

Wireless Business Now

A N E W S L E T T E R F R O M A U - S Y S T E M - N O . 2 - 2 0 0 1

Operations Support Systems in focus:

The expansion of both fixed and mobile networks with more complex services being introduced creates new demands on well functioning support systems.

Read about key success factors, support systems, the importance of openness in standardised systems and about billing solutions.



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Time for operators to put their own houses in order!



It's with some interest that I've been following the intensive media coverage of the new mobile networks, many aspects of which have already been analysed in depth. How much will 3G networks cost to build? How fast will the transmission speed of UMTS be? How much will it cost to download a megabyte? Why is it taking so long for GPRS terminals to appear?

At the risk of playing the role of the devil's advocate, a role that many have already adopted, I'd like to cast some light on another area of the expansion of both our fixed and mobile communication networks. I'm thinking of the support systems that will make it possible to activate services, monitor networks and receive payments from users. To me it is worryingly quiet concerning the question of how the new communication networks will be managed and administered; what we call telecom management.

It was therefore with some relief that I recently read an interview with a representative of Orange, one of the

winners of the Swedish UMTS beauty contest, who highlighted the very point that network management, in particular the billing system, was probably the most likely cause of the delayed launch of what many people call mobile Internet services. Here was someone who at last had recognised the challenge involved in making all the bits of the puzzle fit together! I think that the Swedish (and certainly the foreign) telecom establishment has underestimated the amount of work required to create a working whole out of the many individual components of a functioning operatorship.

This ought not to have been something new. I've been working with such issues since the early 1980s and should therefore be rather hardened and assured that things will be resolved. What, then, is it that makes me doubt the ability of operators to get their support systems in order in time? My doubts are linked to the rapid developments taking place in the following three areas:

Service offers:

The introduction of IP as a bearer for all communication represents a revolution for us as users. Services will be transparent regardless of which terminal is used, and the number of services being offered is increasing like wildfire. The times when a mobile operator could live well on providing voice services and SMS will soon be past. Instead interactive computer services will be introduced in rapid succession.

Interfaces:

Today operators have far more interfaces with both service providers and competitors than ever before. At the same time as content becomes an increasingly important part of the services offered to users, so too will the complexity of our communication networks increase. In addition operators currently choose to work with several suppliers to make sure that they have access to the best technology in each area. Previously, large purchases were made for complete networks, often from a single supplier. Operators such as Telia, for example, had time to conduct extended field trials of new equipment, which is hardly something there is time for today.



Methods of payment:

Even if today (somewhat simplified) it is only the method of payment that differentiates one operator from another, the way services are packaged and billed for will be a decisive competitive factor. Factors that will determine price levels include service quality, amount of data transmitted, transmission time, access type or the type of transaction conducted. These are just a few examples; I'm convinced that creative operators will do everything to create competitive advantages through pricing.

Anyone who can offer operators the integration of all the components in this hotchpotch of technologies and suppliers faces a brilliant future! Systems integration is hardly something new, and it is certainly well established in other areas of IT, but up to now much in the telecom sector has been based on proprietary solutions, which are difficult to develop. Today's buyers of network infrastructure and support systems want the best in every single part of their operations, and the telecom market is therefore moving towards open interfaces and so-called best-of-breed products.

Bearing in mind what I said before, I would like to encourage telecom operators to think in terms of integration frameworks. What is an integration framework? Well, it consists of software for middleware and interfaces for object models for use in controlling communication between support systems. Here's what I suggest:
Build from the bottom up and create a framework in

which you can easily implement new support systems and network elements. The framework will be the first building block in your competitive capability.

Do not chain yourself to a particular type of technology but instead make sure that you can quickly adapt to the changing conditions that the future will surely bring.

Establish long-term relationships with systems integrators and ensure that continuous responsibility is taken to ensure that new equipment can be easily added to your communication network.

Invest from the start in support systems that offer the possibility of automating service activation, smooth changeovers between payment methods and the rapid fixing of shortcomings in service quality.

