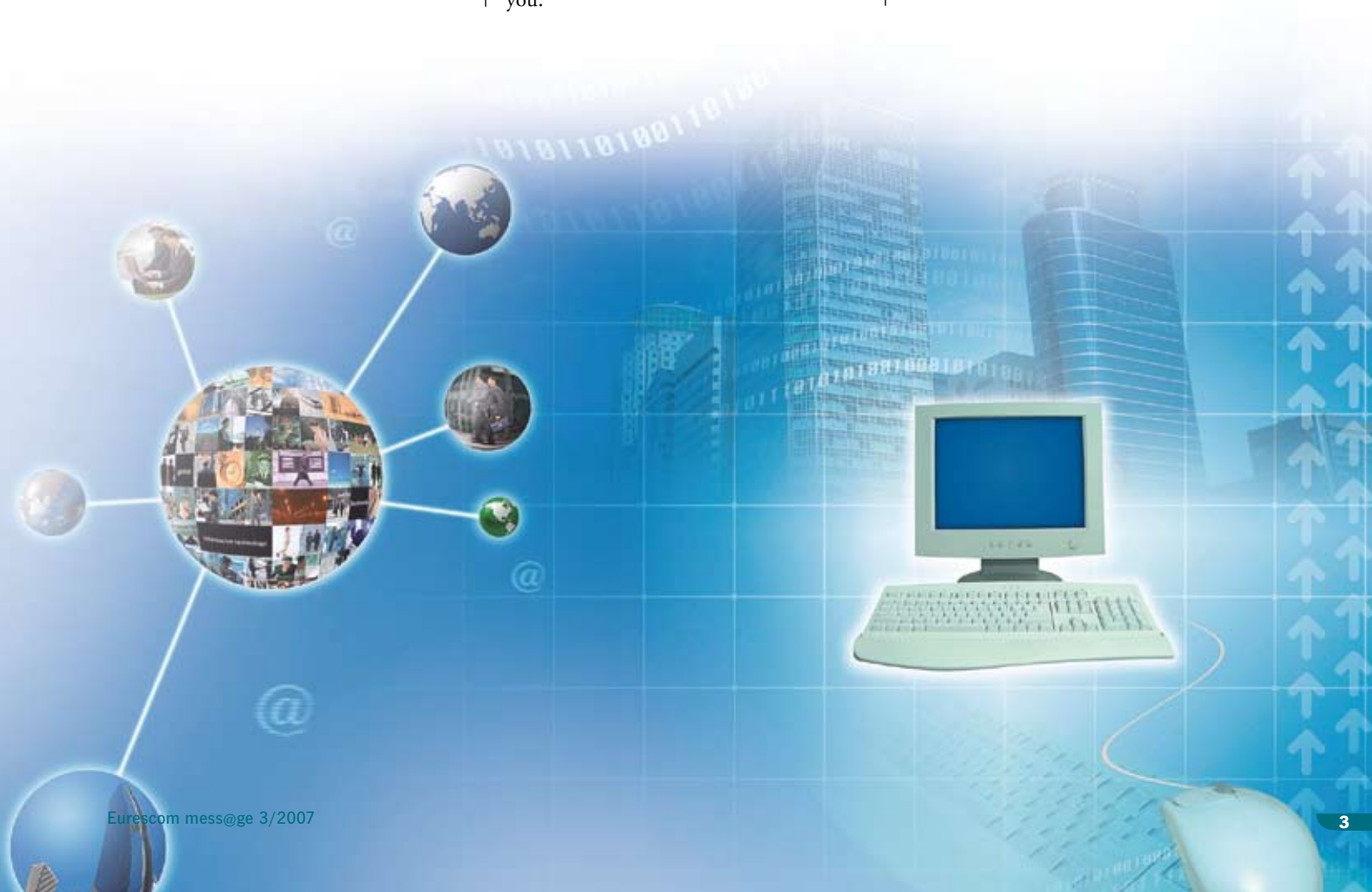
message@eurescom.eu



Events calendar

3 – 4 December 2007
Network Neutrality – Implications for Europe
Bonn, Germany
http://www.wik.org/content/netneutrality_main.htm

3 – 6 December 2007
Broadband Europe 2007
Antwerp, Belgium
http://www.bbeurope.org

11 December 2007
TeleHealth 2007 – Telemedicine and innovative technologies for chronic disease management
Brussels, Belgium
http://ec.europa.eu/information_society/activities/ict_psp/cf/telehealth_2007

17 – 18 December 2007
Digital libraries and technology-enhanced learning – information day
Luxembourg
http://cordis.europa.eu/fp7/ict/telearn-digicult/call3-infodays_en.html

28 – 31 January 2008
HEALTHINF 2008 – International Conference on Health Informatics
Funchal - Madeira, Portugal
http://www.healthinf.org

11 – 14 February 2008
Mobile World Congress
Barcelona, Spain
http://www.mobileworldcongress.com

27 – 28 February 2008
Celtic Event 2008 – Telecommunications and Next Generation Internet
Helsinki, Finland
http://www.celtic-initiative.org

4 – 9 March 2008
CeBIT 2008
Hanover, Germany
http://www.cebit.de

5 – 7 March 2008
The Fully Networked Car Workshop
Geneva, Switzerland
http://www.itu.int/ITU-T/worksem/ict-auto/200803

Sn@pshot

Keep your lane!

The photo shows a demonstrator for a lane-keeping support system that was presented at the Intelligent Car event in Versailles on 18 September 2007.

If the system detects an unintentional lane departure, an adaptive decision system triggers a driver warning or an active steering system. The technology was developed by SAFELANE, a project within EU project PReVENT. Further information is available on the PReVENT website at *http://www.prevent-ip.org.*

See also the article in this magazine under "European issues".

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The Eurescom Study Programme 2007

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One of the strengths of the Eurescom community is its commitment to engage in short and focused collaborative studies. The Eurescom Study Programme is a well known instrument that enables an efficient setup of such studies. The study programme is financed by its subscribing members, and their commitment is underwritten by their upfront payments to the programme's budget.

The Eurescom Study Programme continues to demonstrate its flexibility in bringing together leading experts from its members to address topics of common interest. Eurescom studies develop conclusions on specific topics and pave the way for larger collaborative initiatives.

The fundamental working principle within the Eurescom Study Programme is collaboration. Any network operator or service provider may become a subscriber of the study programme and participate in it, if 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.

Following the second call for proposals in 2007, the study management group recommended two studies, which started in October 2007. After the closure of the second call, two further study proposals were received and evaluated. At least one of these additional studies will start in 2007. This underlines the flexibility of the study programme, which allows to propose and start studies at any time.

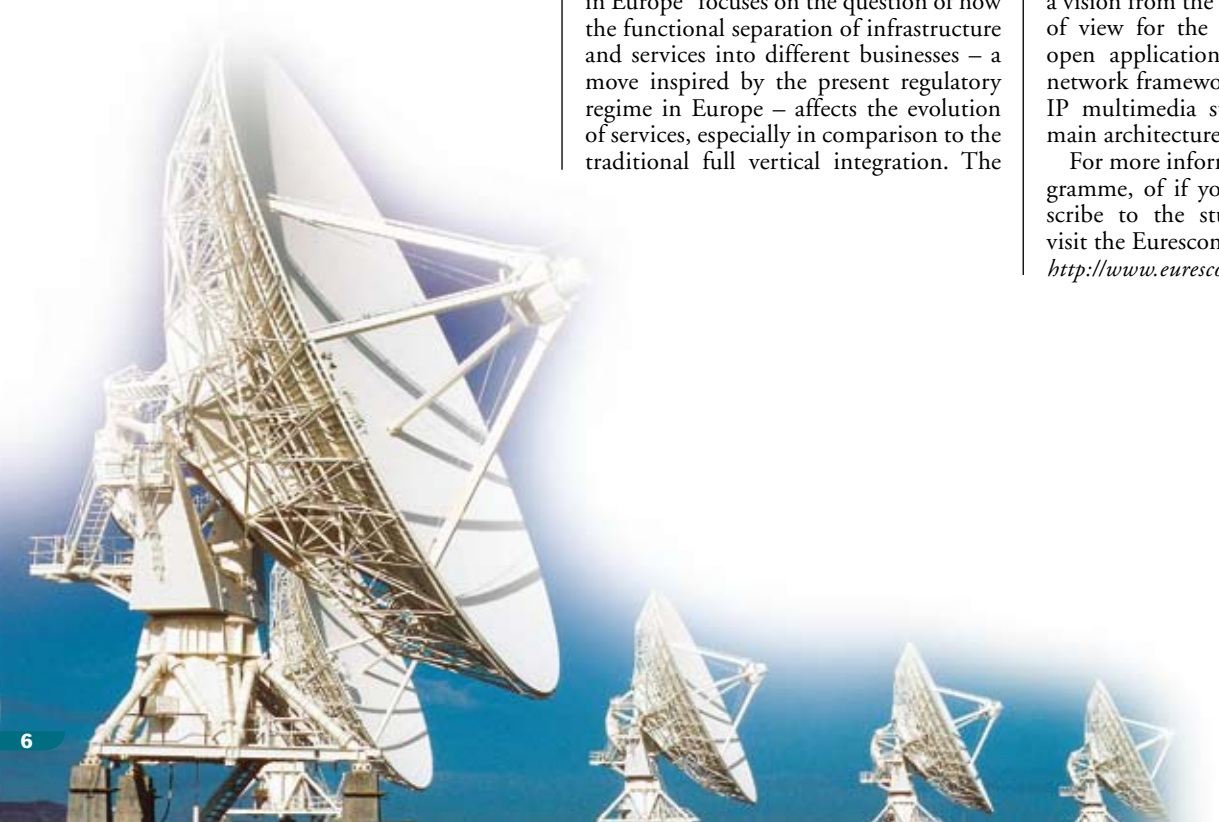
The issues addressed concern the technical aspects of the telecommunications infrastructure evolution in Europe in view of current and potential future regulation, the business opportunities for operators in the e-health area, and the potential of the peer-to-peer (P2P) SIP architecture in telecommunications.

The study on "Regulation and the telecommunications infrastructure evolution in Europe" focuses on the question of how the functional separation of infrastructure and services into different businesses – a move inspired by the present regulatory regime in Europe – affects the evolution of services, especially in comparison to the traditional full vertical integration. The study participants investigate the technical aspects that could place the evolution of European telecommunications into a different evolutionary path as compared to the rest of the world, and whether this would be positive or negative for the market as a whole.

