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www.imsmag.com

IMS MAGAZINE™

IP MULTIMEDIA SUBSYSTEM

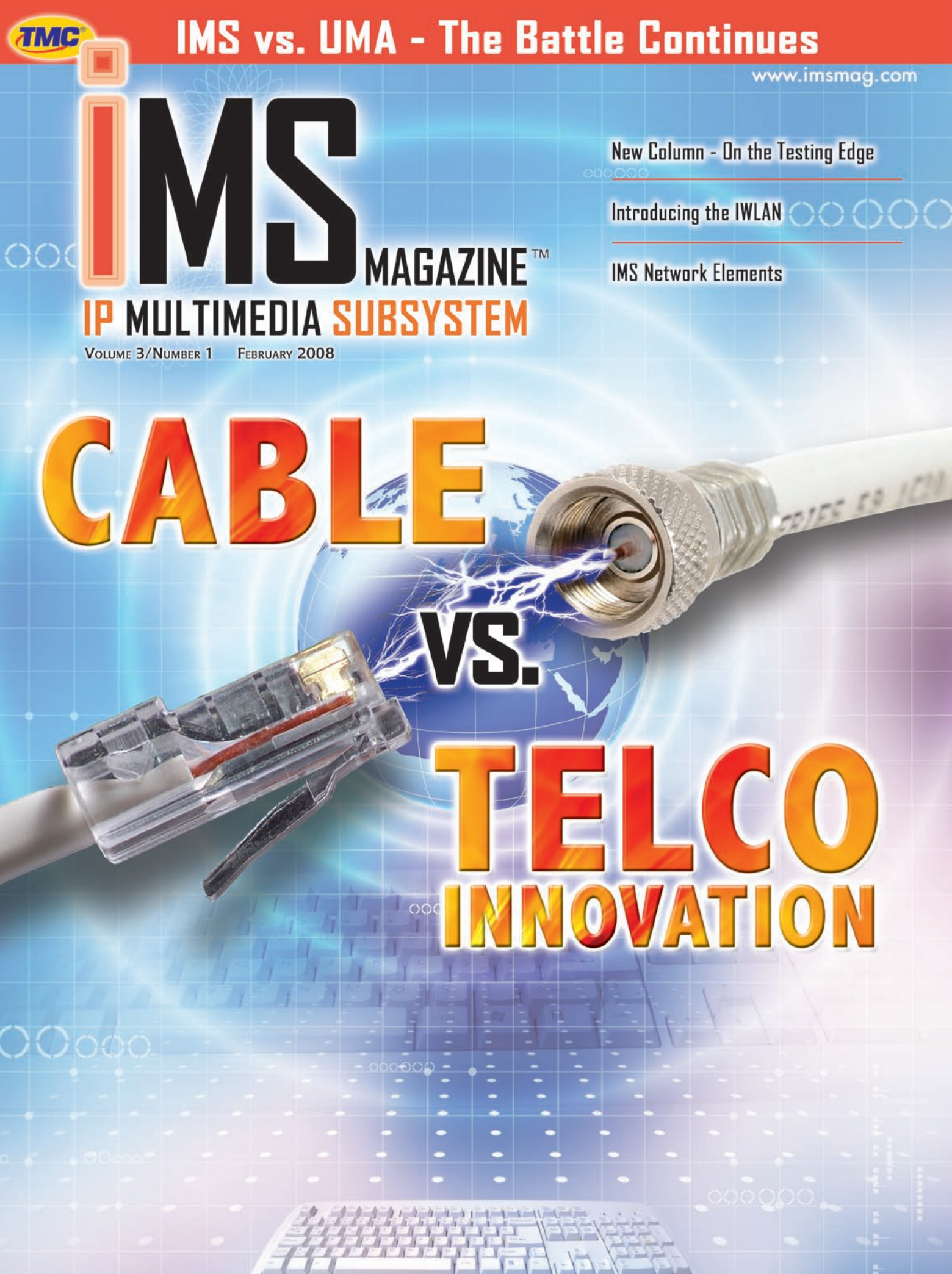
VOLUME 3/NUMBER 1 FEBRUARY 2008

New Column - On the Testing Edge

Introducing the IWLAN

IMS Network Elements

CABLE VS. TELCO INNOVATION



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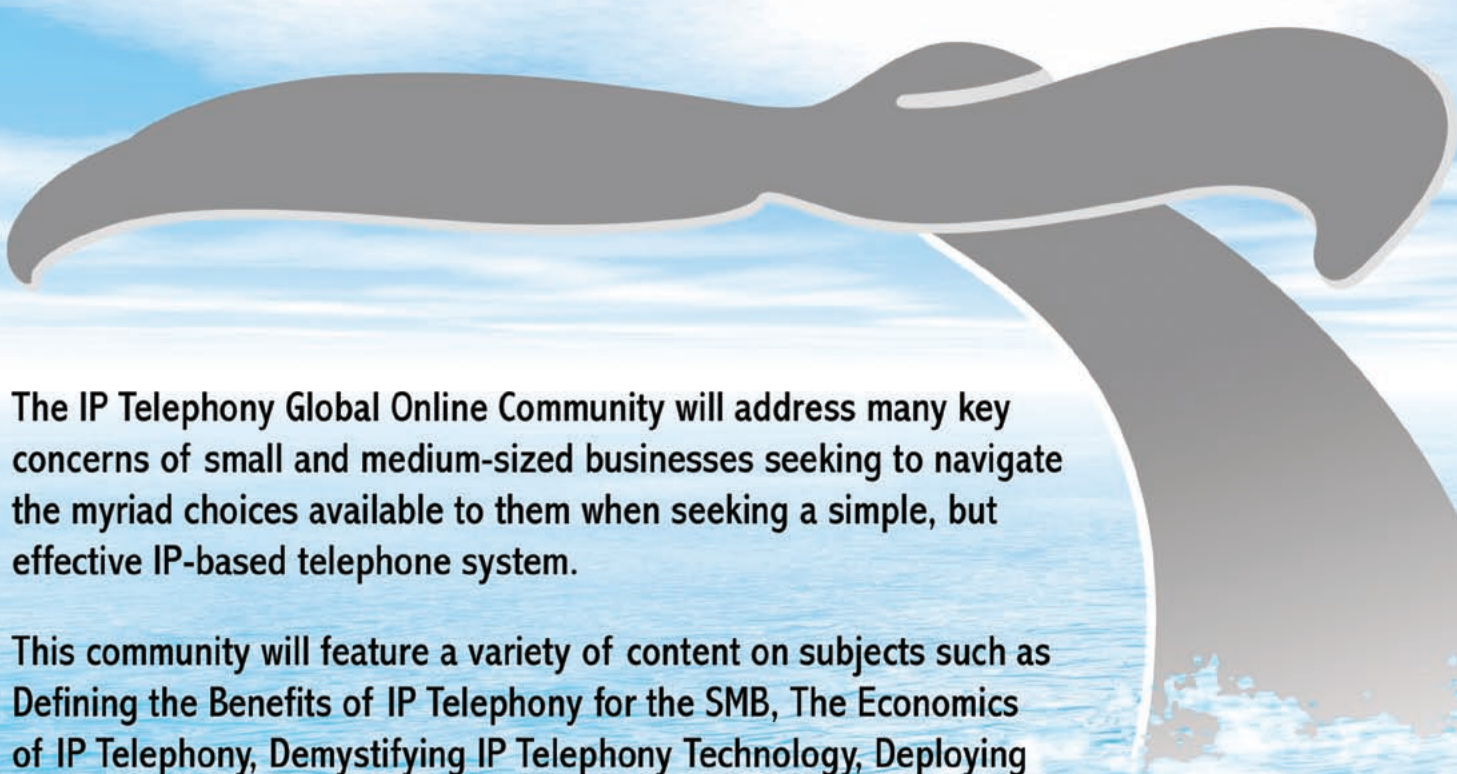

The IP Telephony Global Online Community will address many key concerns of small and medium-sized businesses seeking to navigate the myriad choices available to them when seeking a simple, but effective IP-based telephone system.

This community will feature a variety of content on subjects such as Defining the Benefits of IP Telephony for the SMB, The Economics of IP Telephony, Demystifying IP Telephony Technology, Deploying Broadband Phone Solutions Designed for Small and Medium Businesses, Overcoming the Limitations of IP Centrex, What to Expect from a Managed Service Provider, and a thorough analysis of feature-related benefits.

The community will also feature a wealth of information in the form of case studies and articles that are critical to the SMB decision maker seeking to deploy various applications such as multimedia conferencing; IP-based contact centers; electronic faxing; unified messaging; multi-site deployments; road warrior mobility; and much more...

http://ip-telephony.tmcnet.com

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editor's note

by Richard "Zippy" Grigonis

WiMAX and IMS

Sprint Nextel's efforts to deploy WiMAX (News - Alert) in the U.S., at one time rumored to be floundering, are now picking up some steam. Many people are still skeptical about WiMAX's ultimate deployment on a large scale, but Yours Truly has put off purchasing a new EVDO Rev. A card, waiting patiently for mobile WiMAX to appear.

It was back in September 2005 when Alcatel announced it had demoed for the first time the delivery of IMS services using WiMAX radio access technology. The demo, held at Alcatel's business offices in Vélizy, near Paris, France, used a whole range of Alcatel IMS solution components, supporting 3G/UMTS, DSL and WiMAX.

Recently, Huawei (News - Alert) Technologies Co., Ltd (www.huawei.com) has joined forces with the Warid Group, a mobile service provider in South Asia and Africa, to deploy IMS services. Huawei will build the IMS core network and will add a WiMAX access network, thus allowing Warid customers to receive VoIP and IP-based multimedia services.

And in the Dominican Republic on the Caribbean island of Hispaniola, Veraz Networks (News - Alert) (www.veraz.com), known for their IP softswitch and media gateway solutions, supplied the core technology that was used in the first IMS-over-mobile WiMAX service in the Americas, launched by broadband wireless provider ONEMAX on October 24, 2007. Alcatel Lucent supplied technology for the radio access network.

Veraz's IMS-over-WiMAX solution includes the Veraz User Services Core (USC), ControlSwitch and I-Gate 4000 series of media gateways. After Raoul Fontanez, Chief Executive Officer of ONEMAX, did the honors at the ribbon-cutting ceremony for the network launch, the carrier proceeded to demonstrate WiMAX-enabled video telephony, high-definition streaming video, mobile broadband Internet access and VoIP services. Looking on was Amit Chawla, Vice President of Global Solutions and Engineering at Veraz Networks. Thanks to Veraz and Alcatel Lucent, ONEMAX now offers Internet, multimedia and VoIP services over mobile broadband.

Moreover, Veraz and Alvarion (News - Alert) (www.alvarion.com), a WiMAX and wireless broadband solutions provider, announced that they had completed interoperability testing in their efforts to deliver an IMS core solution capable of delivering multimedia services with end-to-end QoS over WiMAX networks. (Alvarion is a certified member of the Veraz Open Solutions Alliance.)

WiMAX chipsets have been developed by Beceem (www.beceem.com) and Intel (News - Alert), and Runcom (www.runcom.co.il) had some of the first WiMAX chips and reference boards. Runcom's Orthogonal Frequency Division Multiple Access (OFDMA®) technology became the accepted standard IEEE (News - Alert) 802.16-2005 (formerly 802.16e, known to the rest of us as Mobile WiMAX). Aside from their components, channel cards, standalone units and reference designs for mobile WiMAX base stations, Runcom (News - Alert) has also done considerable work in fixed broadband wireless access services (802.16a) and the application of these wireless broadband technologies to the wireless interactive television (DVB-RCT) market.

