Issue 2/2000
Newsletter 28

EURESCOM mess@ge

Next years' burning issues

- Use your GSM phone for M-commerce
- Portals and customer loyalty in the virtual world
- The Future Directions Workshop 2000
- Ubiquitous computing, tele-smelling and interplanetary Internet

Next Years' Burning Issues

Peter Stollenmayer
EURESCOM

An institute doing collaborative work needs to be a good predictor. An institute performing collaborative research and development work in the area of ICT (information and communications technologies) needs to be even a better predictor. EURESCOM is such an institute. It does not have the luxury of waiting to see what new services and technologies emerge. It has to grasp the business initiatives, assess the opportunities and create trends rather than follow them.

EURESCOM needs a continuous "vision" of the work it should be focusing on during the next few years.

EURESCOM has just started the generation of next year's work programme looking for ideas for new future proof projects. In June the member companies were asked to turn the most promising of those ideas into proposals for concrete new projects. This issue of the EURESCOM mess@ge contains more information on the work programme 2001 generation on page 19.

The future is not always easy to believe

In the extremely fast changing ICT environment the future is difficult to predict. Sometimes we do not even believe our own predictions because the impacts are so severe. Who would have believed that within half a year we may have the possibility to equip our home computers with a "tele-smelling" interface which can offer us billions of different smells so we smell the taste of the wine before we order it on-line (see article on page 21)? Or who would have believed that it is already time to study how the Internet could be extended into deep space (see article on page 23)? Or who would think that within the next 10 years mobile commerce could make about 700 000 man years of effort redundant if just 50% of the consumers buy their goods through mobile commerce instead of in conventional shops.

Are future services really new?

Services and applications which sound extremely future proof are often nothing else than a logical exploration and further development of existing technologies. For example B-2-B and B-2-C e-commerce, m-commerce and WAP terminals are mainly based on Internet and mobile telephony with some security and end user applications on top. All the required base technology to start the services has been existing for several years.

The article on WebSim services (see page 6) shows a smart way of using current technology to provide a whole world of value added services based on the little smart card existing in every mobile phone.

Does that mean that it is not technology which determines the speed of new emerging services? Should we put our focus on how to explore existing technology to create new services and applications, rather than on technology itself?

An important issue is human behaviour

Certainly one of the big issues to successfully market new services is forecasting and influencing human behaviour. Just think about the huge part of the European population who currently do not see a necessity to use the Internet. Do we have to wait for a whole generation change until the new services will really take off?

Or is it just a question of cost? Nobody – or at least not many people – would of course buy a PC, if it costs 5000 Euro or more. Only since the price of an average PC dropped below a reasonable level in the late 80s, a significant percentage of the population have started to buy PCs.

I firmly believe that it is a delicate balance of cost and benefit as perceived by the users which turns a service into a business success.

The future is in our hands

A "Future Directions Workshop" organised by the EURESCOM Strategic Study Management Group in April this year tried to bring some light into these issues (see page 14).

EURESCOM is determined to take the challenge and prepare a work programme which tackles next years' challenges in a future proof way. Probably we should put more emphasis on futuristic ideas and higher risk speculative studies, and also dare to explore subjects which seem of no value to TelCos today or are outside our current scope. Both the EURESCOM Stimulus Paper 2001 and this mess@ge which has devoted a whole part on "Futuristic Ideas" help to stimulate challenging project proposals anticipating future developments.

It is also up to you to contribute to our work programme 2001 with your future oriented ideas and proposals.

(The opinions expressed in this editorial are solely those of the author.)

Contents

Editorial 2

Next years' burning issues 2

Project Reports 4

The EURESCOM quality of service framework (P806) 4
P1005 demonstrates a secure GSM-to-Web connection 6
HINE – Heterogeneous In-house Networking Environment 8
Portals and customer loyalty – latest EURESCOM Strategic Studies 9
Always on – permanently connected to your telecommunication services 10
Managing information overload 12
New Deliverables 13

Events 14

The Future Directions Workshop 2000 14
Seeing is believing – the HINE Workshop 15
OSS interconnection 16
Efficient IP transport networks 17

Internal 18

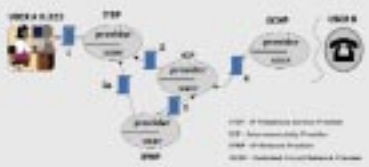
EICS News – Audio and video conferencing system now operational 18
Preparing the EURESCOM Work Programme 2001 19
Staff news 19

Burning Issues 20

M-commerce – an immediate business opportunity 20
Tele-smelling – new dimensions to Internet business? 21
Invisible Computing, ubiquitous computing and other new concepts 22
Interplanetary Internet 23
Ad-hoc networks, anyone? 23

The last page 24

Latest EURESCOM publications 24



The EURESCOM quality of service framework, page 4

A secure GSM-to-Web connection, page 6

Heterogeneous In-house Networking Environment, page 8

Tele-Smelling, page 21

Interplanetary Internet, page 23

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The EURESCOM Quality of Service framework (P806) – theory and practice

Ola Espvik
Project Leader of P806,
Telenor AS

The EURESCOM Quality of Service (EQoS) framework addresses the challenge of QoS offer and management in a multi-provider environment by focusing on the agreement that exists between a user and a provider. The user-provider agreement is a harmonised understanding between the two entities and contains a set of statements describing the way those entities should behave. Statements may also include tariffing and legal issues. The EQoS framework elaborates on the QoS related part of the user-provider agreement.

The EQoS framework defines QoS as the *"degree of conformance of the service delivered to a user by a provider, with an agreement between them"*. The agreement is naturally related to the provision/delivery of that particular service. This definition sharpens the QoS definition provided in E.800, where QoS is defined as *"the collective effect of service performance, which determines the degree of satisfaction of a user of the service"*.

One stop responsibility

The notion of "one stop responsibility" of a given actor (the primary provider) to another (the user) is introduced. It implies the complete responsibility of the primary provider towards the user regarding the service and QoS provided. Applying the "one stop responsibility" principle recursively enables a company to successfully handle QoS in the multi-provisioning environment. As a result QoS agreements would be defined recursively between any pair of actors, identifying the responsibility i.e. determining which actor has the role of a "provider", and which one has the role of a "user".

The benefit of the EQoS approach is that it formally accepts that the delivery of a service depends on the successful operation of many sub-providers, and that their service provision should be traceable and measurable, particularly when working within a multi-provider environment.

Having a template for agreeing on QoS that is independent of a service makes the process of negotiation more efficient (possibly automatic) and cost effective. The last deliverable from the Project (D4) describes, apart from the negotiation structure, how to apply the generic parts of a QoS agreement in some detail.

The QoS agreement – a part of the SLA (Service Level Agreement)

The QoS agreement allows the user to carry over QoS requirements, and the provider to specify under which conditions agreed QoS could be delivered. The QoS agreement also specifies the reactions to be applied, either by the user or the provider, when some requirements are not fulfilled.

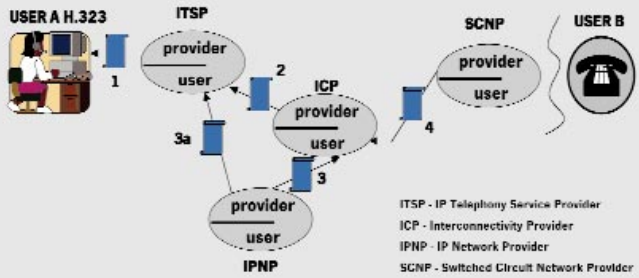
VoIP as an example service where EQoS can be applied

Having a generic tool and not giving the guidelines of how to apply it in a practical "everyday" situation would limit its acceptability within different groups interested in the QoS issues. Therefore, the project brings the description of "step-by-step" procedure applying EQoS, both in theoretical manner and exemplified on the VoIP service case.

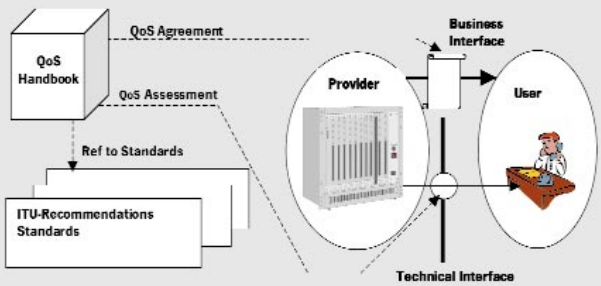
Taking on the perspective of each actor involved, relevant input (Service, QoS parameters, Potential business and technical considerations, etc.) is identified.

The output of the procedure includes the contents of the QoS-related part of the agreement as well as the internal mechanisms that can be applied. The EQoS framework is considered during this procedure. The applicability of EQoS is then demonstrated by the VoIP example. In addition, some values are incorporated in the VoIP example.

Example: A model of the VoIP service



The role of a QoS handbook



*TIPHON (Telecommunications and Internet Protocol Harmonisation over Networks) is a project of ETSI (European Telecommunications Standards Institute)

Analysing the TIPHON* VoIP scenario (see figure on the left) has resulted in a complete service provision configuration including users and providers involved end-to-end. The viewpoints of various providers have been considered separately. At the interfaces identified between entities related QoS agreements have been elaborated into details, i.e. end-user-ITSP, ITSP-ICP, ITSP-IPNP, IPNP-ICP and ICP-SCNP QoS agreements are presented. Involved in establishing the QoS agreements at each interface have been:

- Roles/functionality
- Interface descriptions
- Traffic patterns
- QoS parameters and their objectives
- Measurements and
- Reaction patterns

A QoS Handbook

Also, an outline of a QoS handbook as needed for multi-provisioning is provided. A minor revision of the existing ITU-T QoS handbook is discussed, although a major new approach may be more appropriate.

The future

The ITU-T (and especially the QSDG) has been supportive and has encouraged the work done in P806. The application of the EQoS framework could be further developed in order to provide an answer of how to implement and apply a harmonised and common QoS framework to each department within a company. Therefore, a service life cycle should be investigated, and a QoS handbook should be published. This is to be considered in conjunction with the current demand to update the traditional ITU-T QoS handbook, in order to extend it to multi-provider environments. The EQoS framework would be a good starting point for this enhancement.

The fourth Deliverable of P806 is just about to be published as this issue of the EURESCOM mess@ge is published. Please check the web

www.eurescom.de/Public/Projects/our_work.htm

for access to the Project Deliverables.

Open Issues in the QoS area

EURESCOM does have a rather coherent portfolio of projects working on different aspects related to the provisioning of differentiated levels of Quality. The question often arises though: "Is there more that needs to be done?"