The study on "Understanding e-health and its promises for telcos" will identify and characterise the organisational and technical areas of e-health and specifically address the potential telco business, both in the enterprise as well as in the residential market segment. The study will analyse and evaluate the strategic opportunities of how telcos can successfully participate in emerging e-health areas.

The study on "Potentials of P2P-SIP Architecture in Telecommunications" will start in November 2007 and will establish a vision from the network operator's point of view for the support of peer-to-peer open applications in a next generation network framework, on the basis that the IP multimedia sub-system (IMS) is the main architecture being deployed.

For more information on the study programme, of if you are interested to subscribe to the study programme, please visit the Eurescom website at *http://www.eurescom.eu*



Interactive media

The new user experience

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A silent revolution is under way, which will fundamentally change how we experience content through digital media. The next generation of interactive media will converge different ICT technologies into something completely new, providing a ubiquitous and personalised media experience based on new forms of human-machine interaction. Thus, interactive media have the potential of revolutionising entertainment, learning, and many other areas of life.

Three phases of interactive media

The first phase of interactive media was the analogue age, when interactivity was achieved through analogue media like pop-up books and telephones. The second phase was the digital era, which began in the 1980s with the spreading of personal computers and the Internet. The media experience of the digital era offered access to digital content, like videos and music, as well as to gaming from several devices, like PCs and game consoles. Interactivity was mainly limited to communication with other people and to human-machine interaction with rudimentary personalisation.

This will change in the emerging third generation of interactive media. Not only will users have access to digital content and gaming partners anywhere, anytime, and through any device. The digital content and the game settings will also be adapted to their personal tastes and to their current context. On top of this, users will be able to interact with media in a way, which allows them to get exactly the content they need when they need it, and to send an instantaneous response through the feedback channel which will, in turn, alter the content they see and hear.

From user to engager

The opportunities for this new level of personalised and ubiquitous interaction through digital media are vast, only limited by imagination and bandwidth. Application areas where the next generation of interactive media could add value include entertainment, gaming, eHealth, eLearning, eWork, and news. In the areas of entertainment and news, EU project NM2 (New Media for the New Millennium) has demonstrated how personalised interaction through media could work: some NM2 productions allow users to create their personal documentary online from existing footage. One example for this type of personalised interaction is NM2's "Interactive Village" production (see article in this cover theme). Passive users, who today only have the choice to select among some given, static content, will soon be able to adapt content to their personal preferences, thus becoming active engagers. This is in line with the ever more active role of media users through Web 2.0 applications and user-generated content.

Media convergence

The next generation of interactive media is characterised by convergence on both the content level and the technological level. Regarding content, the boundaries between gaming, film, learning content, news and advertising will blur, giving way to some new, interactive forms of media content. The controversial online game "Second Life" already provides an idea of what this convergence could mean in practice. In Europe, France Telecom's GOA gaming platform demonstrates another way of content convergence (see article in this cover theme).

In addition, a convergence of delivery channels for interactive media is emerging. The same media content, may it be sports, news, or movies, can now be viewed on a TV set as well as on the Internet or a mobile device (Mobile TV). Thus, also the boundaries between broadcasting and the Internet blur, posing a disruptive challenge to the broadcasting sector as we know it. One of the innovative broadcasters in Europe, who are ready to meet the challenge, is Finnish broadcaster YLE. In winter 2006/2007, YLE broadcasted, in cooperation with EU project NM2, the world's first shape-shifted romantic comedy, "Accidental Lovers"; viewers were able to affect the romantic relationship between two disparate lovers via SMS text messages (see interview with Mika Tuomola, the director of "Accidental Lovers", about interactive TV in this cover theme).

Market opportunities

Interactive TV is only one of the many interactive media areas, which offer very promising business opportunities. In 2005, The European Technology Platform on "Networked and Electronic Media" (NEM) estimated a volume of 600 billion euro for the networked and electronic media market.

NEM actively promotes the vision of a media future, in which everyone "will be able to generate, manipulate, use, and enjoy any kind of electronic media content – wherever they are" (NEM Strategic Research Agenda). Besides audiovisual services, like telephony and television, electronic media content, according to the NEM vision, also includes "a wide range of interactive services across all realms of information, education and entertainment".

Interactive media services and applications could have a large share in this emerging networked and electronic media market. The challenge for Europe will be to turn the technologies researched and developed in European projects into successful innovations on the market.

This cover theme of "Eurescom mess@ge" presents some examples of interactive media that could have a tremendous business impact.

Shapeshift TV

Novel tools for interactive media productions

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Media creation is changing. It always has, and always will. One of the key reasons for change is the emergence of new ways of distributing media. Theatres have plays, books have novels, and cinema has film. Each tells a story. But plays are different from novels, and novels are different from films. "New Media for a New Millennium" (NM2), a 6th Framework Programme EU project, has been developing the next generation of software tools for the next generation of media. The new media will be characterised by the fact that the story told adapts to suit the preferences of the viewer. We call it ShapeShifting media.

Maintaining the integrity of the story, adhering to cinematic conventions for continuity and delivering TV quality images over broadband, when the story has to adapt to choice and chance "on the fly", has demanded a new workflow for media production. NM2 has addressed these demands and developed a new software system that enables the production team to represent and test the ShapeShifting narratives they create. The pioneering work in NM2 has been developed hand-in-hand with eight experimental productions with broadcasters, productions companies and media schools across Europe. These productions have been the most visible outputs of NM2, achieving success in academic circles and coverage by international press. However, the real legacy of NM2 should be its production tools, developed iteratively with the media production teams, these tools should enable a new generation of creative professionals to develop ShapeShifting media for future generations of consumers to enjoy.

The production tools were developed through close consultation with the project's media production teams. Before we wrote a line of code, we talked to the producers, listened to their creative ambitions and tried to hear and anticipate their concerns about workflow issues and about the potential pitfalls of trying to create ShapeShifting media. Only after these discussions did the architectural detail emerge.

Our creative partners wanted production tools that:

- Provided a user interface familiar to video editors but also useful to screenwriters
- Would make it easy to annotate media items
- Enable rigorous testing of narratives during development
- Would make it easy to refine a ShapeShifting story during development.

These were and remain very demanding, but necessary, requirements. The resulting tools do not set out to replace industry-standard applications such as Apple's Final Cut Pro, but to work alongside them in managing the additional information needed to describe an interactive narrative structure. The appearance and configurability of the user interface mirrors professional tools, but contains new elements such as the narrative canvas – a graphical representation of the narrative structure (figure 1). Here, stories are built using graphical elements to represent interconnected nodes, layers of items to be played in parallel and groups of items from which choices can be made.

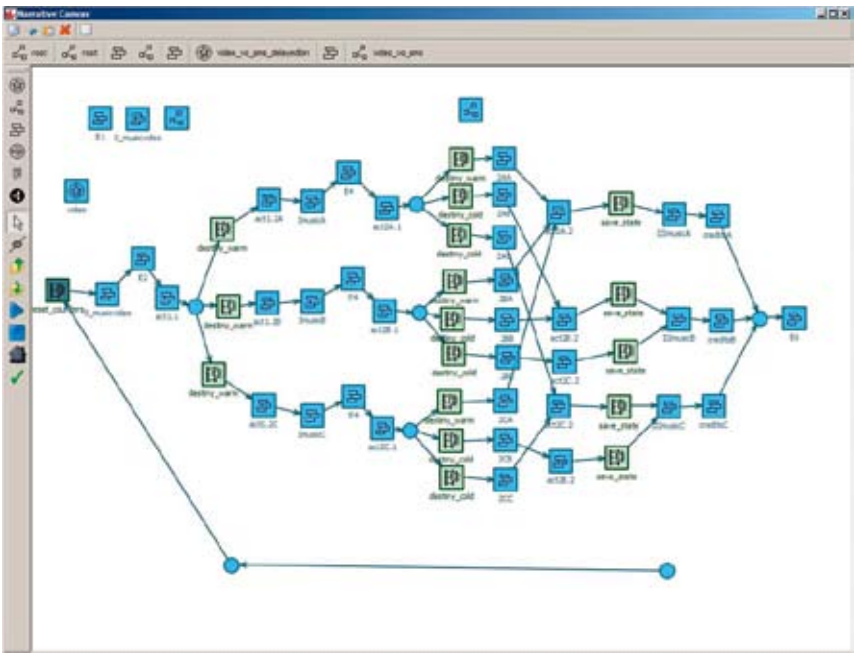

Figure 1: A narrative canvas

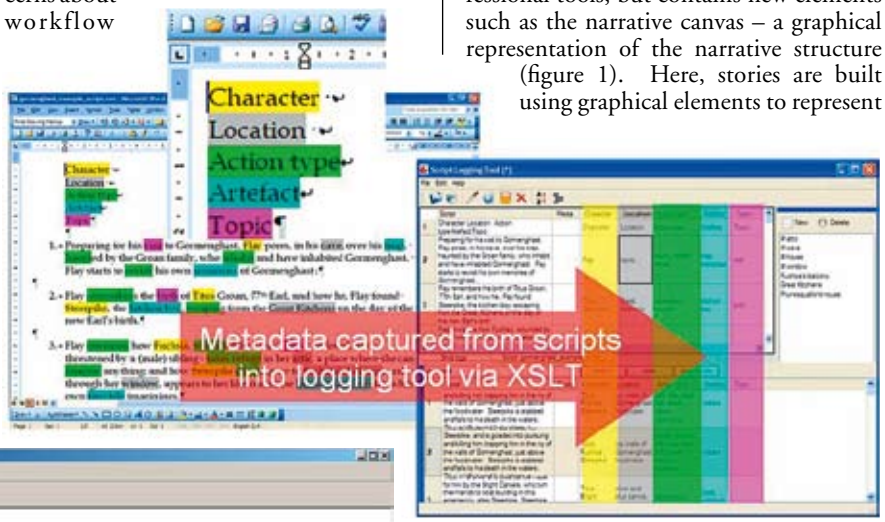

Figure 2: The script-logging tool

Making annotation of the media clips easier was a task tackled using two approaches: one based on the power of technology, one very closely allied to an understanding of media production workflows. The former method integrated content analysis algorithms that can identify scene cuts and other basic features that helped with the description of media clips and the synthesis of new stories from clips with known properties.