In terms of software, the masters of VoIP protocol signaling stack code, TeleSoft International (News - Alert) (www.telesoft-intl.com), offers IMS CompactSIP, a 3GPP/IMS-compliant WiMAX SIP software stack to hasten the development and interoperability testing of 3GPP and WiMAX handsets, 3G PDAs, datacards, telco/WoIP gateways, ATA/residential gateways, mobile platforms and chipsets. IMS CompactSIP supports the key 3GPP authentication and security standards plus the required IETF SIP RFCs. IMS CompactSIP is also available integrated and tested with the Interpeak IPNET TCP/IP networking stack as the IMS SIPNET product.

While some readers may wonder which tortoise is moving slower in this race – IMS or WiMAX – others realize that the fruition of both will ultimately lead to a remarkable synergy, befitting everyone.

Richard Grigonis is the Executive Editor of TMC's IP Communications Group.

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publisher's outlook

by Rich Tehrani

Mobile Operators Move to IP; Sonus' Trillionth Minute

Mobile phone services have a sort of split personality, with voice traveling over a circuit-switched system and other data traveling over packetized networks. For example, circuit-switched 2G GSM voice communications are often teamed with separate packet-switched 2.5G GPRS data communications, used to transport such things as Wireless Application Protocol (WAP) Internet content optimized for mobile devices, Multimedia Messaging (MMS), and other software applications that need to connect to the Internet.

Ideally, given the increasing adoption of the Internet Protocol (IP) and the Session Initiation Protocol (**News** - **Alert**) (SIP) for packetized communications worldwide, 3G and upcoming 4G wireless phone systems should be truly "converged" in that they ought to be based on a single all-IP network founded on 3GPP standards. Such a system encompasses Voice-over-IP (VoIP) as just another form of realtime packet-based data running along with similarly packet-based multimedia services. With just one network with which to deal, infrastructure and operating costs are reduced.

Sure enough, a new Research Brief from ABI Research (**News** - **Alert**) entitled "Migrating Mobile Networks to IP", reveals that network operators are planning to roll out all-IP networks beginning in the next two years.

One reason that 3G network operators are finally beginning to move in this direction is that 3G's great potential rival — mobile WiMAX — will finally see deployment in the U.S. during 2008. WiMAX (Worldwide Interoperability for Microwave Access) can pour up to 12 megabits per second over a distance of several miles. Sprint Nextel is finally about to get this technology up and running in the U.S., with encouragement and help from WiMAX's great champions, Intel and Motorola (**News** - **Alert**). Sprint Nextel estimates that up to 100 million people could potentially be in a position to subscribe to WiMAX services within two years, which is something that should worry 2.5G and 3G mobile network operators.

The only two carriers bigger than Sprint Nextel (**News** - **Alert**) — AT&T and Verizon Wireless — have their own wireless broadband agendas, with their roots in CDMA and GSM cellular technologies. Future networks may fully realize and utilize the 3GPP Release 8's air interface, E-UTRA (Evolved UTRA) that in theory can be used over any IP network, including WiFi (**News** - **Alert**) and WiMAX, and even wired networks.

Not so coincidentally, perhaps, ABI Research reports that in early 2008 there will be full 3GPP standards for mobile networks enabling IP-based services deployment. Trials will occur in 2009, followed by actual deployments in 2010.

Adds ABI Research analyst Ian Cox (**News** - **Alert**), "This will enable service delivery platforms and IMS to be deployed in the network, streamlining operations and allowing new services to be introduced quickly".

None of this will come as a surprise to IMS devotee Sonus Networks (**News** - **Alert**) (www.sonusnet.com) which announced in January 2008 that it had carried over one trillion minutes in aggregate over their IMS-ready network infrastructure equipment, 232 billion minutes of which were U.S. long distance minutes. Quoting from a report by iLocus entitled, "VoIP Minutes and Subscribers: 3Q07 Update," 42.2 percent of all long distance IP-based voice traffic was carried Sonus' network technology, three times the volume of its nearest competitor. Tabulations at the end of 2007 indicated that Sonus-based networks had carried 36 billion IP-voice minutes per month. International long distance minutes totaled 24.4 billion minutes, with Sonus capturing 21.6 percent.

Sonus also celebrated its 10th year of operation in 2007 by announcing a major series of developments, such as in-building femtocell wireless network technologies, the new Access 7.0 platform for residential networks, and the IMX 2.0 Multimedia Application Platform for pre-IMS and IMS-capable service providers.

Sonus' first IMX centered on voice services. Now, this 2.0 release adds support for presence-related services along with an any-to-any messaging capability so that a text message sent from a mobile phone, for example, can successfully appear on anything from another mobile device to a PC or a TV. With the IMX 2.0, providers can create a service once using ordinary web-based APIs and tools such as the open source Eclipse IDE and Servlet API (instead of an unfamiliar, proprietary SDK), and then run the service anywhere in their respective networks.

Although the IMX 2.0 is optimized for Sonus' network architecture, it can integrate into any IMS-based network.

Like the growth of VoIP itself, IMS is steadily making its way through the world's network infrastructure. One day we'll wake up and realize that exciting new and inexpensive services will be popping up all the time to curry our favor and dissuade us from abandoning our current phone company. The underlying basis for this will be IMS.

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industry news

www.tmcnet.com/1564.1

Brightstar (News - Alert) Introduces Ericsson's Fixed Wireless Terminal Solutions to North America

Brightstar has entered into partnership, to sell, customize and distribute Ericsson's (News - Alert) Fixed Wireless Terminal (FWT) solutions in North America. The FWT solution enables homes, small businesses and other organizations to attain high speed data, voice and fax services through WCDMA/HSPA mobile networks, offering a cost-efficient wireless alternative to fixed broadband.

www.brightstarcorp.com
www.ericsson.com

www.tmcnet.com/1565.1

Sonus Networks Achieves Milestone — Over One Trillion Minutes

Sonus Networks announced it entered 2008 achieving a historic voice network milestone. Leveraging Sonus' industry leading, breakthrough technology for voice networks, operators now report that they have carried over one trillion minutes in aggregate on their Sonus-based networks. According to a report by iLocus, approximately 40% of all long distance IP-based voice traffic is carried over Sonus Networks' IMS-ready networks, more than three times its nearest competitor.

www.sonusnet.com

www.tmcnet.com/1570.1

NexTone and Reef Point Merge to Form NextPoint (News - Alert) Networks

NexTone Communications and Reef Point Systems announced they will merge to form NextPoint Networks, Inc. This merger is being touted as creating the world's first fully integrated fixed-mobile connectivity platform. The combined company is expected to bring mobile and fixed-network operators around the world the ability to quickly, securely and profitably deliver voice, data and video services over all-IP networks.

www.nextone.com
www.reefpoint.com
www.nextpointnetworks.com

www.tmcnet.com/1573.1

BNS Deploys GENBAND Communication Applications Server

BNS Telecom Group has deployed GENBAND's M6 Communication Applications Server to provide mobile PBX (News - Alert) and PBX trunking services. The M6 Communication Application Server cost-effectively enables advanced VoIP and multimedia applications for business and residential users. Built for today's legacy, mobile, and IP networks, as well as future IMS network deployments, the M6 platform is a carrier-grade, scalable applications server that delivers revenue-generating multimedia services out of the box.

www.genband.com
www.bnstele.com

www.tmcnet.com/1574.1

ZTE (News - Alert) Integration Reveals How IMS and NGOSS Complement Each Other

ZTE Corporation successfully demonstrated the integration of their IMS products with Telemanagement Forum's (TMF) New Generation Operations System and Software (NGOSS) framework as part of the TMF's Catalyst Project, championed by such carriers as China Unicom (News - Alert) and Chungwa Telecom. NGOSS is a standard global framework for back-end business operations platforms. ZTE claims that this is the first seamless integration of an IMS platform with NGOSS framework.

www.zte.com.cn

www.tmcnet.com/1571.1

IMS Forum (News - Alert) Announces IMS Plugfest IV for 2008

The IMS Forum, the industry's only association dedicated to IMS application and service interoperability and certification, has announced that their fourth IMS Plugfest is to be held February 25 to 29, 2008, at the UNH InterOp Lab (IOL) in New Hampshire. The theme of Plugfest IV is "IMS Triple Play (News - Alert), OSS/BSS and Billing Applications."

www.imsforum.org

www.tmcnet.com/1567.1

Veraz Networks and Apertio (News - Alert) Announce New IMS Solution

Veraz Networks and Apertio have announced a new IMS solution designed to simplify integration of applications for fixed and mobile communication service providers. This joint solution consisting of Veraz ControlSwitch-USC and Apertio One-HSS is expected to enable communication service providers the flexibility to integrate existing and new application platforms with their back office systems. Such flexibility will allow these providers to maximize service revenue even in complex converged networks.

www.veraznetworks.com
www.apertio.com

www.tmcnet.com/1569.1

Nortel and Qualcomm (News - Alert) Drive Market Availability of VCC-Enabled Mobile Phones

Nortel announced the successful testing of a solution with Qualcomm that improves the mobile phone experience for users. The solution allows users to continue conversations uninterrupted and avoid additional roaming charges when a caller is moving between different wireless networks. According to Nortel (News - Alert), the completion of testing between Nortel's IMS-based Voice Call Continuity (VCC) network solution and the Qualcomm chipset solution that uses their IMS/VCC device client is a giant leap towards the availability of out-of-the box VCC-enabled mobile phones.

www.qualcomm.com
www.nortel.com

www.tmcnet.com/1572.1

HP Intros OpenCall Media Platform 4.0 for Enhanced IMS-based Multimedia Services

HP launched a new version of its OpenCall Media Platform for broadband and wireless network operators seeking to offer next-generation, IMS-based services. Now in release 4.0, OpenCall Media Platform is a media server that handles call connections and other digital processing. Carriers can use the platform to offer multimedia content-based services, such as advanced messaging and rich video for social network communities. Because it efficiently handles multimedia, OpenCall Media Platform enables operators to offer competitive, attractive services capable of generating increased revenue and locking in customer loyalty.

www.hp.com

www.tmcnet.com/1566.1

Aculab (News - Alert) Announces Partner Event

Aculab announced its annual global partner event, Aculab Communications Exchange (ACE), will be held March 31-April 2. The event brings together customers and partners to understand the future of the communications industry including challenges and insight into opportunities available thanks to technological advancements. Topics include intelligent and next generation networks; security; video; distributed and services oriented architecture; IMS, SIP, and much more.

www.aculab.com

www.tmcnet.com/1575.1

Tecore Ramps Up with 700 MHz Capability across Multi-Technology Mobile Networks Portfolio

Tecore Networks announced its portfolio of core and radio access network products is capable of operating on the 700 MHz frequency band. Tecore's core platform incorporates IMS and creates support for existing and emerging communications technologies while building on the company's highly successful multi-technology mobile switching center. Now, operators can look to provide communications and media to subscribers across the technology spectrum.

www.tecore.com

www.tmcnet.com/1576.1

Network Operators to Begin Migration to All-IP Mobile Networks by 2010

ABI Research has conducted a study, finding that network

operators are planning to roll out all-IP networks beginning in the next two years. "As we move to the end of the decade, mobile networks will emerge with a flat all-IP architecture using 3GPP standards to deliver multimedia services and VoIP. Operators want to control operating costs by eliminating the current dual circuit and packet switched networks, which will enable service delivery platforms and IMS to be deployed in the network, streamlining operations and allowing new services to be introduced quickly."

www.abiresearch.com

www.tmcnet.com/1568.1

Intertex (News - Alert) Data AB Announces New Product in SurfinBird Series

Intertex Data AB announced a new product its SurfinBird series. The SurfinBird IX78 ADSL is a CPE with full SIP support that also integrates separate IP services like Internet, TV, Telephony and mobility into a Multimedia LAN for the user. The IX78 enables all services, whether delivered over IMS or otherwise, on a single protected multimedia network where all LAN or WLAN connected terminals have access to all applications and services, according to the company.

