WHITE PAPER

Mobile Instant Messaging: The Next Global Messaging Opportunity

Sponsored by: NeuStar

Scott Ellison   Elisabeth Rainge
William Stofega
November 2006

SECTION I: EXECUTIVE SUMMARY

Mobile Instant Messaging (MIM) is the next major global messaging market opportunity and represents a natural evolution of the enormous global success of Short Messaging Services (SMS) and its over 1 billion users. In light of worldwide acceptance of wireless and a global culture of SMS texting, the mobile industry has recognized the global market opportunity of MIM and other next-generation and converged services and is deploying flexible IP-based infrastructure to support these new market opportunities.

These infrastructure deployments and the closely related work of standards bodies such as the Open Mobile Alliance (OMA) have laid the foundation for a new phase of mobile services innovation, which will quickly become apparent in the next 12 months in key regions of the world such as Europe, Asia, and North America with the deployment of a new generation of MIM. These new MIM services will likely be offered to SMS users as next-generation SMS with appealing new functionalities such as presence and instant message exchange, and that will quickly evolve to include the easy sharing of content and media.

Furthermore, infrastructure investments in IP-based approaches such as Session Initiation Protocol (SIP) allow mobile operators to offer these advanced MIM functionalities in a cost-effective and operationally efficient way while also providing a clear market and operational transition path from a decade-old SMS infrastructure and cost basis to a higher-margin and more efficient IP infrastructure and cost basis. In turn, the advanced functionality, efficiency, and cost structures associated with IP-based mobile messaging such as MIM offer the wireless industry new opportunities to create innovative new products, further increase messaging adoption and usage, and substantially increase messaging revenue.

MIM interoperability is a key immediate need that can be effectively addressed through IP-based approaches such as SIP that incorporate all-IP number-based directories and that are administered in a competitively neutral manner. The flexibility and appeal of this approach create multiple market opportunities, including:

☑ Accelerated global MIM adoption in the existing SMS user base

☑ A clear evolutionary path for creation and deployment of converged mobile messaging including SMS, email, PC-based IM, and MIM

☑ Creating the basis for even more advanced forms of converged and real-time communications, such as converged voice, video, and music

Finally, MIM is the first presence-enabled wireless application that could ultimately transform how mobile users initiate person-to-person communications including messaging, music, video, and user-created content. Just as youth and young adults often rely on IM instead of email for PC-based communication, MIM offers a similar opportunity to transform existing SMS messaging behavior over time.

SECTION II: MIM IS THE NEXT MAJOR WIRELESS MESSAGING OPPORTUNITY

Two of the most fundamental dynamics of the global wireless market are the appeal of wireless voice and data communications in every region of the world and the rapid adoption of wireless SMS messaging. Indeed, wireless messaging adoption and growth through SMS in both the developed and developing worlds is one of the brightest stories of wireless, as SMS is now the closest to a near universal and accessible global data communications medium and the largest single contributor to data services revenues. As of 2006, IDC estimates that there are approximately 1.2 billion wireless messaging users around the world, most of whom are using SMS.

MIM is the next major global messaging revenue opportunity, as SMS has proven to be the basic business model for wireless messaging. MIM represents an appealing functional evolution of familiar SMS and will grow into the existing global SMS base of more than 1 billion users.

IDC also believes that existing SMS users will find MIM a highly compelling value proposition, and adoption of MIM by SMS users represents a logical adoption path as MIM creates a more relevant and compelling user experience in several key aspects:

1. MIM is real-time communications and tends to create a messaging "conversation" by avoiding the network transmission response delays associated with SMS and email.

2. MIM incorporates contact buddy lists — which are the personal and business communities defined by each individual end user. An MSDIN-based addressing solution can turn the handset's phonebook into the buddy list and can turn MIM into an easily understood "upgrade" from SMS.

3. MIM incorporates contact presence information — which serves as a virtual invitation to initiate an IM exchange by noting when members of the user's MIM community are available to exchange messages.

4. MIM increases the relevancy of the messaging experience by combining real-time communications and presence information within a user-defined community.

