



# **Convergence: Beyond the Talk, How IMS and SIP factor in**

**White Paper**

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## Executive Summary

We have heard the buzz word “convergence” for many years and in many contexts, so covering the topic always comes at a risk. Convergence is an umbrella concept for a plethora of devices, services and technologies coming together. We believe that the adoption of the IMS (IP multimedia subsystem) standard and SIP (Session Initiation Protocol) will hold the key to a new generation of communication-centric applications that will integrate voice, video and data across the wired and unwired world in an open and accessible format.

The uptake of new applications and services is seminal to the survival and prosperity of the value-chain of the telecommunications industry. Simply stated, in order for consumers and businesses to spend more, they need to be able to do more. There therefore needs to be compelling applications beyond plain person-to-person voice. Having spent hundreds of billions of dollars both acquiring spectrum rights and building out network infrastructures, the wireless carriers are very enthusiastic about a game plan that makes their outsized investments look prudent, economical and rational. Faced with the unprecedented commoditization of the standard voice application, traditional PTT/wireline carriers, who have been historically slow to accept new applications, are embracing IMS and SIP into their infrastructure and leading the charge with new applications. The beauty of IMS is that it is the first architecture agreed upon by both the wireless and wireline industries, granting a fleeting hope of convergence between the two.

IMS is not something that just installs from a box and fixes all the problems of the carriers and consumers overnight. Quite to the contrary, it is a transition from proprietary applications and vertical stacks over to a more flexible and universal platform architecture capable of satisfying the changing needs of the consumer and enterprise. Japan, led by NTT DoCoMo, is the poster child and science experiment for wireless IMS/SIP deployment with its new Push-to-Talk (PoC) application running on top of its 3G network and compatible handsets. Newly emerging MVNOs as well as traditional European wireless/wireline operators are the next likely adopters outside the US.

This whitepaper looks at the implications that the adoption of IMS as a platform and standard, combined with SIP will likely mean for carriers, equipment providers, handset providers, software companies (both application and infrastructure), content providers, consumers and enterprises. We think the adoption of IMS and SIP will have meaningful impact across the value chain – the traditional equipment companies will be forced to compete on features and performance not proprietary lock-in models; carriers will begin to consolidate their capital expenditures around a leveraged and more open platform; consumers will embrace a more advanced generation of communication applications that begin to bring together voice, video and data more seamlessly across multiple platforms; and software providers will begin to deliver applications and infrastructure that can be scaled more easily across the patch quilt of carriers and handset vendors. Given the attractiveness of the market and the shift towards more software driven solutions, a more meaningful presence by the larger ERP vendors looks like a safe bet as well.

## Overview

To understand the impact of IP Multimedia Subsystem (IMS) and SIP (Session Initiation Protocol) adoption on the value chain, we need to first understand the following

- (1) what we mean by network convergence
- (2) why standards will have an impact on both users and service providers and what the benefits are to consumers and service providers over the next 5-10 years

### **Network Convergence: qu'est-ce que c'est ?**

Network convergence is one of those terms that have been so overused by industry analysts and commentators that it has become essentially meaningless. Therefore, before we explore its impact, we need to clearly define what we mean by network convergence.

We see network convergence as a way of enabling the end-user to accomplish communication-related tasks in a relatively simple, straight-forward and low cost manner, and for the carriers and equipment providers to be able to deliver such services and mask the complexity within their network. In an ideal world, this would mean a simple and powerful device for the consumer with a unified backend network provided by the service providers.

We see four types of network convergence

- (1) Traditional fixed line and wireless mobile convergence, best known as FMC (fixed mobile convergence) which, in a perfect world, involves, amongst other things, the interoperability of handsets between both types of networks depending on location and function, the support for seamless handoffs between the networks and a universal address book across networks
- (2) Convergence of networks towards a singular IP transport network for users and carriers supporting different applications regardless of the underlying physical transport/network
- (3) Convergence of current and next-generation applications, allowing them to interact with each other in real-time across varying devices; and
- (4) Convergence of next-generation services from carriers to end-users.

We can see the benefits of network convergence in our everyday lives. For example, in the 1980's, documents were 98% text-only, and email only traveled through proprietary systems within companies. Fast forwarding 20 years, we seamlessly integrate text and graphics into our documents, video and email into our daily experience on our desktop or laptop computer. All of this is driven to a large extent by network convergence.

While a debate about the definition of convergence is almost always likely, the need for such convergence over time is generally understood and embraced enthusiastically by both end users and service providers.

## Why Standards Matter

Consumer products contain both standard and non-standard components with a premium price typically being charged for the non-standard components. For example, consumers that purchase a Hewlett Packard laser printer must buy the premium priced toner cartridge that is built specifically for that printer but the printing paper is standard (at least within continents). With a car, the oil and gas are standard, but the replacement parts and service are not. The more interchangeable a product is (such as a battery), the easier it is to use and the more commoditized it becomes. This typically leads to the market for that product consolidating as companies need scale to remain competitive. Standards, particularly when “open” and not owned by a particular company, will tend to benefit the consumer in both price and convenience. The fact that a BMW, Mercedes and Hyundai car can all pull into a Shell station to refuel is a level of integration based on a standard that we take for granted in our daily lives.

The technology sector has historically been slow to adopt standards as companies have been wary of relinquishing control of their software and of the future benefits that standards bring. The telecommunications market has been slightly more biased towards standards (i.e. GSM, 3G), but the interoperability of those standards remains challenged. We believe that the technology sector is following the telecommunications market and is starting to “open” and adopt standards but this takes time.

Instant Messaging (IM) today is a classic example of disparate systems and entrenched service providers that seek to maintain control by thwarting the adoption of universal standards. To some extent, this same cast of characters (AOL, Yahoo!, Google, Microsoft, eBay/Skype), have decided to assure that their VoIP implementation will absolutely not work together. For example, why is it that a person on Yahoo Messenger cannot communicate directly with someone on AOL Messenger? Is this not like someone on one mobile network not being able to communicate with someone on another network? Companies need to accept these changes and see them as benefits rather than threats.

Fortunately, telecommunication carriers today have largely conceded that they live in a complex multi-vendor world and that customers demand interoperability between the carriers to make the services more valuable. People need to be able to carry out voice and text-message traffic across carriers and across geographic boundaries. This message resonates even louder amongst the PTT/Wireline carriers as they look to capture more profitable business by extending their reach into new, more value add services (such as fixed-mobile convergence).

The Push-to-Talk (PoC) application is subject to a standard known as OMA PoC. In an effort to assure compliance with this standard, a comprehensive compatibility test between client/terminal software and a variety of servers (including versions from Nokia, Sonim Technologies, Motorola, Ericsson, and Siemens) is carried out by carriers to assure that PoC can be ultimately carried out across networks and handsets in a seamless manner.

In our opinion, the adoption of the IMS and SIP standards are key for exploiting the potential of the new 3G networks. We see those benefits already accruing in highly innovative markets such as Japan. But we also see these standards as key to integrating broadband, traditional wireline and wireless customers together to share voice, video and data. Without the standards in place, the adoption curve would be much longer through a gruelling process of market share wars and attrition. Standards benefit consumers but challenge the businesses providing the products and services, in this case the software, hardware and carrier companies.

## **Alphabet Soup: What is IMS and SIP?**

IMS – IP Multimedia Subsystem – is a standardized architecture originally designed for third generation (3G) cellular phones. It emerged from a work by the 3<sup>rd</sup> Generation Partnership Project (3GPP). The architecture was initially supported under UMTS (3G GSM) and then later CDMA2000 (another 3G standard), WLAN (802.11x), and fixed wireline networks. The basic principles behind IMS include access independence (working on packet-switched networks and through gateways on circuit-switch networks), easy-to-use IP-based services (IP applications such as VoIP and Push-to-Talk/PoC) and mobility/portability.