www.intertexdata.com

www.tmcnet.com/1577.1

SPIRIT Increases VoIP Engines Market Share

Marking a successful 2007 campaign, SPIRIT DSP (News - Alert) deployed dozens of its VoIP engined for Tier1 customers and increased market share in all key segments of the maturing V2oIP (voice and video over IP) market, including expanding its presence in the IMS softswitch and media gateway market by launching the IMS-ready version of its TeamSpirit Voice & Video Engine, supporting both PCs and mobile devices.

www.spiritdsp.com

www.tmcnet.com/1578.1

Nokia (News - Alert) Siemens Supplies T-2 Slovenia with High Speed Mobile Network

Nokia Siemens Networks is supplying T-2 Slovenia with an innovative high-speed mobile network that will allow the operator to offer new top-quality multimedia and data services. This marks the first commercial implementation in Europe of a pioneering Internet High Speed Packet Access (I-HSPA) flat architecture solution from Nokia Siemens Networks (News - Alert), including the MSC Server mobile softswitching solution with VoIP server functionality is included in the deal. In addition, the IMS will enable T-2 Slovenia to introduce new IP-based voice and multimedia services.

www.nokiasiemensnetworks.com

www.tmcnet.com/1579.1

AppTrigger Enables Service Providers to Navigate the Path to IMS/NGN

AppTrigger's Ignite Application Session Controller (ASC (News - Alert)) version 8.0 delivers Intelligent Network - Service Capability Server (IN-SCS) functionality that enables service providers to bridge the gap by ensuring their existing voice-centric IN applications are able to work within the IMS networks. The ASC provides a network element that resides between the application layer and the control plane with the purpose of delivering the right combination of call/session control, signaling, switching and media capabilities to support multiple applications for both new and legacy networks.

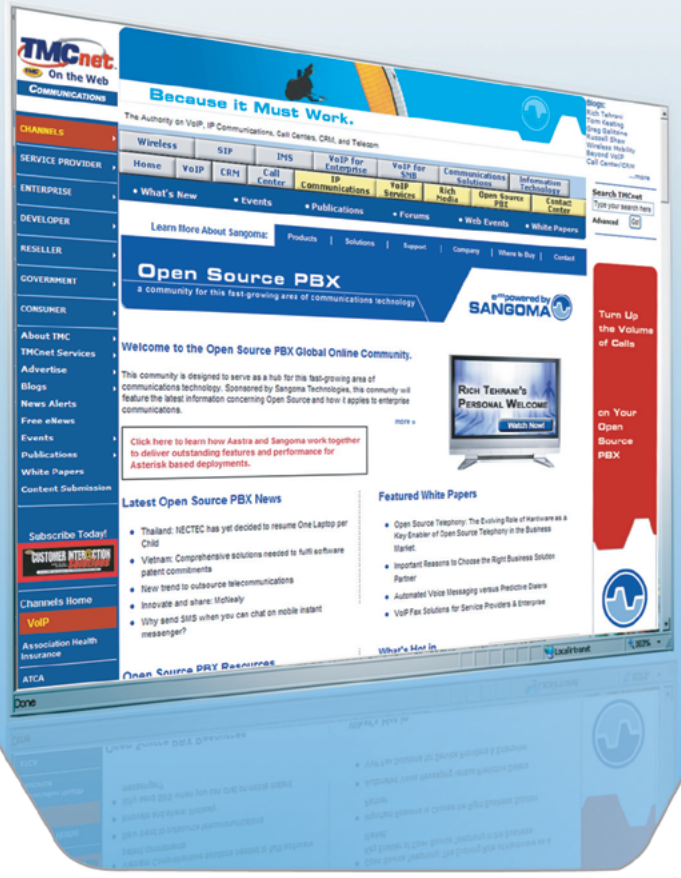
www.apptrigger.com

www.tmcnet.com/1580.1

Tango Networks (News - Alert) Announces Industry's First Enterprise VCC Offering

Tango Networks announced support for Voice Call Continuity (VCC) functionality to further enhance the capabilities of its Abrazo product line. VCC enables calls to continue uninterrupted as the caller transitions between disparate networks, including Voice-over-WiFi and mobile networks. The addition of VCC functionality further expands Tango's commitment to seamlessly extend employees' enterprise PBX experience to any mobile phone – including dual-mode WiFi devices – and using any mobile network, including GSM, CDMA, 3G and now WiFi.

www.tango-networks.com



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by Andy Huckridge

IMS — From Network Deployment to Service Delivery

IMS has transitioned from a concept to a "here and now" architecture. The impact IMS stands to have on revenue streams is forcing service providers and equipment manufacturers to look closely at combining existing service offerings and to pay close attention to the quality of experience (QoE) these combined services deliver.

As a delivery system, IMS provides subscribers with widespread access to new and existing services independent of location or device. The architecture comprises evolving protocols and interface specifications to make possible voice, video and data services over fixed and mobile environments. IMS also offers high scalability for network expansion along with system redundancy for improved reliability.

IMS is expected to work with any wireless or fixed network that uses packet switching, including older gateway-supported telephone systems. Operators and service providers seeking to employ IMS will be able to use a variety of network architectures including their existing systems to offer services such as Voice-over-Internet Protocol (VoIP), gaming, messaging, content sharing and presence information among other applications.

One of the most important promises of IMS is the rapid introduction of new multimedia services. By separating the Application/Services Layer from the control and transport planes, new individual applications can be developed faster at lower cost. Also, service providers can use third parties for application development. Subscribers will enjoy greater service selection from just about any device. They will have broader access from workstations, cell phones, PDAs, fixed and mobile viewing devices, and the latest devices presently in development. Subscribers are expected to use many additional services, generating revenue potential for the operators and providers.

While IMS is not distinctly about developing new services, it certainly enables the introduction of new services by using Internet Protocol (IP) and the IETF-designated Session Initiation Protocol (SIP). Described in RFC 3261, SIP is an application-layer signaling protocol that starts, changes and stops sessions between participants. The 3rd Generation Partnership Project (3GPP) standardized the SIP variant used in IMS, but other protocols and functions also contribute to the viability of IMS across a variety of networks and devices.

A New Service Architecture

Properly set up, IMS core networks will interwork with 2G/2.5G and 3G cellular networks, public switched telephone networks (PSTN) and other existing VoIP networks. And while IMS network and device performance standards have not yet been fully adopted, which leaves open-ended questions as to how IMS goodness metrics will be achieved and measured. One thing is certain, however: The pressure is on to create new services despite the need to solidify standards and measurements.

Fixed and mobile convergence (FMC) paves the way for merging wireless and traditional wireline technologies. The dissimilarity of fixed networks and mobile networks is clear; they were invented and implemented at different times and for different services. Mobile networks enhance many exciting, customer appealing services while fixed services offer mainly caller ID, call back, second line and call block. Yet the two types must now come together. They need to be delivered with a single technology in such a way to provide operating benefits and costs benefits. Carriers will be able to save money by merging the cores of fixed and mobile networks, and NEMs will realize savings by offering a common architecture to service providers.

This new architecture will benefit landline providers as they stave off mobile subscriber churn. Capital expenditures will decrease significantly after some increased operating expenditures. Ultimately, a win-win situation can be expected as providers and operators offer more compelling IMS services, but the steps leading to such success will have to be assured through proper testing of equipment and systems.

Delivering IMS Based Services

Service providers and network operators are independent businesses. None is likely to use IMS and protocols in the same manner. However, all will utilize combinations of protocols depending on their family of offerings and individual strategies. To succeed, providers and operators will have to understand how and where to test their system if they want the best network performance and maximum revenue generation. The first step is getting to know how FMC relates to IMS, and the next step is to begin comprehensive testing.

Until the industry fully implements IMS networks that provide IMS services, FMC and FMC-based services must be linked to IMS. Providers and operators who do not understand this concept may lose service revenue. For the time being, IMS will carry FMC services to subscribers over FMC-capable networks that will essentially be IMS-based. IMS is expected to carry FMC-based

services such as call swapping between a landline and a mobile, as well as swapping between the Radio Access Network (RAN controls transmission/reception of cellular radio signals) and the WiFi network at home. Eventually, new IMS-based services will be rolled-out on IMS-based networks. Underlying network topology, whether mobile or fixed, will be irrelevant. At that time, IMS will be in full operating mode with the transition finalized.

IMS testing over mobility and FMC should be approached by isolating packets and security gateway devices by emulating WLAN access points, millions of mobile nodes and the entire 3G mobile packet core. A test methodology is required that covers all aspects of IMS service delivery — conformance, functional and performance. As the FMC transition approaches and IMS evolves, special attention must be paid to billing systems and security threats.

IMS is a paradigm shift and has a significant impact on testing strategies. Historically, 18 months or more are required to introduce a new service. IMS can potentially reduce time to a few months, even weeks. To do so, testing strategies must be nimble which they have not been traditionally. Testers must be capable of allowing quick prototyping of new services in the lab prior to deployment. As service providers and NEMs evaluate IMS test solutions, they should consider testers that are designed to be inherently flexible to quickly craft new call flows for specific applications. These test systems should allow users to isolate individual application servers (AS) or test applications as a system, including the control plane and the AS. The IMS test systems should analyze and validate functionality, error handling, or tune an application server for performance. Furthermore, they should test most IMS applications such as Presence, Push-to-Talk, Instant Messaging, and Share List Servers.

Taking Care of Billing

The implementation of IMS is a business decision, as payment systems are an integral part of IMS architecture. Standards-based interfaces and network elements have been defined to facilitate billing. IMS changes the rules on unique/customized billing schemes to maximize average revenue per user (ARPU). These billing schemes will permit subscribers to choose from a large selection of services and products by adding or deleting offerings in real-time.

Unlike in the past when testing billing in an IMS service environment, service providers need to consider several important aspects, such as validating the billing criteria and process when adding new services, identifying and testing new billing schemes that are not limited per minute charges and ensuring that systems can handle content-sensitive billing, such as billing different type content in the same service at different rates.

Seizing Security by the Horns

Dedicated testing for threats conducted before and after deployment will keep IMS systems functioning properly, or this new technology will suffer like many unprotected enterprises. While IMS promises easy access across multiple providers, the reality of implementation still faces interoperability hurdles between legacy and next-generation networks. This implementation issue is especially true for not only security but billing accuracy as well.

Vendors and operators must carefully evaluate and verify their IMS strategies prior to full-scale deployment. IMS networks must be able to interoperate with today's existing networks, which is why thorough network and device testing is vital every step of the way—from before deployment and throughout the deployment process.

IMS security must be managed at two separate levels — Network-to-Network Interconnection (NNI) and User-to-Network Interconnection (UNI). Service providers must ensure that when connecting to other service provider networks, traffic passes securely between the networks and that the billing information transfers in a secure manner. Currently, for service providers there are a major set of issues surrounding the users' ability to access the network, in terms of authenticating the user and making sure they can access only the services they have been granted.

Services are the Future

IMS is a business decision that involves technology modification and creation. When a common architecture is implemented, the gate opens wide for the introduction of innovative new services to subscribers. Such new services are expected to drive the adoption of IMS and the global implementation of Next Generation Networks.

It is important to remember that the IMS architecture is for delivering services and not necessarily for advocating an inherent service. For the first time in telecom history, an architecture separates the service layer from the network's signaling and bearer layers. IMS allows NEMs and operators to focus on a "service architecture/service delivery" approach to enhance time-to-market for new products — boosting their ability to compete in an already highly competitive marketplace.