#204458 ©2006 IDC

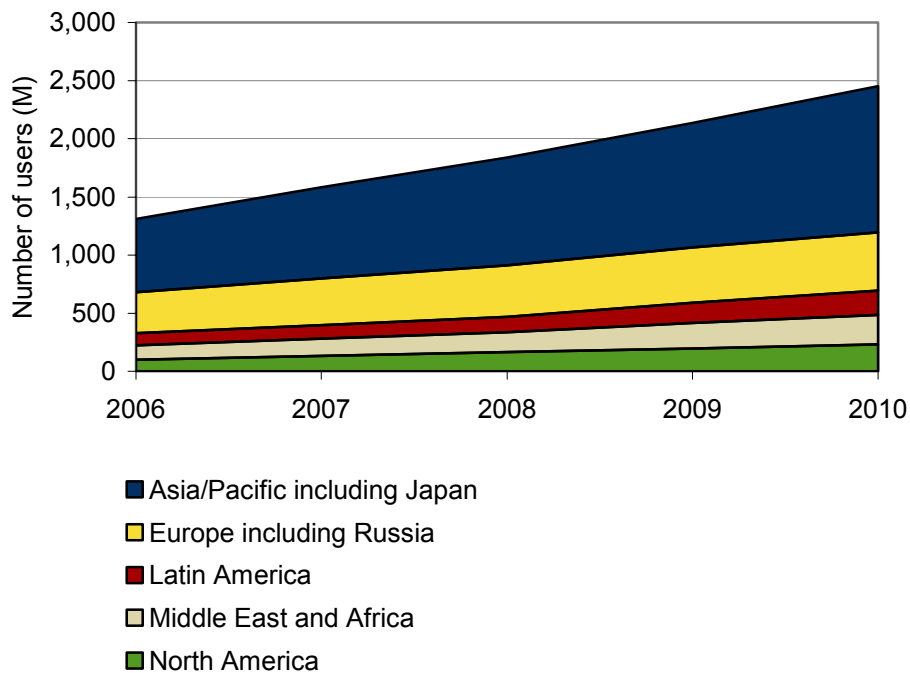# SECTION III: OVERVIEW OF WIRELESS MESSAGING MARKET

The global wireless messaging market began in the late 1990s in Europe and Asia with SMS text messaging. SMS interoperability among carriers was established relatively early — especially in Europe — often as a by-product of extensive roaming agreements among providers given higher levels of inter-country and inter-carrier roaming. Messaging in both these regions very quickly became a standard and convenient form of wireless communications through viral adoption and thereby created the now familiar global "culture of texting."

Since approximately the turn of the millennium, the global messaging market has literally exploded. Although many are familiar with the U.S. market experience where SMS traffic quadrupled in less than six months after the implementation of interoperability, one of the most significant drivers of the global messaging market is growth in the developing world. Specifically, new wireless users in the developing world often adopt wireless messaging — typically SMS — simultaneously when first adopting wireless voice. Indeed, in many countries, wireless messaging is the main form of data communications and is used for a range of purposes from person-to-person communications, to setting market prices for commodities, to forms of banking such as payment transfers.

Even in more developed areas of the world such as Asia, Europe, and North America, wireless messaging continues to grow, through both increased adoption and increased usage. Key drivers of increasing growth now and in the future will be new forms of wireless messaging beyond SMS, including wireless email access — especially in the enterprise market — Multimedia Messaging Services (MMS) with its ability to handle different media formats such as images and video, and especially MIM as the logical evolution of the SMS market. Indeed, IDC estimates that the total global wireless messaging market will increase by over 1 billion users in the 2006–2010 time period, as a function of both underlying total global subscriber growth and continued messaging adoption (see Figure 1).

Global Wireless Messaging Users

Source: IDC, 2006

SECTION IV: KEY DRIVERS OF GLOBAL MESSAGING

Beyond the simple growth of wireless subscribers, the global wireless messaging market is driven by five primary values, which in combination contribute to continued rapid growth of wireless messaging subscribers, traffic, and resultant revenue:

☑ **Connectivity:** Perhaps one of the most basic but often overlooked drivers of the global messaging market, indeed of the global wireless market itself, is the simple human desire to connect with one another in different ways. Wireless messaging is one of the most effective and universal means for people to communicate with one another beyond voice communications. And MIM does not require 3G networks; it can be offered over existing 2G and 2.5G networks.

☑ **Universality:** The universality of wireless messaging is a key driver — most handsets manufactured today are capable of at least SMS messaging and are increasingly being shipped with MIM-enabled clients — so both messaging and voice are standard capabilities understood by users and available at the outset. And universality supported by broad interoperability helps drive viral adoption — still the most effective and least expensive form of marketing for any carrier.