The workflow approach proved immensely productive. In annotating media clips we had imagined that it may be necessary for computers to perform speech to text translation to derive a script, and for computers to identify who was in which

"Accidental Lovers" (Director: Mika Tuomola), a ShapeShifting romantic black comedy, was broadcast in Finland in the winter of 2006/2007.

image. But in drama and some documentary productions, we learned that detailed scripts are already created by the production team which already contain this information. So all this metadata, that a computer would still struggle to determine on its own, is already created in the normal workflow of many productions! Our answer to this was the Script Logging Tool (figure 2). Used extensively in the high profile Accidental Lovers drama production broadcast in Finland in the winter of 2006/2007, it imports scripts from Microsoft Word and allows their key metadata to be associated with media clips within the NM2 production tools, avoiding the need for time-consuming manual entry.

Refinement of ShapeShifting stories can be achieved in many ways, by changing the narrative structures, by changing rules that determine how a story is assembled, or by changing the media items or their descriptions. All will have an effect on the potential aesthetic and narrative integrity of the production, and the tools provide an advanced preview function which makes the effects of iterative changes very easy to observe. In addition to an audio-visual preview, a timeline shows the evolving playlist, and interactions can be made via a simulated client interface.

ShapeShift.tv

Eight media productions influenced the design of the NM2 production tools, from genres as diverse as news and drama – and the same tools are now available for anyone to use from a new community portal, *www.shapeshift.tv*. This site will become the focal point for creative professionals and practitioners who are interested in ShapeShifting media. Registration will be free, and will also provide access to discussion fora, training materials and demonstrations of existing ShapeShifted productions. It will allow a community of users eager to understand the possibilities of ShapeShifting media to congregate and share best practice as they begin to define new media genres for broadband which are as different from television programmes as programmes are different from films. Media creation has always changed and will always change. The shapeshift.tv website, its growing community of users and the outputs of NM2 are all part of the revolution.

More information is available on:
www.shapeshift.tv
www.ist-nm2.org

Interactive Village

A shapeshifted interactive media production

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Interactive Village is a prototype media production using interactive multimedia production tools developed as part of the European research project NM2 (New Media for a New Millennium). The production, which offers a documentary profile of the Czech village Dolní Rove, allows users to piece together an individual viewing based on their own interests and choices. These can be selected through interaction with the user interface which facilitates navigation through the village to meet the inhabitants and to determine subject and depth of the information.

Human interest stories

The documentary approach taken in *Interactive Village* intends to address "human interest" stories. Its purpose is not to offer a programme formula as such, rather to test out a variety of strategies that could be easily adapted to future programming scenarios.

We, the producers had visited the village on a regular basis over a period of 2 years and worked in close collaboration with anthropologists from the University of Pardubice in order to identify and collect relevant information. This included shooting of video material, establishing shots, archive images (still photographs and, in some instances, paintings made by local children), video diaries and cut-away details. It was always evident that its significance would not be fully realised without allowing the user to navigate in the village. This not only mirrored the exploratory nature of the filming process, but developed a virtual landscape in which the viewer could explore the village. In the gathering of material for the production, rather than shooting a definitive storyline (or storylines), we found ourselves looking for "story potentials" in the style of the early stages of investigative journalism – bearing in mind it is a 'story' that does not have to be finally "written-up" in a definitive manner. Consequently it is up to the users to develop the narrative building blocks provided by the media tools into the "story" of their own choice. The "shapeshift" production tools, developed by the NM2 project, provided the ideal environment for making such a user-navigable production.

The Interactive Village user-interface

The Interactive Village user-interface

The interface presents a map of the village (at the bottom of the screen), a selection of thumbnails (left) representing different video clips that can be accessed and a viewing window (right). Below the window are A, B, C and D buttons that enable users to steer the narrative in terms of its duration – button A extends the narrative; button B reduces it. In addition the narrative pathways can be steered by responding to on-screen prompts by selecting button C, or you can choose a voice-over explanation with button D.

For example, viewers can choose an 'unofficial' view of the village from Mr Zevl, the newsagent or the 'official' view of the mayor, Mrs Vinarova.

However, the users may prefer the expert 'outsider's' view and select anthropologist Peter Skalník, who comments on recent social and political change. Or, yet another view of the village can be selected, perhaps from a female anthropologist. In this case, Hana Novotná presents a different perspective and considers the central role of Mr Zevl in the village community.

Conclusion

The Interactive Village production offers a new kind of formula to existing documentary genres, offering a range of unique interactive experiences on a sliding scale from news headline presentation to in-depth documentary, or from automatic presentation to user-explored/contributed ethnography. Each configuration provides a personalised interactive experience, where the source sequences are configured seamlessly in real time to suit the personal wishes and needs of engagers.

You can find more information on The Interactive Village at the NM2 production page *http://www.ist-nm2.org/media_productions.html*

Mrs Vinarova or Mr Zevl? Sources of officialdom or gossip?

Anthropologist Peter Skalník presents his 'didactic' commentary, while anthropologist Hana Novotná presents an alternative perspective.

The future of interactive TV

Interview with Mika Tuomola from Crucible Studio

Mika 'Lumi' Tuomola, artistic director of Crucible Studio at the Media Lab of the University of Art and Design Helsinki

Many people are talking about interactive TV, but only few have produced it so far. Eurescom mess@ge editor-in-chief Milon Gupta talked to someone how did: Mika 'Lumi' Tuomola, artistic director of Crucible Studio at the Media Lab of the University of Art and Design Helsinki As director, he has created one of the first really interactive comedies, "Accidental Lovers", which was broadcasted on Finnish TV.

How do you define interactive TV?
Mika Tuomola: Instead of "interactive TV", which is too fuzzy, I prefer the term "shape-shifting media", which, according to EU project NM2, is defined as non-linear broadband media that can be personalised to suit the preferences of the individual user. Whether you call it interactive or shape-shifting, the characteristics of television need to be preserved, it should remain more than just menus and additional information. The shape-shifting occurs in the re-organisation of actual audiovisual material, its real-time edits, camera angles, sound tracks, plot lines, et cetera. So it is interactive television by the means of television's own language: moving image, audio, drama and storytelling.

What are the benefits of interactive TV for the viewers?
Mika Tuomola: Like all new forms of storytelling narrating our daily life, and more, interactive television provides us a new angle towards the very fabric of reality. As the engager is no longer told things from one point of view only, but has an active role in navigating many points of view, it changes how we perceive any broadcasted information. I think this change is towards the better, because the multiple points of view and non-linearity are the way to go; they are closer to the reality of life, or, to say it with Shakespeare's Hamlet: "The purpose of acting was and is to hold a mirror up to reality".

On top of this important cultural matter are, of course, all convenient benefits of shape-shifting television programmes, like getting your own close-ups, framings, lengths of news, et cetera. It makes your life simpler and enables a personalised way of creating your own fan relationship to your own favourite television programme.

Which interactive TV programmes have already been realised in Finland, and which are planned in the future?
Mika Tuomola: Besides the internationally popular reality television programmes, the Finnish television has many real-time interview and chat programmes on air, as well as early day and late night interactive games that can be played on mobile phones and viewed on national television. In addition, a lot of experimental shape-shifting television programmes have been introduced since the late 90s, like the late night show "Aquarium", in which viewers could influence by voting what the characters do while they cannot sleep. Computers processed the voting decision in real-time.

More recently, there has been "Accidental Lovers", a participatory black comedy about love produced by Crucible, which was broadcasted on Finnish TV channel YLE 1 in Winter 2006/2007. The engagers could affect the unfolding drama of the odd romantic couple via mobile phone and Internet.

Looking into the future, Sankari Productions is planning an episodic "Movie Karaoke", in which television engagers can give a real-time voice-over to the television programme's lead characters and thus influence the plot.

What are the major technological challenges for providing more interactive TV formats?
Mika Tuomola: In automated systems, the main challenge is definitely the computers' ability to understand storytelling logic and rhetoric, something practiced by people for thousands of years, as well as the language of moving images and sound. That is why many television programmes use human hosts, directors and editors to get through the interactive, shape-shifting parts.

What are the business models, and who will be the main players in the area of interactive TV?
Mika Tuomola: Advertising will definitely remain the core source of revenues. However, there will be new revenue models in addition to the old ones. New business models will include engager communities doing engager-to-engager content sharing and engager-to-broadcaster models, like on BBC News. The old broadcaster-to-engager model will continue, but there will also be new forms. As an artist, or content developer, I am most interested in the business models that investigate what the engager-to-engager model can offer to the direct relationship between the artists, content-originators, and their engagers.

How do you envisage the TV experience to be different from today's in ten years?
Mika Tuomola: My vision of my TV experience in ten years is like that: I watch a comedy series with a dark undertone, which I like – take, for example, "Six Feet Under" or "Singing Detective". As my favourite character makes an unjust remark about another character, whom I dislike, I want to see whatever is happening to her. So, I change to her point-of-view, just by expressing my wish to see the story from her perspective. I am at awe of the change, or shape-shifting, of the drama, as I suddenly see the world through her eyes. I still dislike her, but I understand her, and also my character, better – well enough to shift back to my favourite character's point-of-view, which suddenly seems superficial, superficial enough for me to want to see whether she is really all that terrible. The drama is starting to have the depth of a good novel. In short: my TV experience in ten years will be the best media experience I have ever had.

Interactive media –
More than a buzzword

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In Google the search term "interactive media" returns more than two million results. Though not enough to qualify for the buzzword of the year, it clearly shows that there is some hype about "interactive media". The term is used and sometimes misused for a vast variety of things. Generally speaking "interactive media" comprises media that allow for active participation by the recipient. But how active should this participation be?

Digital media and more

Interactive media could be any kind of media, including board games, specific forms of printed media or even face-to-face communication. As a first step we could limit it to digital media; Google returns then only 115,000 results. Typical examples of digital interactive media are interactive television, computer and video games, the World Wide Web, and many more. In any case it requires a two-way

communication path. This communication can be between humans (e.g. several people playing a game over the network), or between humans and machines (e.g. someone is playing a game against a computer), or between machines (e.g. an electronic agent putting the preferred audio programme for the evening together).

Interactive television

There is not much to say about interactivity of computer and video games. Here, interactivity is an inherent factor. But what about the interactivity of television? From when on can we really say that television is interactive? Is it enough if the viewer can select different views of a football match by choosing interactively between a number of channels? Or is it more that viewers can vote for their favourite singer in "American Idol"? Or does real interaction mean that the viewers can influence a programme in real time and receive their individual tailored personal productions? How important is the factor of personalisation?