There is an interesting article in the March 2000 issue of the Internet Protocol Journal (from Cisco), called "QoS-Fact or Fiction?" written by Geoff Houston. See:

http://www.cisco.com/ipj

The article lists some issues that need to be solved before QoS can become a reality. Below is a shortened version of the list, where I added comments on where I think these issues are/should be looked at in EURESCOM:

- QoS-enabled applications need to predict their service requirements in advance, and be able to signal these requirements into the network. *The EURESCOM Project P913 did some work here, but this is an area that needs more effort.*
- When admission control is used, there is a requirement for the interior of the network to be able to signal current load conditions to the network admission systems. *This is still an open research issue and no good solution is in sight yet!*
- The signalling and negotiation aspect of QoS extends into the interdomain space, where two or more service providers need to negotiate mutually acceptable service profiles, and associated service access. The tools and operating techniques required to support this functionality remain poorly defined. *P806 has developed a framework for this scenario and P1008 is looking at the practical issues involved. Now we need to sell the ideas and perhaps follow up with more work on applicability issues!*
- A common selection of a set of QoS mechanisms to deploy. *This may be something for the market, but P906 and P1006 will make recommendations in this area.*
- Ubiquitous deployment of these mechanisms across both service provider and client networks. *This is certainly something for the market.*
- The adoption of a uniform set of retail tariffs for QoS services. *P906 will provide recommendations, but more work is needed in the area of Charging for IP-based services (where QoS can be seen as a special case).*
- The definition and common acceptance of multi-party QoS-related financial settlements that support fair and equitable cost distribution among multiple providers. *Again, P906 will provide a starting point, but more work will definitely be needed.*
- The definition of commonly accepted service performance metrics and related measurement methodologies to allow end-to-end and network-by-network service outcomes to be objectively assessed. *P906 is doing some work, but more efforts will be needed.*

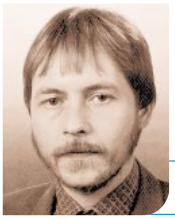
It sounds like bad news that we still seem to be far from the goal of commercially deployable QoS, but the good news is that work is going on in all the essential areas that need work in order to achieve the goal. With some new projects in the 2001 Work Programme, filling the remaining gaps, we can perhaps soon claim that:

"Yes, there are remaining issues related to the provisioning of differentiated levels of QoS in multi-provider IP networks. EURESCOM has projects working on solutions for every such issue!"

Magnus Krampell, EURESCOM

EURESCOM P1005 Demonstrates Secure GSM-to-Web Connection

If you own a GSM phone, you are ready for mobile e-commerce



Joachim Posegga
Deutsche Telekom, T-Nova

Roger Kehr
Deutsche Telekom, T-Nova

EURESCOM demonstrated the successful integration of the GSM security infrastructure into the Internet. This achievement marks the first step of the work of the EURESCOM Project P1005, titled: "Jini & Friends @ Work: Towards Secure Service Access", aiming to provide trusted wireless-to-Web applications and services, and to develop a secure Internet-based architecture for mobile e-commerce.

This integration provides a security solution the Internet is waiting for: electronic transactions over the Internet are secured using a GSM phone. Users are empowered to conveniently make on-line payments and control interactions with Web shops. Online merchants benefit by having access to the widely deployed GSM security infrastructure and are assured that they can securely interact with any customer. All this is made possible through the innovative power of the leading European network operators conducting joint R&D in EURESCOM.

"Everybody who owns a GSM mobile phone is now ready for e-commerce," says Anastasius Gavras, project supervisor at EURESCOM GmbH, *"Any merchant can, via the SIM in your GSM phone, ask you to confirm an action, like a purchase order or a payment authorization. Imagine giving out your GSM phone number instead of your credit card number."*

Every GSM phone includes a smart card, a so-called SIM (Subscriber Identity Module), which already holds unique customer information and is at the edge of the GSM security infrastructure. By turning the SIM into a Web server the GSM phone can provide security services to the Internet using the Web-standard HTTP protocol. GSM's short message protocol (SMS) delivers the lingua franca of the Web to the Web server on the SIM inside the GSM mobile phone. The Web server can return data stored on the SIM in HTML format, can activate GSM SIM-Toolkit applications as server-side CGI scripts, or can initiate on-line payments.

How to Turn a GSM SIM into a Web Server

Mobile networks like GSM or UMTS provide a security infrastructure that builds upon subscriber-individual secret keys. The key is stored in a smart card (SIM) that lives in the mobile phone. These SIMs are in fact small, but quite complex computers that come with an operating system, a file system, and even a built-in Java platform.

The WebSIM-approach turns such a SIM (and therefore also the mobile phone "around it") into a Web server. It can be transparently accessed from the Internet, processes HTTP request and works as a personal Web server for a person.

There are various applications for this technology, like authentication in Internet, online payments etc. Since the mobile phone comes with a keyboard and a display, we can also use it as a secure I/O channel: If the user of such a phone orders a product from a Web site, then this site can simply submit a HTTP request like

```
http://websim.eurescom.de/
+123456789/menue=
(Confirm,Cancel)
```

and prompt the user for a confirmation of the order on his/her mobile phone.

Brief Technical Description

The WebSIM is a GSM SIM with a built-in Web-Server. This integrates SIMs in the Internet and allows for transparent access of the SIM via HTTP/CGI Scripts from Internet hosts.

As a result, GSM operators can market their GSM security infrastructure in the Internet and provide SIM-services to the Internet: The Web-SIM speaks the lingua franca of the Internet, HTTP, and it becomes a trivial exercise for Internet developers to include WebSIM-based services in their applications.

Services of the WebSIM that are accessible from Internet hosts can be classical security services (authentication, encryption), or GSM 11.14 commands, which provide a simple I/O interface to the user of the mobile phone. HTTP requests from a Web application to 11.14 services of a WebSIM allow e.g. for establishing a secure I/O channel to an Internet user via its WebSIM phone.

It should be noted that the WebSIM itself is not an application per se: instead it provides a horizontal technology layer, where applications can be built. The contribution is that this technology layer is designed in the most convenient way for Internet developers and offers a radically simple interface to GSM/SIM services.

"Creating a Web server on a SIM chip represents a breakthrough in development tools for trusted mobile e-commerce. Establishing a direct HTTP connection between the highly secure SIM chip and any Web browser is the first step in deploying a full suite of value-added wireless applications for consumers and businesses," said Mary J. Cronin, Mobile-Mind President. *"Mobile-Mind is working with world-class partners like EURESCOM Project P1005 participants to introduce a new level of trust, flexibility, and speed of implementation to mobile e-commerce through smart phones."*

Example Usage

Assume an Internet customer ordering an item through an online Web shop. If the Web shop knows the mobile phone number of the customer, say +123456789, it can simply integrate a HTTP-request like

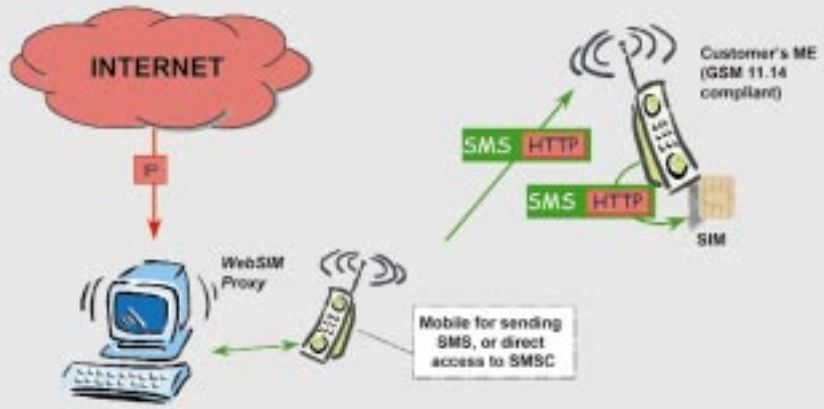
http://websim.eurescom.de/
+123456789/st/si =
(Confirm%20Order,Cancel,
Call%20Helpline)

into the Web application and confirm the transaction through the GSM network. (Note: "%20" is the HTTP-encoding for a Space character; " st/si" stands for: SIM Toolkit/Select Item, cf. GSM 11.14)

This HTTP-request to the WebSIM prompts the user with a menu on its mobile phone, as shown in the picture on the left. The vendor's trust in the transaction can thus be enhanced by the security of the GSM system. Today this security is superior to what the Internet can offer, since a trusted channel from customers to vendors is still missing in the Internet.

"Using standard Internet protocols makes it much easier for Web programmers and authors to build applications that harness the unique properties of the GSM phone", says Joachim Posegga, initiator and participant of EURESCOM Project P1005. *"250 Million SIM cards in use today can become part of the Internet marking a major milestone of mobile e-commerce literally overnight."*

WebSIM Networking



Implementation of the Prototype

The WebSIM is currently implemented on a Java SIM from Schlumberger (32K Simera); the Web Server in the SIM itself is implemented as a Toolkit-Applet of about 8K, several 11.14 commands for I/O are accessible via CGI-Scripts. The approach works with any GSM phase II+ mobile phone.

The connection between the Internet and the WebSIM is handled by a proxy host that tunnels HTTP-requests over SMS to the Web server applet in the SIM. The figure above shows the overall architecture: A HTTP-request arriving from the Internet for a particular WebSIM (determined by its phone number) is packed into an SMS to the SIM, where the request is unpacked and processed. The response is sent back as an SMS to the proxy, where a normal HTTP-response is sent back to the originator in the Internet.

Further information can be found on:
http://www.eurescom.de/websim

HINE – Heterogeneous In-house Networking Environment

The EURESCOM Project HINE (P915) investigated the basis for the use of a broad range of applications in a heterogeneous in-house networking environment as well as their integration into public networks (Internet). Considered in-house applications were centred around communication, multimedia, entertainment, automation and control application scenarios.

HINE was also looking at in-house network infrastructure technologies. Besides existing copper (telephony, power line, coax) infrastructures, new transmission technologies (wired & wireless, optical & electrical) were analysed for their suitability.

The main objectives of the HINE project were to:

- develop criteria for the comparison of infra- and intranet technologies
- compare infra- and intranet technologies and products
- provide a techno-economic analysis of the possible impacts of home infra- and intranet technologies for TelCos
- test and evaluate wired and wireless in-house transmission systems

Seeing is believing

Because "seeing is believing" and because the scenarios, applications, systems and technology, and their interworking needed to be tested and assessed, the project included the implementation of a distributed HINE demonstrator for new representative demonstration applications. Distributed means that each of the seven participating EURESCOM partners implemented a part of the demonstrator.