☒ **Affordability:** Wireless messaging is typically very cost-effective for both operators and end users compared with a voice call, with operator costs for a text-based message as little as a fraction of a cent, and end-user charges as low as a few pennies a message. And IP-based messaging such as MIM will have an even lower cost basis and higher-margin opportunity than those offered by decade-old legacy SMS infrastructure solutions.

☒ **Efficiency:** In IDC surveys, end users cite the time efficiency of messaging as a key appeal; for instance, being able to send a short message that requires no reply (such as they are running 10 minutes late) rather than initiating a voice call that may require more time and potentially create additional delay or receiving a message that can be read later rather than having to respond to an incoming call. And the youth market's adoption of IM clearly indicates an instant-gratification expectation as a result of presence. Also, using a native mobile IP channel instead of WAP means that MIM can be very bandwidth efficient.

☒ **Flexibility:** Email and wireless messaging — including SMS, MIM, and MMS — are flexible communications media that are increasingly being used in different ways. For instance, messaging is a key channel for delivery of content, whether it be purchased entertainment content, consumer-created content such as pictures, or enterprise content such as alerts or work orders. And MIM can readily be expanded to support arbitrary media types, including voice, video, music, and user-created content file transfers.

SECTION V: YOUTH AND YOUNG ADULTS AND ENTERPRISES AS KEY EARLY MIM ADOPTERS

Youth and young adults and enterprises will be key early market adopters of MIM, just as they have been the core early adopter segments of most new forms of wireless messaging. However, the market drivers for these two market segments are somewhat different.

For youth and young adults, key wireless messaging drivers are typically:

☒ Communicating with friends

☒ Staying current with peer group trends

☒ Instant gratification

Youth and young adults around the world are typically one of the earliest adopter groups for the latest and most advanced wireless data capabilities and have been a key early adopter group for MMS just as they were with SMS. MIM should have strong appeal to this market segment, especially with interoperable presence information, which meets the key need of this market segment to stay closely connected with one another. IDC also notes that the high uptake among U.S. youth and young adults of PC-based IM is a potential early indicator of the appeal of "instant gratification" offered by MIM to youth and young adults on a global level, especially in light of existing high uptake of SMS among youth and young adults around the world.

For enterprises, adoption of wireless data services is typically driven by key considerations, including:

☑ Increasing efficiency and productivity

☑ Compressing competitive response times

☑ Controlling costs

☑ Increasing customer and staff communications

MIM can address such considerations, just as PC-based IM is becoming increasingly prevalent in the enterprise market for the same reasons. MIM is real-time communications that can augment other forms of communication such as voice calling and email. MIM can be cost-effective, as it can replace some voice calling and thereby contribute to voice plan savings. And as more enterprises use MIM themselves for both their staff and customer communications, they will come to expect that their key partners and vendors use MIM as well in order to meet customer needs and expectations in terms of response times.

SECTION VI: MIM INHIBITORS TO DATE

The market inhibitors to global MIM adoption and traffic growth are more complex than those the industry faced with SMS, with the key inhibitor being lack of interoperability among different operators. Key MIM interoperability challenges include:

☑ **Complexity:** MIM interoperability is substantially more complex than that for SMS, as SMS interoperability is typically addressed through non-real-time "batch and match" solutions that do not address fundamental MIM issues such as presence management, contact list sharing and management across different networks, and creating a real-time messaging experience.

☑ **Aversion to "siloed" solutions:** Wireless service providers are increasingly reluctant to invest in siloed solutions to an issue or market opportunity, recognizing that investments must be made strategically not only to address an immediate opportunity but also to lay the foundation for additional market opportunities, ensure operational efficiencies, and drive greater total return on investment (ROI).

☑ **Need to lower MIM cost basis:** Additionally, as SMS traffic grows to billions of messages exchanged per mobile operator per month, mobile operators are looking for a lower cost basis over which to provide MIM than the legacy and higher cost basis SMS networks that represent a decade-old approach. And the richer MIM feature set that can be supported cost-efficiently by IP-based solutions and infrastructure can provide both a compelling value proposition to end users and substantial new revenue streams to mobile operators.

- ☑ **Competitive neutrality:** Wireless carriers and their MIM solution partners to date have had understandable concerns about how MIM can be addressed in a competitively neutral manner that protects their own competitive positioning while addressing sensitive issues such as how to manage and protect presence information.

- ☑ **MIM productization:** Finally, to date, the wireless market has found it challenging to productize non-IP-based MIM that is non-interoperable, or does not include expected functions such as presence indicators, or that is delivered through SMS and can therefore be time-delayed.