Our new columnist, Andy Huckridge (News - Alert), is Director, NGN Solutions at Spirent Communications, where he leads Spirent's strategy for the Multimedia Application Solutions division. His responsibilities include product management, strategic business planning & market development. Andy has worked in the Silicon Valley Telecommunications industry for 12 years and has a broad background in defining and marketing products in the Semiconductor, VoIP and IMS/NGN space. He holds Bachelor's and Master's degrees in Telecommunication Engineering from the University of Surrey, England. Andy is active in various Forums including the Multi-Service Forum, where he is Chairperson of the Interoperability Working Group & NGN Certification Committee. Andy is a VoIP patent holder, an IETF RFC co-author and inaugural member of the "Top 100 Voices of IP Communications" list. Andy can be reached at andy@huckridge.com

by Ronald Gruia

The Outlook for IMS in 2008

While the migration to IMS appears to be the eventual NGN migration choice, certain developments in the final months of 2007 have raised some uncertainty about the exact time frame of the technology's adoption by some service providers. On the positive side, there has been progress on the standardization front, with initiatives by bodies such as the 3GPP/3GPP2, ETSI **(News - Alert)** Tispan and efforts such as A-IMS and IOT (Inter-Operability Testing) by the IMS Forum and by other industry forums. On the other hand, market development has been proceeding at a slower pace than originally anticipated.

In September of 2007, France Telecom (News - Alert) signaled a change in its IMS strategy, favoring a more gradual plan. While the French incumbent had originally hinted that it would make public its primary IMS vendor choice before the end of 2007, later in the fall the company changed its tune, instead declaring that it was "too early" to disclose anything related to IMS. Another indicator of the more phased approach was the election of UMA (Unlicensed Mobile Access) instead of SIP/IMS (VCC) solution for its Unik network convergence offering.

In October of 2007, Dutch incumbent KPN documented some of its own issues with a strategy of moving quickly towards a single IMS core, including high costs, the associated requirement of a large volume of traffic (with only voice qualifying), and the difficult case for converged/blended services[1]. KPN made no secret about the fact that the current IMS industry approach was not meeting the company's expectations, also criticizing the long lead times and limited flexibility of solutions presently available in the marketplace.

In addition, market pressures led operators to introduce several "pre-IMS" solutions. The increased popularity of "mashups" (web-based APIs combined to create new services executed on a client) has raised questions of whether waiting for all IMS service implementation issues to be solved is in fact the best strategy for carriers to embark on. Moreover, the well-documented launch of Google's (News - Alert) Android open mobile platform in November 2007 has added further uncertainty about the most timely approach to launching new services, and whether IMS system integration is a worthwhile proposition for operators.

So what do all these data points mean? Can they be interpreted as indicators of the demise of IMS? Not so, at least according to feedback received from other "avant garde" operators who did embrace IMS early (e.g. Vodafone (News - Alert) and Telefonica) and others who are considering the technology. Another interesting view is that of the IMS Forum, which concluded in its own report that service providers will most probably build an IMS infrastructure in a "piecemeal fashion driven by individual IP service rollouts"[2]. This would suggest that operators will continue to deploy services on parallel paths: some new offerings will be deployed within an IMS framework while others will be on either a "mashup" or even older "vertical stovepipe" fashion, depending on the business case, time-to-market and other considerations. The benefits that a mashup offers include an attractive cost, good time-to-market and a wide availability (when offered by an omni-present player such as Google). No wonder KPN has introduced a "cool" new Text Messaging Gadget which allows its subscribers who are also Second Life users to send 3 SMS text messages to their "first life" at the price of L$ 150.

Service providers will increasingly take some incremental steps towards an IMS infrastructure instead of continuing to stick with the legacy stovepipe architecture. That said it will be unlikely to see too many operators committing to a full blown "forklift" type of migration, as the bulk of their subscribers are still generating ARPU on IN platforms. The great preponderance of all this legacy gear means that it will be important to consider transitional strategies that will help service providers bridge the gap between the legacy and the new IP world.

As we highlighted in the December issue of IMS Magazine, some operators such as Telemar/Oi (Brazilian converged operator and the largest wireline carrier in South America) are taking a more gradual and pragmatic evolution, choosing to deploy services that can be accessed by subscribers regardless of whether they are being served by NGN or legacy infrastructure. Telemar's pre-IMS approach enables the company to separate the timing of investments in NGN/IMS access layer infrastructure from the timing of introduction of new services.

RFP Outlook for 2008

While the IMS acronym might have not been as widely used in 2007 as it was in 2006, a closer look reveals that in fact there have been many positive indicators that suggest that the adoption of the technology is under way. Perhaps the smaller number of press releases containing the IMS buzzword is more of a hint that the technology has already passed through the first peak on its hype cycle and is now undergoing further refinements prior to becoming more widely deployed.

As the saying goes, "the proof is in the pudding": there are a number of IMS RFP decisions that we expect will be announced in 2008, including, among others, the following:

- **China Mobile** (News - Alert)**:** decision expected in the second half of the year and the size of the deal is rumored to be in the US$ 200-400 million range.
- **Comcast:** decision expected sometime in the first semester; the competition will be between NSN, Ericsson, Nortel and Alcatel-Lucent (News - Alert).
- **France Telecom/Orange:** while the timing of the announcement is still unknown (the results of the RFP were expected to be disclosed in Q4 2007), we believe that players such as Ericsson, Alcatel-Lucent, NSN and ZTE are still in the running. On the other hand, there are indications that FT may take a multi-step approach to IMS, by first moving to a VoIP architecture

(which we think must be SIP-based if to transition to IMS).

- **T-Mobile USA:** decision rumored to be in the first half of the year, with players such as Alcatel-Lucent, NSN and Nortel in the running.
- **Verizon (News - Alert):** the timing of the announcement is still to be determined however there are rumors that this will be a close battle between Alcatel-Lucent and NSN.

Besides the above tenders, Chungwa Telecom just announced the NSN (Nokia Siemens Networks) as the winner of its own IMS RFP in early December 2007, a deal worth about 21 million Euros.

Much work remains to be done in 2008, on areas such as interoperability between older and newer networks, security, policy charging functions, and a wider availability of IMS handsets and clients. In fact, the last issue has not quite gotten the attention that it needs from the industry, with no major ongoing efforts to introduce some common IMS client standard other than a few "point application" initiatives such as the OMA (Open Mobile Alliance) PoC (push-to-talk application Version 1.0) specification.

In conclusion, operators will start capping their investments in current technologies and gradually begin to shift them to new equipment purchases. As they embark on their IMS migrations, there will be several paths open to them, including evolutions starting from the softswitch, signaling layer or service mediation (an incremental buildout starting from the SCIM component in the IMS architecture). In the interim, they might continue to pursue some other deployment options for certain services, but the end game will still lead to an IMS-like architecture.

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Footnotes:

[1] KPN presentation by Karl-Heinz van der Made at "IMS Strategies" in October 2007 entitled, "IMS: the Holy Grail?"

[2] Please refer to the IMS Forum "Report Card" issued on October 2007 and available at http://www.imsforum.org/files/IMS-Report-Card-2007.pdf

by Mikael E. Björling, Jennie Carlsten, Piotr Kessler, Erik Kruse and Mats Stille

IMS and Utility

IMS is an ideal platform for developing an ecosystem of enriched communication services that can work across numerous device platforms and operator networks. While the promise of IMS is exciting, players in the telecommunications industry would be well served to make utility the guiding principle when creating these services.

The industry can greatly improve person-to-person communication by paying attention to, and taking advantage of, known user behavior patterns when taking steps to enrich voice communication and improve interaction between voice and data services. It would be a shame if the new services that IMS enables are too complicated for widespread adoption.

Usability helps determine the success or failure of mobile services. Poor usability is a significant barrier to diffusion. This was very evident for services such as the Mobile Internet (WAP) and picture messaging (MMS). At the time of their introduction, these services were simply too complicated: users had to configure the services manually, they were difficult to use and their performance was lackluster.

For enriched communications services to succeed, particularly in the mobile space, users must find them easy to use and interact with. Therefore, a criterion for developing enriched communication services is coherent interaction and system design.

At Ericsson, utility was a key consideration when planning and developing Ericsson IMS weShare, which at present includes four services: 1) Image, for sharing snapshots; 2) Motion, for sharing live video; 3) Media File, for sharing a stored file, such as a picture or video clip; and 4) Whiteboard, for sharing what is drawn on a picture or a black background.

Guiding the development of Ericsson IMS weShare were fundamental utility questions such as:

- How will the service be used and in what context?
- Which goals should be supported and what are the driving forces for enriched communication?

Ericsson conducted extensive consumer research to address these and other important utility issues. The research, conducted in China, Italy, Japan, South Korea, Sweden, the UK and the USA, was based on:

- 3-hour interviews with 334 focus-group participants;
- 1.5-hour, in-depth, one-on-one interviews with 105 participants; and
- a quantitative study of combinational services based on a survey of 14,500 consumers (representative sample).

The specific Ericsson IMS weShare study consisted of:

- 7 focus groups with 56 consumers (Early Adopters) in Sweden and the UK;
- 20 in-depth interviews (Early Adopters) in Sweden and the UK;
- A web survey of 500 participants (Early Adopters) in Sweden; and
- 10 pairs of consumers in a detailed usability test (Early Adopters) in Sweden.

Research indicates that users are most likely to use Ericsson IMS weShare services outside the home (e.g., when they are purchasing something, when they are at an event or simply when out and about). In many such situations, the user will be in a demanding environment and must thus pay attention to his or her surroundings. Therefore, the service must be easy and quick to use (spontaneous usage).

Device configuration is another key utility consideration. When MMS was introduced, many users had to visit a webpage or call their operator to obtain the right configuration for their phone. Ericsson is addressing this matter by introducing a technique called automatic device configuration (ADC). Ericsson IMS weShare reuses ADC to give consumers a high-quality, out-of-the-box experience. If the Ericsson IMS weShare application has been pre-installed on a phone, the configuration will be set up automatically.

The most interesting use-case for pervasive usage of Ericsson IMS weShare services calls for installing the application in phones already in use. Ericsson has developed a simple model for downloading applications and associated configuration parameters over the air. This method eliminates configuration-related hassles for users. Additional work is underway to complement this model with automatic downloading when a user powers on a phone for the first time after having subscribed to Ericsson IMS weShare services. This is one way of ensuring that consumers have an immediate and positive out-of-the-box experience.

A new communication culture has sprung up, putting new demands on the future. Voice communication is still a fundamental element, but by itself it is not always enough in today's fragmented society. Rich and spontaneous communication, on the other hand, adds tremendous value when physical presence is not an option.

Successful operators will understand that meeting the expectations of the future (consumer requirements regarding mobile services) means working with clear and understandable concepts that are easy to use and deliver quality and consensus. Understanding consumers, the context of usage and what goals need to be supported is fundamental to developing the many new services that IMS will enable.

Ericsson's authors: Mikael E. Björling, ConsumerLab Researcher; Jennie Carlsten, IMS weShare Marketing Manager; Piotr Kessler, Chief Architect, Client Software Service Layer; Erik Kruse, Senior Expert Consumer Behavior, Consumer Lab; Mats Stille, Expert, Mobile Switching and Network Architecture.

by Grant F. Lenahan

Drive Revenue by Putting Your Customers in Control

"Driving revenue by putting your customers in control" may seem a very threatening premise to many operators, but I aim to show that this is not the case. It may be better to say "give your customers choice, how to pay, when to pay, how to receive, what to receive and so on". Either way, in today's market: Choice = Control, and it ultimately leads to higher satisfaction, utilization and thus revenues for you.