It is high time that both fixed- and mobile-network operators reviewed the management and administration of their networks and services. From the very start 3G operators in particular must put much time and energy into creating manageable frameworks for their support systems.

Who wants to own a network if it isn't possible to realise new services and control their quality, and thereby attract customers?

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Lars Andersson

World Premiere at CeBit: AU-System introduces digital signatures over GPRS



At the CeBit fair in Hanover, it was once again time for AU-System to present a breakthrough solution. Together with its partners Baltimore Technologies, Gemplus, and Ericsson, AU-System demonstrated the world's first solution for digital signatures and authentication over both GSM and GPRS.

The security issue is seen by many as one of the most crucial factors when it comes to the breakthrough of mobile

e-commerce and the increased spread of broadband is placing even more stringent demands on the security aspects. AU-System has presented a solution wherein the wireless PKI (WPKI) was integrated with AU-System's WAP browser for secure digital transmission. The new aspect of this solution is that the application and mobile phone now completely support the security functions in WAP.

"Support for secure transactions is an important milestone since GPRS and the coming 3G net open avenues for new services and application areas," says Jonas Holmer, strategic and business development manager at AU-System, who ran the project .

The solution that was shown in Hanover was comprised of a banking application with various transaction services, and demonstrated on an Ericsson R520 telephone, both over GSM and GPRS networks. In order to make it possible to conduct these transactions in a secure manner, the telephone is equipped with the AUS WAP Browser, which supports WPKI (Wireless Public Key Infrastructure). The user identifies him-/herself to the bank with the aid of a digital certificate that is stored in the telephone's S/WIM card. S/WIM, which stands for Subscriber Wireless Identity Module, is the accepted standard for storage and management of digital certificates and encryption keys in mobile telephones.

As simple as Internet banking

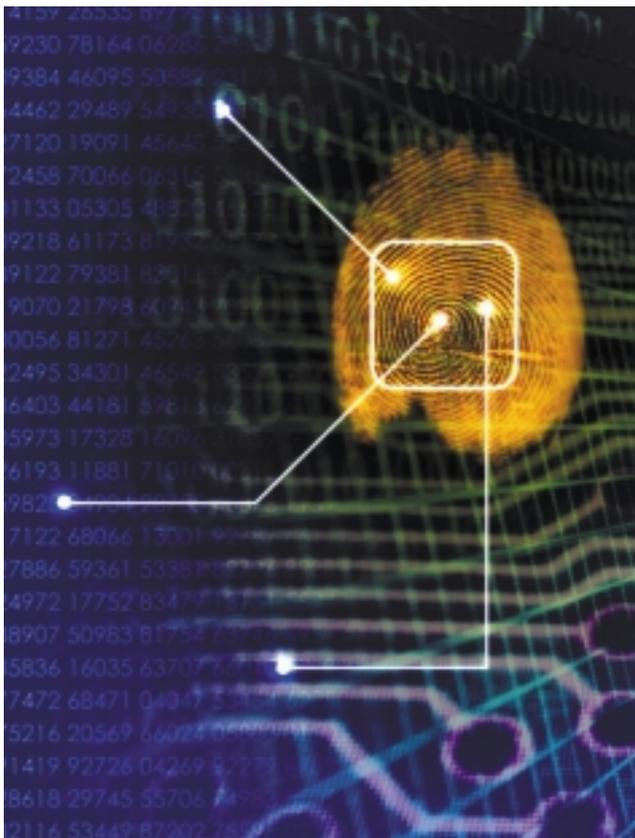
Those familiar with their bank's Internet services will recognise the logistics in the solution. The difference between today's Internet banks and this solution is that it contains an additional security level through its PKI infrastructure. Holmer also points out that a payment system based on digital signatures is even safer via mobile telephones than if the same service is performed from a computer, since the computer must store the private encryption key on its hard disk. The mobile telephone, on the other hand, stores the key in the considerably more secure and "theft protected" SIM card.

"One of the largest challenges for those providing mobile services and mobile telephones is to create sufficient confidence on the part of the user so that they will dare to use the services offered. With this security development

we will, in the very near future, consider the mobile phone to be as obvious a payment method as the credit card is today, but even more secure,” says Holmer.