IMS works hand-in-hand with a protocol developed by the IETF MMUSIC Working Group called SIP – Session Initiation Protocol. Back in 2000, 3GPP adopted SIP as a permanent part of the IMS architecture standard. SIP is a protocol used to establish a communication session between two points. Typically this means establishing and terminating a phone call or video conference. Microsoft Messenger is a SIP client and uses the protocol to establish an IM session between two end points. SIP is a text-based protocol which is easy to read and diagnose. Whereas the SS7 (Signal System 7) was a highly centralized (and successful) protocol that originated in the telecom industry, SIP originated from the IP/IT industry. Concepts such as presence are supported through the SIP standard.

## **The End User and the Carrier have Similar Ambitions**

We believe that in the next phase of telecom investment and growth the end-user will be the enterprise customer as well as the traditional consumer. This is largely driven by the business-like nature of some of the next-generation communication applications (such as PoC: Push-to-talk over Cellular), which appeal to individuals, small businesses and larger enterprises alike.

End users have for almost 10 years endured multiple devices to accomplish their tasks – pagers, PDAs, Blackberries, fixed wireline and mobile phones and laptops to name a few. While this trend has been accentuated in the past few year (iPods, GPS devices, fixed

broadband service, WiFi), generally the end-user is looking for simple, functional and easy-to-use devices and services, sufficient battery life and acceptable performance in a single device.

In addition, the carriers are seeking to drive future revenue, expand margins and improve their returns on investment by broadening their range of services away from commoditised voice traffic towards more advanced data-oriented services and unifying services around a central and common platform that provides a source of leverage whilst maintaining their overall operational expenditures.

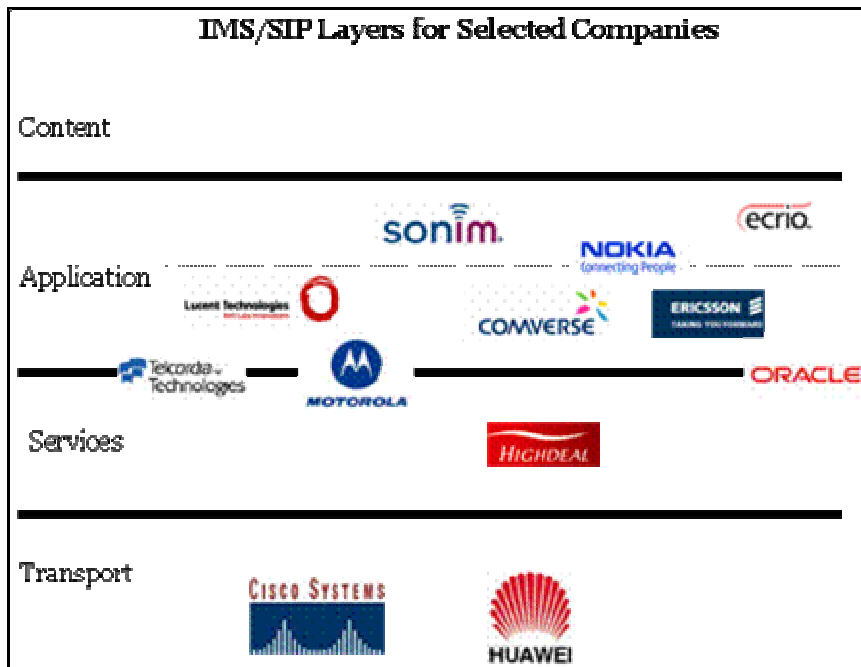
Logic would tell us that the common goals of the end-user and carrier should somehow collide and IMS/SIP will be the foundation of that framework to happen.

## The Impact of IMS/SIP on the Industry Value Chain

The value chain for the mobile, fixed-line and broadband segments will be impacted by the adoption of IMS and SIP standards. Standards, once adopted, often shift the competitive dimension of an industry. We see this happening as the network architecture shifts to purely IP, as applications and services are deployed on a standardized infrastructure and as rapid innovation, personalization and scale all begin to impact the composition of the industry.

The majority of the early SIP/IMS adoption by carriers is focused on service replacement rather than new service introductions. For wireline carriers, this means shifting from the circuit-switched analogue voice service to VoIP services and flatter billing rates in a more competitive world. Once this transition is more advanced (2007), we should then begin to see new service offerings that serve as points of differentiation. For example, emerging VoIP carriers today are offering web interfaces to a host of additional services not available through traditional wireline carriers. Quality of Service, however, remains a challenge for almost all VoIP carriers.

Figure 1 – IMS/SIP Taxonomy



Source: Arma Partners

## The Carriers

Over the last few years, there has been a lot of discussion about the increasing importance of data over voice for the carriers and the need for the carriers to adapt to this new wave. Although we agree that data is becoming increasingly important, we believe that voice will likely remain the “killer” application for the carriers over the next 5 years. The main reason for this is that wireline carriers are transitioning to an underlying IP infrastructure to carry their voice traffic and using SIP and IMS as part of the foundation to do this. The quality of service (QoS) in developed countries will remain a key consideration for customer loyalty and acquisition. We estimate that there are nearly 100 IMS implementations globally being undertaken by carriers, the majority of which are service replacement implementations on the wireline side. FMC (fixed-mobile convergence) is the next logical offering that will likely gain traction in 2007 and which will enable the wireline players to gain a better “customer lock” and to drive incremental sources of revenue.

Selective wireless carriers, such as NTT DoCoMo, are demanding SIP/IMS technology be incorporated into the handsets in order to assure an end-to-end solution in areas like Push-to-Talk over their 3G network. While carriers introduce new services, they will, over time, face VoIP pricing pressures not unlike that of their wireline counterparts. Consequently, new services are key to sustaining if not accelerating ARPU. Carriers should benefit from a capital expenditures perspective as they begin to deploy multiple applications across a common and standardized infrastructure.

The wildcard question for the incumbent wireless carriers is whether they will be able to capture sufficient value from the delivery of existing and new applications and content while facing competition from newly emerging MVNOs that may be more nimble and able to adapt their services to the changing environment.

## The Equipment Providers

Traditionally telecom equipment providers have generated a large portion of their revenue by providing highly reliable hardware for the networks, corresponding professional services and related software. Specialized software companies, like Amdocs, have captured a significant portion of the value chain by focusing on billing, provisioning and mediation rather than on the network layer.

With the adoption of IMS and SIP standards and the transition to IP-based transport systems, hardware infrastructure will become more standardized and largely commoditized resembling the classic enterprise IT infrastructure. The strategies of the network equipment vendors will evolve as they seek to become more “solutions” oriented by either providing their own software or alternatively bundling third-party solutions with their standardized hardware and execution expertise. As IMS services become more complex and evolve beyond simple person-to-person voice, there will be a need for vendors to service lower-levels of the network in order to appropriately account for and

bill resource usage. Equipment providers may therefore see software as an increasingly important part of their overall offering to the carriers. This has been the case with Lucent, Alcatel, Ericsson, Nokia, Tekelec and others.

## The Software Providers

Software vendors are likely to gain significantly from the transition to a standards-based world not unlike what they have historically experienced on the IT infrastructure side of the business. As larger “traditional” software vendors find an opportunity to address the infrastructure and application side of the telecom industry (i.e. Oracle, Microsoft, BEA, IBM), they are likely to use their sheer scale and financial muscle to challenge vertical incumbents (such as Telcordia, Amdocs). If the platform becomes standardized, then the opportunity for new, innovative applications that can be deployed on dozens of networks to hundreds of millions of users will create a new avenue of innovation and growth for software vendors. Some application-focused SIP/IMS vendors – such as Ubiquity Software, Sonim Technologies and Ecrio – may face new competition from traditional software vendors. Ecrio, with its focus purely on the terminal handset may have a slightly more defensible position in the application area as the server market has attracted more traditional players to compete. Sonim Technologies, which has passed extensive interoperability standards for IMS/PoC, along with some real-world deployments, also shows defensible characteristics. Overall, we see the software industry benefiting from the standards adoption.