The HINE project started its activities in January 1999 and was completed end of June 2000. It was led by Mr. Falk Schulz of Deutsche Telekom AG until February 2000. From February 2000 it was led by Mr. Paolo Pastorino of Telecom Italia, CSELT. Seven EURESCOM Shareholders participated in the Project (BT, Swisscom AG, Deutsche Telekom AG, France Télécom, Telecom Italia S.P.A., Telenor AS and Telefónica de España S.A.). The total project budget was roughly 100 man months for the manpower and about 140 kEuros for the implementation of the HINE demonstrator.

The project issued four Deliverables:

- *Deliverable 1* ("Analysis of in-house system technologies") provides a methodology for classifying the various in-house system technologies, and compares the in-house system with other related areas (e.g. FSAN or SOHO). It also provides basic technical and cost information for comparing different in-house technologies and products.
- *Deliverable 2* ("Getting the in-house network hooked up to the outside world – constraints, approaches, impacts") describes the Gateway and API (Application Programming Interface) requirements, and the influences of the home networks on access networks.
- *Deliverable 3* ("Analysis of in-house transmission systems") provides an overview of wired and wireless home and office transmission systems including an evaluation. This Deliverable is available to EURESCOM Shareholders only.
- *Deliverable 4* ("Description and evaluation of the HINE demonstrator") describes the HINE demonstrator concept and introduces the scenarios and technologies presented in the demonstrator. It reports on the experiences the project team had with implementing and testing the demonstrator, and it provides lessons learned and recommendations on home network implementation and access network connection for the EURESCOM Shareholders.

All Deliverables are available on the

EURESCOM Web server
http://www.eurescom.de/Public/Projects/our_work.htm

You can play live with the different HINE demonstrators through the HINE Web Portal, accessible through the HINE Web page on the

EURESCOM Web server
http://www.eurescom.de/~public-seminars/2000/HINE/HINEag.htm

On 11 May 2000 the EURESCOM Workshop "HINE – Heterogeneous In-house Networking Environment – Seeing is Believing" took place in Berlin. The article on page 15 of this mess@ge reports on this event.

Peter Stollenmayer, EURESCOM

An example from the Swisscom demonstrator

Portals and Customer Loyalty

Recent Winds in the Strategic Studies in EURESCOM

Annakaisa Häyrynen
Project Leader of P948 and P1041, Finnet Group/ Elisa Communications Research

Portals as Channels to the Virtual World (P948) and Customer Loyalty in the Virtual World (P1041) are two recent Strategic Studies, so called "short and sharp" studies. They represent new kinds of projects in a sense that they look into the latest and emerging changes in business environment, where also TelCos "play".

Some of the leading experts e.g. at the Haas Business School, University of California, Berkley, argue that the companies, in the so called smart market, will in near future have only one asset – customers. The top priority is to know as much as possible about the customer, to have participating customers and to keep the customers. And of course to understand the related problem of the new converging environment.

Portals and customer loyalty have many interesting synergies as projects. It has often been argued that portals are the way to build customer loyalty and e.g. customer lock-in in a virtual world. From that statement naturally rises the question "What is customer loyalty in a virtual world?".

That is very much the reason these two projects have been run in parallel, partly even with the same participants. On the one hand the projects concentrate on understanding the customer end and how to keep the customers, and on the other hand, what kind of services will be typical in the Information Society.

The Concept of Convergence

The new/emerging/present environment is also well described by a definition of convergence by the P948 project participant, Sofia Kocergin of France Télécom:

"Convergence is more than a technical notion, it´s an economical, industrial and social structure between audio-visual, telecom and computing sector in terms of technology, channels, contents, terminals, functionality and usage, made possible by digitalisation. If we understand what convergence implies as an economic-industrial-social structure, we can show difficulties and conflicts that market players involved can experience by trying to install some compromise between themselves. The conflict moments are always due to content, media or media/content commercialisation modes. Conflict arises when it is necessary to define rules and find compromises in this construction. These are so called "critical junctions". Critical junctions are not only moments where compromises are found but also the moments where one player is trying to dominate the others. They could finish by having some common rules or stay in confrontation. Portals are one of the important critical junctions."

The projects' content in brief

First the portal project briefly reviewed the most important existing research results of the concept of portals. After having extracted the key issues, we tried to imagine what could be the future of integrated digital services. We formed different short and longer term scenarios related to both work and home environments. During and after the scenario work we considered the potential TelCo roles in portal business and performed some SWOT (Strengths, Weaknesses, Opportunities and Threats) analyses on role/scenario combinations. The final part was to look at the business implications, including issues like criteria for successful portals (both customer related and business related) and potential related revenue streams. Through all these analyses and reflections also major trends related to portal kind of business were included in the Deliverable the project has produced.

The customer loyalty project looked at the concepts of customer (in general and in the virtual world), for example what is customer loyalty and the notion of a virtual world, using the results from the EURESCOM P843 study "Cyberspace, the Next Frontier for the TelCos" as a starting point. The project also looked at the customer oriented process versus the marketing oriented process thus reflecting the changing paradigm mentioned in the beginning of this article.

One significant underlying issue is the changing role(s) of TelCo customers, like customers as members of an audience. That brings us again to the issue of converging environment. Most of us would perhaps relate the notion of audience to broadcasting or cultural events, or in general to media.

The synergy of these two projects has very much been the possibility to focus on a restricted number of issues in each project, and to be able to communicate the related issues to the other project. For example in the final phases of the portal project, which concluded a month earlier than the one on customer loyalty, it was possible to include the knowledge of loyalty concepts and issues specific to virtual worlds from the work done within the customer loyalty project. Again, thanks to the fact that the portals project looked more in depth at the new features in business environments, like culture industry socio-economic models, Internet revenue generation models or trends like convergence in addition to what has been mentioned earlier.

The participants in the projects are highly qualified experts from (P948) Finnet Group, BT, France Télécom, Telecom Italia, Telenor and *eircom* and (P1041) Finnet Group, BT, Swisscom, Telecom Italia, Telenor and OTE. The high spirit and extremely well performing co-operation shows again that in our EURESCOM community we have high class professionals to tackle these interesting new issues related to the existence (and the forms of existence) of TelCos in the era of Digital Economy and in the Information Society.

Always On – permanently connected to your telecommunication services

Erik Bergersen
Project Leader of P1003
Telenor AS

Really wide-spread, everyday use of Information and Communication Technologies (ICT) – not only in business and among youth, but in the general population – is still a dream for the TelCo executive. While most of the population will use the broadcast media, television and radio, for hours every day, the telephone with its high penetration is only used for minutes. New media such as the Internet bear promise of more traffic, but still has not reached high deployment in most European countries.

With convergence – of services, networks, terminals and market actors – much of this is likely to change, with more people from different segments of the population using ICT, and for a greater variety of purposes. The idea driving the EURESCOM research in the field of Always On is that much of this new use will be rather casual and ad hoc, and that people will prefer applications that are quick and reasonably simple to access.

An important aspect is that the user should not need to engage in cumbersome and time-consuming procedures for accessing the relevant applications – retrieve information, send or receive messages or calls, pay the bus ticket, book a seat at the local cinema etc. If a large number of everyday chores are solved by a few clicks on a handy terminal, the solution may prove rather seductive. If this solution is available whenever and wherever the user wants it, it may be irresistible. Thus, we are looking into solutions that may be accessible from both fixed and mobile networks.

The 'Always On' concept may prove to be a very powerful competitive weapon in the convergent marketplace. The Japanese service "I-mode" with a number of "WAP-like" applications has shown that a TelCo-based initiative can be very successful, but traditional TelCos may soon find that their lunch is eaten by quick and hungry competitors coming from entirely different business areas, such as mass media, retail marketing etc., or new companies engineered by players from several business areas.

EURESCOM projects P945 and P1003

To give the user this conducive, no-hassle information environment, the information provider must strive to comply with a number of requirements that may be found challenging from a traditional TelCo service provisioning point of view, potentially representing major changes in the TelCo's approach to network design and provision.

The Strategic Study Project P945 started in September 1999 and finished 31 January 2000. The main focus was on the relationship between the TelCo and the users of the TelCo services. It set out to:

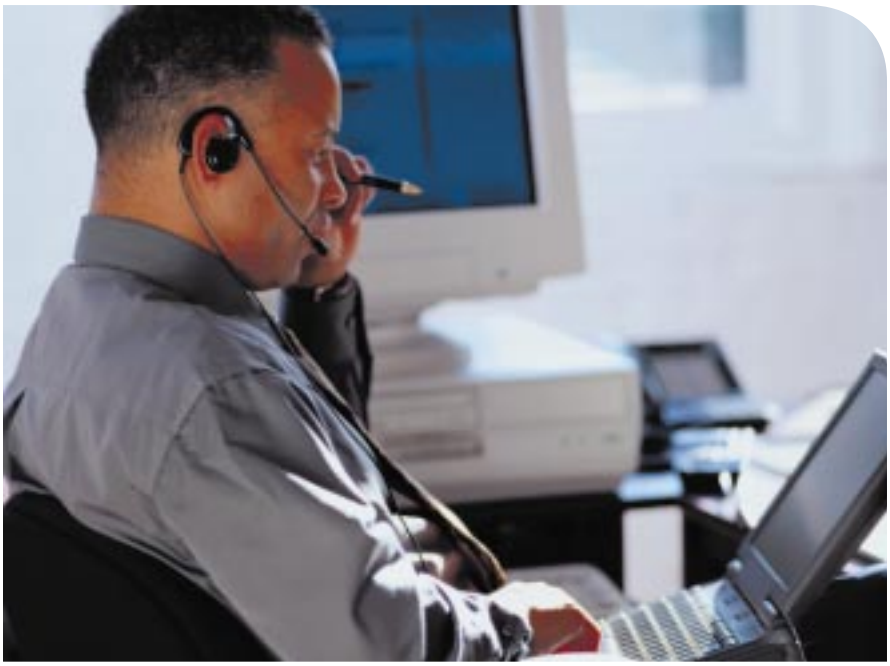
1. Clarify the idea of 'Always On' and similar concepts with reference to available and foreseeable network technologies.
2. Identify how these concepts might affect the approach we take to building networks and offer future services.
3. Look at the potential of the 'Always On' concept to provide the TelCos with a continuous presence or relationship with the customer.
4. Classify by means of SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis what market opportunities these concepts may provide for TelCos.
5. Classify to what extent these concepts may represent unexpected market developments by competitors, paradigm shifts, regularity events, etc.