Here’s how you create a digital signature:

The user chooses ”pay bills” where any current bills are available and chooses one of them for payment. A so-called contract is shown in the window that contains all the terms of payment and the amount, date, and account number from which payment shall be drawn. The user then chooses to accept payment. Then the actual signature process begins, connecting the users identity to the payment. The payer now provides a PIN code that prompts the user’s private encryption key to be released from its secure storage site. Payment is signed with this key. The personal certificate can be compared to an ID card and is stored in the telephone’s SIM card. The certificate contains information about the user’s identity and the public encryption key that is required to check that the digital signature is correct. The certificate and the signed payment are sent to the bank, which then verifies that the user’s personal certificate and digital signature is correct, a process that can be compared to showing ID at a bank today. Once verification is complete and approved, the user receives a confirmation



that the transaction has been processed.

In addition to supplying the WAP browser, AU-System has supplied the project with integration with the WPKI infrastructure and development of the signature functionality. Collaboration with Ericsson enables the solution to be shown on the GPRS telephone R520.

Baltimore Technologies supplied the WPKI infrastructure and Gemplus contributed with its S/WIM card, GemXplore™.

AU-System and Condat to cooperate on GPRS

AU-System UK and mobile business software and solutions provider Condat AG, Germany, has signed a memorandum of understanding to improve the global availability of wireless devices that are capable of exploiting 2.5G mobile Internet services.

The first project is to offer a complete software solution for the inner workings of devices able to browse the Internet at improved speeds to handset and PDA manufacturers. This will be the first generation of ”always-on” GPRS data services. The devices will combine Condat’s GPRS-enabled GSM protocol stack with the AUS WAP Browser, which includes support for new bearers like Bluetooth, GPRS and 3G networks.

The offering is a fast-track way of providing telecommunications network operators with the devices they need to get revenue-generating 2.5G services up and running quickly.

Stefan Fleron, CEO, AU-System UK, comments: ”Telecommunications network operators desperately need GPRS devices to get into the market fast so they can generate revenues from the obvious improvements that 2.5G brings to mobile. With their ‘always-on’ capability, these devices will offer a major improvement over the first incarnation of WAP. They will be the first to function as true extensions of office business tools.”



The new "new economy"

The previous year witnessed some of the most turbulent economic times in recent history. Markets initially soared, lifting stock markets throughout the world to dizzy new heights. The bulls were running at full speed, and the talk was all about the 'Goldilocks' scenario.

By the end of the first quarter, however, everything had changed. Company sales declined, stock-in-trade skyrocketed and profits went into free fall. The markets rapidly followed suit. The bulls were gone and the bears ruled in their stead. In a few short months we went from irrational exuberance to dread and despair.

What happened was perhaps unexpected to most observers, but it was certainly not inexplicable. Quite the contrary: what took place in 2000 was in many ways a reenactment of the past. The rise and fall of business usually follows a predictable pattern. The scale and the scope of the changes may vary over time, but the business cycle is always there.

What we've been experiencing over the past few years is not a new economy but an economy that behaves the way it always does when driven by a major shift in technology. There are many examples in the past of similar patterns driven by disruptive technologies: steam in the late 1700s; railways in the early 1800s; electricity in the later 1800s; motor cars in the early 1900s; semiconductors in the mid-1900s; and computers in the late 1900s.

Today it's telecommunications. More specifically, it's

mobile telecommunications infrastructure. The build-out of the next generation of mobile technology is the current engine of growth. Far from being different, the developments are very predictable. The pattern was established generations of communications technology ago.

Every communications technology deployment goes through five major phases: infrastructure; software and services; content aggregation; retail and commerce; and, lastly, business re-engineering/vertical market development. Whereas the timing may differ from one technology to another the pattern remains the same. Witness the buildout of the Internet between 1995 and 2000.

In 1995 the major revenue generators were the companies providing the basic infrastructure, and we saw rapidly rising sales figures for companies such as Cisco, Worldcom and @Home.