## The Handset Providers

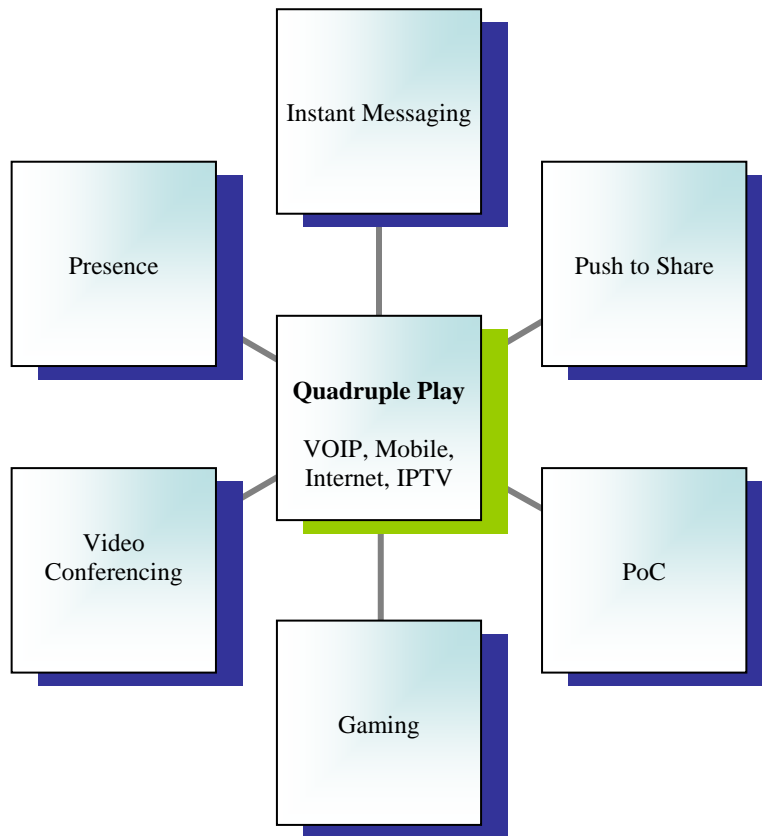
Handset providers will either by their own accord, or through mandates from carriers begin introducing SIP compatible phones incorporating IMS applications. In certain cases, like NTT DoCoMo, the carrier will purchase a license directly from the software vendor and then incorporate that software directly back into the phone. New opportunities will emerge for handset providers as the FMC (fixed mobile convergence) phones emerge and take hold. For example, SIP/IMS could provide a means for handset makers to standardize terminal applications around well-adopted standards. We see mandatory support of SIP/IMS as a requirement for the handset providers, but not a differentiator as most applications will need server-level support. We believe that the handset business will remain a very competitive industry with constant pressures of new standards and therefore will need to adapt to the changing standards environment.

## The Content Providers (Media Content and Applications)

Content providers (both applications and media) could be the wild card as value rises to the top of the food chain. IMS/SIP adoption by the networks should be seen as a positive for the content providers as new applications are developed and demand for proprietary

content (songs, ring tones, movies) and user-generated content (push-to-share, video conferencing, blogging) increase. Moreover, we see content providers (a) extending their offerings to a broader variety of platforms/media, (b) adding unique value with interactivity, and (c) using proprietary data on certain media to drive traffic to other media. The larger question is whether media consumption will simply be reallocated from the traditional broadcasting side to the more dynamic, interactive IP-based world or if people will be willing to increase their spending on media. We suspect it will likely be the former. Even under that scenario, the content provider is better fighting cannibalisation by joining the party than avoiding it.

**Figure 2: IMS/SIP Applications Architecture**



Source: Arma Partners

## SIP/IMS Applications

IP Multimedia Systems (IMS) deployment extends PC applications to mobile handsets creating endless possibilities. These added features serve both consumers and enterprise segments of the market as carriers look to increase ARPU and reduce costs. The key applications of IMS include:

### Push To Talk over Cellular (PoC)

Similar to a two way radio Push to Talk over Cellular (PoC) is a feature of IMS that allows walkie-talkie like communication over handsets. With one push of a button, one-to-one, one-to-many, or group communication can be established through presence based contact lists stored on mobile handsets. PoC uses VoIP technology to stream voice over data networks such as GPRS, EDGE, or CDMA. Voice connections are made in less than a second. In addition to the added benefits to the consumer, PoC frees up cellular networks. On the backend of PoC is a network- based application server which routes calls and manages both the voice transformation, and group/presence information. With an emerging class of new wireless phones and WiFi networks (such as Tropos Networks and The Cloud), we expect to see PoC to also be implemented through IMS over a WiFi IP network.

### Group/Presence Server

Group Presence Manager is an application that allows a PoC contact lists to be organized in the following manner:

- *One-to-one sessions*: This allows a subscriber to instantly contact with a ‘buddy’ from a list of their stored IM contacts.
- *Ad-hoc groups*: This provides the capability of formulating ad-hoc group sessions with one or more online contacts. As with the one-to-one sessions, each contact will be selected from a phonebook style list.
- *Group sessions*: These predefined groups (e.g. “Marketing team”) allow communication with a number of people in a predefined group with the click of a button.
- *Chat groups*: This allows subscribers to join/leave pre-defined chat room style conferences.

Group/Presence Manager



Figure 3

Source: Ecrio

A key component to the group/presence list is that it enables users to view if other contacts are available (see figure 3). Additionally, users can indicate their preferred method for being contacted. For example, if someone is in a meeting and doesn't want to be disturbed they can set their presence manager to notify their contacts to instant message or email them.

## Instant Messaging

IMS/SIP instant messaging blends traditional instant messaging with video and text applications. More specifically, the IM menu allows subscribers to choose a character to represent them. For example, you could choose Donald Duck to be your official character to represent you on IMS instant messaging. When receiving an instant message Donald Duck could speak the incoming message (text-to-speech). Additionally, several animated features are available with these characters when messages are received. These animations and voices are selected from a template. IMS instant messaging services include a push to share feature (discussed later) where a user can send various messages and attachments simultaneously to contacts on the presence manager.

## Push to Share

Similar to PoC, push to share is a convenient feature that allows users to send pictures, videos, and audio clips in real-time speeds to members of the presence manager. This transformation from IMS being primarily used from a voice to data communication application provides limitless opportunities for carriers, particularly on the wireline side. Field workers will be able to take pictures of job sites (construction sites, service level etc) and send them to a list of work contacts. Additionally, kids can share their favorite ring tones or video clips with their predefined buddy lists. A key advantage to this feature is a simple push of a button on the handset allows users to send data simultaneously to multiple users. Much like a mass email, this efficient way of sharing information encourages interaction among a large group of mobile users. Ubiquity, a company primarily focused on developing IMS software and servers offers an innovative service which allows mobile users to receive RSS feeds. In turn, they can push to share this info (movie times, weather, and traffic) with contacts on their group/presence manager. It's possible to imagine in the near future popular social networking sites like MySpace and YouTube embracing this application as it efficiently connects a mobile community together.

## Gaming

With the convergence of fixed and mobile broadband platforms, real-time multiplayer gaming will be available on mobile devices. Utilizing the presence based server, mobile users will be able to challenge members of their 'buddy' list to games. The presence server can also keep track of user's high scores and other historical scoring information. An example of initiating a game between users is as follows: a user sends an SIP INVITE text to another user. Once the user accepts the invitation to join the game (figure 4) the player is ready to compete against other players. Figure 5 depicts an IMS version of Tetris, the popular game that requires players to put shapes in horizontal rows. As you can see the gaming interface enables users to monitor the competition in realtime as the interface is a split screen. Additionally, some games will allow users to send real-time messages to other competitors. This provides the users with a truly interactive gaming experience.