Today nearly all "interactive" television productions are of linear nature, such as a time-shifted TV channel accessed via the Internet, or feedback to a live TV production via telephone, SMS or Internet. A more innovative level of interactivity brings non-linearity together with personalisation into a production so that end-users get their real-time personalised programmes put together from small media objects; very much like assembling Lego bricks. You could, for example, set personal preferences for a personalised documentary on Australian animals. Or you could explore different aspects of a specific village, as described in the "Interactive Village" article in this issue. Personalised non-linear media productions are still in the R&D phase. They require special media production tools, as described in the article on ShapeshiftTV tools in this issue.

Everybody would probably define the boundaries of interactive television differently. But it is clear that real interactivity starts when each viewer has an individual channel allowing individualised productions on a per-viewer basis, even if some interactivity can also be achieved by broadcast.

The economic driver

From an economic point of view, currently interactive digital media is probably driven by the computer and video games market. Fox News reported that in 2005 U.S. retail sales of video game hardware, software and accessories hit $10.5 billion. And with the release of Nintendo's and Sony's latest game consoles we might expect an even faster increase during the coming years. The latest trade fair in this sector, Leipzig's Games Convention, reported again a high increase in exhibitors and visitors.

Interactivity is an integrated part of all computer and video games. They can be installed locally from a CD or a DVD, such as for example "The Sims", or they can be played directly on the Internet, such as for example "Second Life".

Lean-back or forward

Will computer and video games ever come together with interactive TV, and – most importantly – will the users go along with

such a development? By nature computer and video games are more of a lean-forward type, where engagers interact with their computer or games console peripherals - often very actively, if you just think about the latest Wii controllers. Watching TV is currently mostly of lean-back nature where viewers do not want to intervene much more with the ongoing programme than zapping away commercials.

I am very confident that boundaries will vanish, as the conditions for individual broadband channels will improve, and the in-house wired or wireless connections will allow for their distribution to the living room. Finally, users will enjoy themselves with combined functions of interactive TV, computers and game consoles, and they will not think any more, whether they should lean back or forward.

You can find more information on interactive media at

http://en.wikipedia.org/wiki/Interactive_media

http://www.bima.co.uk/

http://www.aimia.com.au/i-cms?page=2

http://www.prospects.ac.uk/cms/ShowPage/Home_page/Explore_job_sectors/Broadcast_film_and_interactive_media/as_it_is/p!eigLac

http://en.wikipedia.org/wiki/Video_game_console

http://thesims.ea.com/

http://secondlife.com/

http://www.ist-nm2.org/

CELTIC N • E • W • S
Telecommunication Solutions

CONTENT

EDITORIAL

Dear reader,

In this issue we will present the outcome of three successful Celtic projects, which have finalised their work in 2007. All three projects started in 2004.

- DESYME focused on the development of tools and systems for the easy creation of mobile services.
- ECOSYS investigated the techno-economics of integrated communication systems and services, and
- QUAR2 examined the end-to-end quality of real time applications over heterogeneous domains.

With these projects all Call-1 projects will have been closed. This first series of Celtic projects was indeed very successful. We have received a large number of very valuable results; several of these are already becoming real products. The success of Call 1 is very encouraging for us, and we expect similarly good results from the projects started in later calls.

Heinz Brüggemann
Director Celtic Office

DESYME

MAKING MOBILE SERVICES DEVELOPMENT AN EASIER TASK

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For the last 10 years, the telecoms industry has focused on developing new mobile services targeting a wide audience. However, though many applications had reached a huge number of customers, search will still continue, as customers will always request new and different mobile applications as their possibilities, needs and preferences change. Also, creating new mobile services is not an easy task, as besides fulfilling user needs each application service provider (ASP) and mobile network operators (MNO) have their own network policies and service restrictions. Then, why not provide a simple service creation tool with a common framework for ASPs and MNOs? Why not offer this tool to SMEs for easy generation of mobile services?

DESYME deals with this topic, closing the existing gap between new generation services over mobile networks and user needs.

Based on the concept mentioned above, the main objective addressed was to build an open development and runtime environment allowing developers and SMEs create distributed mobile services in an easy and flexible way.

DESYME (DEvelopment SYstem for Mobile sErvices) is based on an integrated development environment (IDE) and a common framework located at ASPs using service enablers provided by one or several MNOs.

It enables users to design mobile services through an IDE to suit their requirements in an easy and low cost way, creating services with less tan 100 lines of code. Semantically enriched mobile services designed by the DESYME system use Web Services, Parlay-X technology and an integration framework based on ontology called ONAR.

DESYME architecture

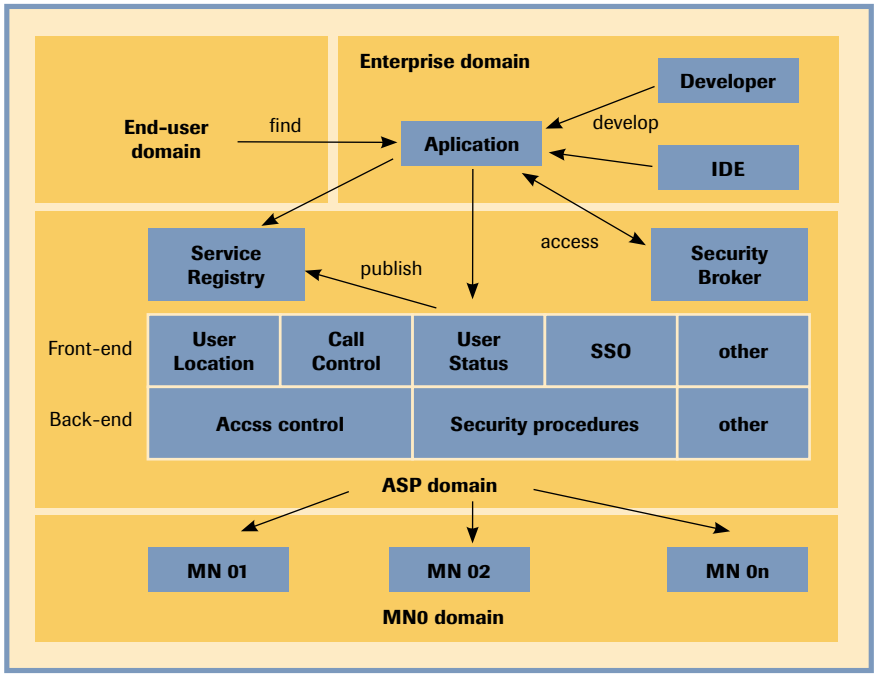
The figure below shows the basic parts of DESYME:

- In the ASP domain, a Framework provides access to network services located within MNOs. This Framework was made flexible and modular allowing ASPs to add new services capabilities to it from several MNOs in an easy way. It was divided in two modules: front-end and back-end.
- An IDE (developed by using Java and based on Eclipse), comprised of APIs and a graphical interface to ease the development of applications to developers.

A Web Service architecture enables the communication between the front-end and the customer applications that were developed using the IDE provided by the project.

One of DESYME's challenges was to provide means to perform searching Web Services based on sophisticated criteria. Thus, an important part of the system is the Web Service Browser built on top of the Framework, allowing the user to browse through the registered services.

Within the Framework, a back-end was required to enhance the functionality of the mobile network interface based on Parlay, with the access control and security procedures.



Conclusions and impact

At present, there are many technologies available that provide network access to mobile users. However, no matter how good they are, their success depends on the services that can be provided over these networks. Therefore, the main challenge for operators and service providers is to provide a method for customizing the services according to the user's requirements. There are a lot of service opportunities in the existing mobile networks, and some of them are wasted because of the lack of an efficient solution for creating them.

This is exactly the problem DESYME addresses, allowing to generate mobile services without having to deal with the complexity and heterogeneity of the network environments of different mobile operators and the complicated way of connecting to mobile networks.

With the DESYME solution, this environment becomes easy and simpler, as developers only have to worry about the features required by the user.

The DESYME platform will guarantee the interoperability of the final service, providing access functionalities to the network without the requirement that the programmer needs a profound knowledge at this level.

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

ECOSYS

TECHNO-ECONOMICS OF INTEGRATED COMMUNICATION SYSTEMS AND SERVICES

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ECOSYS concentrated on developing a strategic techno-economic framework for future telecommunications business. The framework was applied on case studies drawing conclusions and recommendations for the stakeholders. ECOSYS studied the market dynamics and worked out models and forecasts for the mobile, fixed and converged technologies, services and business scenarios.

Focus and approach

The ECOSYS project focused on analysing and modelling the technology and business evolution in developed and emerging telecom markets. Building on top of methodologies developed in earlier European projects, ECOSYS created a new techno-economic framework that is suitable for modelling emerging business scenarios.

The profitability of fixed broadband technologies was evaluated for areas that have a strong cable TV operator, and in areas where the competitor uses unbundled copper lines and the incumbent operator is not forced to provide unbundled lines from their new VDSL2 nodes.

For the emerging mobile business five most interesting scenarios were identified:

- Incumbent 2G operator choosing between UMTS or mobile WiMAX
- New entrant without spectrum license choosing between the pure service provider role or becoming a mobile virtual network operator (MVNO)
- New entrant possessing an UMTS license
- New entrant with CDMA450 license focusing on a rural market in a Nordic country
- Mobile broadcast provisioning using DVB-H technology

The analysis of Fixed Mobil Convergence (FMC) focused on the differences between the "continue as now", i.e. separate fixed and mobile approach, and the approach to unify the business lines both in the organizational and technical levels.

Key results and conclusions

The analysis of fixed broadband technologies shows that in areas with a strong cable TV operator the DSL operator's upgrade to VDSL2 is hardly profitable outside the areas, where no new fibre rollout is necessary. In cases where the competitor uses unbundled copper lines and the incumbent operator is not forced to provide unbundled lines from the new VDSL2 nodes, the upgrade case showed good profitability. WiMAX proved to be a viable fixed broadband solution for suburban and urban areas only where no or very low ADSL coverage is available.

Out of the analysed emerging mobile technologies, services and business players, the scenarios 1, 2 and 5, proved to open up viable cases, while the scenario for new entrant with UMTS license is challenging. The business case for a new entrant with CDMA450 license focusing on a rural market in a Nordic country did not show promising results at all. In scenario 1, UMTS showed a clearly stronger and less risky case than the mobile WiMAX, but only for those who have acquired the license. A full virtual operator, with own network termination has benefits compared to a plain service provider, as having more competitive power and e.g. possibility to collect network termination fees. The last case study for mobile broadcast provisioning with DVB-H shows economically feasible prospects.

Both Fixed Mobile Convergence studies indicate that the main advantage of introducing FMC services and network functionalities is to maintain market shares and, in the long run, to save OPEX costs.