By 1996, however, providing basic infrastructure alone was no longer good enough to qualify for the top division. The game had shifted to software and services. America Online started its rapid ascent from a few million customers to the 20 million or more it has today. Microsoft launched MSN, AOL, the Microsoft Network. New Internet service

providers, ISPs, turned up in every town and village. Access was the name of the game.

By 1997, though, plain old access was no longer enough to be a major player. Consumers demanded content. The key revenue generators became the ones that could package and deliver customised information out the wilderness of the Internet. We saw the rapid rise of the portals: Yahoo, Excite and Lycos, to name just a few. And the key ISPs followed suit. AOL rapidly embraced the Internet and became the major web-based portal. MSN split into four industry-specific portals. 1997 was truly the year of the portal.



In 1998 the game changed again. No longer satisfied with aggregated content, consumers proved increasingly willing to spend money on online purchases. The retail phase began in earnest with the advent of Amazon.com. Although certainly not the most profitable company in the world, Amazon set the standard for Internet customer relations and online sales, while generating phenomenal sales figures (and share-price appreciation). And of course we also witnessed a plethora of 'new' business models appear, from electronic flea markets (eBay) to do-it-yourself computer configuration (Dell).

However, 1999 proved to be the key year in the development of the Internet. This was the year the net truly became part of the overall economy. By now it was clear that the Internet was here to stay. Company after company in the 'old economy' now embraced the Internet. Web-based business-to-business commerce fundamentally altered existing supply chains. Exchanges and marketplaces appeared all over the web, making many old business pro-

cesses obsolete along the way. Existing business were now forced to adapt to new realities, or become relegated to vertical niches.

Of course it all had to stop sometime. The frenetic pace of the late 1990s could not last forever. By 2000 the business cycle had run its course. Sales slowed, stock-in-trade started to accumulate and profits fell, as did the stock markets. The year of correction was at hand. Growth took a breather, before taking off again on the back of the next technology: the wireless Internet.

Starting in 2001 the five-phase race is on again. The build-out and deployment of the wireless Internet will move through the same phases that the fixed Internet did. Perhaps a little slower, perhaps a little faster. It's still too early to tell what the pace will be. Inevitably, however, this new technology will work its way through the five phases.

Although we can't predict exactly how and when, there are a few indicators to keep an eye on:

1. 3G contract clauses. Many companies that purchased or were awarded a licence to deploy 3G services have agreed to build out the basic infrastructure within 2 years of receiving their licences.
2. The development of new software and services is now in its early stages, particularly in the fields of data synchronisation and voice processing.
3. Content aggregation is not yet an issue, but look out for announcements regarding wireless support from existing content aggregators.

The 'new economy' may be dead, but long live the new 'new economy' of the wireless Internet!



*Mikael Edholm
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The invisible support systems – crucial to functioning traffic systems

Would you want to fly if there were no network of air traffic controllers managing the world's air-space that thousands of planes use at the same time? Probably not. You can draw a parallel between the importance of controlling our airspace and doing the same with the networks that we use to control the transmission of our telephone and data communications traffic; in both cases, continual monitoring and control are required in order for traffic to flow without incident, interruption, or delay.

The issue of network supervision and service-affecting disturbances is becoming more and more pertinent in step with the expansion of both the fixed and mobile networks. Those services provided are more and more complex and as a result, payment methods and business logistics also change accordingly. Security aspects also gain importance. A broadband operator currently handles traffic for a number of competing operators or service providers, which requires that all interfaces be managed in a proper fashion. Accessibility also has high priority, of course; service interruptions not only cause irritation among customers and end-users, but also create large costs in the form of lost revenues.

OSS is nothing new

AU-System's almost 150 consultants within the business unit OSS (Operations Support Systems) integrate and implement solutions for operators and infrastructure providers together with support system providers. The primary principle from AU-System's side is to create as much openness as possible between the various providers' systems in order to enable the quick implementation of new support systems, interfaces, and services.