Aspects addressed by the Study

The main objectives of this strategic study can be divided into three distinct areas and the structure of the report reflects this grouping. The first area examines the services and applications which benefit from the advantage of 'Always-on' whereby the customer may be accessible from the network at any time or location and can always be reached at the first attempt. Thus sending any kind of information is fast, easy and guaranteed.

The second area is concerned with the customer service surround and underlying always-on network technologies. New customer requirements were identified as a result of the numerous available delivery technologies and the drive for competition in the telecommunication market.

The third natural grouping considers implications for the TelCos and contains example scenarios for Information Communication Technology use by households and Small and Medium Enterprises (SMEs) involving 'Always-on' functionality in the areas of e-commerce and entertainment.



Conclusions and Benefits for TelCos

The Always On concept may change the way people use information and communication technologies, and thereby the traditional ways of providing services related to this. 'Always-on' may thus change the way TelCos operate and compete.

Infrastructure: There is already an infrastructure deployed; the backbone part of it is very well adapted for 'Always-on'. A basic access infrastructure is in place, with almost universal deployment in all European countries; However, the introduction of xDSL technologies into the local loop provides competition to cable TV, which has a rather variable deployment but a bandwidth advantage.

Security: TelCos have significant experience and a good reputation in the provision of security measures. There are considerable security challenges in 'Always-on' operation, and TelCos may have a competitive opportunity compared with new entrants.

Business exploitation: This may become the most serious issue as the question of who fronts the customer, who sets the menu and who sends the bill will be the most important one, and it may not be decided by traditional TelCo strengths and virtues. The intended introduction of a flat rate (subscription) which includes all Internet and telecommunication costs (to Internet provider) could be seen as an 'Always-on' development.

Summary of Recommendations

1. In order to play any important role in the future markets, TelCos must develop a strategic vision for Always-On and be able to provide the necessary functionality at competitive prices and service levels, to all important market segments.
2. For TelCos to realise the strategic vision, considerable changes are called for in the infrastructure, in the operational support systems, in the pricing and in the packaging of the services. The timing, the direction and the extent of these changes are uncertain, but highly important for the conduct of business.

P1003 – Exploiting the Always On concept

As a logical continuation of the Strategic Study P945, the project P1003 was defined. The approach taken in this project is that user preferences will be the deciding factor with respect to how the market develops. The major part of the project resources goes into exploring how users respond to the concept, and into field trials with Always On technology. In parallel with the design of the concept tests and the field trials, a survey is being carried out of existing and planned applications and services which embody Always On functionality, to provide realistic input to the concept testing.

The rapid and simple access to applications mentioned in the introduction of this article is obviously an important characteristic of Always On, and the requirements to the overall system are investigated further. It is important to include all components of the system – network, applications and the service levels of all involved parties – necessary to realise the desired functionality. Finally, an evaluation of the business opportunities and threats posed to the TelCos by the implementation of Always On is planned.

This Project started in March 2000 and will run for 15 months.

Forthcoming EURESCOM Workshops and Conferences

BOBAN Workshop – Building and Operating Broadband Access Networks

The EURESCOM BOBAN Workshop will be held in Torino (Italy) from 11-12 July 2000. It focuses on Building and Operating Broadband Access Networks with the following main subjects:

- service delivery over different access networks
- powerline technology
- ADSL
- broadband street cabinet
- powering of broadband access networks
- specification of a universal access network planning tool
- access network monitoring and supervision
- passive optical networks with VDSL drop
- fibre architectures at low penetration - cost effective migration to FTTH
- WDM in the access network

For more information please see:

http://www.eurescom.de/Public/Events/Conferences/BOBAN.htm

EURESCOM IT-Telecom Conference

The EURESCOM Conference on IT for Telecommunications, focusing on the integration of IT in telecommunications, will be held in Frankfurt from 10-12 October 2000. The conference is a comprehensive industry business and developer technology event that offers a combination of:

- Business oriented / market success / business future(s) sessions
- Technical sessions
- Exhibits
- Interactive technology demonstrations

For more information please see:

http://www.eurescom.de/it-telecom

Managing Information Overload

The EURESCOM Strategic Study on "Impacts of information overload" (Project P947) has come to its end. The study started in December 1999 with 4 Participants, Swisscom AG, Tele Danmark A/S, Telenor AS and *eircom* plc. The Project Leader was Per Helmersen of Telenor.

The Project investigated three areas in detail:

- the human aspect of information overload
- information management techniques and
- the impact of information overload on mission critical information flows in telecommunication operators

Definition of Information Overload

"Information overload is a situation experienced by an individual when the amount and/or form of accessed, or potentially accessible information exceeds the individual's ability to locate, retrieve, process, store and/or re-retrieve that information."

The causes of information overload

- *Volume:* The sheer amount of information exceeds the individuals capacity to process (access, digest, store, react to) that information.
- *Comprehension:* The information's complexity or format does not match the user's needs and/or cognitive skills required to process that information.
- *Integration:* The information arrives from multiple sources requiring the user to adapt not only to content but also demands made by each individual source.
- *Location:* The potential user is unable to determine if sought after information actually exists.
- *Access:* The potential user is unable to access existing information.
- *Relevance:* The user is unable to filter out relevant information.
- *Verification:* The user is unable to determine the quality or accuracy of the accessed information.

The typical symptoms of information overload:

- Cardiovascular stress
- Reduced vision
- Confusion and loss of priorities
- Frustration
- Impaired judgement
- Decreased benevolence
- Overconfidence (see box)

The consequences of information overload:

- Less time is allocated to each input
- Low-priority inputs are disregarded
- Attempts are made to shift the burden to others participating in the interaction
- Reception is blocked off by means of unlisted phone numbers or unfriendly facial expressions
- Filtering devices are used to diminish the intensity of inputs
- Specialised institutions are created to absorb inputs that threaten to overload the individual

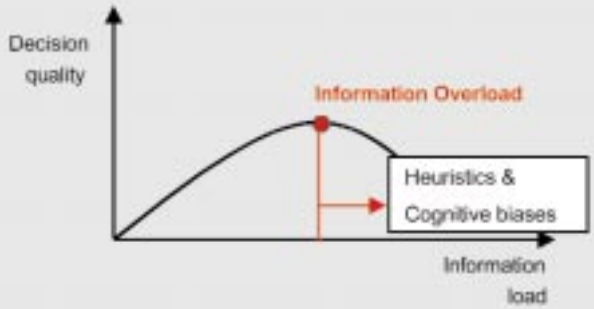
Impact on the organisation and work

The impact of information overload is often overlooked, and the size of the problem is underestimated. Massive increase in the availability of information of all kinds, and advances in mobile communications as well as bad information and knowledge management, contribute to the already burgeoning problem of information overload. The problem of information overload and bad information and knowledge management is frequently dismissed as integral part of work and not identified as a problem that can and should be solved. It is worrying that low awareness lies especially with senior managers, who are arguably the worst affected of all employees by this problem. This increases the pressure on employees' time and resources with the result that managers and staff are increasingly engaged in 'fire fighting' problems which often result directly from information overload and bad information and knowledge management. In this environment managers understandably have less time, energy and resources available to improve information and knowledge management to tackle the related problem of information overload.

Free flow of informal data is very important to high performance and productivity – simple tasks often command more time and effort than key tasks. The cumulative effect of difficulties in disseminating and retrieving seemingly innocuous, non-mission critical information is hampering the ability of telecommunication operators (and other large organisations) to achieve their major goals. A disproportionate amount of employees' time is being devoted to seemingly minor matters.

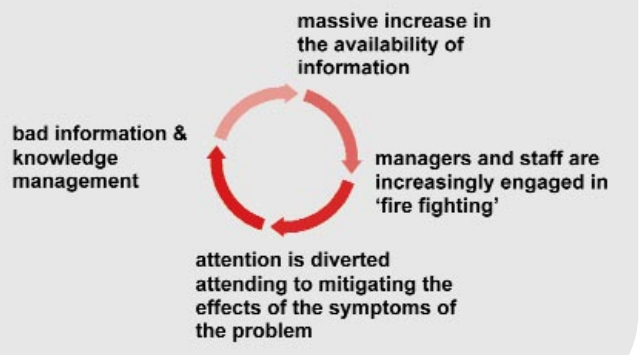
One of the main conclusions of the Study is that management of information and communication is a core competence of telecommunication operators. The operators themselves

An example for overconfidence



One might think that having more information results in better decisions. However, this is not the case. Decision quality increases with the amount of information until a certain point, after which it actually decreases. That is the point where information overload steps in.

Impact on the the organisation and work



are to a certain extent responsible for the problem of information overload being manifested as a by-product of telecommunications services. It is worth noting that information overload may hinder the take up of new advanced services such as e-commerce, m-commerce on which so much is being staked.

The recommendations

The Project P947 formulated a number of detailed recommendations on how to fight information overload. These recommendations range from raising awareness through company policy and staff education, to the organisational level where it suggests the appointment of a Chief Information or Chief Knowledge Officer.