SECTION VII: IMPORTANCE OF PRESENCE AND PRESENCE MANAGEMENT IN MIM

The role and importance of presence in MIM cannot be under-estimated as it is a key functional differentiator compared with other available types of messaging such as SMS and MMS. Presence information contributes to a richer messaging experience because it signals when a contact is receptive to engaging in a MIM exchange, and MIM sessions are similar to PC-based IM sessions in that they more closely resemble a conversation conducted in real time than does time-delayed SMS or email. Indeed, youth and young adults are well-known to engage in hours-long IM sessions over desktop PCs, just as enterprise users are known to regularly multi-task using IM during conference calls or meetings that don't require their full attention at a given moment.

Because presence information is typically shared only between users with permission and tends to indicate a closer business or personal relationship between users, effective management of presence information is highly important for adoption of MIM. For instance, a client might feel ignored by a vendor contact whose MIM presence information indicates that they are present for MIM but do not respond to a message, nor would the vendor contact want to create the inaccurate impression that they are available when in fact they are otherwise occupied. While MIM users can easily understand their need to manage their own presence information, they will likely prove intolerant of mistakes in presence information or delays processing changes to their presence information. Therefore, effective presence information administration across mobile network providers will be critical to the success of MIM.

SECTION VIII: APPEAL OF NEUTRAL PRESENCE ADMINISTRATION TO MOBILE NETWORK OPERATORS

As noted earlier, the competitive sensitivity and complexity of MIM user presence management has been a key inhibitor to MIM interoperability to date. Mobile network operators are understandably reticent to share subscriber information with other operators, especially in ways that they feel might compromise their ability to protect subscriber privacy or provide good MIM user experiences. The need to provide real-time MIM message exchange across different networks is currently understood, but how to provide interoperable real-time presence management in a way that protects MIM user privacy and addresses competitive issues remains a key concern.

Competitively neutral third-party presence exchange administration will likely prove highly appealing to mobile network operators as they address MIM interoperability — especially when offered by vendors that are recognized as both competitively neutral and that have deep IT expertise given the operational complexity of MIM. Competitively neutral administrators are a familiar solution to highly complex issues that must be addressed to create major market opportunities, such as Internet domain name assignment and administration, as well as administration of numbering databases such as those used for number portability. Finally, mobile operators have expressed strong interest in not surrendering control of presence either economically or in terms of privacy to third parties, which therefore increases the potential appeal of neutral third-party administration of presence exchange information.

SECTION IX: THE PROMISE, REALITY, AND CHALLENGES OF CONVERGED SERVICES

Although there is much discussion regarding the promise of converged services, the reality has yet to reach the mainstream in terms of technology or market acceptance. IDC believes that IP is the base-fabric of convergence that will enable true integration between modalities while creating a consistent user interface. However, much work needs to be done in order to bring the vision to reality. IDC believes that voice/data convergence is the first step in the journey toward convergence. Still, even end-to-end–enabled VoIP calls are rare. In some cases, carriers' calls that are allegedly "on-net" are routed via the PSTN.

The costs incurred by the carriers and ultimately paid for by the customer include not only any per-minute interconnection fees but also the cost and upkeep of infrastructure, including voice gateways. IDC believes that although IP has reduced the costs associated with voice (VoIP) and core infrastructures, there are additional efficiencies that are yet to be exploited. At the same time that carriers are moving to an IP-based infrastructure and beginning to deploy VoIP services, they are also looking to bring to market new multimedia applications and services to help bolster diminishing profit margins in their legacy wireline and wireless businesses.

Convergence of the infrastructures is a key factor in service providers' ability to deliver converged applications and services. Although IP is the underlying fabric of convergence, SIP provides a lightweight, standards-based protocol that will help overcome interoperability challenges, enabling a rich set of MIM features. SIP enables basic signaling, user location, and registration. The combination of simplicity and decentralization has made SIP the protocol of choice for next-generation services and equipment.

The capability to deliver converged applications and services over a network has been a long-term goal of service providers. However, many issues still remain to be solved, including billing, identity management, service orchestration, and delivery multimodality. In thinking about convergence, it is important to make distinctions in several areas. First, convergence of services is more that just creating a service bundle, which is offered today as a marketing creation with little or no integration between services included in the bundle. Second, convergence reaches across networks, technologies, endpoints, and protocols to deliver rich services and applications on any device. Finally, converged services must be delivered to end users via a consistent interface.