"With the development now occurring, it is important that operators do not build in a dependence on any specific item and do not lock in to a support system structure that makes later changes all too costly," states Carl Piva, marketing and sales manager for OSS Solutions at AU-System. "Speed and flexibility are crucial to survival in today's environment."

Unique experience gives quick delivery

AU-System has participated and worked with operators from the point when they developed their own monitoring systems to the present day, when the demand for standardised solutions with open interfaces is increasing. One example is Skanova, where AU-System adjusted and integrated a monitoring system in only three months despite the fact that equipment from several suppliers was to be integrated. Skanova has Sweden's largest broadband network and provides capacity to Europolitan, Tele1 Europe, Telenordia, and Tele 2 among others. The assignment consisted of installing and implementing the Netcool system from Micromuse into Skanova's operating environment. AU-System has carried out a number of similar assignments where external suppliers' monitoring equipment has been implemented in the respective operators' operating environments. Among these assignments can be seen deliveries to operators such as Banverket Telenät, Nextra, Utfors, Telia Telecom, and Bredbandsbolaget.

Integration framework creates openness

Another explanation for our speed is that AU-System helps operators build an integration framework and takes ongoing responsibility for integration, which entails that new support systems can be introduced in step with changes to conditions regarding the operators' service production. In short, the framework can be described as the part that regulates communication between support systems, and that the support systems instead of being directly connected to one another, can provide their respective business interfaces to a common message bus. Information crucial to business operations can, in this way, be made available in real-time to both existing and new support systems that are connected to this bus.

On the infrastructure side, AU-System works with partners such as Ericsson, Net Insight, Dynarc, and Allgon. On the support system side, AU-System works with companies such as Cisco, Micromuse, Granite, Arkipelago, Astracon, XACCT, Digiquant, and InfoVista.



Mobile possibilities in Great Britain

There is a great deal that supports the claim that London is Europe's capital city for the capital market, cricket and for the development of the next generation of mobile services. Almost all of the global players, including Ericsson, Nokia, Cisco, Panasonic, Lucent, and Nordtel, already have major offices there.

It was in May of 2000 that AU-System decided to follow the trend and opened its own office in London. The focus was clear – to be at the forefront of the development of mobile Internet services and to work with operators and companies in preparation for the start of the next generation of mobile networks, such as GPRS and UMTS.

“Five UMTS licenses have been auctioned out and trial services are expected to arrive in the middle of 2002,” comments Stefan Fleron, Managing Director of AU-System in Great Britain. “Most of the major operators are currently or soon to launch GPRS services. The future for AU-System is bright in this area.”

Competition is tough and demands are stringent. Just counting inside the M25 that encircles London, there are about 8 million inhabitants and an average operator in Great Britain has about 11 million subscribers. This places high demands on the development of applications that can manage many simultaneous users and has no limitation with regard to scalability. AU-System's expertise within

mobile Internet services and the London office's strong support from Sweden are seen by Fleron as two of the reasons that AU-System is seen as a reliable provider of such solutions.

New London locale

In March, we opened our new premises in the IT and media dense area of Clerkenwell in London City. Invited VIP clients mingled with our 19 local employees and ate from a traditional Swedish smörgåsbord. Many took advantage of the opportunity to play games over Bluetooth and to make phonecalls with the Seiko watch. Most appreciated was Kajsa Ritzén's presentation of her paper on the mobile services of the future. See the report at www.ausystem.com

“In a new survey done by the Sunday Times, it was shown that most people in London, both women and men, talk about new technology and new technological services at the pub, such as new mobile phone services, for example. Ten years ago it was politics and children,” says Fleron. “AU-System is in a good position here with proximity to the place where it's all happening.”