Figure4 Source: Italtel

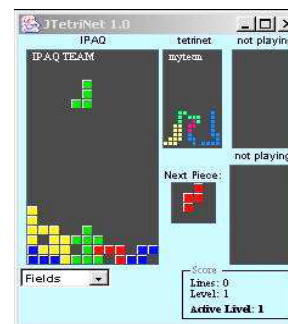


Figure5 Source: Italtel

Participating in IMS gaming is not limited to mobile vs. mobile users as fixed line convergence allows people to participate from their home PCs. Thus, a user can begin a game on a PC and finish it on a mobile unit. For example, a teenager is eagerly involved in a game of Tetris on the PC, but has to go to school in an hour. Instead of terminating the game, IMS gaming allows the boy to continue the game uninterrupted via a mobile unit. This continuous gaming experience from the PC to mobile units provides various opportunities for online gaming companies. For example, Microsoft announced at E3 its "Live Anywhere" gaming strategy which promises to link game consoles, mobile phones and PCs to an online network. The presence server will also enable gaming companies and network providers to gather more information about the user and customize in-game advertising to the interests of the gamer.

## Audio/Video Conferencing

Traditional audio and video web conferencing will be supplemented with IMS to provide a seamless integration between different devices and applications. To illustrate this, a real world example of how IMS will enrich this traditional communication median is appropriate. Imagine you begin a video conference from your PC. Your presentation includes a web cam, PowerPoint slides, and live chat. An hour after the presentation has started you have to go to the airport and need to resume the conference on your mobile handset. IMS will enable you to log on to the video conference using a 3G enabled phone and continue the conference via the handset in the car. The 3G handset will be able to attach to a wireless LAN and provide streaming audio and video quality. You will be able to continue to share slides, realtime text, and to stream video uninterrupted. In addition,

through the presence server you can send instant messages or communicate via PoC with others on your buddy list. Once you reach the airport you can deactivate you mobile IMS video/audio conferencing and use your laptop via a WiFi signal to resume the presentation.

In this example we can see how the functions of traditional PCs are being deployed by mobile handsets. Video conferencing is taking place over fixed lines (people in office listening to presentation) and over mobile devices (you in the car driving to airport).

## Fixed Mobile Convergence (FMC)

Fixed Mobile Convergence largely represents the ability for a person to use a single phone and be able to make calls over it using the lowest-cost, highest quality means whether it be cellular, fixed-line or IP-based. Interest in the FMC area is being driven largely by the fixed-line operators as they can possible regain some lost market share they have suffered in the uptake of the mobile handsets. Additionally, in regions like Europe where the roaming charges on cellular are extraordinary, both businesses and consumers are interested in deploying fixed-line or VoIP calling at a 95% reduction in price-per-minute. As you would imagine, wireless carriers in regions like Europe that are charging in excess of \$3 per minute for roaming are generally viewing the FMC opportunity more as a threat.

There are a number of solutions to the FMC opportunity that have emerged over the past few years. While many have elements of SIP/IMS in their software, the more compelling aspect tends to be the slant towards more cost-effective networks to move phone traffic.

UbiquiSys, based in the United Kingdom, has come up with an innovative solution to FMC opportunity with ZoneGate, an access point that allows VoIP coverage within the confines of a home or office for GSM/GPRS and UMTS cellular phones. Consequently, mobile users can switch to fixed-line or VoIP coverage inside buildings (or a home) to obtain lower coverage rates on outbound dialing and in some cases better quality of service. For users, a single mobile phone can be used for all calling, hence a universal phone directory. While this solution is not necessarily based on IMS/SIP, it highlights innovation that allows the use of existing cellular handsets.

Cicero Networks, based in Ireland, approaches the FMC problem from a slightly different angle. It focuses on the fixed wireline operator, and offers software both in the terminal handset (typically manufactured by HTC) and the server side to help intelligently route calls through the highest quality/lowest cost solution. In effect, Cicero is the opposite approach to the same opportunity. Fixed wireline operators are offering phones that will provide cellular coverage outside the home or office, but use the IP networks or existing land-line networks if possible to route outbound calls. The market opportunity for them is in helping companies reduce the extraordinary roaming charges levied on customers in Europe.

## Traditional Value added Services

The IMS infrastructure will support many of the value added services that traditional mobile carriers or third party vendors provide today. These include;

- Caller ID
- Call waiting, calling holding
- Call forwarding, call transfer
- Call blocking services, malicious caller identification
- Location based services (GPS)
- SMS, MMS

## ... And Innovative & Promising Mobile Applications

In the developed world, competition amongst carriers is intense, subscriber rates are leveling off and the carriers are focused more than ever on customer retention and improving ARPU by offering more value added services. As data transmission speeds increase, more applications are being developed and deployed such as mobile television. Like voice, these services will face pricing pressure over time. Carriers that offer unique services that differentiate themselves from the crowd will gain an advantage in this ultra competitive environment.

Virgin Mobile, in a joint venture with Sprint/Nextel and the Virgin Group developed a service called Rescue Ring. The purpose of the service enables users to prerecord messages on their mobile phone and set a time in which the phone will ring with the message. Instead of the original person's voice that recorded the call, the service morphs the voice to sound like another person is talking on the other end. This service can be used in many instances. For example, before a blind date you are nervous that you won't be attracted to the other person. You can use your mobile phone to program the following message 'David, this is your mom, your father had an accident and was rushed to the hospital and I need you here as soon as possible'. Next, you can set the message to ring at 9:30 pm. Later on that evening if the date is going well you wouldn't pick up the phone at 9:30 pm, but if you are disappointed you could answer the phone and converse with the pre-recorded human like voice. Such a dialogue would include the prerecorded message followed by 'oh my God I'll be there right away'. This would be an excuse to end the date. The possibilities are endless with this service, as it could be used to get out of work, family functions, or even church. Virgin Mobile offers other mobile services including horoscope, ring tones, and various media content. There are many other SIP/IMS applications on the horizon, the functionality of which will continue to evolve as SIP/IMS becomes more widespread.

## Convergence & Challenges

While the core mobile IMS applications (PoC, presence, conferencing, push to share) have been examined independently from one another it's important to see how these services can potentially converge. You could be playing a game of Tetris with a friend while using the PoC application to communicate with a buddy list. In the middle of the

game, an RSS feed pushes a video highlight from a sports event. Next, you can pause the game and push to share the sports highlights with other people on your buddy list. In this example IMS gaming, PoC, and push to share are all working simultaneously. There are limitations to the possibilities that fixed/mobile convergence offers. Most notably are the size of screens and keyboards on mobile handsets. Handset manufacturers face the challenge of developing phones that satisfy design specifications and provide end users with enjoyable mobile IMS applications. Nonetheless, there are some interesting companies supporting IMS deployment/adoption which we will examine (see appendix).

## **What are the challenges to convergence and IMS adoption?**

The move by the industry to IMS/SIP as an underlying architecture and set of standards is a long-secular trend that will take some time to gain traction. While this paper lays out the compelling reasons why this is to happen, the time frame is longer than most expect.

There are a number of factors that are slowing down the adoption including:

- billing systems that can accommodate new services in a real-time environment
- terminal (handsets) with software built-in to accommodate SIP/IMS
- networks (particularly wireless) that deliver QoS at high speeds.

### **Billing systems need to be brought up-to-date**

The implementation of IMS service delivery by the carriers is largely driven by the need to increase revenue and ARPU. Carriers are therefore demanding more complex billing systems which can support IMS services and can easily be adapted as new services are rolled out.

For the PTT/wireline carriers there are significant challenges moving from a post-paid “traditional” services model to a world where there are variations in services, payments and transport and where transaction levels are in real-time and potentially significantly higher. In order to address these challenges the carriers need flexible, scalable and real-time systems which will enable them to be more creative around the billing of their services.

In addition, the mentality of the carriers will need to change. Historically, the focus of incumbent carriers has been on attracting new subscribers, reducing customer churn and remaining competitive on price. The roll-out of new services has been less important, has tended to be over a longer time horizon and has typically been done in a piece meal approach. As technology evolves and customers become more demanding, the carriers will need to become nimbler and to roll out new IMS services in rapid succession. Not unlike the financial services industry, many of these services will be developed rapidly, have shorter life cycles and the failure rate will be high. No one foresees an application likely to rival voice in terms of uptake and adoption over the next decade, however there will be applications (such as games, video, music etc.) that will create significant

incremental revenue growth for carriers and which will force carriers to change their pricing methods.