Adam Kapovits, EURESCOM

NEW DELIVERABLES

C = EURESCOM confidential
F = for full publication

STRATEGIC STUDIES

P901 Extended Investment Analysis of Telecommunication Operator Strategies
D 2 Investment Analysis Modelling . . . F

P945 Always-On; Being Continuously Present with the Customer
D 1 Main Report . . . C

SERVICES AND APPLICATIONS

P806 A Common Framework for QoS/Network Performance in a Multi-Provider Environment
D 4 QoS Handbook outline and EQoS example . . . F

P906 QUASIMODO – Quality of Service Methodologies and solutions within the service framework: measuring, managing and charging
D 1 Offering quality classes to end-users . . . F

P922 VENUS – Virtual collaborative Environment with Next generation multimedia Systems
D 1 Technology for collaborative applications . . . F
D 2 Collaborative applications: requirements and architecture . . . C

MIDDLEWARE, SERVICE AND NETWORK MANAGEMENT

P817-PF Database Technologies for Large Scale Databases in Telecommunication
D 4 Experiments: results and conclusions . . . C

P908-PF OSS Interconnection Gateway Validation
D 1 Phase 1 Report – Project framework for validating gateways . . . F

P909-GI Enabling Technologies for IN Evolution and IN-Internet Integration
D 2 Architecture and service scenarios for Internet-IN convergence . . . F

P924-PF Distribution and Configuration Support for Distributed PNO Applications
D 1 Requirements, Terminology and Concepts . . . F

P925-PF Internet Middleware (for customised service bundling)
D 2 Report on technology support for interactive multimedia services (1) . . . C

INTERNET AND IP TECHNOLOGY

P911-PF IP Multicast
D 1 State-of-the-art technologies, products and services . . . F
D 2 Results and recommendations . . . C

NETWORKING

P709 Planning of Optical Network
D 3 Optical network planning . . . F

P810-PF Wireless ATM Access and Advanced Software Techniques for Mobile Networks Architecture
D 2 Requirements and solutions on the wireless link . . . F
D 3 Evolution and application of enabling software technologies to mobile network architectures . . . F

P813-PF Technical Development and Support for European ATM Service Introduction
D 3 Broadband services operator interconnect handbook . . . F

P816-PF Integration Frameworks for Integrated Wireless – Optical Access Networks
D 2 Techno-economic analysis of integrated wireless-optical networks . . . F
D 3 Implementation strategies . . . F
D 4 Enabling technologies for hybrid fibre radio architectures (final results) . . . F

P915-PF HINE – Heterogeneous Inhouse Networking Environment
D 2 Connecting the inhouse network to the outside world – constraints, approaches, impacts . . . F
D 3 Analysis of in-house transmission systems . . . C

P916-PF Supporting of H.323 by IN
D 1 Transport of INAP over an IP Stack . . . F

P917-GI BOBAN – Building and Operating Broadband Access network
D 7 Medium voltage AC access network and customer equipment powering . . . F

The EURESCOM Future Directions Workshop 2000

A look into the future

We are living in a society experiencing rapid change and uncertainties in many ways. If we can understand the dynamics of this change and mobilize our knowledge, experience and creativity, this might create a range of new opportunities to us. There will, however, be no one right view of the future, instead each of us has to develop and maintain multiple perspectives on what is happening.

This was the theme for the second EURESCOM Future Directions Workshop that was held in Landshut, Germany, on 2 - 4 April 2000. This year we wanted to run a Workshop stimulating the participants to think more "out of the box" and thus get insights that were not already on their radar and in particular look for the disruptive events.

To allow workshop participants to familiarize and exchange first ideas a dedicated Web server was installed and people were given a two-week period of e-mail discussions prior to the physical workshop. The members of the Strategic Studies Programme Management Group (PMG) were moderating these discussions.

18 Shareholder participants, the 6 members of the PMG and 4 individuals from the EURESCOM Permanent Staff assisted the workshop. In addition 4 external experts from universities and other organisations were invited to share their opinion.

The time horizon of the workshop was 10+ years into the future. Knowing that the pace of change is more logarithmic than linear, this is not that far away.

The workshop was organised in 4 groups:

- *Citizens and users*
  The workshop brief for this group was to generate and explore ideas about the future behaviour of ordinary people set against accelerating technological change in all aspects of life. The emphasis was put on understanding people's needs, motivations, life style decisions and values and how these may change for people, their families and their wider communities. By understanding some of these parameters it might be possible to predict what type of choices people may make in the future.
- *The marketplace*
  This group was asked to explore ideas about the structure, properties and dynamics of the future marketplace. This included exploring how the marketplace could respond to new types of needs and behaviours arising from technological dependent users and societies.
- *Society and Institutions*
  The workshop brief of this group was to identify and elaborate radical ideas about society and its institutions in the light of technology change.
- *Technology*
  This group was asked to generate and explore ideas about future technology trends and not limit to ICT only. It was believed that many of the highly controversial technologies would originate from the biological and chemical sciences. Of particular interest was the convergence of these with ICT.

Details of the workshop can be found on the EURESCOM Web Server

http://www.eurescom.de/Secure/Projects/StrategicStudies/FDW2000/FDW2000-Main.htm

and the main results of the workshop will be summarised in a special edition of the "EURESCOM mess@ge" to be issued later this summer.

The technical oriented findings of the workshop were considered in drafting the Stimulus Paper 2001 being part of the Call for Proposals for the Work Programme 2001 (see page 19). Some of the more general observations are summarised in the box below.

General observations

- Users find it increasingly difficult to vocalise their needs in a jungle of new products and technologies brought to the market at an increasing pace. The owners of technology have a large task here: To make technology development understandable and help in making choices, technologists should also see an obligation to inform of the possible negative aspects of the technology they are developing.
- There seems to be a general scepticism whether the marketplace will offer people real or artificial choices. It is difficult to believe that what is described as choices really enriches one's life, rather than create more personal confusion.
- Time is becoming the most scarce resource and everything that can help me manage my time better would be appreciated. "Time to Think" will increasingly become part of an individual's value system.
- We will see a fundamental move away from today's ideas of separate independent services towards a supportive technology environment that knows what you might need and moulds reality around you.
- The "Haves" and "Have-nots" will not only be valid for individuals and groups in society. Companies will experience a similar divide. R&D will become an issue for "drivers" only. Those who are relaxing their R&D efforts today will find themselves as "followers" tomorrow. This will become an issue for society that should encourage new ways of organising R&D both public and private. Fair access to IP (Intellectual Property) will become an issue of tomorrow's society.
- Not only the technical systems surrounding us are getting more and more complex. Also the work of institutions and their interaction is getting increasingly complex. In 10+ years time this might turn citizens and users away from society.
- How much energy can be released into the atmosphere before human beings start to suffer? In 10+ years time first limits may be imposed in some countries. This will become a delicate issue for all those doing business with radio equipment in particular. (This issue was also addressed in the Financial Times 12 May 2000 reporting that the British Government had moved to impose an unprecedented tough regime on the countries' mobile phone operators because of health fears raised by a panel of experts [www.iegmp.org.uk]).

A useful exercise

As a final exercise during the last day, the workshop invited the participants to discuss what type of new companies could appear in the future. The groups re-organised and – building on the discussions and findings from the previous days – outlined four dot.com companies:

- *B-Well.com* offering health monitoring services and an interface to your biological functions through appropriate implants.
- *CyberEveryOne.com* being a market leader in offering personalised services wherever you are in the world, knowing your personal preferences, what you might need and moulding reality around you.
- *VIC-P.com* being a company offering intelligent billing and micro-payment services.
- *VCB.com* assisting you in building your own virtual company with emphasis on the health care services.

This exercise was highly appreciated by the participants.

This was the second event of this kind organized by the Programme Management Group (PMG). The overall impression from participants' feedback was that the workshop objectives were mainly met. It was considered a good idea to invite external experts to share their view. The PMG is considering running a third event with a different approach early next year before concluding on this kind of activity within EURESCOM.

Karin Becker and Harald Johansen, EURESCOM

Seeing is believing – The HINE Workshop

On 11 May 2000 the EURESCOM Workshop *"HINE – Heterogeneous In-house Networking Environment – Seeing is Believing"* took place in Berlin. T-Nova of Deutsche Telekom kindly hosted the Workshop on their premises because the main focus was on demonstrations, and the T-Nova labs hosted the biggest part of the distributed HINE demonstrator.

More than 50 representatives from our Shareholders and from manufacturers involved in home networking saw with great interest many live demonstrations of in-house multimedia/entertainment, communication and home automation scenarios. The demonstrations were partly done on-line through a EURESCOM HINE Web Portal and partly with real equipment set-up at the Workshop site. All presenters undertook a big effort to show all demonstrations live. Although the demonstrations were focused around home network application scenarios, they spanned the whole range of home networking issues, encompassing applications/services, user interfaces and transport networks.

What can we learn from the discussions?

The biggest problem identified by the Workshop participants was the (missing) reliability and quality of service of the Internet. This is not so much a problem of the in-house system itself, however it is important for the connection of the in-house networks to the outside world and the provision of a seamless service. One of the participants stated that most of the traffic tends to stay inside the in-house environment and – depending on the application – only a very minor part needs to go to the outside networks. This fact actually should allow the usage of proprietary protocols and systems in-house and to afford a gateway and protocol mapping to the outside world.

Security and privacy issues are of big concern and importance for the uptake of integrated in-house applications. This problem is expected to be resolved soon in context with e-commerce anyhow.

In-house networks need to be economically modular, i.e. the initial monetary investment should be reasonably low. This would be for example the case if a full gateway functionality was necessary for all applications.

Everybody interested can play with the live online scenarios through the HINE Web Portal, see some of the demonstrations on a captured Web video or have a look at the presentation slides. All this is accessible through the EURESCOM Web site:

http://www.eurescom.de/~public-seminars/2000/HINE/HINEag.htm

Peter Stollenmayer, EURESCOM

EURESCOM hosts a highly successful Workshop on Regulatory OSS Interconnection, Gateways and e-commerce

The EURESCOM Workshop on "Regulatory Interconnection of Operation Support Systems" was held in Heidelberg on 17 and 18 May 2000. The Workshop attracted a large number of participants, indicating the high significance of this work for EURESCOM Shareholders, new operators, regulators, standards bodies and system vendors.

The Workshop Agenda included keynote and guest speakers, several presentations from the EURESCOM Project on OSS Interconnection Gateway System Validation (P908-PF) and vendor presentations. The most attractive part of the agenda was the live demonstration of prototypes for a Carrier Pre-Selection Ordering application, based on available products from Hewlett-Packard (HP) and GE Global eXchange Services (GXS).

The EURESCOM Senior Program Manager, Mr. David Kennedy, opened the Workshop, emphasising the benefits of closer links with the vendors' industry.

An excellent keynote speech by Mr. Gordon Crosby from Andersen Consulting was well received by the participants. Furthermore two guest speakers were invited; Mrs. Deborah Burkett from the TeleManagement Forum and Mr. Mikael Grape from Post & Telestyrelsen (the Swedish national post & telecom agency). Mr. Crosby elaborated on the need for OSS systems as the binding glue for the emerging industry structure, whereas Mr. Grape reported on the experiences recently, when Swedish customers were able to pre-select their telephone operator. Mrs. Burkett gave a brief overview of the experiences with gateway interconnection in the U.S., concluding that gateways are essential tools for automating trading-partner transactions. The key message is that plenty of time is needed for the dialogue with the market, the necessary mediation and the decisions. "Clear, timely and appropriate leadership is needed from regulators working with the industry players", said Mr. Crosby, whose statement was later confirmed by Mr. Grape: "It is important to have rules set in place early".