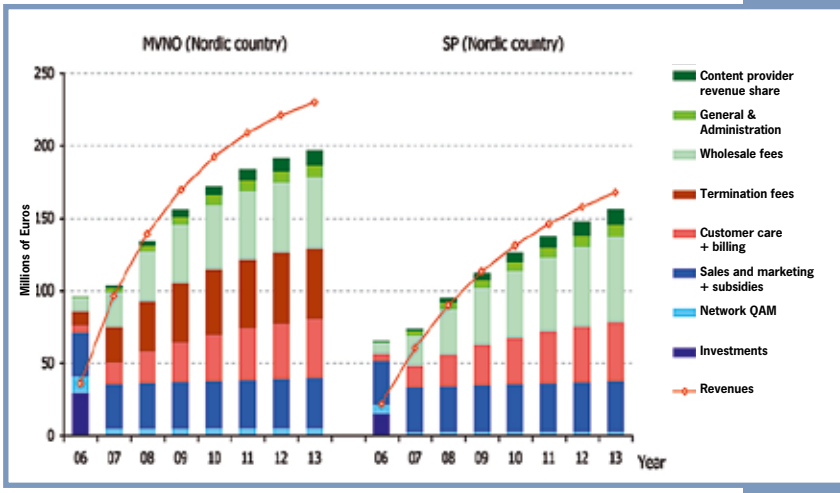

Figure: Cost and revenue results for a new entrant without spectrum license when choosing between service provider (SP) and MVNO roles in Nordic country context

The delta cash flow calculations between the FMC case versus continuing the current separate fixed and mobile businesses indicated clearly better profitability for the FMC operator. The second scenario of a 2G operator that has no 3G license in an emerging market, demonstrates that the broadband-through-FMC approach can be a crucial factor for the 2G operator in reducing churn and related losses, when the other operators start to offer 3G services.

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

QUAR2

MANAGING THE QUALITY OF REAL-TIME IP SERVICES

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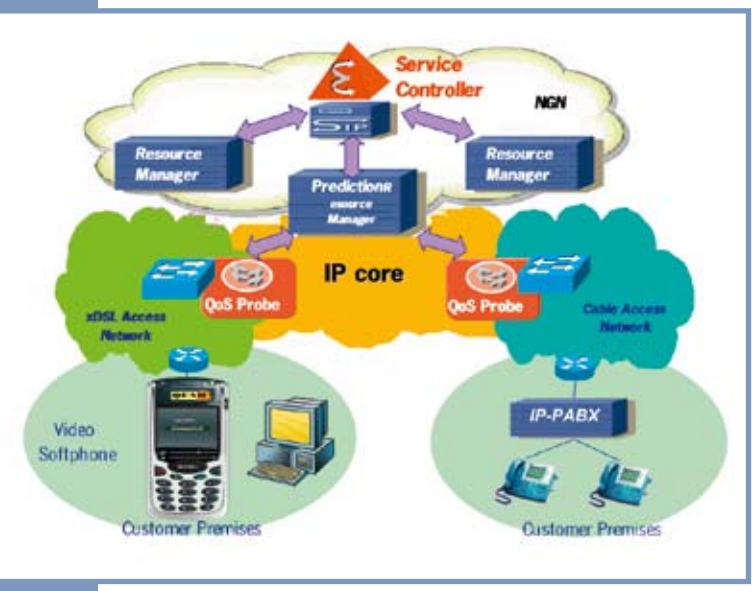
The QUAR2 project – Quality of Real Time Applications End-to-End over Heterogeneous Domains – has developed a new system able to provide high quality to voice and video over IP services.



The development has relied on emerging Next Generation Networks (NGN) infrastructures, providing carrier-class quality of service at low operational costs using standard interfaces and resulting in multiple value-added services to the benefit of the end users.

A new approach to solve the QoS issue

Quality of Service (QoS) is one of the key issues of multimedia services demanded today. Several techniques are currently applied to the network equipment in order to enhance the QoS in IP networks, but finally it is always necessary to control the customers' real experience. For that reason QUAR2 has based its research on measuring and predicting the perceived quality of experience of real-time IP services. The prediction provides the necessary data to control the end-to-end quality by means of intelligent management systems deployed into the NGN core network.

The building-blocks of the solution

At the first level, the quality control is based on QoS Probes that measure in real-time the perceptual quality of multimedia sessions by obtaining the MOS (Mean Opinion Score) of every customer's communication without intrusion.

The QoS measurements and the network statistics are passed as input data to a subsystem called the Predictor Resource Manager which is in charge of predicting the behaviour of the whole network in terms of QoS.

The predictor reports these results to a high-level subsystem called the Service Controller (SC), an intelligent subsystem that manages the end-to-end QoS of multimedia sessions. The SC provides extended signalling interfaces to end users' equipment and management interfaces to the Resource Managers that ultimately control the individual resources of the heterogeneous access networks.

Finally, at the customer premises, two advanced terminals were used: a video-softphone and an advanced IP-PBX, both with QoS signalling features (see figure).

Thus, depending on the QoS requested by each customer and the real status of the network, the system reserves the necessary resources for each type of access network, chooses the most appropriate voice- or video-compression algorithm and even modifies the multimedia characteristics of an already established session. Therefore, every broadband customer is able to enjoy at any time the highest QoS offered by the network operator.

Conclusion

QUAR2 has represented a migration effort to overcome the major obstacles to deliver Quality of Service for voice and video over IP applications. The project produced a global system with the key pieces able to manage QoS within next generation networks: the Service Controller, the Prediction Resource Managers, the QoS Probes, and the advanced end-user devices. This architecture plus the key concepts and the methods employed will enable the service provider to enhance its service portfolio with the next generation of high-quality multimedia services, utilizing their existing core and access networks and achieving a significant reduction of its capitalization and operation expenditures.

To learn more, please visit
http://projects.celtic-initiative.org/QUAR2

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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.

The European Investment Bank –
Innovative finance for RDI

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The European Investment Bank (EIB) was established in 1958 as the long-term financing institution of the European Union, investing in projects promoting European objectives. Through loans, guarantees and technical assistance, the EIB has actively contributed to the financing of the integration and development of the EU Member States. The Bank also supports the EU's cooperation and development policies outside the Union.

With the adoption of the Lisbon Agenda in 2000, the European Union set itself the strategic goal of establishing a competitive, innovative and knowledge-based European economy, capable of sustainable economic growth, employment and social cohesion by 2010. In response to this strategy, the EIB launched the Innovation 2010 Initiative (i2i), for the first time making the financing of research, development and innovation (RDI) a priority objective for its lending activities. Since 2000, the EIB has lent a total of 52 billion euro to projects under i2i, of which 11.4 billion euro was dedicated to information and communication technology projects.

Innovative finance for innovation

In a bid to further increase its support to research, technological development, demonstration and innovation (RDI) projects and to improve access to debt financing for innovative private companies or public institutions, the EIB and the European Commission have recently launched the Risk Sharing Financing Facility (RSFF).

RSFF is based on an innovative idea of leveraging Community Budget funds available under the Seventh Community Framework Programme through EIB financing. As a result, RSFF will create an additional EIB financing capacity of up to 10 billion euro in support of eligible higher-risk RDI activities.

Accessible finance across the board

RSFF targets in particular low or sub-investment grade companies, including the vast number of typically unlisted and unrated medium-sized companies in Europe.

Promoters who can benefit from RSFF financing range from private and public entities of all sizes and ownership to special purpose companies, joint ventures, research institutes, universities, science and technology parks, and Joint Technology Initiatives.

In line with the Lisbon Agenda, projects eligible for support under RSFF must be located in an EU Member State or in one of the following Associated Countries: Iceland, Liechtenstein, Norway, Switzerland, Israel, Turkey, Croatia and Serbia. Possibilities for financing RDI outside these countries are not entirely excluded.

Much more than brick and mortar

The diversity of RDI activities that can be financed is another key element defining RSFF as an innovative financing solution. RSFF can finance basic or fundamental research, applied or industrial research, experimental or pre-competitive development, definition stage or feasibility studies, pilots and demonstration activities, and innovation projects. These activities can also be conducted as part of European research initiatives, such as Research Infrastructures, European Technology Platforms, Joint Technology Initiatives, or alternatively projects undertaken under Eureka.

In addition to traditional "brick and mortar" investments, EIB can finance intangible RDI investments including researchers' salaries and IPR acquisition cost.

EIB contribution

Tailored financing is an important thread that runs through RSFF. Debt based financing in the form of structured loans and guarantees, but also mezzanine-type solutions will be made available to address specific funding requirements.

Independent of project size, the share of EIB financing is normally limited to 50 percent of the total amount of eligible project cost. The EIB can provide direct financing for projects with a total cost of 15 million euro and above.

European Investment Bank

Smaller sized projects and companies will be financed in collaboration with the EIB's national and local partner banks, with whom the EIB is in the process of developing risk sharing credit facilities.

Bringing RSFF to life

The best way to understand the nature of the European Commission and EIB's innovative financing solution for RDI projects is through an example:

A-Company is a mid-sized manufacturing company of mobile telephone components. With a staff of 2,500 employees and an annual turnover of 300 million euro it does not have a financial rating. While the recent acquisition of a competitor has boosted activity volumes, the company's balance sheet suffers from an increasing level of short-term debt.

A-Company has been asked by the Original Equipment Manufacturing B-Group to develop its next generation intelligent touch screen. The company has therefore launched a three-year RDI programme totalling 60 million euro, comprising the construction and equipment of a laboratory, the recruitment of a specialised engineering team, and the acquisition of a license for nano-material processing.

EIB headquarters in Luxembourg

While the implementation of the RDI programme will further increase the company's funding requirements, A-Company cannot be sure that B-Group will eventually retain its solution or choose a competing offer. Under the Risk Sharing Finance Facility, the EIB proposes an 8 years unsecured loan of 30 million euro to finance half of A-Company's overall investment programme. In order to reduce the impact on the company's cash flow during the investment period, the reimbursement of the loan principle starts only two years after disbursement. Furthermore, the interest rate will be reduced in case of a reduction of the company's indebtedness and rise up to a pre-agreed ceiling in case of a deterioration of A-Company's financial standing.

By financing the company's challenging RDI programme on a long-term basis and with an adaptive interest rate scheme, the EIB is effectively sharing risks with A-Company, thereby strengthening and balancing its overall financial structure.

Moving forward with your project

If your RDI project meets the criteria for financing under RSFF and you would like to obtain more information on how to apply, you are invited to contact the EIB directly. There are no formal requirements or deadlines for such an application. The Bank's experts in RSFF financing can be contacted either via its head offices in Luxembourg or via its European external offices located in Austria, Belgium, Finland, France, Germany, Greece, Italy, Poland, Portugal, Romania, Spain, and the United Kingdom.