We expect to see carriers keep their existing billing systems in place, but to complement them with a new generation of real-time rating solutions. Companies such as Highdeal, located in France, have 40+ live implementations of their real-time convergent rating engine embedded in OEM solutions to carriers today. As is the case with the HighDeal offering, dynamic graphical interfaces will allow marketing and product people to design new offerings along with their corresponding billing requirements and directly drop them into production systems circumventing the burden normally placed on the internal IT department. Nimbleness and rapid service offering will be key, and billing systems have to be accommodated for this evolving set of requirements.

### Terminal handsets need to support SIP/IMS

SIP is a text-based means of establishing (and terminating) a real-time communication session. In order for SIP to be deployed, handsets need to be equipped to run either embedded software or software that has been downloaded onto them. For the cellular market, this generally means more on-board software mandated by the carrier and supplied by third party vendors (such as Ecrio and Sonim Technologies) or directly by handset manufacturers (such as Nokia). In the FMC (fixed mobile convergence) market, the handsets must also be equipped with the SIP software and the ability to handle multiple frequencies (i.e. several flavours of GSM frequency and WiFi). This upgrade and migration of handsets will take a reasonable amount of time measured in years not months.

### Networks need to support sufficient packet speed

Networks will have demands from highly scalable applications to deliver a consistent and high level of quality. The rate of adoption of new standards like IMS and SIP will be largely determined by the reliability, robustness and performance of the underlying packetized IP network. While one can make the argument that PoC (Push to talk over Cellular) is intended to provide new features over an existing cellular network, there is substantial debate as to whether that makes rational sense from a raw resource perspective versus over a pure 3G network. Consequently we believe that a fast 3G network is a minimum requirement for implementing most IMS applications.

## Conclusion

Compelling applications and services, not industry standards will always drive the adoption of technology and IMS/SIP is no different. Having said that, we are at a unique transitional stage in the telecommunications industry's history, and a combination of competitive pressures, pricing commoditization trends and dynamic consumer demand are all shaping up as significant forces that will inspire the adoption and usage of these standards as a means for the overall industry to benefit.

Convergence takes on many meanings, but relative to our analysis in this whitepaper, we believe it represents the ability to bring together on an endpoint device a plethora of services and applications (voice, video, web, messaging) across a variety of delivery channels (fixed/broadband, wireless) to consumers and business people.

We see the ultimate achievement of this convergence through IMS taking a decade and likely changing the industry landscape and structure through the process. Carriers should be the overall benefactors but consolidation amongst them will continue. Network equipment providers (NEPs) will face a significant upgrade opportunity to sell into, but ultimately we believe the industry will become a near-oligopoly with size and scale driving survival in a highly competitive market. NEPs could encroach on the BSS space given their expertise at the network level. New service and application providers will emerge, as will entirely new networks to take on the entrenched providers.

We believe convergence provides not only an opportunity for carriers to shift their value-add from commodity-priced applications (like voice) to higher value-added services, but for these carriers to do so in a more organized and methodical fashion with lower overall capital investments. Moreover, we believe the service providers can become more nimble in the process by relying on standards that allow for quicker construction and introduction of new services. We also think the logical outcome from an M&A perspective is to see ongoing consolidation amongst the service providers, but this time between the wireline and wireless firms as they will have a common physical IP network infrastructure and a common framework and architecture based on IMS and SIP.

The value-chain in the IMS/SIP market remains fragmented but will consolidate as the market gets larger and gains momentum. Companies that have historically not been deep in the carrier network from an operational side, such as Oracle, are positioning themselves to address the market with acquisitions such as Hotsip and a broad line-up of software that extends to the OSS/BSS side of the equation. Application and content providers like Yahoo!, Google, AOL and Microsoft will clearly seek to play at the service/application layer. They see IMS convergence as an opportunity to extend dominance from the fixed-line to wireless with the emergence of a common architecture and standards. Additionally, smaller application providers such as Ecio are likely to ride the terminal handset application opportunity with little threat from the backend server providers. Sonim Technologies, which focuses on the PoC opportunity, can provide the terminal and the server solutions.

The telecom software market went through a relatively stagnant period post bubble-crash. The market is showing some signs of life again and larger companies (such as IBM and Oracle) are making strategic acquisitions in the space. The adoption of IMS/SIP represents a significant opportunity and challenge for all the players in the telecommunications value chain and should lead to a much more vibrant and growth oriented market. This structural change in the market will lead to certain of the more established telecom vendors adapting their strategy to address the opportunity and to new players entering the market with innovative solutions. We would anticipate once IMS/SIP are widely adopted that the telecommunications value chain will have significantly changed with existing players reinventing themselves, the ERP vendors broadening their offerings and new leaders emerging, particularly around new software applications. We have started along the road to convergence but we are still on the dirt tracks and the motorway is looming up ahead. There are some twists and turns to navigate but when we arrive there should be a five star hotel waiting for the winners including the end-consumers.

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### Company Description

Cingular wireless is the largest voice and data carrier in the U.S. with over 54m customers. The company was formed by the merger of BellSouth and SBC Wireless in 2001. Currently, AT&T owns 60% of the company, while BellSouth owns 40%. Wireless plans are offered as Pre-paid and post-paid packages. Cingular has a large enterprise presence as the serve more than 95% of the Fortune 100 and 80% of the Fortune 500 companies. Additionally, the company has over 1,200 federal, state, and local government agencies as customers.

### IMS Initiatives

Cingular has partnered with Lucent to help build necessary infrastructure to deploy IMS. Under the 4 year agreement, Lucent's IMS-based platform will be used to provide voice, video, data, and multimedia services that can be accessed over different types of devices. The IMS service will be offered in conjunction with Cingular's rollout of its High-Speed Data Packet Access (HSDPA) upgrade to its cellular network. The IMS applications Cingular plans on offering are unclear, but there are rumors the company plans to build a mobile roaming service using a dual-mode handset that lets users go between a home line and the cellular network. Cingular already offers PoC service (partnership Kodiak Networks); however the technology is based on non-IMS specifications.



### Company Description

Cicero Networks was founded in 2002 and is headquartered in Dublin, Ireland. The company is a provider of wireless voice over IP (w/VOIP) for the operator and service provider market. The company predominantly focuses on the fixed wireline operator as a customer who wishes to offer VoIP over wireless as well as cellular from a single phone solution. The company has received numerous awards for innovation in the w/VOIP space. In 2005, the company was named to the Pulver 100 list for the 2<sup>nd</sup> time. The Pulver 100 list features private companies in the communications sector with real-world deployments and enjoy significant growth rates. Additionally, Cicero Networks was awarded the best VoIP product at the 2006 Wireless Broadband Innovation Awards. With more than 150 companies competing for the award, Cicero Networks was recognized as a leader in fixed and mobile convergence.

### IMS Initiatives

The company's software solution allows mobile phone users the ability to make and receive all of their calls – VoIP, Fixed and Cellular – though the same phone. When

multiple wireless networks are available (WiFi, 3G, WiMax, or Cellular) the software intelligently routes calls to the optimal network. Switching between networks is also automatically routed when leaving one network and entering another. Users can override this automatic detection and manually set their preferred network. Using the Cicero Phone software businesses and consumers can reduce their voice costs while adding increased flexibility to communication. For example, when roaming on a cellular network users of Cicero Phone Software can eliminate these added costs by connecting to WiFi networks. The software is automatically configured to log users on to WiFi hotspots. This switching between networks would reduce mobile costs while leveraging cheaper wireless networks in the area. The software is especially useful in Europe as users can avoid costly roaming charges. The company management sees performance and quality of service rather than pricing as drivers for business in the United States. Value added services like call waiting/forwarding, instant messaging, redial, and mute are also supported by the Cicero Phone Software. The solution can come pre-installed by handset manufactures/service providers or downloaded. On the backend, the Cicero Controller is the server that manages the infrastructure and routes and manages connections between networks. In addition, the Cicero Controller maintains call activity, including time and duration allowing billing to be calculated.