Mr. Dave Milham from BT, gave an introductory overview of the Project emphasising the benefits of the OSS Interconnection Gateways:

- Automated e-commerce processes
- Automated management of service
- Secure
- Ease of Regulatory compliance/audit
- Gateway flexibility
- Support for multiple interconnect processes

"This is about e-commerce for Information and Communications Company Supply Chains", said Mr. Dave Milham. There is a big opportunity for convergence on common solutions that has the potential to create a win-win-win situation. There are benefits for the vendors, the telecommunication operators and the European consumers.

During the technical part of the Workshop, Mr. Andrea Laganà from CSELT presented the Carrier Pre-Selection case study and guided the audience through a demonstration in which a customer chooses to order his local and international service from different service providers and how this order is handled by the OSS Interconnection Gateway. In fact this part of the demonstration successfully interconnected gateways from two participating vendors, HP and GXS.

The flexibility and usability, as well as guidelines for verification, validation and test strategies for OSS Gateways were the topics of the presentations and demonstrations by Mr. Jan Svensson from Telia and Mr. Kapur Birdy from BT.

In his presentation Mr. Simon Griffiths from BT discussed the highest priority requirement for OSS Gateways, namely Security. Inter-operator gateways need to operate in an environment where some companies, which have a clear idea of how to maintain their own security, closely interconnect with other companies of unknown trustworthiness or security status.

Many thank to the vendors

Special EURESCOM certificates were awarded by Mr. David Kennedy, in recognition for their valuable contribution to the success of the Workshop and the Project P908 to Mr. Chuck Seibold, GE Global eXchange Services (top) and Mr. Marcel Riemen, Hewlett-Packard (bottom).

Time for informal discussions

The discussions that took place during the Workshop as well as "off-line", once again underlined the importance of achieving industry-wide consensus on OSS interconnection.

The main advantage of using a gateway is that it represents a single entity for risk analysis.
Giving an outlook on the OSS Interconnection Gateway Evolution, Mr. Mike Fisher from BT confronted the audience with some basic and valid assumptions for the changing business environment and technology trends and how these changes might have an impact on the evolution of the OSS Gateways. The emphasis in future Gateways will be on Security, Flexibility, and Scalability. The Gateway may evolve to a Mediator, maybe as a separate business role, offering Trusted Third Party Services or Virtual Community hosting. Mr. Fisher introduced the term "electronic business hub" to describe the potential role of future gateways.
All technical presentations were accompanied by live demonstrations carried out by experts from HP and GXS. Both these vendor companies and Telcordia Inc. assumed an active role, closely co-operating with the Project, effectively building a team with the Project members in providing core OSS Interconnect solutions for the European market. The P908 Project team and Waterford Institute of Technology, sub-contracted by *eircom*, provided further demonstrations in the area of OSS Gateway evolution.
The work of the Project P908-PF is highly relevant in view of the regulatory requirements for interconnection of OSS, laying the technological groundwork to deal with these requirements. Concluding the Workshop, the participants expressed the need to convey the core message of the Project results to a broader audience and especially to new entrants at the national level. The Project and EURESCOM were asked to exploit further opportunities for dissemination of the results. The slides from the workshop are available on

http://www.eurescom.de/~public-seminars/2000/OSS/OSSag.htm

At this point I will take the opportunity to thank all contributors to this very successful Workshop on "Regulatory Interconnection of OSS"; the Project members, the participating vendor companies and all the people "behind the scenes".

Anastasius Gavras, EURESCOM

CONGRATULATIONS!

The award for the best speaker went to
Mr. Simon Griffiths, BT

Efficient IP transport networks Workshop

EURESCOM Project P918 organised a workshop on 22 March 2000 in Issy-Les-Moulineaux close to Paris to disseminate the results of its work on "Efficient IP transport networks". Technical experts from 11 EURESCOM Companies attended the workshop. This included a significant number from France Télécom, who kindly hosted the workshop.
There were three P918 presentations on the different aspects of IP transport studied. The first presentation was about the functionalities that the Optical Transport Network (OTN) can provide for IP. In the second presentation a detailed comparison of 3 interesting solutions, Packet Over SONET/SDH (POS), Gigabit Ethernet (GbE) and Dynamic Packet Transport (DPT), proposed and supported by Cisco, was given. The presentations stressed interoperability, management, functionality, performance and service aspects. Those 3 interesting solutions will be further investigated in practice within the framework of the new EURESCOM project P1014. Another presentation gave a comprehensive view of the management aspects of Optical Transport Networks (OTNs). P918 is unique in creating a detailed comparison of the numerous architectures and technologies proposed for transporting IP based traffic that is not available anywhere else.
The industry session included presentations from Tellabs on Multi-Protocol Transmission Networks and from Wavetek Wandel Goltermann on the challenges of the Optical Internet from the perspective of testing.
A third session was dedicated to major European and Canadian research initiatives. In this session the new IST Project LION (Layers Interworking in Optical Networks), which focuses on management aspects, was presented. There was also a report on the Swedish Winchester test-bed, in the Stockholm area, used to evaluate the applicability and performance of opto-electronic cross-connects, and which is a candidate experimental network for EURESCOM Project P1014. Mr. Bill St. Arnaud from CANARIE presented a view that is radically different from the European view and his talk created quite some discussion. He highlighted the emerging trend of "Customer empowered networking", the invasion of the WAN by the LAN and the proliferation of customer owned dark fibre networks in Canada.
In the last session the French next generation Internet project, VTHD was presented, which is another platform available for experimental work within the P1014 Project. The workshop ended with a presentation of the planned activities of EURESCOM Project P1014 on the Testing of WDM IP Networks by Project Leader Ahmed Madani from France Télécom.

Adam Kapovits, EURESCOM

CONGRATULATIONS!

The award for the best speaker went to
Mr. Bill St. Arnaud, CANARIE

EICS NEWS

Audio and Video conference system now operational

EURESCOM's H.323 based audio and video conference system is operational since March and is heavily used. The technical background of H.323 based conferencing and the architecture of EURESCOM's new system was discussed in the December 1999 issue of the EURESCOM Newsletter. At the time of writing this article approximately 50 audio conferences have taken place. The benefits of this system compared to external solutions are:

- No need for booking conference systems and registration of participants. The facility is available 24 hours a day.
- Telephone only users and PC Netmeeting users can join a conference
- PC Netmeeting users can share applications, e.g. edit a Word document or PowerPoint presentation
- PC users can connect via ISDN, PSTN or via the Internet. For best results an ISDN connection is recommended.
- Significant cost savings on Project budget

If you want to use the system you should check out the so called "Conference Lobby" page at

http://vc.eurescom.de/vc/Conferencing/

Telephone users must have a DTMF enabled phone and will have to key in a 5 digit PIN code to access a conference. PC users should have Microsoft Netmeeting and Internet Explorer 4+ installed and can log on by pressing a single Login button. The Conference Lobby page has a help section which may solve most of the common problems.

In order to push the use of the system for video conferences EURESCOM will start a pilot where PMC members of a few selected Projects will be equipped with the necessary hardware and software such as camera, video capturing board and ISDN board. For the future we hope that video conferencing with application sharing will boost the collaborative way of working in EURESCOM projects.

In the next deployment phase we hope to introduce video conference bridges (MCU) in each Shareholder's Intranet. The advantage is that the traffic of all participants from a single Shareholder can be aggregated in a single 128 kbs connection which reduces costs and of course the bridge can be used for local conferences within the Shareholder as well.

The physical setup: 2 PCs and 1 Cisco access router

The experiences so far ...

So far most audio conferences were of good quality. However in the case of conferences with telephone users there is a single enemy which has impact on the quality: Echo !

For technically interested readers this phenomenon is explained below. This is the last single devil in our system and we are working hard to solve it for ever.

The Echo problem

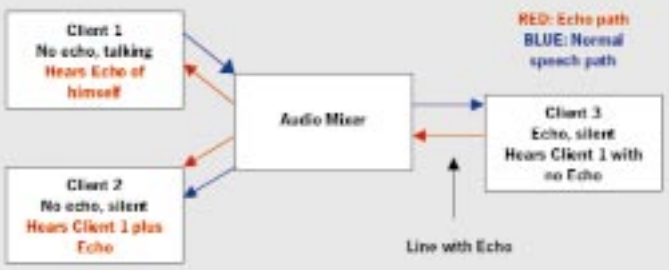
The Figure shows a simplified scheme of a conference with three clients connected. Client 1 is speaking, clients 2 and 3 are listening, but the path to client 3 is causing an echo, sent back into the central audio mixer. The mixer is half-smart: it mixes an audio stream for each participant, leaving out the participants own speech. This fact leads to the funny effect that the echo-causing participant does not hear any echo himself, but is causing it for all other participants.

Such echo issues are usually fixed by applying echo cancellation either in the path to each participant or inside the audio mixer. The audio mixer used in the EURESCOM setup is designed for mixing H.323 streams and thus does not have echo cancellation at all, since there is no echo in H.323 calls.

The Cisco gateway EURESCOM uses for linking H.323 and the PSTN only supports echo cancellation up to a coverage of 32 milliseconds, which is enough for the delay in national phone calls. International calls (routed through many exchange points, PBX etc.) sometimes have much longer delay, so the echo arrives too late for the cancellation to take effect. We hope to resolve this problem with Cisco soon.

Klaas-Pieter Vlieg, EURESCOM

Echo scenario



Preparing the EURESCOM Work Programme 2001

... now your proposals are sought!

With the Collective Letter 035/2000 of 9 June 2000 we called all Shareholders to prepare and submit their proposals for the Work Programme 2001. You will always find up to date information on the preparation of this Work Programme at the following Web page

http://www.eurescom.de/Secure/Workprogrammes/WP2001/WP2001.htm

... so please have a look every now and then. The Calendar is an important document in the collection you will find on the Web page above. Please synchronise your own diary with the main deadlines of the Calendar.

The collection of Preliminary Titles and Short Abstracts was a good idea that we want to continue. Like last year we will make all these available at a dedicated page for your convenience. Deadline for submission is Friday 21 July 2000.

To improve the preparation of proposals we are planning a Proposer's Day this year, Wednesday 26 July 2000, allowing people to discuss some of the Preliminary Titles and Short Abstracts submitted with the aim of getting more comprehensive and better targeted proposals.

Also this year we are calling the Shareholders to second experts to assist us in the technical assessment of the submitted proposals. We are trying to reduce the overhead both for our Shareholders and for ourselves and will, therefore, run the technical assessment with around 30 experts this year. We want to avoid that experts are involved in submitted project proposals directly or indirectly. Experts have to indicate this if they are involved in submitted project proposals.