Although many of the fixed-line or broadband-based applications are well-known, it is the seamless interchange between fixed and mobile worlds that will begin to change and create a new services landscape. From a mobile perspective, the capability to utilize the same IM client that is used on the PC has merit in terms of a consistent point of contact. In addition, IP service can bring convergence to control devices and services that have often been associated with endpoints that are not attached to the network. For instance, given the ubiquity of the mobile handset, the capability to program a DVR or cable set-top box via a mobile handset is an example of a simple mobile solution that solves a real problem. Although mobile video content over IP provided by content aggregators provides a compelling business model for carriers, perhaps even more important is to do away with this concept and avoid the complex game of guessing who wants to watch what. This model lets cable or IPTV providers stream content to a subscriber's mobile endpoint, giving the end user the opportunity to watch his or her TV choices, not those provided by an operator. Thus, a user could begin to watch content on a home TV set, continue to watch via a mobile handset, and perhaps switch to a laptop while waiting for a flight at an airport. Besides the IP link to the provider, the service must be delivered via a consistent interface on all devices and endpoints.

Although mobility is often talked about in terms of communications devices embedded with other features and functions, IDC believes that IP-enabled services will eventually become enabled on devices that are not associated with communications services but are nevertheless portable and thus mobile. Certainly cameras and MP3 players are candidates for IP-based services. Even further, enabling these types of devices with communications functionality will not only bring convergence to another level but also create the possibility of ubiquitous communications that form ad hoc networks with a wide variety of communications capabilities.

From a service provider perspective, the fundamental goal of convergence is revenue generation, materializing from the ability to build and release new applications quickly to market and incorporating blended communication functionality across business and consumer segments as services dictate. Of course, this vision of converged services is very much dependent upon the use of open standards as well as peering services. In rationalizing their networks to enable convergence, carriers are focused on IP as the service delivery and network vision to extract the necessary economic efficiencies. The fact that convergence is happening today instead of 10 years ago speaks much to the delicate relationship between economics and technology.

From a network perspective, a variety of protocols and technologies are mature enough to support new services. For their part, service providers such as cable companies and telecom companies are facing not only a hypercompetitive environment in which they challenge each other but also real competition from Internet-based portals such as Google and new entrants with new business models such as Skype or MVNOs such as Virgin Mobile.

This competition is driving innovation — especially new service creation — as both traditional service providers and new entrants compete for an ever smaller slice of the services market as broadband penetration increases, driving down the profit margins as end users look for unique services to justify their monthly fees.

Of even more concern is that communications as a traditional standalone industry service may begin to fade. Instead of a standalone commodity, the ever decreasing cost of transmission makes communications an easy add-on to any application — games, music, travel, shopping, working, and so forth. In this vision, ubiquitous and pervasive communications is the norm and plays an integral role at work and home. This suggests a future where communications is a sector-less industry. In the sector-less future, communications may be an overt feature such as the "Skype Me" buttons that will proliferate through eBay properties in the coming months or an operational feature such as a language translation service, a text-to-speech conversion service, or a personalization service such as avatars and ringtones. Thus, a world in which services are decoupled from network infrastructure is a distinct possibility.

In order to combat new entrants, and better leverage the opportunity to secure their place in the brave new world of convergence, traditional service providers will need to better leverage their assets. Unfortunately, incumbent providers of communications services have legacy networks that are built with expensive and proprietary hardware and standards and cautious upgrade philosophies. Although this has created a level of service that has served incumbent providers well, it has also created a competitive disadvantage. This is especially true when incumbents are up against new entrants such as Google, whose use of off-the-shelf plain vanilla hardware, agile software programming, and public beta tests gives it a cost basis that is significantly lower than that of the incumbents.

IP to the Rescue?

Of course, utilizing the flexibilities inherent in IP can enable more efficient and timely deployment of services. Legacy systems, while delivering a steady revenue stream, carry a serious capital cost burden as well as supplier dependency. For instance, a card on a piece of TDM-based network system is typically a proprietary hardware design and can cost more than 10 times as much as that in an IP-based softswitch. In contrast, the same part on an IP messaging platform is based on lower-priced server blade technology. The shift from proprietary to open systems has already changed the infrastructure economics for basic services, such as IP-enabled messaging and voice. From an operational cost standpoint, requesting the feature from the TDM switch vendor and then rolling out a new feature can take as long as 18 months to complete and cost the carrier over $100,000.