It is important to understand the options available to service providers to counter the threats to their revenues, and to understand how they can change their business models to turn potential competitors into customers as well. This way, they can have customers, and revenues, at *both* ends of their value chain. Opening up network capabilities — to both types of customers (both partners and end-users) — is the key competitive weapon allowing the service provider to provide the most value, and hence receive the most revenues.

In order to provide value, service providers needs to be able to address "markets of one," by allowing users to customize the experience of all their interactive services to meet their own particular unique circumstances, their lifestyles and their preferences.

Consider the evolution of the service provider's business model, which is evolving continually in complexity and scope. Historically, the business model was based on post-pay, pre-pay and combinations of voice and some value added services. In almost all cases, the value chain was simple — operators provided service and subscribers consumed them.

The first generation data services business model was based on walled gardens — both onlandline (AOL (News - Alert), Compuserve) and on the mobile Internet. Soon, ISPs were totally bypassed by the open web where ISPs began to capture the "iInteractive" experience with end users and the market mindshare for innovation. The same is occurring, albeit more slowly, in mobile. Witness the Google android phone. Clearly there is a need for change.

If they wish to capture innovation — and thus service revenues — back from the "over the top" providers, CSPs and mobile operators will need to leverage their network assets with an *interactive* service delivery framework that can support individualized plans, personalized allowances, dynamic promotions, user policy, subscription and free (well, ad-supported and mighty profitable, really!) business models for these newly branded Open Networks, which can embrace partners and innovative social networking communities.

The traditional communications industry was characterized by "mass marketed" services, paid for almost entirely by traditional fees (monthly service, per minute fees, etc.). It was driven in part by latent consumer and enterprise needs, and, in part, by technological feasibility, the market now is changing in two radical ways:

1. Personalization of everything-from affinity groups to charging plans to targeted advertising with delivery options...
2. Fundamental changes in how services are paid for — the advertising/fees split is changing. Formerly ad-sponsored media (TV, radio) are more and more paid by fees, while traditional fee-based services (phones, IP access) are being subsidized by ads.

The ideal mix may be a personalization of these choices as new rules define business models, scope and opportunity. The future business world extends far beyond the simple bounds of monthly recurring bills.

There is no disagreement that the communications industry is fundamentally changing. Devices, services, and networks are becoming "interactive". The interactive network supports new revenue sources — including partner services, digital commerce and advertising. The network has expanded from a technology focus on mobile, fixed, cable or satellite to encompass content, TV, media, advertising and other 3rd party partners. The services and devices running on these networks are the key drivers for the interactive experience for the customer.

The Interactive Experience

For service providers to capture the full value of their customer base, they need to build an interactive relationship with their customers. Enabling an interactive experience enables users to personalize their service for their lifestyle and allows service providers to build interactive relationships with their customers, going well beyond the concepts of eBilling or basic web self care. It also creates more opportunities for service providers to increase revenue via offers, upgrades or short term promotions and provide more services to the user like e-mail and voting on the web.

In the end, its worth focusing on three fundamental imperatives:

1. Give customers a personalized experience and they will be loyal and profitable.
2. Open your value chain to 3rd party content and services, to drive more revenues and provide your customers that variety they crave.
3. Don't rely on last decade's charging models for next decade services!

Happy innovating!

Grant F. Lenahan is Vice President and Strategist, IMS Service Delivery Solutions at Telcordia (News - Alert) Technologies, Inc. For more information, visit www.telcordia.com.

by Richard "Zippy" Grigonis

Cable vs. Telco Innovation

Cable TV companies started off slowly in IP Communications, testing their "digital voice" (aka VoIP) seemingly forever before they made their move. Now, however, cablecos are steaming ahead with triple-play bundles (Yours Truly has one), increasing deployment of Video-on-Demand (VoD) and making allowances for digital recording and "time shifting". It's kind of amazing that one can compare cablecos and telcos at all, since both types of providers differ dramatically in their strategies and deployment methodologies.

According to Richard Siderman, an analyst for Standard & Poor's Ratings Services, wireline companies keep losing fixed access lines in the low- to high-single-digit percentage range. This is partly because of the steady stream of consumers abandoning fixed-lines in favor of cell phones (i.e., "wireless substitution") and partly because of cable's extremely inexpensive introductory rates for their voice services. (The National Cable Industry Association says that there are now already more than 12 million cable telephony customers out of approximately 180 million phones in the U.S.)

Siderman cites cable pioneer Cox Communications with its 2 million customers at year-end 2006 and Cablevision Systems (News - Alert) of New York City – a third of whose video customers now have voice service; customers gained "almost exclusively at the expense of Verizon Communications".

Cable companies these days appear to have little trouble competing with their voice offerings. In mid-2007, according to a study by JD Power & Associates, for the first time ever, cablecos led traditional phone providers in terms of customer satisfaction with voice service in all U.S. markets.

Whereas cable companies appear to have made quick inroads into stealing voice service from telcos, the telcos are only now gaining some steam in terms of stealing video customers from cable via such innovations as IPTV (News - Alert). The two principal rainmakers in this area are Verizon with its super high bandwidth, Fiber-to-the-Home FiOS product and AT&T's U-verse.

It's easier for cable companies to add low-bandwidth voice to coaxial cable (or hybrid fiber/coax systems) than it is for telcos to add high bandwidth video to DSL channels traveling over traditional copper pairs. That's why Verizon has taken no chances by deploying fiber directly to the home, and "retiring" or removing copper lines coming off of telephone poles to those homes receiving an FiOS (News - Alert) installation (buried copper, on the other hand, is left in place). So in Verizon's vision of things, there's no reason to go back to using copper, ever.

Interestingly, as in the case of cable companies, about 80 percent of Verizon FiOS customers order a triple play services bundle. But Verizon at the moment has fewer than a million FiOS customers (out of their 40 million phone customers) and AT&T had 100,000 video customers as of September 2007. So telcos clearly have a ways to go before cable companies start to quiver in their boots. Verizon says their $18 billion network project will make FiOS available to 18 million homes by the end of 2010. (That works out to about a $1,000 per home expenditure on the part of Verizon, though they claim it's more like $700 to $900 per household.) Some FiOS users claim that Verizon has been trial offering a symmetrical 20 Mbps service in the New York City area for $65 a month.

AT&T's less aggressive, lower bandwidth, U-Verse is the brand name for a group of services provided over IP, including television service, Internet access, and ultimately voice telephone service. U-Verse is the "beneficiary" of AT&T's Project Lightspeed (announced in 2004 and begun in 2006) the company's $6 billion initiative to expand fiber coverage in its nework. Alcatel is the Systems Integrator. However, their current VDSL infrastructure provides only 25 Mbps to the home, with only 6 Mbps of that allotted to broadband. These bandwidth restrictions are why U-verse employs H.264 (MPEG-4) encoding, which compresses video better than the old MPEG-2 compressor still used in cable systems (IP/Ethernet over MPEG-2 for downstream, Ethernet framing for upstream) and DVD. As a result, AT&T as of late has been pondering doing a Verizon-FiOS type of rollout of Fiber-to-the-Home.

Sometimes network upgrades don't happen without a few hitches here and there. In October 2007, an Avestor-made battery in an AT&T U-Verse VRAD in a Houston, Texas sub-

urb malfunctioned and caused the device to explode, firing shrapnel for a distance of 50 feet. A short time later, AT&T announced that they'll be replacing 17,000 VRAD Avestor batteries. (Note: Avestor went bankrupt in 2006.)

AT&T has announced upgrades and new features, such as "AT&T U-bar," which brings customized weather, stock, traffic and sports information to the TV screen; "Yellowpages.com TV," a user-friendly new way to find local businesses and other information using www.yellowpages.com.; "AT&T Yahoo! Games," now available on TV screens served by AT&T, including JT's Blocks, Solitaire, Sudoku, Mah-Jongg Tiles and Chess. AT&T will also be adding dual HD streams and high bandwidths via channel bonding in mid-2008.

U-Verse is now available in limited sections of about 30 metro markets. AT&T "cherry picks" the most profitable neighborhoods for deployment, which is the same approach Qwest (**News - Alert**) has followed (they offer video services via fiber and VDSL to a limited number of communities).

AT&T's other video offerings include AT&T Homezone, a service combining satellite TV programming with AT&T Yahoo! Internet, and satellite service from AT&T / Dish Network.

Cable companies, faced with a saturated market for their video services, have also taken the advice that Yours Truly and others used to dispense to telcos during the "enhanced services" years of the 1990s – reduce churn and gain new customers with interesting new services and applications, such as digital TV and now IPTV, VoD, Digital Video Recorders (DVRs), cable telephony ("digital voice"), and small-footprint multifunction residential gateways that resemble in size the analog modems of yesteryear.

Verizon is also exploring diversification by taking advantage of the latest technologies' interactivity and investigating such ideas as a TV portal, home shopping, gaming, and on-demand and multimedia enhancements.

I Love My Fiber TV

As it happens, a September 2007 survey report from Changewave Research reveals that that 85 percent of fiber subscribers definitely enjoy TV served in such a manner, and Verizon's FiOSTV has the highest customer satisfaction among the TV operators in general, topping the rankings at 96 percent, followed by DirecTV (**News - Alert**) (89 percent) and Dish Network (82 percent). Ironically, cable operators traditionally exasperate their customers in the video satisfaction area (as revealed by this and other surveys), though AT&T's U-Verse didn't score much higher – indeed, it tied with Comcast (**News - Alert**). Interestingly, satellite subscribers also are far more content with their TV service than cable subscribers (85 percent Very/Somewhat Satisfied vs. 70 percent Very/Somewhat Satisfied).

For copper-based telcos, however, some technological hurdles must be taken care of to compete in the video delivery arena.

Vinay Rathore, Director of Marketing for the global communication network infrastructure provider Ciena (www.ciena.com), says, "Probably the most important thing for telco operators to keep in mind as they move to deliver new multimedia services - especially those outside of their core areas of competency - is that consumers are not willing to sacrifice what they already have just to get a new service or service provider."

"Consumers expect to get rich TV — up to four Standard Definition SD or HD streams — high-speed Internet service and voice services that are at least comparable to the current cable offerings. The challenge will be whether or not the underlying telco network infrastructure can handle the expected demand for the rich content," says Rathore. "For example, a single HD TV stream can require as much as four times the bandwidth as a typical SD channel. What that means is that much of the underlying telco infrastructure must be significantly upgraded to accommodate the bandwidth requirements, without having to rebuild the entire infrastructure."

"To help operators, our vision here at Ciena has been to deliver multiple levels of flexibility and automation so operators can efficiently scale and modify their networks along with the requirements," says Rathore. "For example, our FlexiPort programmable optical ports allows the same network to deliver multiple types of services on-demand, including storage, business services and video services up to 40 Gbps. In addition, our exclusive hybrid ROADM (**News - Alert**) technology allows on demand activation and rerouting of individual services from 155 Mbps to 40 Gbps at far lower costs than the traditional routers, in some cases as much as 60 percent lower."

The battle between cablecos and telcos will stretch on into eternity. Both will undoubtedly be tripping over each other in an attempt to provide innovative new services in order to garner new customers and prevent churn.

Richard Grigonis is Executive Editor of TMC's IP Communications Group.

by Richard "Zippy" Grigonis

IMS Network Elements

The IP Multimedia Subsystem (News - Alert) (IMS) is essentially a service architecture for delivering IP multimedia to mobile users. (Though fixed access via DSL, cable modems and Ethernet is also now included.) The initial IMS was defined by the 3G.IP forum. Founded in 1999, 3G.IP's Mission Statement includes items such as: "Actively promote a common IP based wireless system for third generation mobile communications technology to ensure rapid standards development and take up by operators, vendors and application developers… Review and evaluate alternative wireless architectures and strive for industry convergence on all-IP architectures… Develop agreements between carriers for implementation direction and services requirements and priorities… and promote alignment between wireless and fixed IP architectures."