Concerning the size of the Work Programme 2000 we assume a budget ceiling of 2750 man months for the year 2001. Prior to a review of existing projects as part of the assessment process, the current commitment of 2001 is roughly 1000 man months for existing and planned projects. This means that we can expect new projects in the range of 1750 man months in 2001 which is a slight increase compared to the current year.

Stimulus Paper 2001

In preparing the Work Programme 2001 we have made an effort in not only collecting ideas that might be considered as a starting point for project proposals but also tried to give the Work Programme a certain perspective. The Stimulus Paper 2001 is a response to that and widens the scope for the year 2001 and beyond in giving brief outlines of topical areas to be considered for the future. Furthermore, it contains a compilation of ideas that might be a starting point for project proposals. You can access the Stimulus Paper 2001 through the link given above.

There is a strong wish to get a larger proportion of higher risk, speculative projects in next year's Work Programme. With the hints and ideas you will find in the Stimulus Paper 2001, the articles in this EURESCOM mess@ge and your own ideas, you should be in a good position to submit innovative proposals for the Work Programme 2001 by the deadline Friday 8 September 2001.

Karin Becker and Harald Johansen, EURESCOM

Staff News

Juan A. Siles returns to Telefónica

After five and a half years at EURESCOM, Juan A. Siles returned to Telefónica Investigación y Desarrollo, the company in Telefónica's

group responsible for R&D. As he said, he liked the challenge of having supervised not only technical projects in the area of software, speech recognition and language, and IC cards, but also less technical projects like those related to environmental and the social aspects of telecommunications. He said that he was particularly happy with those projects because they have given him a broader view of what TelCos should take into account to do business nowadays.

Juan returns to Spain, happy to go back to a sunny country, leaving behind an enthusiastic group of people that will continue with the challenge of maintaining collaborative research in a time when competition is a word more often used than co-operation.

He will be back in Valladolid, a city 200 kilometers northwest of Madrid, where Telefónica I+D founded a new building a couple of years ago. He said that living in a city not as big as Madrid, and with a lot of history will remind him of the good time spent in Heidelberg.

EURESCOM wishes Juan all the best in his new post with Telefónica.

Uwe Herzog, Deutsche Telekom AG joins EURESCOM as new Project Supervisor

In May, Uwe Herzog joined EURESCOM as new project supervisor.

Uwe has been working with the Deutsche Telekom research centre in Darmstadt from 1993 until 1999, where he was mainly involved in Intelligent Networks and TINA. In the TINA-IN Working Group Uwe was involved in the definition of the standard on the TINA-IN Adaptation Unit.

Since July 1999 Uwe was with T-Nova, the innovative competence centre of Deutsche Telekom. In T-Nova Uwe worked in the research and development department "Next Generation Service Platforms and Architectures", where he was project leader of a project on IN-Internet integration.

Uwe has been familiar with the EURESCOM operation for many years as he participated in the projects P508 and P909, for the latter he was in charge of the dissemination of results.

As project supervisor Uwe is now responsible for projects in the area of mobile networks and services.

EURESCOM welcomes Uwe and wishes him a lot of success.

M-Commerce – an immediate business opportunity

What is M-commerce? Well, e-commerce is still not defined but an approximate definition could be "the use of electronic means and technologies to conduct commerce, including within-business, business-to-business, and business-to-consumer interactions". Following that definition of e-commerce we can define mobile e-commerce as the use of a mobile device to conduct e-commerce. Consequently m-commerce is only an instance of e-commerce where the mobile operators become the key players. Let us do a reality check!

By m-commerce we mean "mobile commerce", as in e-commerce conducted over a mobile device.

M-commerce is one of these hot buzzwords that need cool technology incarnate. But maybe not even that cool technology anymore. More than 120 million GSM phone users, in Europe only, already have all they need for m-commerce. They own a smart phone, which includes a display, a keyboard, a wireless smart card reader and a smart card.

The GSM phones are in fact smarter than most Palm PDAs or Pocket PCs because they can communicate! And we are probably only a few years away from a global market size of a billion mobile phones.

But wait! How often do you walk down the street and feel the urgent need to jump online and buy a CD or a book. M-commerce can not possibly be just about that!

The real issue is the ubiquity of the mobile phones and the intimate relationship people develop to these devices. The role of the mobile phones has already changed. We are starting to use them constantly – for everything – from checking bank account balances, stock prices and making trades, all the way down to buying Cokes from vending machines. Smart homes can already forward triggers (alarm systems) and be controlled (turn the heat on) by GSM phones.

What are the benefits for the consumer?

The benefits for the consumers are hard to specify, since they largely depend on the behavior of the individual and how he/she makes use of the features of his/her m-commerce capable smart phone. Admittedly there are other, and maybe more comfortable, means to conduct (e-)commerce than using mobile phones. Considering though that there is a whole generation that grows up with mobile phones using SMS to chat, it will clearly become a matter of lifestyle to have the "remote control for your life" in your pocket.

Who are the key players?

Inevitably the mobile operators are among the key players in m-commerce, since they provide the platform and since they have already all pieces of the puzzle in place. It is up to their skills to develop a useable and trustworthy environment for the consumers and a viable and beneficial business model for them.

Other key players could be the credit card companies and other financial institutions. They have a huge customer base and are in fact controlling the majority of the cash flow in society. The problem for them is that the ability of the consumers to get engaged in financial transactions is limited in space. So, they need a hook in the mobile platform their customers already have in their pockets.

Since commerce is about trading tangible and intangible goods the merchants and retailers are certainly also key players. The initial investment hurdle to get connected to the network has come down considerably, although the TCO (total cost of ownership) is still not fully understood.

Creating a trusted environment for mobile commerce

The general assumption is that smart cards are used to create a trust environment for m-commerce. The mobile operators already deployed millions of smart cards (the so-called SIMs) that are fitted in the mobile phones. The SIMs are tiny servers holding credentials used for user authentication and authorization when needed (see also the article on the WebSIM on page 6). The mobile operators invested large amounts for the provision of the GSM security infrastructure, while it is used merely for authentication of users for the purpose of allowing them to use the voice service. It is only a minor step to enable this infrastructure to secure any kind of transactions. Many new applications require the deployment of card readers to PCs and other devices (even dual smart card-slot mobile phones are emerging on the market – what a waste), forgetting that all mobile phones are already smart card readers. Looking a bit into the future, the first smart cards with RSA based cryptographic capabilities are available as prototypes, enabling applications requiring digital signatures.

The Technical Logic

- Mobile operators already have millions of customers contracted
- Customers have the necessary equipment to do electronic transactions now
- The IN (Intelligent Network) and the ISPs that could support the electronic transactions are in place
- Prepaid cards are the same as cash cards

The Business Logic

- Mobile operators are already Credit Brokers. Just take a closer look at the Roaming Agreements enabling seamless voice service within the GSM world.
- Furthermore the Roaming Agreements enable Distributed Accounting. If a mobile phone user uses the voice service while being outside of the area of reach of his "home domain", the operator of the "visit-

ed domain" is doing accounting on behalf of a third party. Currently this third party is also a mobile operator. No fundamental difference exists from this third party being a merchant on behalf of which accounting for used services is performed.

- Mobile operators can handle micro-payments better than traditional credit card companies. They already have billing systems designed for micro-payments in place today, used for detailed billing of the voice service. The ability of these micro-payment systems to capture amounts down to a few cents, suggest a very low cost per billed item.
- Prepaid Cards are effectively electronic purses that could also be used for micro-payments as well.
- Mobile operators only need the financial institutions if they want to distribute risk and responsibility (not necessary for micro-payments).

Challenges

Of course not all issues are solved yet. If that would have been the case you would not be reading this article. A requirement from the retailer/merchant will definitely be that he receives an immediate confirmation that a certain amount has been "captured" for him. Many different scenarios can be developed to satisfy this requirement:

- Should the mobile phone talk directly to the sales point? This requires a standard interface. Then cash can flow from device to device.
- The retailer may receive credit on his monthly telephone bill. A negative payable amount on the phone bill indicates that the retailer will receive a money transfer from the operator.
- The retailer may directly receive a money transfer (weekly, monthly, etc.) from the operator for its sold services or goods.

The chosen scenario is up to the mobile operator and his skills to develop a viable and beneficial business model for him.

Concluding, there is a short window of opportunity for the mobile operators to become the key players in business-to-consumer e-commerce. Today many mobile operators are very busy selling the basic GSM voice service and seem to have limited imagination when it comes to value added services. When the market penetration reaches 60%-70% (as it has reached already in Finland and the Scandinavian countries) the requirement for service differentiation among the operators will increase dramatically. At the same time the pressure from the financial institutions to get a hook on the mobile devices of the customers is ever increasing. Mobile operators should lean back, just for a minute or two, and pull the pieces of the m-commerce puzzle together.

Anastasius Gavras, EURESCOM

Tele-Smelling – new dimensions to Internet business?

Enhancing e-commerce and games by "tele-smelling, tele-tasting and tele-touching"

Imagine playing a Formula One racing game on your PC and smelling the burning rubber. Imagine shopping for perfume online and getting to try before you buy. The Internet of tomorrow will reek. The California company DigiScents plans to add a third sense to the sights and sounds of the Web using the iSmell, a piece of plug-and-pong hardware it thinks will create quite a stink. The concept is simple. At the appropriate moment a software program called ScentStream cues the iSmell to bombard the user with a blend from its payload of scented oils. Is a perfumed Net a good bet?
This summer DigiScents will open a scent-enabled Web portal, and guess, it will be called "Snortal". Through Snortals you can send "ScentMails", design and register your own ScentObjects, and create and share ScentTracks for your favourite movies and music. By end of the year iSmell devices, being able to reproduce 2128 different smells (!), shall be widely available.

Maybe the idea of transmitting smells is weird but it is close to becoming reality. And, if "tele-smelling" will become possible, why not also "tele-tasting" and "tele-touching"? Would these new dimensions not add a tremendous value to e-commerce and games? Wine tasting, ordering pizzas or delicious goods through the Internet could become something completely different. Think also about ordering clothes by "feeling" the tissue, having communications with "real" handshakes and feeling your partners...

Recent examples showed that initially crazy ideas have become quite successful. If it would be possible and affordable to realise those sensory media will it then be only an end-to-end issue, or are there more aspects to be considered? Is there a need for common activities and should we think about some studies in these fields?