Further information on the Risk Sharing Finance Facility can be found on the EIB website at *www.eib.org/rsff*

Philippe Maystadt, president of the EIB

IMS Enabled Converged Networks

VITAL-PANLAB workshop in Patras

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The "1st Workshop on IMS Enabled Converged Networks IP Multimedia Subsystem: Present and Future", jointly organized by the EU projects VITAL and PANLAB, was held on 24th and 25th September 2007 in the Conference and Cultural Centre of the University of Patras in the city of Patras, Greece. About 50 network experts and decision-makers from Europe and North America participated in the workshop.

The first day of the workshop was dedicated to presentations of speakers and keynotes, while on the second day a number of live demos were presented by the participants from the two projects. The demos included IMS-related scenarios, followed by an open discussion.

The main purpose of the workshop was to openly discuss the present and future of IMS as an enabling technology for converged networks. In particular, the participants discussed a series of present IMS features and functionality from the viewpoint of problems, limitations and deadlocks that may eventually lead IMS deployment to fall behind expectations and widespread adoption.

The participants also made a projection into the future and discussed possible directions for IMS transformation and coexistence with emerging technologies, such as P2P. One of the key questions discussed at the workshop was whether IMS is eally 'the solution' to true convergence and seamless communication in future networks, serving a next generation of communications services.

The morning of the first workshop day was dedicated to topics which mainly address actual open issues and the state of the art of converged networks while the afternoon sessions were dedicated to the future of converged networks, followed by a panel discussion with the same subject.

Keynote speaker David Boswarthick from ETSI presented an overview on IMS standardisation activities and their long-term evolution. He particularly evaluated the position of IMS in future standards, considering converged networking.

End-to-end communications and related issues in future converged networks were presented and discussed at the beginning of the workshop. It was concluded that requirements on terminals and devices have to be seriously taken into consideration in the future development of networks and services, where particularly a large diversity in applied platforms is expected to occur. Furthermore, the problems and corresponding points to be addressed in further research and development activities are recognised in realisation of routing in IMS based dynamic peering, which includes multiple routes, implementation of IPTV, and realisation of IMS management systems, which seems to become a highly complex management system. However, at the same time, it was concluded that IMS seems to be a suitable solution for implementing IPTV and other services with high requirements on QoS (Quality of Service) and QoE (Quality of Experience).

Panel

The panel was composed of representatives from a vendor, an incumbent operator a new entrant and a standardisation body. The panellists discussed the question of whether IMS is really the solution for true convergence and seamless communication. During the discussion, it became very clear that the right balance between rapid deployment, complexity and maturity of the standards as well as openness at all levels has to be found in order to benefit from the technology.

Demonstrations

The implementation complexity of the future converged networks became obvious on the second workshop day during the demonstration sessions where members of VITAL and PANLAB were the main participants. Therefore, a significant need for testing facilities including various testbeds spread in different locations was recognised by the workshop participants as an important enabling factor for implementation of the future converged networks.

Presentations are available on the workshop website at *www.converged-networks.eu.* Information on the EU projects VITAL and PANLAB can be found on their projects websites:
www.ist-vital.eu
www.panlab.net

Future mobile applications

eMobility Workshop in Rome

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The second workshop on "Shaping the Future of Mobile and Wireless Communications" took place at Telecom Italia Mobile in Rome on 25 September 2007. It attracted about 30 participants from industry and academia. Organised by the eMobility Working Group on Leading-Edge Applications, the goal was to discuss potential services and their requirements as they are seen by other industry sectors.

The eMobility Working Group on Leading-Edge Applications has been formed in order to address non-technological aspects related to services and applications in mobile and wireless communications. After a first successful workshop held in 2006, the goal of this second workshop has been to start collecting ideas for the Strategic Applications Agenda, to establish further links between Mobile & Wireless and other sectors, to identify new applications, and to get disruptive ideas for R&D. Speakers were sought in various areas, but with a focus on the priority areas listed by the European Commission.

In the area of socio-economical sciences and the humanities, Prof. Philippe Mallein from University of Grenoble addressed usage aspects. He gave an overview of new tendencies in social change and gave his view on opportunities for non-conventional applications in mobile and wireless technologies.

The topic of eHealth has been discussed in Europe and worldwide already for quite some time, and a number of applications has already been deployed and adopted. However, eHealth has yet another dimension in developing countries where the density of medical staff is comparably low, often not or not easily accessible from remote areas, and where people can often not afford appropriate medical treatment. Adesina Iluyemi from the University of Portsmouth presented results of his work on e-health opportunities for Africa.

The Scientific Research Unit of the Royal National Institute of Blind People develops guidelines for the accessibility of information and communication technology systems. Dr. John Gill, Chief Scientist at this unit, gave his view on the opportunities for new applications in this area.

Finally, Dr. Antonio Marques, from ETRA I+D, presented some views on the challenges put by the transport industry to mobile and wireless communications. He made it clear that links between the transport industry and the mobile and wireless communications industry need to be reinforced, with benefits for both sides.

Conclusion

The workshop can be considered very successful, as the discussion after each presentation was very lively. Many ideas emerged from the brainstorming held during discussions, and it became clear that multi-disciplinary aspects need to be included in the work developed by mobile and wireless communications researchers. For example, this multi-disciplinary approach can lead to the inclusion of very simple concepts and ideas in the design of systems and networks, ensuring a broader range of customers and applications.

Workshop on Future Internet Design

at ECOC 2007

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On 16 September, 60 researchers gathered at a workshop on "Future Internet Design" in Berlin. The meeting was part of ECOC 2007, the European Conference on Optical Communication. The researchers from the areas of future Internet design and optical communications explored areas of joint interest and discussed the directions of future network research.

The presentations covered different aspects of Future Internet design. Professor A. Odlyzko pointed out, "What (not) to expect from the Future Internet". Professor Ben Yoo talked about "Intelligent and Agile Optical Networking for the Future Internet". Anastasius Gavras from Eurescom, the coordinator of EU project Panlab, explained the "Challenges in experimental testbed design for the Future Internet".

Bob Briscoe argued in his presentation that "Scheduling in optics is the wrong answer for fine-grained resource sharing". Michael Scharf asked, if we are "Heading towards a post-TCP Era" in regard to the Future Internet transport layer. Finally, Adam Kapovits from Eurescom presented "The Operator's Vision" on Future Internet Design. The workshop was chaired by Phuoc Tran-Gia and Michael Menth from Würzburg University, and by Michael Dueser from T-Systems.

Further information is available at *www.vde.com/Conferences_en/ECOC+2007*

Mobile online gaming

Eurescom study on business opportunities for mobile operators

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Successful multi-player games require a common platform for managing all aspects of mobile online games. Eurescom study P1655 has explored what the opportunities for telcos in the area of mobile online gaming are. Mobile operators could take advantage of their position in the value chain by supporting and integrating the necessary service platforms.

Mobile online gaming is quickly emerging into a significant segment of the mobile services market. In a study commissioned by the European Commission in 2002, Andersen Consulting estimated the European mobile content market size in 2006 at around 19 billion euro[1]. Of this, 5 billion euro would be in games, especially when multi-player offerings would become available. The OECD reports similar estimated figures at over 10 billion euro for wireless games in 2008 and at over 5 billion euro for mobile gaming download revenues [2]. However, the definition of the market is difficult since the topic is vast and can take different forms. The market can be segmented according to different criteria, such as (1) download vs. non-download, (2) network server based vs. handset based, (3) streaming vs. non-streaming, (4) on-line vs. off-line, and (5) multi-user vs. single-user. The Eurescom study P1655 focused on games for which the mobile network service forms an intrinsic part of the gaming experience.

Value chain of mobile online games

The value chain for traditional games, including PC and console-based online games does not include the network operator as a key stakeholder and is very similar to the value chain of the digital-content industry. In the case of mobile online gaming, the value chain is more complex and although the roles have been identified, the stakeholders that will assume these roles are not yet clear. This means that there exist significant business opportunities for the mobile network operators to assume roles in the value chain, such as aggregation, distribution and retailing of mobile online games. Furthermore, since the mobile network connectivity is an intrinsic part of the user experience, the network operator can offer value-added services, ranging from simple high-quality network links up to server-side environments for hosting multi-player games and providing services around the gamers' communities.

Technology aspects

Multi-player games require a common platform that manages all aspects of online mobile games. Such aspects include content aggregation interfaces, load balancing in hosting the games, billing and authentication interfaces, user and asset management, community communication functions, multi-network protocol support, and others.

The client-server principle is the standard model, in which the server provides the managed environment to which all clients connect. The server uses different strategies for load-balancing and partitioning of the gaming functionality. Depending on the nature of the game, certain network parameters may be critical for the user experience and the functionality of the game. Such parameters include latency, round-trip delay, and bandwidth. In a different model, the rendering of the scene in an action game is not happening on the device, but rather on the server in the network and is streamed to the user device. This model requires little capabilities and resources in the user device, but imposes significant load on the backend servers and requires low latency, low round-trip delay and high bandwidth towards the client devices.

With the maturing of peer-to-peer (P2P) networking technologies, also P2P mobile online games are appearing. The fundamentally different possibilities for central management and control will also affect the value chain in the P2P mobile online gaming market. In this model the role of most traditional stakeholders is questioned. It remains to be seen whether the basic competence of the mobile network operators, namely to provide high quality and high availability of connectivity, can be exploited towards higher quality of the user experience, for which the user is willing to pay an added value subscription fee.

Conclusions and recommendations

In this emerging market segment, operators can assume roles such as content distributor, retailer, content aggregator, and offering or supporting multiplayer platforms. To take advantage of these roles and to support mobile multiplayer games, operators must integrate advanced multiplayer online gaming service platforms. They can do this either by offering games that are implemented on third party's platforms or by implementing online gaming platforms in their own network infrastructure.

The trend in PC based games that games challenge the hardware capabilities is likely to continue also in the mobile world, which means that mobile games will push the limits of handset technology but also the limits of the mobile network. Operators should thus continue to support the evolution and further development of mobile data transmission technologies.

The majority of mobile customers are not gamers, thus it is important for the operators to find ways to attract a wider audience by addressing the segments of social, leisure, and occasional gamers.