Great Britain – Facts in Brief

Population: 58 million

Number of mobile phone users: approx. 44 million

Number of Internet users: 20,14 million



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(AU-System)*



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*Ken Cornrie
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*Stefan Karlsson (AU-System)
Johan Wirde (Netlight)
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Soon all gadgets will be able to communicate with one another

The Internet has become a staple item for many of us and the youth of today will consider the Internet to be as natural and commonplace as radio, TV, or electricity. Something that is quite simply there; we pay it no thought at all. Bluetooth takes the fantastic possibilities offered by the Internet one step further and soon, our everyday gadgets and apparatus such as pens and pocket radios will be able to communicate with the Internet. So far, we have only seen the tip of the iceberg with regards to Bluetooth. The interesting question is what happens when all the small gadgets that surround us gain a life of their own and begin to communicate?

AU-System has been involved with wireless technology since the very beginning, when Ericsson had only sketches to depict the new approach. AU-System was given the task, as early as 1997, of suggesting how the telephone related parts of the software should be designed. The collaboration has continued since then and AU-System currently assists Ericsson with other areas of software development concerning the Bluetooth standard. The company's expertise and knowledge of this technology has also resulted in AU-System, as one of the first consulting companies in the world, transforming vision into reality through a number of prestigious projects that bring Bluetooth to the consumer market.

Interactive watch

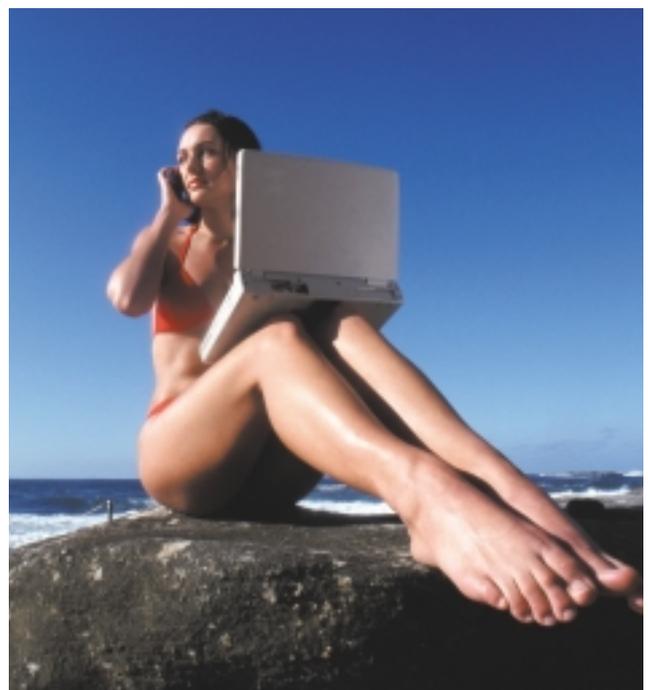
One of the latest in this row of projects is the Wrist Companion from Seiko Instruments. The watch, which has both a Bluetooth link and inbuilt WAP browser, would make Dick Tracy himself green with envy. The Bluetooth link enables the watch to be connected to the Internet with the aid of a mobile telephone. The watch can also send and receive SMS, store contact information, and transmit speech via the inbuilt microphone. A similar solution has been developed with the car stereo manufacturer Clarion, wherein AU-System equipped their AutoPC with Bluetooth software to enable the stereo to be able to be connected to the Internet.

We are now seeing a great number of products begin to integrate the same type of functionality: telephones, hand-held computers, and watches. Will all functions be integrated into one unit or will we have a separate gadget for each function?

"I believe that there is room for both types of products on the market," says Christer Björk, Business Area Manager at AU-System. "It's all a matter of preferences."

The finesse of Bluetooth is seen in the fact that its components are small and energy efficient, which means that even the smallest of pens can be interactive. Bluetooth enables distributed functionality through small, dedicated units instead of the need to integrate all functionality in larger, so-called hybrid units, as seen today in certain mobile telephones and handheld computers. Christer Björk also emphasises that the technology is flexible:

"When on holiday, for instance, you may choose to take along your mobile telephone and camera, while on a business trip you may want to have your mobile phone, handheld computer, and lap-top with you. The nice thing is that since more and more units are being equipped with Bluetooth, you can choose."