Applications and the revenues that they will create drive the economics of current and future investments. A top sub-text to the move to IP-based infrastructures among service providers today is the shift to a fully software-based model. If service providers and their suppliers are going to succeed in the future, they must make the shifts toward re-use, toward software, and toward practices that leverage standards. Far too many efficiencies of actions and profits of operations have emerged from the IT user and vendor communities for telecom carriers and suppliers to turn a blind eye to these issues for the future.

Traditionally for service providers, the infrastructures for services are largely custom-developed projects that are used by the service providers to deliver services. In the past decade or so, an increasing level of "product" solutions was put in place for key applications such as SMS/MMS. However, each service provider and SMS/MMS

supplier continues to work from a perspective of custom-build, or at least custom-install, rather than fully packaged product. This is a key issue in terms of the efficiency of the service providers and their ecosystem. Significantly, the new generation of software technologies starts from a very distributed and changeable perspective, an architecture, rather than a discrete packaged application. In this, the applications layer is a key piece of the architecture that enables but does not replace the role for the deliverer of content or a key application such as MIM. Such an approach, informed by SOA software developments as well as efforts such as IMS in the service provider community, mandates interoperability internally and externally. However, this concept is intimidating for today's service providers. Converging on IP networks, improving software-driven service creation capabilities, and working toward convergence of services are substantial challenges. It is in this context that the idea of a SIP service-based application has the potential to set the stage for service providers to begin to cope with the broad scope of changes to be wrought by the convergence of networks and services.

Policy-Based Control: Enabling Converged Services

A common registry is a necessity if converged communications are to reach their full potential. However, beyond providing a central component in the delivery of rich media services, service providers can also utilize a common registry to create opportunities that can take advantage of peering relationships that present themselves at an IXP or in connection with an enterprise customer in need of a managed service. For instance, utilizing the information contained in a common registry, a service provider could enable a specialized set of peering relationships, including private peering arrangements with selected partners, public peering, and settlement-based arrangements with smaller carriers. Furthermore, the information contained in a common registry could help service providers offer the advantages of managed services to enterprises. In this context, a carrier could help a business to take better advantage of IP telephony from a cost perspective as well as more customized control over its more advanced IP-based applications.

The hot topic of IMS might be (rightly) construed as simply a new network architecture that capitalizes on SIP to introduce more control. However, control is a broad issue in the IP-based network, and presence systems also play a role in driving policies for control. For many service providers, control is an appealing way to prevent unwanted traffic such as Skype or Gizmo. As service providers and suppliers work toward a more complete understanding of what an IMS infrastructure might look like, the idea of SIP-based IMS potential is prompting some tuning. For the 2006–2007 market, IMS infrastructures are still too immature, in many cases, to be truly supporting applications. But in this period, the concepts associated with control and SIP are maturing. Overall the conversation is beginning to open up the idea of application software and application-facing software as the critical infrastructure technology. In fact, the idea of SIP-based infrastructure is moving to become a new understanding of software in telecommunications. Significantly, in IDC's ongoing work to track service provider adoption of next-generation infrastructure, we are finding that the service provider's sense of the relevant applications that are driving all sorts of operations and marketing investments rests very much with messaging, though other examples are cited.

Many infrastructure builders — vendors and service providers — are working toward building out presence as a service to be used by other systems. A business approach that takes key infrastructure such as addressing, presence, and interoperability is much needed for today's technology-focused service provider infrastructure. The ideas of convergent infrastructure and convergent applications are too separated for the vendor community. Having a vendor that is focused on delivering a value-added product such as MIM based upon IP solutions speeds time to market for the service providers that would like to use IM as well as for the vendors supplying it.

Completing the Picture

Although many identify the network as a static collection of hardware and software, history has shown that in reality the network is in a constant state of flux. However, when examining past network development cycles or opining on future possibilities, IDC has found that several issues seem to always accompany each new advancement in network technology. First, although networks are often conceived of as islands, these islands must be woven together to create a continuous fabric. Furthermore, a centralized registry of information that can enable correct routing of services information is a necessity in order to create useful services that can reach most if not all of the endpoints and subscribers. Registries must be centralized — and attempts to isolate such functionalities in a proprietary fashion defeat the underlying principles of networks.