3G.IP then brought IMS to the 3rd Generation Partnership Project (3GPP) wireless standards body with the idea of delivering "Internet services" over GSM's mobile data service environment, GPRS (General Packet Radio Service). The 3GPP, 3GPP2 and TISPAN later revised this to include support of additional networks such as WiFi, WiMAX, CDMA2000 and W-CDMA.

The IMS infrastructure is based on many well-defined service functions having open interfaces that interact with each other in a modular, building-block fashion. These IMS functions can be called upon by vendor products and services as needed. By taking a modular and layered approach, service delivery is no longer closely tied into the physical network, so that third parties can easily and quickly devise many new and interesting services for customers.

Essentially there are three main IMS layers: the transport layer, the control layer, and the service layer.

The transport layer includes any type of access network ranging from the original GPRS to various forms of CDMA, WiFi, PacketCable and DSL.

The control layer provides session and call control for subscribers accessing services within the IP multimedia core network. In particular, the Call Session Control Function (CSCF) is the central routing engine, session controller and policy enforcement network element. The CSCF uses the Session Initiation Protocol (SIP) for call control – indeed, the CSCF is essentially a SIP Server. It interacts with network databases such as the Access, Authorization and Accounting (AAA) servers for security and the Home Subscriber Server (HSS), also known as the User Profile Server Function (UPSF), the master user database that supports roaming.

The service layer is the where Application Servers (AS) are situated. These deliver services via the IMS interface to the control layer through such standardized protocols as SIP.

Top-down designs make for nice schematics but when you actually start building what they represent, things can get a bit involved (which is a nice way of saying tortuous).

Early on, some people thought that softswitches and Session Border Controllers (SBCs), well known in the current PSTN/hybrid network, wouldn't be applicable to IMS. However, that has not turned out to be the case.

Covergence (**News - Alert**) (www.covergence.com) for example, is the creator of the Covergence Session Manager (CSM), an SBC specifically designed to address the unique requirements of the VoIP access edge. Situated where SIP traffic initially enters the network, the CSM combines traditional border control with top-notch security and management and control capability, so you now have a single point of security, control and management for VoIP and other real-time services.

Ken Kuenzel (**News - Alert**), Covergence's Founder, CTO and VP of Engineering, says, "IMS network elements and the functionality will morph a bit over time until we actually end up with a totally locked-in reference architecture and implementation. One good thing about IMS is that it brings voice out of the wireline world and makes it just another application. In fact, IMS allows many IP applications to play fairly in a network for deployment of a truly next-gen delivery platform. All of that is good. And then when you try to map functions onto specific elements, you can see that, given where the designers were ten years ago when they started, they gave a pretty good shot at formulating IMS, given how technology moves and morphs and the world changes. It's changing now, and IMS will evolve with it."

"Certainly we embrace the core IMS vision of policy-based control and delivery of applications through a service provider network," says Kuenzel. "The lines are blurred as to not only which part of which function lives in which logical element, but also how you deploy them in boxes and where you deploy them in networks. Maybe nobody has built a reference IMS architecture and maybe nobody ever will. Still, I think people are out there making things work and actively embracing IMS today."

"The way of the rest of the telecom world's application delivery platforms have evolved, especially in the Web Services space, may change the way people in the IMS space look at their functionality and

how to deploy it," says Kuenzel. "When they started building out this architecture, the focus was really on telephony and voice-type applications. But now the whole Web Services architecture for mass deployment of various applications over an IP-connected backbone has changed things dramatically. A lot of those elements will get 'squished together' and we'll end up with a set of boxes that are hopefully a combination of the best of both worlds, with the carriers still providing policy-based controls of delivery of bytes, packets and things like that, and Web Service architectures providing application frameworks that will yield trusted ways of deploying applications and a proven way of delivering bandwidth and consumer control."

"The softswitch is really an application delivery platform for delivering and controlling voice," says Kuenzel. "It's just another way to deliver an application. Many softswitch platforms, such as Broadsoft and a Sylantro, are architected on top of Web Services platforms. In many cases they're built in environments such as Java. You'll see peers for delivering TV and various applications over the network. The SBC is really the security piece of the network. It's about how you manage security, which is split into two areas of interest. One area concerns carrier-to-carrier connectivity – which is the typical session border controller piece – and then there's the service provider-to-consumer or enterprise area, which is what we focus on at Covergence. We answer questions like: How do you manage application delivery to enterprises, and consumers? How do you manage those kinds of sessions on that side of the network, as opposed to when SBC makers first started years ago trying to figure out how to peer two carriers together and have them trust each other to exchange data and not perturb each other? We're really more about getting applications delivered out to consumers and enterprises and providing a policy framework for those."

"I think that's where the most interest parting of the network exists today: getting data to the guy who actually has the money in his pocket and is paying for all of these deployments," says Kuenzel.

Will All of IMS Make It to the Finish Line?

Intervoice (**News - Alert**) (www.intervoice.com) is a well-known leader in providing scalable, switch-independent software and professional services responsible for standards-based voice portals, multi-channel IP contact centers, and next-gen mobile-enhanced services. Their solutions are used by the world's leading banks, communications companies, healthcare institutions, utilities and government entities.

Ravi Narayanan, Intervoice's Vice President, Product Management, says, "IMS hasn't taken off quite as fast as many people would like, but that has more to do with all of us looking at IMS as a self-contained entity. Parts of IMS that are 'farmed off' are more likely to flourish immediately than IMS itself. The idea behind IMS is to move beyond the monolithic switch architecture or 'stovepipe' architecture, so that you can actually have a sort of web 'atmosphere' in the telephony world in terms of being able to easily create applications. That's what IMS is capable of delivering. It doesn't matter if it's called something else three or five years from now. But what is important is that we've actually taken the switch architecture and have broken it up into an application server and a whole bunch of servers for call control and session control, and we've also created a network element that is also an application processor, such as an MRF [Media Resource Function] that gives people new freedom to develop applications that couldn't have been done earlier. If you look at IMS that way, then it appears that it will live on for a very long time."

"We're in the business of building applications for mobile networks and other telephony networks, and so on," says Narayanan. "We're not really interested in the switched architecture. If it gets broken up and if an ecosystem emerges, we can still build an application where we can piggyback onto an architecture, even if it's distributed. We're capable of creating applications that we couldn't have done if we were tied closely to the network switch."

The Killer Network

Ulticom (**News - Alert**) (www.ulticom.com) provides service-enabling signaling software solutions for wireless, wireline, and Internet communications. Ulticom's products are used by major telecom equipment and service providers globally to deploy mobility, location, payment, switching, and messaging services. For example, their Signalware® SS7 products enable network equipment and service providers to deliver value-added services to their customers. Signalware provides a complete SS7 development and deployment platform for developers to rapidly create and deploy services in traditional, next-gen, and converged networks. Also, their nSignia® eSTP (Edge Signaling Transfer Point) enables the seamless migration of applications such as wireless prepaid, text messaging, free-phone, global roaming and VoIP-to-IP networks.

Ulticom's Osman Duman, Senior Vice President and CMO, says, "We're known as a signaling technology provider, primarily for SS7 and Sigtran and for natural extensions into the SIP and Diameter protocols. In the legacy telecom movement around the IN [Intelligent Network], typically, we have been the top producer and market share leader when it comes to signaling technologies. We have about a 28 percent market share. When anybody talks about SS7 on opens systems, Ulticom comes to mind. We generally sell our technology to top-tier NEPs [Network Equipment Providers] such as Nokia Siemens, Alcatel Lucent, Ericsson, Nortel and so forth. They place that technology in their equipment, including softswitches, Home Subscriber Servers, prepaid systems, messaging systems, voice systems, and location-based systems."

Duman elaborates: "We help TEMs and service providers deploy services in five different areas: mobility, switching, messaging, payment and location. We enable different types of network elements. As we move from IN to IMS networks, even though the IN networks were all deployed by network operators and IN was supposed to be as open and modular as possible, in the end the network equipment providers pretty much controlled the destiny of the networks and how certain things unfolded. NEPs were involved in creating the stovepipe-types alignments that put them in control of the destiny of service providers. And now, IMS doesn't necessarily deliver on the promise of changing the game in such a way that services can be defined and implemented and put into commercial applications within weeks or months. We used to talk about doing the same things in the IN circuit-switched era."

"But what IMS *does* do is to change the alignment from stovepipe 'siloed' applications to a more horizontal approach, in a way that passes the control of service providers' destinies back to the providers and operators themselves, because they can now hunt for best-of-breed network elements, re-architect their network in a more granular fashion and not be at the mercy of, say, an Ericsson or Alcatel Lucent. That's partly because of the ubiquity of IP at the transport and service levels. It's the kind of network that's open to more innovation. Also, they're now able to take a staggered approach, adding whatever new capabilities they desire. It gives operators more freedom of choice, but doesn't necessarily guarantee 'killer apps'. Instead, it's really the 'killer network'."

"Because IMS is an access-agnostic framework, it allows the operators to expand their business onto much larger groups," says Duman. "If you're a wireline operator, you might expand into the wireless space, for example. So in theory it adds a great deal of flexibility."

Richard Grigonis is Executive Editor of TMC's IP Communications Group.

by Kevin Mitchell

3GPP IWLAN – a Closer Look at One of Two Paths to FMC

Service providers are implementing fixed-mobile convergence (FMC) architectures that aim to deliver access to IP data and interactive communication services over wireline, wireless and blended broadband connections. FMC embodies various access and core technologies and the drive for FMC is mandating evolution in network architectures and introducing new functions and network elements. The evolution of FMC can be roughly drawn along a path from tunneled GSM signaling over WiFi to full blown SIP in an IP RAN with a focus today on delivering services over a combination of nearly ubiquitous WiFi with mobile radio access networks. In order for FMC to be successful for operators, the cost of implementing the various architectures will be determined in part by how the new functions can deployed.

Two 3GPP FMC Architectures

The 3rd Generation Partnership Project (3GPP) defines two specific FMC architectures regarding GSM networks:

- **Unlicensed mobile access (UMA)** – uses GSM signaling for voice services over the circuit-switched radio access network GERAN (GSM EDGE Radio Access Network) as well as the IP WiFi access network
- **Interworking-wireless LAN (IWLAN)** – uses GSM signaling for voice services over circuit-switched UTRAN (UMTS Terrestrial Radio Access Network) access but SIP signaling for voice services over WiFi access

Both approaches require dual mode handsets that support 2 radio interfaces, of which there are a growing number on the market today. Femtocells can also take advantage of UMA or SIP for the femto base stations at the premise. In all cases the WiFi access network makes use of fixed network backhaul (such as DSL, WiMAX or cable) using the general Internet (e.g., a mobile operator using the Internet connection of a cable provider to connect to dual-mode handsets) or a managed IP network (e.g., a fixed-mobile operator that uses its private IP network), with implications for security and call quality.

For service providers both FMC approaches share advantages, such as improved indoor coverage and reduced backhaul costs, and drawbacks like limited handset selection today and billing complexities. As the signaling protocols differ between the approaches, there are some benefits unique to each FMC architecture.

UMA enables service transparency and seamless roaming between GSM and WiFi as the mobile core network remains largely unchanged using existing mobile switching centers (MSCs). The back office and OSS do not require any changes, making rollout easier.

Initially UMA was solely specified for 2G /2.5G RANs and not the growing base of 3G voice and packet data services, but there has been some work to support UTRAN environments.