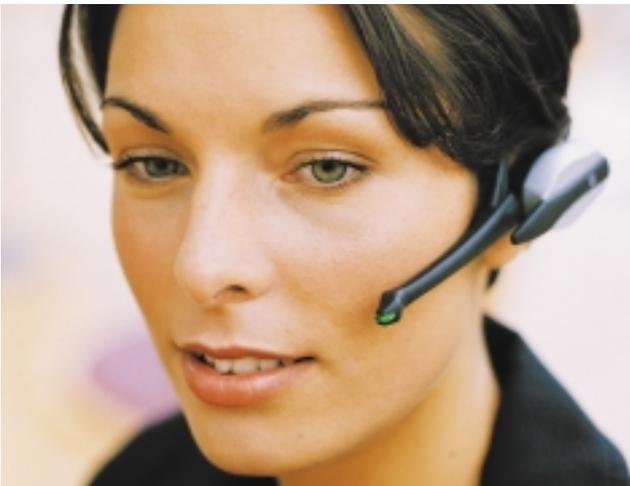


The PC: To be or not to be

Some contend that the most complete hybrid unit that now exists, the PC, will disappear when Bluetooth experiences its breakthrough and provides us with more options. This is a view that Björk does not share, however.

“When new technology emerges, it is always the popular opinion that the new technology will replace the old. But after a while we see that the new usually complements the old,” explains Björk.

He also contends that the PC fulfils its function since it manages to store large amounts of information and can offer a wide range of application areas.



Bluetooth products to reach the market this year

During the past year we have seen a row of prototypes with various Bluetooth solutions. Which products will reach the market first and when? Björk believes that already this year we will see a range of so-called add-ons where Bluetooth technology has replaced the traditional cords. Headsets for mobile phones and PC cards are two forthcoming examples. AU-System has collaborated with the PC card manufacturer Xircom and integrated Bluetooth software with their soon to be launched PC card. On the mobile phone side, Philips is an example of a collaborative partner that AU-System has licensed Bluetooth software to. Philips also estimates to have its Bluetooth telephone on the market this year.

So, all of you that have waited for the actual arrival of Bluetooth technology, hang on! Bluetooth will be here soon!

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Billing systems can both aid and support

With the introduction of UMTS, the world's mobile telephony operators are faced with the greatest billing challenge to come in many years.

Uncertainty is high regarding issues such as which services the system is to handle, which payment models it is to be able to handle, and how the income division among the network owners, operators, and content providers is to work. Many existing billing systems are completely customised according to demand upon implementation, which has resulted in a situation where many operators are now stuck in complex systems that require long lead-times in connection with changes.

"Most of today's billing systems are not flexible enough to be able to quickly handle new payment models and revenue flows," says Mats Krekula, in charge of Billing at AU-System.

What will operators do?

Those operators that have hundreds of thousands of clients in their existing billing system can not easily change their old structure for something completely new. The possible cost if something were to go awry and the operator was unable to bill its customers is very high and Krekula believes that few operators are willing to take that risk.

"The most likely situation is that operators with an old billing system will, in the beginning, treat the new IP-based services separately," comments Krekula. "This will be at the expense of simplicity, however, and can result, for example, in customers receiving several different bills."

Tips for operators regarding new billing systems

New operators have a head start with regard to the launch of UMTS services, since they have the freedom to build their billing structure from the ground up, taking the new demands and business models into consideration.

"Operators want scaleable solutions with open interfaces and short implementation times," explains Krekula. "That places demands on AU-System as the integration partner to be able to work with both system providers and operators."

To avoid the risk of being locked into an outdated system, Krekula recommends that the new operators keep the following in mind:

- That the billing system should have a flexible architecture with open APIs, which makes it easier to integrate with other systems.
- That the system should be able to manage transactions in the form of licenses, commissions, and other fees that collaboration with various partners leads to.
- That the system should be easily adapted, in real-time, to new services, payment methods, and customer demands.
- To invest in a modern mediation system that gathers, sorts, revises, and packages information from the network to the billing system in a correct way. IP networks generate considerably more information from routers, switches, servers, firewalls, and the like with more than one connected network and it is important to avoid giving the billing system erroneous or duplicate information.



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