SECTION X: PROFILE OF A SOLUTIONS PROVIDER

For almost a decade, NeuStar has provided the telecommunications industry with essential and trusted registry services. NeuStar services have been deployed around the world in 20 countries. NeuStar's unique capabilities reside in its ability to decipher and interpret tens of thousands of connections initiated by thousands of service providers each day in a neutral and efficient manner. The company was founded to meet the technical and operational challenges of the communications industry with respect to local number portability as required by the FCC and is the authoritative solution that the communications industry has utilized to realize and deliver upon this mandate. NeuStar is charged with playing an important role in administering the complexity of NANP and more importantly the difficulties inherent in ensuring that number porting is done in an accurate and authoritative manner. It is through these authoritative processes that NeuStar enables the disparate telecommunications networks to function seamlessly. NeuStar operates the authoritative directories that manage virtually all telephone area codes and numbers and also enables the dynamic routing of calls among thousands of carriers operating in both the United States and Canada. Thus, any carrier offering services to the public — either wireless or wireline services — utilizes NeuStar as an authoritative provider of numbering assets. In addition, NeuStar also provides clearinghouse services to alternative and emerging service providers, such as MSO, MVNOs, as well as VoIP service providers. NeuStar's continuing capability to service carriers is illustrated by the following:

#204458   ©2006 IDC

- ☒ Continuous management of the Number Portability Administration Center (NPAC) for North America since 1996, accommodating millions of transactions monthly to ensure that each telephone number is associated with the correct service provider managing the master routing directory for all calls, signaling, messaging, and inter-carrier transactions in North America.

- ☒ The award of a contract to manage the Global System for Mobile communications (GSM) Root DNS database. The contract was awarded by the GSM Association, a trade organization that represents over 700 GSM operators in 214 countries around the world. Under the terms of the agreement, NeuStar will run the Root DNS service to enable roaming and interoperability for IP-based data services by GSM subscribers. This service enables billions of subscribers — regardless of their geographic location — to send one another email, pictures, and video on their mobile phones.

- ☒ The renewal of a multi-year contract to provide local number portability in Canada.

- ☒ The launch of the Taiwan NPAC, NeuStar's first number portability initiative outside North America.

- ☒ In partnership with the Bridge Mobile Alliance (BMA) and ESPN STAR Sports, NeuStar enables the delivery of a full suite of sports, news, entertainment, and other regional-based and cross-border content service offerings across Asia for millions of BMA subscribers.

- ☒ Partnerships with the world's major Internet Exchange Providers (IXPs) to launch SIP-IX, an unprecedented suite of services to enable peering for nearly 1,000 IP networks across the globe for voice, video, and content services using SIP-based technologies such as IMS and VoIP.

In addition to its role as a trusted neutral provider of registry services, NeuStar is very much involved in shaping the direction of future technology by participating in a variety of technical forums, including the IETF's RFC process. NeuStar's participation in these forums includes input on 10 RFCs that directly impact the delivery of converged services and MIM. These RFCs include the following:

- ☒ RFC 4119: Presence-based subscriber location exchange

- ☒ RFC 4079: Presence architecture for distribution of location

- ☒ RFC 3953: Electronic Numbering (ENUM) for IM (Jan '05)

- ☒ RFC 3863: Presence data interchange format

- ☒ RFC 3861: Address resolution for IM and presence

- ☒ RFC 3860: Common profile for IM

- ☒ RFC 3859: Common profile for presence

- ☒ RFC 3824: ENUM for SIP

- ☒ RFC 3694: Security threat analysis for location exchange

- ☒ RFC 3693: Requirements for location exchange

In particular, NeuStar's Jon Petersen was the lead developer of the SIP protocol and has authored more than 20 core SIP-based RFCs. In addition, Petersen is currently involved in developing IM standards based upon ENUM-related service routing, discovery, policy presence, and other key issues related to both IM and MIM. NeuStar's intimate knowledge of key technologies related to converged services gives the company a unique advantage in bringing new communications opportunities to life.

S I P - I X

NeuStar's SIP-IX is designed to allow service providers to realize the benefits of direct network-to-network inter-working of SIP and future IMS-based applications. By combining open-standards directory technology and the global IP peering infrastructure, NeuStar's SIP-IX makes it possible for service providers to use existing IP network peering facilities to originate, terminate, and share calls or sessions for mobile, fixed, and broadband communications. Derived from NeuStar's commercial private ENUM infrastructure, SIP-IX is architected as a comprehensive service that integrates NeuStar's policy-enabled shared directory services into the peering fabric of major IXPs around the world.

By enabling global end-to-end IP connectivity, SIP-IX reduces the costs associated with the conversion of IP traffic to legacy protocols for transport. In addition, SIP-IX allows service providers to create new sources of revenue by deploying innovative SIP-based services such as video, presence, and push to talk.