For more information check
www.digiscents.com

A similar development is the "Sniffman" by a small German company in Munich.

For more information check
www.sniffman.ruetz.de

Heinz Brüggemann, EURESCOM

Invisible Computing, Ubiquitous Computing and other new concepts

There are plenty of descriptions of *Invisible Computing*, e.g. the "smart" room where lights and music turn on when a person enters or the personal digital assistant with wireless Internet access. But many of these are based on the PC mentality in which users have to give orders to a passive system to make something happen. Devices should do things automatically, talk to each other, take in new information and anticipate what you need and do it without asking!

One problem is information management. If the smart house of the future has 1,000 or so mini-computers each with specific tasks, how will all this information be managed? Another obstacle in the trend toward miniaturisation is the question of power sources. Each of these devices will need power, Nobody wants to change 1,000 tiny batteries in their house or wear a device that generates too much heat.

Ubiquitous Computing names the third wave in computing, just now beginning. First were mainframes, each shared by lots of people. Now we are in the personal computing era, person and machine staring uneasily at each other across the desktop. Next comes ubiquitous computing, or the age of calm technology, when technology recedes into the background of our lives. We have all heard about refrigerators that scan bar codes, notice food shortage and place Internet orders for delivery. But where do we go from there?

The late Mark Weiser is the father of ubiquitous computing; his web page

http://www.ubiq.com/weiser/

contains links to many papers on the topic. Some of the text below is taken from there and from:

http://www.cs.berkeley.edu/~culler/

Ubiquitous computing is roughly the opposite of virtual reality. Where virtual reality puts people inside a computer-generated world, ubiquitous computing forces the computer to live out here in the world with people.

The important words in the third wave will not be "intelligent" or "agent", but rather "invisible" and "calm" and "connection". Over the next twenty years computers will inhabit the most trivial things: clothes labels (to track washing), light switches (to save energy if nobody is in the room), and pencils (to digitise everything we draw).

The imbedded computers of 2005 will bring other worlds to us in new ways – sometimes in ways so unobtrusive we will not even notice our increased ability for informed action.

Ubiquitous computing will not make our houses "smarter". It is commonly believed that thinking makes one smart. But it's frequently the opposite: in many situations, the less you have to think about, the smarter you are. Who's smarter, the beginning piano student who thinks about each note, or the artist who thinks about the music and lets the notes take care of themselves? Who's smarter, Deep Blue analysing billions of moves, or Kasparov, who wins the game after analysing three hundred? In each case the expert can think about "less" because long practice has made it unnecessary to attend to the details. Previous revolutions in computing were about bigger, better, faster, smarter. In the next revolution, as we learn to make machines that take care of details we are not consciously aware of, we might finally have smarter people.

Impacts for EURESCOM?

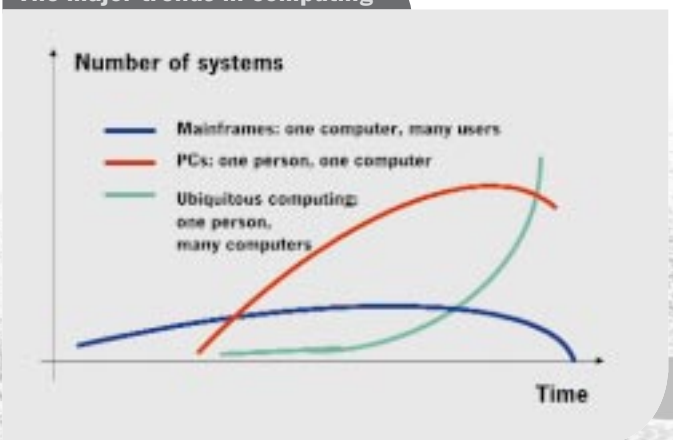
So, what does all this have to do with EURESCOM? Well, if we are aware of what is happening, we can plan for such a world (see also side box), help creating it and make moves to be able to operate it! Because, however smart the system becomes, someone has to build it, manage it and upgrade it! This could be a suitable role for Telcos, couldn't it?

Human time and attention, not processing or storage as *the* limiting factors. Imagine:

- A vast diversity of computing devices (PDAs, cameras, displays, sensors, actuators, mobile robots, vehicles). No such thing as an "average" device.
- Unlimited storage: everything that can be captured, digitised and stored, will be.
- Every computing device is connected in relation to its capacity.
- Devices are predominantly compatible rather than incompatible (plug-and-play enabled by on-the-fly-translation/adaptation).
- Personal information management is the killer application: analysis, aggregation, dissemination and filtering for the individual.
- People create knowledge, not data: automated extraction and organisation of daily events.
- Information technology as a utility: continuous service delivery, on a planetary scale, on top of a highly dynamic information base.

Magnus Krampell, EURESCOM

The major trends in computing



Interplanetary Internet

"It's time to think beyond the Earth ... in Solar System and beyond"

The words are not a joke, but from the well known Vint Cerf, one of the "fathers" of the current Internet.

The primary goal of the study is to investigate how terrestrial Internet protocols and techniques may be extended and/or used as-in the exploration of deep space. The study team has also founded the IPNSIG (Inter Planetary Networks Special Interest Group) under the sponsorship of the Internet Research Task Force (IRTF).

The future of this next-generation Net revolves quite literally around Mars: A series of probes, launched by the US and other countries, will gradually envelop the planet between now and 2040. The first mission, slated for 2001, 2003, and 2005, will launch satellites into Mars' orbit and soft-land surface rovers with more processing power and electricity-generating power than *Mars Pathfinder's* lander. Each new piece of mission hardware will come equipped with an IPN (Inter Planetary Network) address, (perhaps using ".mars.sol" or ".earth.sol" domain names ...) and special protocol permitting each to operate as node along a packet-switched network.

Although IPN bears similarities to our own Net, it presents many engineering challenges. The problem is not to support very many users but communicating in a very weird, noisy, long-delay communications environment. Round-trip transmission time between Mars and Earth varies from 20 to 50 minutes, depending on the planets' distance from each other.

IPN will also suffer bandwidth shortages because of its weak signal. In general, radio waves become fainter at a rate proportional to the square of distance travelled. With current technology and transmitting power, for example, a probe orbiting Mars sends data to Earth at up to 250 Kb/s.

So, much research is needed, to develop the necessary protocols, transmission systems and applications that will enable our exploration of space. The Americans are of course on the forefront of all this, but there may be opportunities for Europe as well – now the time to invest in research on order to be there when the intergalactic market opens up!

For further reading, see:

http://www.ipnsig.org/
and
http://www.gip.org/

Magnus Krampell, EURESCOM

Ad-hoc networks, anyone?

Imagine you are using your mobile phone when walking down the street. But instead of routing the call through a base station on the nearest hill top and then through the fixed networks, your call is routed by a car at the curb. The car is in turn in contact with another car and so on. The call only leaves the chain of cars at some point far away from your location. If you think about it, cars are really moving small networks with maybe 20-50 computers. Acting as relay stations for voice or data traffic would not be a big challenge for a modern car. If a large number of cars were equipped with hardware/software to act as network nodes, ad-hoc networks could be built in seconds, interconnecting thousands of cars and covering vast areas.

Imagine the competitive edge of the operator controlling such a network – no investments in base stations of fixed networks, only software spread to the nodes in the network. The owner of the car may not even know that his/her car is part of a wide-area network!

This may sound like fantasy, but the American military is reported to have worked on a solution where, for example, a group of tanks in enemy territory would act as network nodes for each other, thus avoiding the dependency on fixed installations.

Also, there is now a device called "Cybiko"

http://www.cybiko.com/

that will communicate with other devices within close range. You can send mail, chat etc through the device without having your own Internet connection.

Is there a role for Telcos in all this? Well, Telcos may face competition from unexpected places if they are not aware of this development. However, these ad-hoc networks must be managed somehow. The knowledge and experiences from operating other networks can become valuable for this. Research in the technology and its potentials is important though.

Magnus Krampell, EURESCOM

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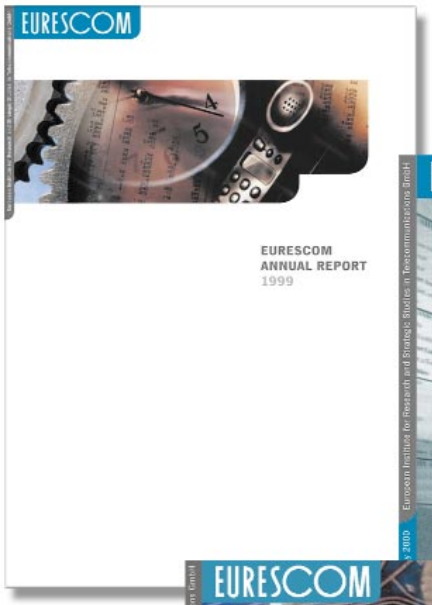

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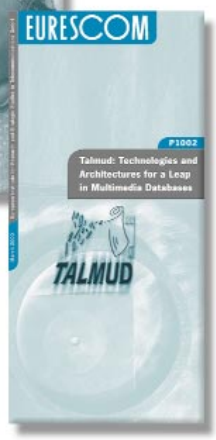

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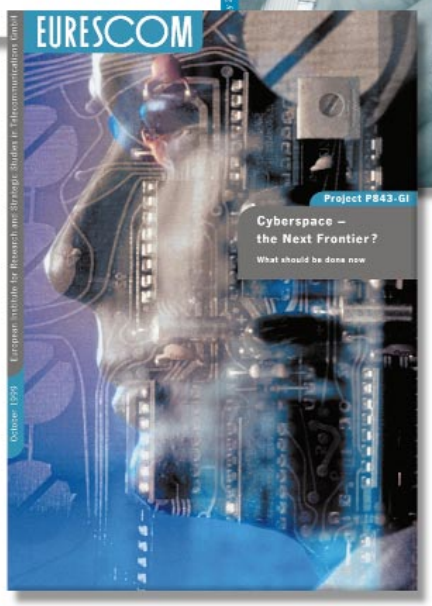
Project P843 study results
booklet, 78 pages
October 1999



EURESCOM

EURESCOM is the European institute for collaborative research and strategic studies in all areas of telecommunications. Currently there are 24 Network Operators from 23 European countries participating as shareholders in EURESCOM.
It acts as a technical forum for sharing visions and concepts, as an initiator of targeted activities, and as a facilitator for common undertakings on technical issues.
EURESCOM is open to any European Network Operator or Service Provider who may wish to join.

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