### Company Description

The core of Comverse's business is to provide communication software and equipment to wireline/wireless providers, call centers, and government agencies. Comverse operates in three segments: Comverse Network Systems, Service Enabling Signaling Software, and Security and Business Intelligence Recording. The company was founded in 1984 and is headquartered in New York City.

### IMS Initiatives

Comverse up until recently has been slowly entering into the IMS space. The company was reluctant to embrace IMS as the technology poses a threat to Comverse's legacy business. Nonetheless, in April, Comverse acquired NetCentrex a software company that enables IP-based voice-video data and fixed mobile convergence. Some of NetCentrex solutions include: IP telephony, video telephony, triple play, IP centrex, voice and video VPN, contact center and IVR services. These solutions are all built on an IMS compliant infrastructure that includes media services and provisioning/management. NetCentrex's products are deployed in more than 50 service providers worldwide, including: France Telecom, Fastweb, and Tiscali. Last year, Comverse also expanded into server side with the release of the company's first presence IMS server. The functionality of the server also is designed to support existing legacy messaging services.



### Company Description

DoCoMo is the largest wireless carrier in Japan and the second largest in the world in terms of subscribers. A large portion of the customer base (45m) subscribes to i-mode an innovative mobile internet and email service. Additionally, the company is in the business of providing phone services for in maritime and in-flight passengers. NTT owns 64% of the company.

### IMS Initiatives

DoCoMo captures value from being both a carrier and application provider. On the carrier side, mobile connections in Japan have stalled. With revenue flattening the company is trying to increase ARPU through their popular i-mode service. The open standards of IMS based on 3GPP enable DoCoMo to easily integrate new services into i-mode. Ecrio, recently licensed out their PoC application to DoCoMo and the open standards of IMS allowed the application to be easily integrated. Along with PoC, some features of i-mode include video transferring, presence, mobile television, push button tracking, and video conferencing. I-mode is available on the 3G FOMA line of phones. The 3G FOMA handset is one of the most complete phones on the market with a 2 GHz frequency band and data packet transfer rates ranging from 64 kbps to 384 kbps. These transfer speeds allow IMS applications to run efficiently on their network.



### Company Description

Ecrio is headquartered in Cupertino, California and a leading provider of IMS and SIP software for mobile phones. The software is compliant with 3GPP standards. Ecrio is a privately held company that was founded in 1998. Cypress Ventures and Next Ventures are the company's largest outside shareholders.

### IMS Initiatives

Ecrio's software line consists of instant messaging, presence services, IP multimedia services, and push to talk (PoC) software. The software is available for native OS, Symbian OS, Pocket PC, Smartphone, and Palm OS operating systems. Ecrio has strong partnerships with some global leaders in IMS. In Oct. 2005, DoCoMo signed a deal with Ecrio to license out their PoC software. DoCoMo is deploying the PoC software on their FOMA line of phones. This agreement is significant as DoCoMo has over 50 million subscribers in Japan that have traditionally embraced next generation mobile applications. On the handset side, companies licensing Ecrio software include: NEC, SonyEricsson, and Panasonic. While the company has historically been focused in the wireless handset market, we believe the company will be introducing FMC application support for wireline/wireless opportunities during 2006. The company has developed

extensive relationship with handset manufacturers in Asia/Japan including NEC, Panasonic, Fujitsu, Mitsubishi and Sony Ericsson.



### Company Description

Ericsson is a provider of telecommunication equipment and related services to mobile and fixed-line operators globally. The company has a joint venture in place with Sony to manufacture mobile devices. The company was founded in 1876 and is headquartered in Stockholm, Sweden.

### IMS Initiatives

Ericsson offers an end to end solution from the backend (servers, nodes, etc.) to the front-end (phone, software). In addition, Ericsson has professional support to help integrate IMS infrastructure. Ericsson's solution is compliant with 3GPP/3GPP2 IMS standards. The company has signed 18 contracts for commercial launch and 37 for commercial trial making Ericsson the worldwide leader in deploying IMS services. Some of the carriers under contract include Vodafone, GrameenPhone, France Telecom, and TeliaSonera. On the application side, Ericsson offers PoC, IMS Video, Messaging, WeShare (simultaneous speech & media share), and Studio (developer tool).



### Company Description

HighDeal is a French software company that was spun off in 2000 from France Telecom. The company's software provides pricing, rating and billing options while managing and settling transactions between partners (suppliers, distributors, service providers). HighDeal's customers are primarily telecommunication carriers, online services, and media companies. The company has over 140 implementations in more than 40 countries worldwide.

### IMS Initiatives

With the emergence of quadruple play, a single billing platform is necessary to charge users for all these emerging applications. HighDeal's convergent rating engine is a real-time billing solution that provides carriers/content providers flexibility with pricing quadruple play applications. HighDeal's solution is built to complement existing legacy billing solutions and is very easy to customize. The software enables businesses to set their rating pricing by utilizing a patented decision tree. This decision tree allows mapping to be set by simply dragging and dropping relevant information without using code. Once pricing has been set on the decision tree, billing can be captured for pre-paid and post-paid customers. The company's solution focuses on pricing and rating, but they are working to add a charging element. Companies license the software from HighDeal and can also receive support in implementing. Many large companies use HighDeal's

software to help in bill customers in an ‘a la carte’ manner. The HighDeal Transactive rating engine is an integrated part of Nokia's advanced charging solution for mobile data services. Additionally, some other large customers include; AOL Germany & France, Webex, and Ericsson. About half of these agreements are signed through HighDeal's direct sales force. The company's business model is based upon on a per-subscriber or per transaction depending on volume. As 3GPP standards take hold and new mobile applications are developed, the company is positioned to gain significant market share in the mobile billing space.



### Company Description

Huawei Technologies is China's largest manufacturer of telecommunications equipment. The company's products and solutions cover core voice and data switching platforms, optical networking systems, wireless products, corporate networking equipment, and network management and messaging software. Some of the Asian carriers the company serves include China Telecom, China Unicom, and SingTel. In addition, the company serves more than 270 telecommunications operators worldwide including 22 of the world's top 50. The company currently employees over 34,000 people worldwide.

### IMS Initiatives

Huawei Technologies is a vendor of softswitch technology for SIP/IMS. Huawei's IMS platform is based on 3GPP specifications and the company recently licensed Ubiquity Software's SIP Application Servers. Integrating these servers has allowed the company to offer end users with a tailored end to end IMS solution. Huawei Technologies solutions include: conference services, PoC, messaging services, unified messaging, presence, and group communication. The company has signed large contracts with global telecommunication companies.



### Company Description

Lucent Technologies is a provider of telecoms equipment, and manufacturer of products used to build communication network infrastructure. In addition, the company also develops communication software. Some of the leading telecommunication company's use Lucent's wireless and wireline products to help manage their infrastructure. Lucent's customer base includes both enterprise and government clients. In April, the company agreed to be acquired by their French rival Alcatel for \$13.4b. The deal is pending approval before the merger is complete.

### IMS Initiatives

Lucent provides critical infrastructure in 3G UMTS network equipment, software and services for IMS deployment. The company's IMS portfolio is offered under the name Accelerate™ Next Generation Communications. Some of the key elements of the portfolio include; Lucent Session Manager, including: the service broker function; the Lucent Feature Server; Lucent Unified Subscriber Data Server; Lucent Network Controller; Lucent Network Gateway; Lucent Communication Manager with next-generation features; MiLife® Application Server and MiLife® SurePay® Solutions. The company signed some large contracts in 2005. Cingular Wireless and SBC recently signed agreements to license out components of Lucent's IMS portfolio. According to a SBC press release, the company plans on delivering voice, video and data services to its customers by the end of 2006, and their relationship with Lucent is critical in meeting this goal.