3GPP IWLAN is future-oriented and as such is specified only for 3G RANs and handsets and requires SIP and core IMS equipment investments and depends on an embryonic network function—the voice continuity server (VCC)—to enable roaming from and to WiFi and GSM access networks. However, IWLAN primarily addresses the ability to handle operator roaming; i.e. how to handle visited networks which is key for widespread adoption. As this FMC architecture is tightly integrated with IMS, IWLAN enables access to new services delivered by the IMS core infrastructure.

Both UMA and IWLAN approaches require a new network function: a security gateway that authenticates devices and terminates the IPsec tunnels from the handsets when on a WiFi network. This article focuses on deployment considerations for IWLAN and the placement of the tunnel termination gateway (TTG) function.

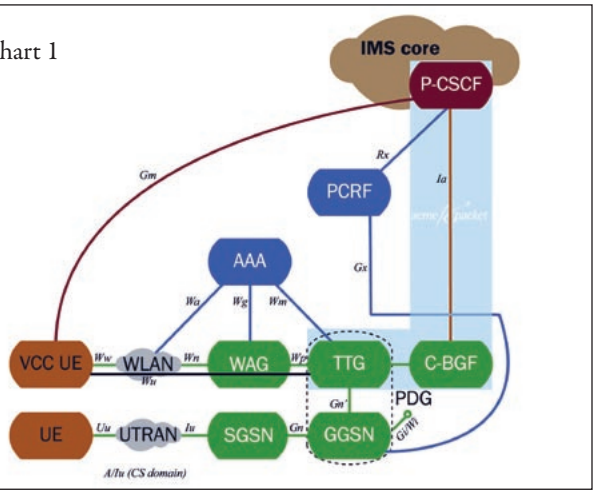
3GPP IWLAN Architecture Overview

In 3GPP IWLAN a dual-mode handset (or user equipment, UE), supporting both SIP and GSM signaling, accesses the UTRAN network or WiFi network depending on the radio signal strength. Both voice and data services are delivered via the same access networks to which the UE is connected at that time.

When services are delivered via the UTRAN, voice is circuit-switched, using traditional MSCs. Packet data services are delivered via the IP portion of the UTRAN and are served by the existing SGSNs (Serving GPRS Support Node) and GGSNs (Gateway (News - Alert) GPRS Support Node). (See Chart 1.)

When the UE is connected to a WiFi access network all voice and data services are encapsulated in an IPsec tunnel fixed network

Chart 1



backhaul network such as DSL. In this scenario, SIP-based interactive communication services are controlled by a session border controller (SBC) providing the 3GPP-defined P-CSCF and C-BGF functions in the IMS network. IP data services and IP address management are controlled by the SGSN and GGSN. A VCC application server enables handover and roaming between the circuit-switch GSM voice and IP-based SIP voice. The new function that's defined in IWLAN is the TTG which authenticates devices (via AAA queries), decrypts sessions originating from mobile handsets, allocates IP addresses and protects the layer 3 and key exchange infrastructure from denial-of-service attacks.

One of the main decisions for service providers revolves around the degree of separation or integration of the TTG function with established SBCs and GGSNs.

IWLAN Architecture Deployment Considerations

3GPP defines functional elements, not specific products. The standards groups do not dictate or provide guidance on the elements that can be combined into a single product, but does define interfaces between elements in the event they are distinct products. However, multiple functional elements could be integrated into a single product. This integration can have an effect on the scalability, manageability and cost of the individual elements and the overall fixed mobile convergence network.

As GGSNs process and route IP data packets, the addition of IPsec termination can be seen as a natural fit. The TTG function can be logical or physically combined with a GGSN or subset of GGSN functionality and are referred to as a packet data gateway (PDG). Logical PDGs will exist with standalone TTGs with interfaces to distinct GGSN. The TTG can also be combined with SBC components (P-CSCF and C-BGF) as the SBC is the first signaling hop in a service provider network and the security element for IP interactive communication services.

Creating a leading GGSN or SBC is very difficult due to the intensive software development time and costs, interoperability, high availability and hardware design for scale and performance. They are also significantly different products in that they each inspect and control a specific type of network traffic. They can also be deployed in different parts of the network (SBCs on the broadband access edge or edge of IMS core and GGSNs in mobile core or the edge of walled garden server farm). Due to the stark differences, the requirements for processing the different traffic types and the challenges in building SBCs and GGSNs, the likelihood of these functions being combined into a single element is remote. Adding the TTG function to either platform is comparatively easy and relatively inexpensive.

Operators should be wary of the "god box" approach to fixed-mobile convergence with vendors purporting to solve all challenges and deliver all requisite functional elements in a single network element. Various god boxes have been proposed in telecommunications and have fallen short in the promise to deliver best-of-breed functionality across many functional domains along with the scale, performance and high availability requirements while being cheaper to buy and operate than dedicated network elements.

Pragmatic network design and selection for TTG must take into account many factors, including:

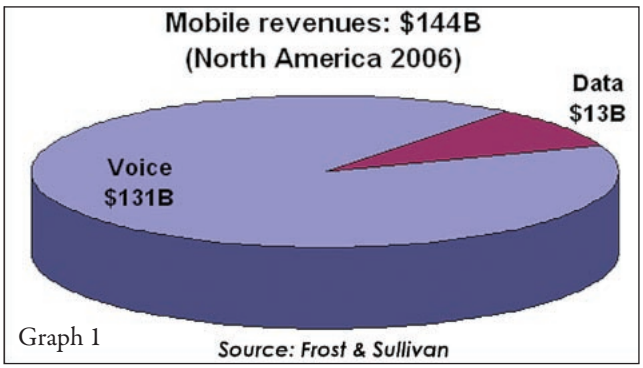
- **Session composition** – number of SIP sessions, non-SIP walled garden data and Internet access
- **System throughput** – aggregate system bandwidth (Gbps) for handling VoIP and data
- **Capacity** – number of IPsec tunnels and sessions and whether they are appropriately in proportion to each other
- **Capital expenditures** – cost per IPsec tunnel
- **Integration tradeoff** – degree of impact in terms of scale or performance on the core functions with which the TTG is integrated
- **Operational expenditures** – number of network elements required, rack space and power draw
- **Service evolution** – FMC architecture used today and how the elements may work in the evolution path from UMA with GSM signaling to TTG with SIP signaling to 4G VoIP over licensed spectrum

- **Location dependent usage** – mobile and premise-based usage will be different; for instance, consumers will likely watch IPTV and movies on big screen wall-mounted TVs, not the small screens on handheld mobile devices
- **Physical location** – the location of pre-existing and planned network elements may dictate the feasibility and possibility of TTG integration
- **Degree of integration** – functions could occupy the same physical rack or chassis, yet involve external interfaces or be tightly coupled as a single functional element
- **Access network ownership** – integrated mobile and wireline operators can make different decisions than mobile-only or wireline-only providers based on the access networks it controls and owns

As noted in the above list, one of the top concerns that should drive the decision for placement of TTG functions is the number of sessions (and revenue) controlled by each device — SBCs for SIP-based interactive communications and GGSNs for walled garden packet data services. In most cases, the Internet access and web-based services accessed from a mobile device do not need to be encrypted and may not be backhauled to the operator's mobile core to the GGSN. Instead, the user can access the Internet via the local broadband connection (DSL, cable, etc.) that is backhauling the traffic from the femtocell or dual-mode handset.

In an IMS environment the SIP-based services — those controlled by session border controllers — include VoIP, text and multimedia messaging and video sharing. IMS also brings the promise of additional service types using SIP such as gaming, multimedia collaboration and other services. The packet data services controlled by the GGSN today include SMS, ring tones, walled garden services that may include videos, news, sports, games and ringtones. On the GSM RAN, mobile packet core elements also tend to handle and create billing records for Internet access to Google searches, YouTube (News - Alert) videos, online banking etc.

Research firm Frost & Sullivan reports that North American mobile operator revenue is vastly voice and predicts it will remain that way. Frost & Sullivan reports that in 2006, mobile voice revenues in North America totaled US$131 billion dollars. The packet data revenue, while large in its own right at $13 billion, is only 8% of the total mobile revenues of $144 billion. That figure also includes SMS and MMS revenues, services that are transitioning to SIP signaling services in IMS networks. (See Graph 1.)



Graph 1

Compared to revenues, the number of sessions (i.e., calls) more heavily favors voice. Consider the average mobile subscriber's phone bill: the ratio of the number of calls made and received *versus* the number of messages sent or ringtones downloaded is easily in the range of 100-500 to 1. As the revenue and sessions are vastly SIP-signaled services, this heavily favors the integration of the TTG function with the first SIP device on the service provider edge. As there is a long list of factors that should drive this decision, there will be cases where GGSN integration may be favored or the only possible choice.

Summary

Today, there are specific network elements tied to enabling voice and data services in mobile networks—session border controllers for VoIP and mobile packet core elements (i.e., SGSNs and GGSNs) for data services. The FMC architectures, as defined by 3GPP, introduce a new functional element centered around mobility management, subscriber authentication and secure and encrypted access between a mobile device and the mobile core network serving the subscriber. 3GPP IWLAN operators are facing a decision in 2008 on how to deploy this new function, the tunnel termination gateway: as a standalone element or integrated in a SBC or GGSN. If integration is preferred, given that fixed and mobile voice communications are moving to SIP and more individual sessions and revenue-generating traffic will traverse an SBC rather than a GGSN, the TTG function is likely to be integrated with the session border controller.

Kevin Mitchell (News - Alert) *is Director, Solutions Marketing, for Acme Packet (www.acmepacket.com). Reach him at kmitchell@acmepacket.com.*

Other Network Elements

Session Border Controllers (SBCs): provide critical control functions to deliver high quality interactive communications across IP network borders; the SBC controls and shapes any real-time, interactive voice, video or multimedia communication using IP session-layer signaling protocols such as SIP and data services that are not set-up via signaling protocols are not processed by a SBC.

Serving GPRS Support Nodes (SGSN) and GPRS Gateway Support Nodes (GGSNs): essentially, edge and core routers for GSM networks that handle IP address allocation, layer 3 routing, traffic shaping, mobility management for packet data applications; there is no SIP session control or awareness.

by Richard "Zippy" Grigonis

IMS vs. UMA

One of the most-talked about convergence-related innovations in recent years is the ability for a suitably-equipped mobile phone or voice-enabled device to roam between unlicensed spectrum domains (such as WiFi or Bluetooth) and cellular phone environments while a call is in progress. Seamless handover of the call is the goal, with this type of "make-before-break" service often being called Dual Mode Service, a subset of the concept of Fixed Mobile Convergence (News - Alert) (FMC). Carriers generally deploy such a service either on a GSM network using UMA (Unlicensed Mobile Access) technology, or else a more elaborate IMS-based network that can handoff calls to GSM, CDMA2000 and other kinds of cellular networks.

It was Mark Powell and his colleagues at Kineto Wireless (**News - Alert**) (www.kineto.com) who were the principal developers (and boosters) of the revolutionary UMA ecosystem. (Though, to be specific, a full roster of companies involved in the UMA specifications includes Alcatel, AT&T Wireless, British Telecom, Cingular (**News - Alert**), Ericsson, Motorola, Nokia, Nortel, O2, Research-in-Motion, Rogers Wireless, Siemens, Sony-Ericsson and T-Mobile U.S.)

UMA is essentially an access technique; it allows cost-effective access to a GSM operator's 2.5G core network via some WLAN (e.g., WiFi, Bluetooth) systems. UMA-enabled mobile devices access circuit-switched services via the "A" interface with GSM's MSC (**News - Alert**) (Mobile Switching Center) and GPRS (General Packet Radio Service) or more evolved packet services via the "Gb" interface with the SGSN (Serving GPRS Support Node; which is the gateway between the RNC and the core network in a GPRS/UMTS network).