SIP-IX Features and Benefits

☒ Global service availability: NeuStar has formed alliances with leading IXPs, including the Amsterdam Internet Exchange (AMS-IX), Equinix, the Hong Kong Internet Exchange (HKIX), the Japan Internet Exchange (JPIX), and TELEHOUSE, to provide highly available and reliable services.

☒ Accuracy of the information is ensured given NeuStar's role in administering LNP via the NPAC, as well as aggregation of mobile number portability data globally.

☒ SIP-IX enables both forward and backward compatibility, enabling carriers to deploy services that utilize today's protocols and standards but can quickly adapt to future changes.

☒ Policy-enabled, private ENUM-based shared directory services: Efficient open-standards design allows flexible inter-working using either SIP or ENUM and reliable, low-latency setup of calls and sessions.

☒ Inter-network QoS offerings: End-to-end IP service path ensures network and application integrity between peering networks.

SECTION XI: VENDOR CHALLENGES

NeuStar, with its unique collection of capabilities and assets, is well-positioned to help bring the promise of converged and IP-based services to life. However, the road from innovation to mass-market acceptance is hardly straight or narrow. In particular, NeuStar should look to avoid the following:

☒ In order to increase the value of its MIM business, NeuStar will need to duplicate its MIM story to other network/service types, especially working with MSOs as well as the big portal companies such as Google and Yahoo!.

☒ The ideas of converged infrastructure and converged applications are too separated for the vendor community. NeuStar needs to explain why applications and infrastructure/interoperability should come from the same vendor.

☒ The necessity of this announcement demonstrates that service providers are not quite ready for the world of packaged applications promoted by visions such as IMS and SDP. It will be a challenge for NeuStar to evolve its offering as the service provider concept of applications evolves (in line with initiatives such as major IT vendors have to build the third-party applications community).

☒ NeuStar has played a pivotal role in helping to define some of the core protocols that will enable the development of real-time communications. SIP will likely dominate IP communications, but there will likely be those who wish to add proprietary extensions and thus create a fork in the road. This does not seem to be an especially pervasive problem, but it does have the potential to be disruptive. In combating this problem, NeuStar will need to use its reputation as a neutral third party as well as its standing at the IETF to keep protocols as open as possible.

☒ NeuStar brings technological capabilities to bear that create a world of reliability, accuracy, and interconnection. Of course, another parallel world exists in which "just good enough" free and the "perpetual beta" happily coexist. This is the world of the Web and conceptual variations such as Web 2.0. Companies such as Google are representative of this approach and pose an alternative vision of services. In moving forward, NeuStar will need to address this vision of communications and either work with those companies or underscore why its own vision of communications is better.

☒ Finally, competition from traditional competitors such as VeriSign as well from companies that could become new threats — such as Oracle with its acquisition of HotSip and Sybase with its acquisition of Mobile365 — will need to be addressed. Clearly, NeuStar has been selective and strategic in its acquisition strategy but may need to become more active in the market should its competitors fashion a cohesive set of offerings from their acquisitions.

SECTION XII: CONCLUSION

The worldwide success of SMS with its over 1 billion users and the global culture of wireless messaging that it has fostered have in turn created the opportunity for more advanced forms of IP-based messaging such as MIM. In light of worldwide acceptance of wireless and a global culture of SMS texting, the mobile industry has recognized the global market opportunity of MIM and other next-generation and converged services and is deploying flexible IP-based infrastructure to support these new market opportunities.

IDC believes that the advanced functionalities of MIM, such as presence, instant message exchange, and easier sharing of user-created content such as video, will be highly appealing to SMS users. Furthermore, the lower cost structure and inherent flexibility of IP-based approaches such as SIP can create new opportunities for mobile operators to increase messaging margins and offer new products such as converged messaging that in turn can drive increased messaging adoption, usage, and revenue.

MIM interoperability is a key immediate need that can be effectively addressed through IP-based approaches such as SIP that incorporate all-IP number-based directories and that are administered in a competitively neutral manner. The appeal of this approach creates multiple market opportunities, including accelerated MIM adoption, a clear evolutionary path for converged messaging, and the basis for advanced forms of converged real-time communications.

But perhaps more profoundly, MIM is the first presence-enabled wireless application that could fundamentally change how mobile users initiate person-to-person communications. Just as youth and young adults often rely on IM instead of email for PC-based communication, MIM offers a similar opportunity to transform existing SMS messaging behavior for wireless users on a global basis.