### Company Description

Motorola is the 2<sup>nd</sup> largest manufacturer of mobile handset units in the world. The company is also a provider of public and enterprise wireless infrastructure communication systems, including: hardware, software and services. Motorola has a fully owned finance subsidiary Motorola Credit Corporation (MCC). The company is based in Schaumburg, Illinois and was founded in 1928.

### IMS Initiatives

Motorola launched their IMS program in 1994, and today is at the forefront of the emerging technology. The company offers a complete range of products and services including: handsets, core network components, applications, and service delivery and support. Motorola's IMS can support applications that run in a circuit-switched environment, as well as provide an economical platform where IMS premium applications can be added. These applications include PoC, push to share, multi-player gaming, remote surveillance, and streaming audio/video. On the billing side, Motorola offers secure third party access to billing systems to cover prepaid, pay as you go, or unlimited usage mobile users. At the 3 GSM last year, Motorola showcased their IMS applications with a demo allowing mobile users to watch television on a 3G phone over an IP network. The demo also showcased video/audio conferencing over an IP network. Motorola's platform is access agnostic as they work for GSM, CDMA, WiFi, Broadband, and PSTN networks.



### Company Description

Based in Finland, Nokia is the world's largest handset maker. The company products are divided into four divisions: mobile (wireless voice & data services), multimedia (mobile gaming devices & satellite services), networks (wireless switching & equipment), and enterprise solutions (wireless systems for businesses). Nokia manufactures handsets based on GSM/EDGE, 3G/WCDMA, and CDMA cellular technologies. Its products are sold to operators, distributors, independent retailers, and corporate customers.

### IMS Initiatives

Nokia was the first company to provide an end to end solution for SIP based applications. Some of the mobile applications the company offers on their handset include: voice, presence, interactive gaming, PoC, video/audio sharing, and chat. Nokia has many contracts worldwide to deploy their IMS service. Among one of the largest is a recently signed agreement with Vodafone. Nokia will deploy their end to end IMS service worldwide to Vodafone customers for 2G and 3G networks. In addition, Nokia has deployed many elements of their IMS platform to network carriers. Telecom Italia Mobile (TIM) is using Nokia's software and infrastructure in launching a video and communication service. Chunghwa Telecom licensed Nokia's SIP/IMS application servers to launch a PoC service. Nokia and Ubiquity Software teamed up last year to develop a media push application that allows users to subscribe to news and other types of media content, and get selected content pushed to their terminal handset. This partnership is an example of how the open standards of SIP/IMS encourage companies to partner in developing new innovations. The partnership also established an agreement to include Ubiquity's IMS servers as part of the company's end to end IMS solution.



### Company Description

Oracle is one of the largest enterprise software and database companies in the world. The company's database management software enables enterprises to store and access data across numerous platforms. Oracle also has software that allows organizations to effectively manage supply chains, data warehousing, and customer relationship management. The company is located in Redwood Shores, California and was founded by Larry Ellison in 1977.

### IMS Initiatives

Next to financial services Oracle's largest vertical is telecommunications. The company further expanded into this space with the acquisition of Hotsip and Portal Software. Hotsip is a provider of telecommunication infrastructure software and SIP enabled applications for IP telephony, presence, messaging, and conferencing on new converged networks. The company offers products on both the client and server side. It was important for Oracle to acquire a company like Hotsip with strong OEM relationships

(Nokia, Ericsson, and Motorola) and live customer deployment (TeliaSonera, Telenor). Portal Software focuses in on the billing side. The company is a maker of billing and revenue management software for the communications and media industries. These acquisitions in addition to the purchases of TimesTen (database) and Net4Call (virtual PBX, click2dial) form the core of Oracle's service delivery platform (SDP). Some of the key offerings in SP middleware platform include Oracle's core real-time database, an application server, and a standards-based BSS integration to connect to front office applications like CRM. Oracle plans to roll out a virtual PBX and push email and content delivery service. The company believes that early adopters of IMS have a significant advantage and will reap the benefits in the next 3 to 5 years.



#### Company Description

Sonim was founded in 1999 and is headquartered in San Mateo, California. The company makes 3GPP IMS compliant server and client software that enables a series of applications including OMA PoC. Sonim was instrumental in writing the initial specifications for the OMA PoC standard and provides a complete end-to-end solution. Some of the investors of the privately held company include 3i, Accel Partners, Apax Partners, and BV Capital.

#### IMS Initiatives

The company offers an IMS compliant OMA PoC server (XPS) which runs standalone and on top of most major IMS subsystem providers (e.g. Nortel, Ericsson, Nokia, Huawei, ZTE). This server runs as a hosted deployment or a premise-based solution for carriers. The two types of servers offered are a standard grade and upgradeable version. The upgradeable server is a turn key solution that has all the components to handle SIP routing, call management, media processing, presence and status management. Sonim also provides the Sonim xperience client (XPC) which provides handset vendors with an OMA PoC client capability for either embedded handsets or a downloadable version for Symbian, Microsoft, Brew and Linux-based smart phones. Sonim has partnered with some key players in the IMS market. Openwave signed an agreement to resell Sonim XPC to handset manufacturers. Nortel also signed an agreement with Sonim to offer XPC to their customers. Sonim is commercially deployed in multiple carriers in Europe and in trials in Asia as well.



### Company Description

Sprint is a North American wireless and wireline carrier. The company merged with Nextel and formed one of the largest wireless carriers in North America. The company has over 50m wireless subscribers. The wireline business provides local and long distance service to business and consumers. The company was founded in 1899 and is headquartered in Reston, Virginia.

### IMS Initiatives

Sprint and Nextel offer their own popular PoC service that pre-dates IMS. Nextel has been offering customers a PoC service for years and Sprint introduced a comparable service called ReadyLink, although these services were inoperable across other networks. Sprint, is in the process of rolling out a new service to supplement their popular mobile broadband product EV-DO. The service utilizes some functions of IMS and will include; using a mobile phone to view live TV broadcasts, check the program listings, program a DVR, or watch a program stored on a DVR. Sprint is also focusing on creating many programs targeted towards business customer. The company's biggest challenge in the IMS space is migrating many of their legacy services (PoC, Push to share) to an IMS platform without incurring huge costs or losing functionality.

## SYBASE

### Company Description

Sybase is an enterprise software company specializing in managing and mobilizing information from the data center to customers. The company's solutions integrate platforms, databases, and applications to mobile users through mobile and WiFi technologies. Sybase focuses on select verticals including: financial services, telecommunications, healthcare and government. The company headquarters are in Dublin, Ca and was founded in 1984.

### IMS Initiatives

Sybase's offers wireless carriers a solution to deliver real-time personalized content to mobile users. Mfolio, the company's software is designed to take advantage of the increasing computational power that convergence brings. The software is integrated into handsets to allow for optimal display and battery life. In addition, the software is designed to minimize the scrolling required on handsets. Information is accessed quicker through caching content on the edge of carrier's networks. The Mfolio solution allows wireless subscribers to easily view all Web-based content, not just content developed for mobile devices. The Mfolio software includes some innovative features:

- content alerting (RSS feeds) – alerts users when requested content is updated has been updated and ready for viewing. Users typically use the service to receive stock or news alerts

- camera photo albums- allows users to share and store photo's on their mobile devices
- podcasts - allows users to access audio/video podcasts from mobile devices

The Mfolio carrier edition operates on various handsets including Palm Treo's, Rim Blackberry's, and Motorola's RAZR. The software has gained traction in the recent months with key OEM agreements with CellStar and Cibenix.

## TeliaSonera

### Company Description

TeliaSonera is a leading telecommunications provider in the Nordic and Baltic regions. The company provides service to over 8 million fixed lines and about 15 million mobile phones subscribers. Additionally, the company has over 2 million internet subscribers. With the deregulation of the telecom market in Sweden the company has expanded operations overseas into other parts of Europe, Asia, and the Americas. A majority of the company is owned by the Kingdom of Sweden followed by the second largest owner the Republic of Finland.