The key UMA component to achieve dual-mode access is a gateway called a UMA Network Controller (UNC) which sits at the boundary between the mobile core network and the IP network. When the dual-mode phone is communicating via a corporate WiFi network, the voice packets containing GSM format voice and SS7 signaling data travel via an IPsec tunnel originating in the handset and running across the Internet (or other IP access network) to terminate on the UNC where the encapsulating IP shell is stripped off and the voice data is sent as conventional GSM traffic into the mobile core network. The UNC is paired with either a MSC or SGSN in the cellular operator's core network. These elements maintain call control, even when the phone has roamed onto the unlicensed spectrum network. Therefore, the call in a sense stays on the GSM cellular network even though it is embedded in IP packets – it isn't actually a full-blown VoIP call. In accordance with this idea, the UNC is designed to masquerade as a BSC to the mobile network, so when handover occurs between WiFi and GSM cellular (or vice versa), the core network perceives it as a seemingly ordinary BSC-to-BSC handover (or "handoff" as we in the U.S. prefer to call it). UNC functionality can be integrated into the existing BSCs, thus relieving the core network from handling signaling and multiple resources related to users switching between wireless LANs and GSM cellular in the same geographic area.

Since the UNC also provides authentication, encryption and data integrity for signaling, voice and data traffic, and acts as a conventional cellular base station, this one little box certainly can be used as a short-term "quick fix" to quickly and inexpensively enable carriers to provide dual-mode services, and it was expected that mobile operators would naturally employ such a system as an adjunct to their GSM/GPRS networks. Indeed, British Telecom, Orange/France Telecom, Telecom Italia (**News - Alert**) and TeliaSonera Denmark have offered UMA-based services at one time or other.

Thus, UMA has mostly been a system to handover voice calls from Wireless LANs to a GSM/GPRS/EDGE cellular environment, although Kineto Wireless in 2006 first announced client software for mobile/WiFi handoffs that could support 3G UMTS.

Aside from the ubiquitous Kineto IP-based UMA Network Controller (IP-UNC), which underlies and/or works with UMA solutions from Motorola and Nokia (such as the Nokia 6136 and 6301 handsets), other UMA network solutions include the following:

- Alcatel Lucent (www.alcatel-lucent.com) offers a standalone or a more elaborate combined NGN-UMA architecture for those mobile operators who have implemented Alcatel's NGN solution. In both platforms, UNC functionality is provided by the Alcatel 5020 Wireless Call Server (WCS) for voice signaling support; Alcatel Wireless Media Gateway (WMG) (either 7540 or 7570) for

voice bearer support; Alcatel 1000 Wireless IP Network Controller (WNC), also known as the GPRS Gateway, for packet signaling and bearer support; and the Security Gateway (an OEM product). The Alcatel 1430 Home Subscriber Server (HSS) serves as the UMA database and the 3GPP AAA server, and the Alcatel 1300 Operation & Maintenance Center - Core Network (OMC-CN) acts as the Operation and Maintenance Center for the UMA network and for Alcatel Core Mobile Network solutions.

- Ericsson's (www.ericsson.com) solution for UMA is Mobile@Home™ - also known under its 3GPP name Generic Access Network (GAN). In 2005, Ericsson delivered the world's first commercial UMA/GAN network for British Telecom to launch their Fusion service and is now the main supplier of the Orange UMA/GAN solution in several countries. The Ericsson Mobile@Home solution consists of three main components, the Home Base Station Controller (HBSC); Mobile@Home™ Support Node (HSN); and Security Gateway (SEGW). Supporting nodes include the AAA Server and DHCP/DNS Server as well as the overall element management solution for the UMA/GAN relevant nodes.

- Motorola (www.mot.com) has an end-to-end UMA solution including a UNC, access control, billing integration, network management, WiFi access points, and UMA handsets such as the dual-mode Motorola A910.

- NEC (**News** - **Alert**) Corporation (www.nec.com) has partnered with Kineto Wireless to integrate Kineto's UNC into NEC's Home Gateway Solution, enabling deployment of a complete end-to-end femtocell solution, comprised of the NEC Home Gateway Network Controller (HGNC). The UMA-enabled HGNC interfaces to a mobile operator's existing core network with standard IuCS/IuPS interfaces, enabling a fast time-to-market as well as full service transparency for the end user.

IMS – A Broader Canvas?

Deployed as they are by facilities-based MNOs, the classic formulation of UMA works only with GSM cellular networks. Since the voice traffic is in GSM format and is delivered to the mobile core network, UMA can't completely leverage the "toll bypass" cost advantages of IP telephony, even though the voice traffic is encapsulated in IP packets. It doesn't bring any benefits to traditional wireline operators, VoIP providers or Mobile Virtual Network Operators (MVNOs). Although it works specifically and very well for dual-mode WiFi/cellular access, UMA doesn't support other FMC services and cannot extend FMC services to wired handsets, softphones or other kinds of devices.

UMA aficionados will say that UMA is the 3GPP standard for enabling all mobile services accessed over broadband IP and WiFi: voice, data and IMS, and that UMA, being an access technology, actually increases the number of locations where IMS services can be delivered. WiFi access in homes, workplaces and hotspots can now be added to the list of places where one can find cellular coverage and use SIP-based IMS services at full broadband capacity.

But whereas SIP or any IP-based protocol will run over UMA access technology, when a dual-phone is removed from a WiFi hotspot, a broadband SIP session would now have to be made to run over low-bit rate GPRS (or slightly higher EDGE). And handing off a SIP call to a GSM network would be a neat trick. That's why UMA implements its own signaling and RTP (Real-Time Protocol) channel - all real-time traffic, such as audio or video, of the circuit-switched domain user plane is received at the UNC via the "Up" interface and conforms to the standard RTP framing format defined in the IETF specifications RFC 3267 and RFC 3551. (To enable downlink quality measurements in the mobile station, the UNC must send at least one RTP frame each 480 milliseconds.) And what about roaming from one storefront hotspot to another? Still, despite these mobility constraints, many operators today do deliver SIP applications to UMA-enabled devices.

IMS, though more expensive to install in the infrastructure, allows for many services to be deployed in carriers using a common service architecture. And IMS is access layer agnostic, which means it can use any IP connection to deliver applications over GSM, UMTS, WiFi, UMA, or DSL/cable. The type of WLAN/cellular handover associated with IMS is VCC (Voice Call Continuity), a more complicated "dual-service" approach that presumes mobile handsets access a fixed core voice network when connected via WiFi and a mobile core network when connected to GSM, something which UMA proponents claim will result in a different end-user service experience. Even so, the idea behind IMS is to go beyond the limited access convergence capabilities of UMA to deliver true service convergence, enabling the consistent delivery of many possible services (not just dual-mode) across all types of access networks and user devices.

Both sets of UMA and IMS "true believers" will no doubt be arguing with each other for years to come. The general trend, however, is that the world's telecom infrastructure is slowly moving toward the flexibility and scalability offered by IMS.

Richard Grigonis is Executive Editor of TMC's IP Communications Group.

From the Desk of Michael Khalilian

State of IMS Plugfest™ and Certification

We at the IMS Forum®, the industry's only association dedicated to IMS, NGN application and service interoperability and certification, eagerly look forward to 2008. In this column, I will take stock of 2007 and set the stage for our fourth Plugfest (the first for 2008).

In 2008 service providers (SPs) globally will aggressively offer more services and new applications for triple play and quadruple play utilizing IMS architectures over wireless, wireline and cable broadband. A recent Frost & Sullivan report[1] reveals that SPs now realize that the move to IMS will occur gradually, entailing the interplay of different network applications, technologies and protocols as the networks evolve. To achieve success in this complex and highly competitive environment, SPs need to comprehend how their networks' evolution will affect their business, and more importantly, what best transitional path to follow. Moreover, carriers now emphasize operational expense savings and not necessarily service capability.

The report specifies indicators of ongoing and impeding IMS technology adoption, such as expected IMS RFP decisions to be announced in 2008, from China Mobile, Comcast, France Telecom/Orange, T-Mobile and T-Mobile USA, Verizon, and Chunghwa Telecom (News - Alert), among others.

The report concludes that operators will cap their current technology investments and gradually shift to new equipment purchases. As they embark on their IMS migrations, there will be several paths open to them, including evolutions starting from the softswitch, signaling layer or service mediation (an incremental build-out starting from the SCIM component in the IMS architecture). For more details on this report, please see the January IMS Forum newsletter.

In 2008, IMS will continue to evolve as the only pervasive SP architecture for quadruple play including voice, video, unified communications (UC), Web 2.0 and user mobility. As always, the IMS Forum is here to continue its interoperability testing with Plugfests and to enhance its working group initiatives both in marketing and in the development of state-of-the-art, technical guidelines for service deployment that emphasize return-on-investment.

IMS Forum members and Plugfest participants made a great deal of progress in moving the IMS industry forward this year. The level of interoperability between participating vendors has increased greatly since our first Plugfest, which took place in January 2007. In our last two Plugfests we were able to set up a fully interoperable network running live services and applications. During 2007 we moved from testing basic calls and IMS registration to full applications testing. In Plugfest III we successfully tested the Sh interface for IMS Applications Servers and the Diameter protocol. Also, in Plugfest III participants demonstrated for the first time in the industry their support of the IMS AKA authentication mechanism in addition to SIP authentication. We also demonstrated IMS-to-IP network and services compatibility and our members have witnessed a definite acceleration in the pace of service deployment over the previous 12 months.

Our first Plugfest of 2008, Plugfest IV, whose theme is "IMS Triple Play, OSS/BSS and Billing Applications," will be held February 25 to 29, 2008, at the UNH InterOp Lab (IOL) in New Hampshire. In Plugfest IV, IMS Forum members will test the interoperability of IMS applications and operational systems over a unified IMS network. These applications, operations, and business support systems are available to all types of service providers including wireless, wireline and cable companies. A complete portfolio of services to be tested is being defined by the IMS Forum Interoperability and Testing Working Group. It will include VoIP services for consumer and enterprise users, various types of video services, fixed-mobile converged (FMC) services including support of femtocell, UC and interworking with IMS and operations support and business support systems (OSS/BSS).

To date, confirmed IMS Plugfest IV participants include HP, Amdocs, Acision (News - Alert), Alpha Networks, Aricent, Data Connection Ltd, Empirix, Ipgallery, Mavenir Systems, Mu Security, NextPoint Networks, Radvision, Shenick Network Systems, Sonus Networks, Starent Networks (News - Alert) and Tekelec. Sponsors include Intel, IMS Magazine/TMC and Pulvermedia.

IMS is emerging as a framework to carry current and future advanced multimedia, mobility and nomadicity applications over cellular, WiFi, WiMAX, cable, fiber, and power lines.

IMS Plugfest IV will integrate multiple applications and billing/charging onto a unified IMS network in order to test the deployment by real-world service providers. The Plugfest results can be used by all types of service providers including wireless, wireline and cable companies. The portfolio of services to be tested this time around will include VoIP, triple and quadruple play, OSS/BSS elements, presence and Enterprise UC interworking with IMS. This fourth Plugfest marks an important milestone in our Plugfest series of test events. After a full year of testing we have shown the readiness of the industry for its first real IMS applications and services certification program, IMS Certified™.

We are excited about the upcoming Plugfest IV taking place February 25-29, 2008. For additional information on participation, please contact info@imsforum.org.

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Footnotes:

[1] Please refer to "IMS — Ready for Prime Time?" by Ronald Gruia, released by Frost & Sullivan in February 2007. Copyright: Frost & Sullivan, used with permission by the IMS Forum.

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