By adopting the best practices in other countries, European mobile operators should be able to generate bigger revenues from mobile online gaming. These best practices aspects found in other markets are:

- Sharing a significant part (up to 90 percent) of the gaming revenues with game developers (which ensures higher quality games).
- Making use of user generated games by providing authoring tools as well as incentives like revenue sharing with the creators of successful user generated games.
- Adopt new business models based on free or one-euro games sponsored via advertising, combined with item-selling or try-before-you-buy options.
- Enhance the look and feel of games and the quality of the mobile network.
- Make it easy for anyone to access and download a game.

References:

[1] Andersen, "Digital Content for Global Mobile Services", Final Report to the European Commission, Directorate-General Information Society (2002)
[2] OECD (2005) – Digital Broadband Content: Mobile Content, New Content for new Platforms, DSTI/ICCP/IE(2004) 14/FINAL

Radio resource management

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Future radio access networks (RANs) are expected to provide ubiquitous broadband access, good quality of service (QoS), and, whenever possible, seamless mobility. To meet these requirements while limiting infrastructure investments, efficient radio resource management (RRM) is needed. This overview describes trends in RRM of future RANs.

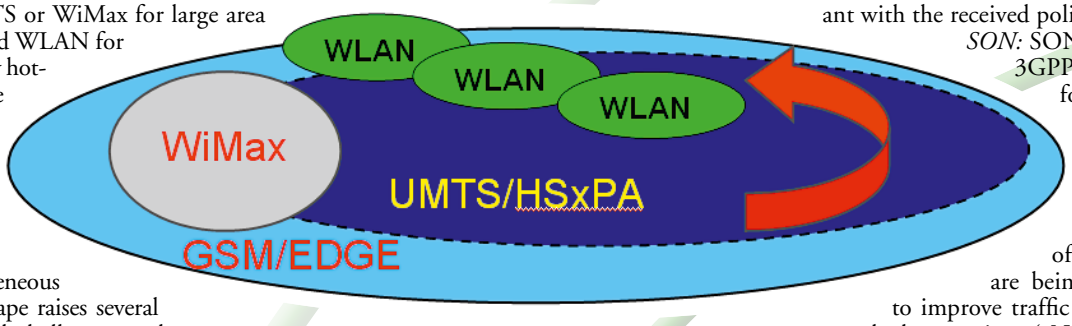
RRM in future radio access technologies

RRM is responsible for basic functions in RANs such as resource allocation, mobility and QoS. To achieve ubiquitous broadband services, most operators deploy different radio access technologies (RATs) that complement each other, such as GSM, UMTS or WiMax for large area coverage, and WLAN for high capacity hotspots. In the future, femto cells will become available for home coverage. The heterogeneous RAN landscape raises several technological challenges such as management of mobility and resource allocation that balances traffic between the network subsystems.

Traffic balancing between overloaded and underloaded systems can be performed via different mechanisms such as admission control, selection and reselection, and intersystem mobility. It can considerably increase the network capacity and hence its profitability. Traffic balancing between different RATs is a topic of intensive R&D activity in both industry and academia. Dynamic Spectrum Allocation (DSAllocation) is an alternative way to balance traffic, namely the network can locally reallocate spectrum resources between overloaded and underloaded systems. This interesting feature still needs to be discussed on the regulatory level. It is noted that the use of under utilized spectrum bands can be performed via opportunistic spectrum access or Dynamic Spectrum Access (DSAccess).

The distributing RRM functions in the RAN currently receive much attention. The motivation is threefold: reduce signalling overhead, reduce complexity and improve the scalability of RRM functions. The efficiency of RRM functions can be improved by introducing cognitive radio mechanisms of sensing the environment and of improving decision making via learning capabilities.

Self Optimization Networks (SON) receive growing attention as a means to enhance network performance. Auto-tuning is an example of SON functionality aiming at tuning parameters of RRM algorithms to adapt the network to traffic variations. The Gandalf project under Eureka Cluster Celtic has demonstrated that auto-tuning of mobility parameters can perform traffic balancing and considerably improve network capacity. SON functionalities can be viewed as advanced RRM. They receive growing interest by both network operators and vendors. A sample of the activities related to RRM in standardization groups is briefly summarized below.



Radio resource management (RRM) in heterogeneous networks.

RRM activities in standardization groups

Mobility: Intersystem mobility is an important standardization topic. Mobility between 3GPP and non-3GPP access networks is currently being studied in the System Evolution Architecture (SAE) of UMTS. The IEEE 802.21 standard, the Media Independent Handover, proposes a mobility solution for 802 and non-802 RANs by providing a generic interface for handover initiation and preparation between different RATs.

DSAccess: The IEEE 802.22 standard supports DSAccess. It introduces the mechanisms of opportunistic spectrum access allowing unlicensed devices of Wireless Regional Area Network (WRAN) to access spectrum of licensed TV broadcast service.

RRM decision distribution: The IEEE P 1900.4 standard focuses on distributing RRM decisions between the network and mobiles/devices to improve usage of radio resources. According to this standard, the network sends policies for the users, and the mobiles/devices take decisions compliant with the received policies.

SON: SON is studied in 3GPP TSG RAN3 for the long term Evolution (LTE) of UMTS. Different case studies of auto-tuning are being investigated to improve traffic balancing between the base stations (eNode Bs).

Conclusion

Radio resource management will play an essential role to meet the requirements of future RANs. RRM functions can improve radio resource utilization and interoperability of network sub-systems, and reduce infrastructure investments. Some of the ongoing RRM related R&D activities have been described above, and will remain a major research topic to conceive better radio access technologies.

Smart cars for safer roads

The EU's Intelligent Car Initiative is gaining speed

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Every year, about 1.3 million road accidents happen in the EU, and more than 40,000 people die on EU roads. Nine out of ten road accidents are caused by human error. Although the number of fatal accidents has decreased in the last ten years, a much larger decrease is possible through intelligent vehicle systems. In 2001, the European Commission set the target to halve road fatalities by 2010. Recent advances in European R&D raise hopes that this target could be achieved.

In September, EU project PReVENT presented at the MOV'EO-LAB test site in Versailles a number of new ICT technologies, which aim to reduce the number of accidents and increase road safety. The in-vehicle systems developed by a consortium of 53 European automotive manufacturers and suppliers led by DaimlerChrysler help drivers to avoid or mitigate an accident.

PReVENT's on-board safety systems inform the driver as early as possible about a critical situation, issue a warning if there is no reaction to the information by the driver, and actively assist or ultimately intervene in order to avert or mitigate an accident. In addition, PReVENT's safety applications also help drivers to maintain a safe speed and keep a safe distance, keep the car within the lane, and avoid overtaking in critical situations.

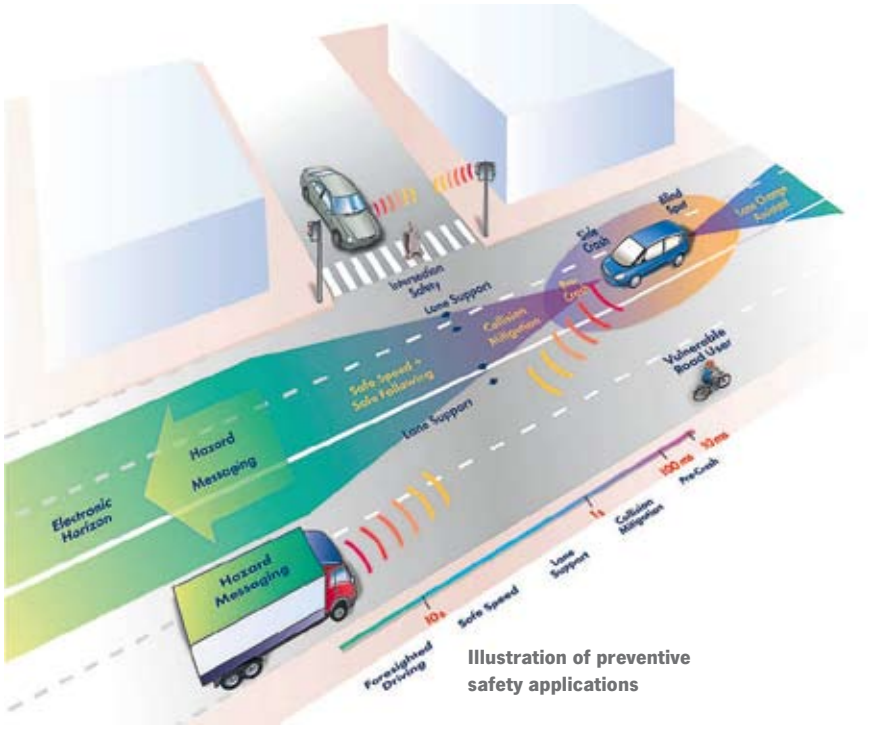

Illustration of preventive safety applications

At the opening of PReVENT's Intelligent Car event in Versailles on 18 September, Viviane Reding, EU Commissioner for Information Society and Media, Commissioner Reding made it clear that despite considerable achievements much more needs still to be done, in order to halve the number of road accidents. She particularly deplored the slow take-up of Intelligent-Car systems.

In order to increase the use of in-vehicle safety systems, the Commission wants to speed up the availability of Electronic Stability Control (ESC) for middle-class and small cars. The Commission co-sponsors an awareness campaign to promote the use of ESC called ChooseESC! (*www.chooseesc.eu*). According to Ms Reding, 4,000 lives could be saved annually, and 100,000 crashes avoided, if all cars had ESC. By 2012, she wants to see a 100 percent availability of ESC. Ms Reding announced that the Commission will hold a consultation later this year on ESC in order to see, if regulatory measures are required. "We are prepared to make ESC mandatory," Ms Reding said.

David Ward, Director General of the FIA Foundation and chairman of eSafetyAware, admitted that ESC has not yet penetrated the market to the extent he would like to see. However, he does not see the need for

Test driver Viviane Reding at the wheel of a Volvo truck after a successfully mitigated collision

new legislation to reach the 100 percent target of ESC adoption.

Another car-safety feature promoted by the Commission is eCall, an in-vehicle safety system that builds on the single European emergency number 112 and its location-enhanced version E112. When the car sensors register a major impact in an accident, the in-built eCall device automatically notifies the nearest emergency centre, transmitting the vehicles' exact geographic location. The fact that the rescue services immediately get the accurate location data drastically cuts their response time, allowing them to reach the scene of the accident much quicker.

According to Ms Reding, the European Commission aims to bring about a voluntary agreement with the automotive industry to include eCall as standard option in all new vehicles from 2010. However, if voluntary agreement cannot be reached the possibility of a mandatory requirement has not been ruled out.