### IMS Initiatives

TeliaSonera is in the process of testing many IP based solutions for its customers. Partnering with Nokia and Cisco the company is testing a wireless IP telephone via WLAN for enterprise customers. The wireless IP telephone system will allow enterprise customers to work completely mobile. Inside the office, a user of the IP telephone system will utilize IP and WLAN networks. When the users leave the office, the IP telephone system will pick up on a mobile network while preserving the same features available inside the office. The first phase of testing is complete and participants were positive with the telephone system. They were extremely pleased with the ability to carry one phone throughout the day and receive one bill for wireline/wireless communication. TeliaSonera has also been testing to ensure that IMS/SIP interoperable worldwide.



### Company Description

Telcordia is a provider of open configurable software for IP, wireline, mobility and cable networks. Telcordia is headquartered in Piscataway, N.J, with offices throughout the United States, Canada, Europe, Asia, Central and Latin America.

### IMS Initiatives

Telcordia offers carriers an extensive suite of IMS products and services. This portfolio includes; billing, servers, and applications. On the billing side, Telcordia Converged Real Time Charging solution provides carriers with the ability to charge for next generation services. The billing solution is IMS compliant and supports standard fixed, mobile and IP interfaces. Some wireless operators using the billing system include: Tata Teleservice

(India), Oi (Brazil), and Virgin Mobile. On the server side, Telcordia's Converged Application Servers enable fixed and mobile carriers to delivery customized IMS services. The key features to the servers are the open interface and protocols that work with pre and post IMS compliant networks. Additionally, Telcordia's Converged Application Servers support both circuit switched and IP networks. On the application side, Telcordia recently introduced location based services and ringback tones to their portfolio of applications.

Some features of the location based applications include:

- Child tracking- check the current location of a child or log book that saves tracking data throughout the day
- Finding friends- enables alerts when buddies are in close proximity, also the service allows users to share their current location with others
- Fleet tracking- manage the location of a group employees via mobile phones allowing alerts to be set for particular set parameters
- Finding a business with directions- restaurants, gas stations, grocery stores



#### Company Description




Ubiquity Software was founded in 1993 and is a provider of SIP based Application Servers. The company primary focus was on VOIP, but in 1999 the company reengineered their model to concentrate on SIP/IMS products. Ubiquity Software headquarters are in Cardiff, Wales and is publicly traded on the Alternative Investment Market (London Stock Exchange) with a market cap of 64.04m £.

#### IMS Initiatives

Ubiquity Software was one of the first companies to provide SIP Application Servers. The company offers carrier grade servers and a programmable, standards based base server. Some of the portfolio of applications include; mobile conferencing, IP multi-media conferencing, push-to-conferencing, and mobile music sharing. In addition, the company has a professional service division that assists in offering customizable products. In May, the company announced the launch of the Ubiquity Developer Network (UDN), the industry's first community of developers partnering in discovering new services based on SIP standards. In partnering with Network Equipment Vendors (NEV), System Integrators (SIs), Complementary Technology Partners (CTPs), Independent Software Vendors (ISVs), and Service Providers (SPs) applications will be brought to the market quicker. More than 30 companies form the UDN partnership with Ubiquity Software. Some of these companies include; Borderware; Cantata; CGI; Convedia; Counterpath; Followap; Huawei; HP; JBoss; Magpie; MDS; Movial; New Heights; Nokia; Qualphone; Radvision; Sandcherry; SipStorm; and United Online. Additionally, the company has numerous agreements in place with major carriers. In May, Ubiquity announced an agreement with BT to provide SIP application servers. This deal was significant for Ubiquity as they were selected over large competitors (BEA Systems, Ericsson) to aid in deploying BT's 21st Century Network (21CN) \$18B IMS strategy. It's

estimated that the contract is potentially worth tens of millions of pounds. The company also announced a large contract agreement last March with Bell Canada. Ubiquity is providing the company with programmable SIP application servers and a conferencing solution (Speak). The servers enable Bell Canada and system integrators to deliver customized IP services. Speak, is an IP conferencing solution that is enriched by the various features of Ubiquity's SIP Applications (voice, video, data). In the North America, the company signed a three year agreement with AT&T. Under the agreement, AT&T is testing next generation VOIP services using Ubiquity servers. While the three year testing is in its infancy, the contract with AT&T provides Ubiquity with added credibility and a potential lucrative partner in the future.

# Arma Partners Announced Transactions

<p>January 17, 2006</p> <p><b>Undisclosed</b></p>  <p>has been acquired by</p>  <p>Arma Partners acted as exclusive financial advisor to Kreatek Communications AB</p> <p>Armapartners</p>	<p>June 2, 2005</p> <p><b>\$55,000,000</b></p>  <p>has been acquired by</p>  <p>Arma Partners acted as exclusive financial advisor to Inca Digital Printers Ltd</p> <p>Armapartners</p>	<p>April 21, 2005</p> <p><b>Undisclosed</b></p>  <p>has been acquired by</p>  <p>Arma Partners acted as exclusive financial advisor to Cirpack S.A.S.</p> <p>Armapartners</p>	<p>December 20, 2004</p> <p><b>\$94,000,000</b></p> <p><b>SESA</b></p> <p>has been acquired by</p> <p><b>TietoEnator</b><sup>IE</sup></p> <p>Arma Partners acted as exclusive financial advisor to S.E.S.A. AG</p> <p>Armapartners</p>
<p>December 2, 2004</p> <p><b>Undisclosed</b></p>  <p>has been acquired by</p>  <p>Arma Partners acted as exclusive financial advisor to Ubitrade SA</p> <p>Armapartners</p>	<p>November 8, 2004</p> <p><b>\$52,000,000</b></p>  <p>has been acquired by</p>  <p>Arma Partners acted as exclusive financial advisor to Mosaic Software Holdings Ltd</p> <p>Armapartners</p>	<p>October 4, 2004</p> <p><b>\$112,000,000</b></p>  <p>has been acquired by</p>  <p>Arma Partners acted as exclusive financial advisor to Dione Plc</p> <p>Armapartners</p>	<p>April 27, 2005 February 8, 2005 August 3, 2004</p> <p><b>\$45,000,000 (agg.)</b></p> <p>Anite Group's disposal of:</p> <p><b>Anite Consulting</b> to <b>softlab</b></p> <p><b>DATAVANCE</b> to <b>Financière RDM</b></p> <p><b>Anite systems</b> to <b>VEGA</b></p> <p>Arma Partners acted as exclusive financial advisor to Anite Group plc</p> <p>Armapartners</p>
<p>January 26, 2004</p> <p><b>\$44,000,000</b></p>  <p>has been acquired by</p> <p><b>Avid</b></p> <p>Arma Partners acted as exclusive financial advisor to NXN Software AG</p> <p>Armapartners</p>	<p>December 23, 2003</p> <p><b>Undisclosed</b></p> <p><b>Apax PARTNERS</b> And other investors</p> <p>have acquired</p> <p><b>CARTESIS</b><sup>®</sup></p> <p>Arma Partners acted as exclusive financial advisor to Apax Partners</p> <p>Armapartners</p>	<p>November 4, 2003</p> <p><b>\$210,000,000</b></p>  <p>has been acquired by</p> <p><b>Novell</b></p> <p>Arma Partners acted as exclusive financial advisor to SUSE Linux AG</p> <p>Armapartners</p>	



## **About Arma Partners**

Arma Partners is an independent investment banking firm focused exclusively on providing corporate finance advisory services to technology companies. We provide our clients with advice on public and private mergers and acquisitions, financial restructuring, equity capital raising, as well as a range of other advisory services.

Arma Partners is dedicated to helping our clients achieve their financial and strategic objectives. Our sole focus on the technology sector gives us an unparalleled understanding of, and experience in, global transactions within this industry.

Our team of professionals is among the most seasoned in the technology sector, having advised on dozens of international landscape-changing transactions, and our approach is always to dedicate the necessary senior-level attention to deliver superior value to our clients. Arma Partners has offices in London and Palo Alto.

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