Dr. Bharat Balasubramanian, Vice President Group Research and Advanced Engineering at DaimlerChrysler, pointed out that standardisation of enabling technologies across manufacturers is extremely important for reaching the car safety goals which the Commission and the industry aim for. The way to achieve such standardisation is pre-competitive collaborative research, he said.

Dr. Bharat Balasubramanian, DaimlerChrysler, at the opening of the Intelligent Car event in Versailles

This perspective was shared by Dr Rémi Kaiser of Delphi France, who stressed the importance of a common sense approach to avoid the proliferation of competing enabling technologies. In view of the acceptance of intelligent car systems, Dr. Kaiser said that the driver should stay in full control of the car, despite all electronics.

Further information on the Web:
Intelligent Car Initiative:
http://ec.europa.eu/information_society/activities/intelligentcar
Integrated Project PReVENT:
http://www.prevent-ip.org
eSafetyAware!:
http://www.esafetyaware.eu
Choose ESC! campaign:
http://www.chooseesc.eu

PReVENT's collision mitigation system in action

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

Power storage on paper

Researchers at Rensselaer Polytechnic Institute in the US have developed a nano-engineered battery that is lightweight, ultra-thin, and flexible. The paper battery is designed for implantable medical equipment and transportation vehicles.

The battery can be printed like paper. 90 percent of the device is made up of cellulose. Aligned carbon nanotubes are added, which act as electrodes and allow the storage device to conduct electricity. The device is engineered to function as both a lithium-ion battery and a supercapacitor.

The paper batteries can be rolled, twisted, folded, or cut into any number of shapes with no loss of mechanical integrity or efficiency. They can also be stacked, like a ream of printer paper, to boost the total power output.

Due to the use of ionic liquid as the battery's electrolyte, researchers claim that the paper battery can function in temperatures up to 149 degrees Celsius and down to minus 73 degrees Celsius.

The researchers suggest that the paper batteries could be used in small handheld devices, automobiles, aircraft, and even boats.

As the paper battery is biocompatible, the researchers claim it could power, for instance, a pacemaker without introducing any harsh chemicals. To activate the

battery device, naturally occurring electrolytes in human sweat, blood, and urine can be used.

The researchers are still working on ways to increase the efficiency of the batteries and supercapacitors, and investigating different manufacturing techniques. The final goal is to print the paper using a roll-to-roll system similar to how newspapers are printed.

Details of the project are outlined in the paper "Flexible Energy Storage Devices Based on Nanocomposite Paper", published on 13 August in the Proceedings of the National Academy of Sciences.

Further information is available at
http://www.rpi.edu

Social networking sites – UK users on top in EU

Social networking sites seem to be much more popular in the UK than in other EU countries. According to a study by comScore, over three quarters (78 percent) of British Internet users regularly visited social networking sites in August, compared to

56 percent in Europe. The total number of unique visitors of networking sites in Europe amounted to 127.3 million. Apart from Spain (61 percent), the percentage was below average in France (50 percent), Italy (49 percent), and Germany (47 percent).

British Internet users spent an average of almost 6 hours visiting social networking sites. Heavy social networkers in the UK, 20 percent of all users, visited sites like Facebook.com and Bebo.com 22 hours, almost four times as often. In comparison, German users spent an average of 3.1 hours per month on the sites, French users 2 hours, and Spanish and Italian users 1.8 hours.

One of the main reasons for the higher popularity of these portals in the UK is that most of the major social networking sites were launched in English. Local language versions and new networking portals in other languages were created with a considerable delay.

The comScore study is based on a survey among people aged over 15 who agreed to put monitoring software on their computer that records their surfing habits.

Further information is available at
http://www.comscore.com

Broadband gap in Europe

The gap between the strongest and weakest broadband performers in the EU has widened. In Denmark, 37.2 percent of the population have broadband access, but only 5.7 percent in Bulgaria, according to a report on "Broadband Access in the EU", published by the European Commission in October.

Broadband growth has continued in the last year throughout the EU. Average penetration (number of subscribers per population) has grown from 14.9 percent to 18.2 percent, despite the relatively modest penetration rates in some Member States. In the best-performing countries – Denmark (37.2 percent) and The Netherlands (33.1 percent) – about one third or more of the population has broadband.

On 1 July 2007, there were over 90 million fixed broadband lines in the 27 EU

Member States of which some 20 million lines, excluding Bulgaria and Romania, have been added since July 2006, an increase of 28.7 percent. Proportionally, growth was highest in Denmark (7.7 lines per 100 inhabitants), Luxembourg (7.1 per 100) and Ireland (6.7 per 100).

Digital Subscriber Line (DSL) remains the EU's main broadband technology, with some 72.5 million lines. However, DSL growth has slowed by 6.1 percent compared to July 2006, while alternative technologies, such as cable, fibre to the home, and wireless local loop, are more widely used, totalling some 17.7 million lines.

The EC report "Broadband Access in the EU" is available at
http://ec.europa.eu/information_society/policy/ecomm/implementation_enforcement

E-mail in bed

The growing e-mail addiction

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Thanks to mobile devices, e-mail has become ubiquitous. You can check your e-mails anytime and anywhere through laptops, smartphones, and wireless handheld devices, like the BlackBerry. And this is exactly what a growing number of people do, up to the point of addictive behaviour. They check their electronic messages in cars, bathrooms and even in bed.

15 percent e-mail addicts

According to a recent survey on e-mail addiction, conducted in June 2007 in the United States on behalf of Internet provider AOL, 15 percent of the 4,025 respondents (age 13 and above) described themselves as addicted to e-mail. Interestingly, e-mail addiction seems to be more pronounced among women (16 percent) than among men (13 percent). Women are actually spending 15 minutes more per day on e-mail than men, according to the survey. On average, e-mail users check their mailbox five times a day. About 40 percent of e-mail users consider e-mail accessibility during vacation as important, and 38 percent actually check their e-mail once a day while on vacation.

The availability of portable devices with mailing capabilities seems to have increased extensive e-mail usage. E-mail use on portable devices has nearly doubled since 2004, when the first AOL survey was done. The effect has been that 59 percent of those with portable devices are using them to check e-mail every time a new message arrives. Access has become literally ubiquitous, as the survey data confirm: 59 percent of people e-mailing from portable devices are checking e-mail in bed while in their pyjamas; 43 percent keep the device nearby when they are sleeping to listen for incoming mail; 53 percent are checking e-mail in the bathroom; 37 percent while they drive; and 12 percent admit to checking e-mail in church.

E-mailing lowers your IQ

The situation in other parts of the world does not seem to be any better. According to a study performed on behalf of Symantex in 2005 among 1,700 employees from large enterprises in Europe, the Middle East and Africa, e-mail is dominating the working day: 52 percent of respondents said they spend two hours a day reading, replying to, and creating e-mails. A further 15 percent of respondents claimed to spend 4 or more hours a day managing their inboxes. The productivity effects of e-mail addiction seem to be anything but harmless. In 2005, English psychologists found out that regular use of e-mails can lower the IQ more than twice as much as smoking marijuana, reducing the individual's IQ by up to 10 points.

Addiction, or not?

It is still debated among psychologists, whether extensive use of e-mail or the Internet in general qualifies as addiction in the medical sense. Traditionally, addiction requires a psychoactive substance – like, for example, alcohol, drugs, or tobacco – which crosses the blood-brain barrier and temporarily alters the chemical behaviour of the brain. However, in a more general sense, the term addiction covers any recurring compulsive behaviour that includes a psychological dependency on particular objects or activities. This includes, for example, gambling, food, pornography, work, exercise, shopping, computers, and the Internet. The chemical reactions taking place in the brain, when an e-mail addict checks his mailbox at midnight, could be comparable to the addictive effects of alcohol or other external chemicals. It is possible that e-mail addicts, while satisfying their electronic craving, produce opiate-like biochemical substances called endorphins in their brain, which reinforce the addicts' positive feelings while obsessively checking e-mails.

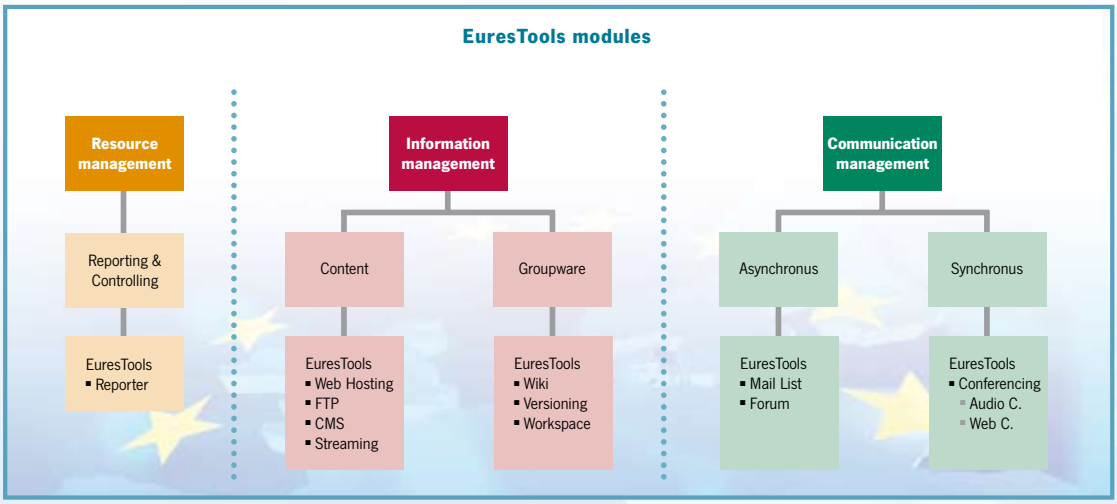
Causes and remedies

The causes of e-mail addiction are even less clear. Some pundits say that any form of Internet addiction, including e-mail addiction, is only a symptom of a deeper behavioural disorder. A more mundane explanation would be that e-mail addiction is rather boosted by working conditions than by individual disorders. In a Washington Post chat on the subject in May 2007, a mid-level government employee complained that her boss tried to make her take along her BlackBerry on her honeymoon in Europe. She refused – "even if it costs me my job".

Creating e-mail free time slots seems to be the right method for fighting e-mail addiction. This can be achieved by switching off e-mail programmes and only checking e-mails at set times, for instance at 11:00, 14:00 and 16:00. People travelling with a BlackBerry could have it temporarily locked in the hotel safe.

If you need further advice, just send an e-mail to *message@eurescom.eu*, the address for e-mail addicts, and keep checking your mailbox for the reply.

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



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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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