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Next generation multi-media service enablement in IMS

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Overview

Historically, mobile carriers have experienced impressive growth in the number of subscribers and significant premiums on mobile services and mobility. However, markets are reaching saturation points, competition for subscribers is intense and regulatory pressures are increasing. Combined, these factors are driving down overall revenue per user. The mobile market is also transforming. Research conducted by Chetan Sharma Consulting¹ shows that in 2009, global data traffic exceeded voice traffic for the first time and mobile broadband connections are forecast to surpass fixed broadband in 2010. The research also revealed global mobile data traffic exceeded an exabyte (10¹⁸ bytes) for the first time in 2009 and both North America and Europe will exceed an exabyte in 2010. The Internet truly is “going mobile.” The explosive growth in data traffic requires investment in newer, more efficient network technologies to meet the expectations of

In 2009 global data traffic exceeded voice traffic, while mobile broadband connections are forecast to surpass fixed broadband in 2010.

“real time” access by customers.

To remain relevant in the overall communications experience of customers, mobile carriers need to introduce into the market new high-value, flexible multi-media services on top of mobile broadband. New multi-media services will reduce the real risk of becoming a commodity bit pipe transport medium for the over the top services. Mobile carriers need to enhance the communications experience with new services within the walled garden. Outside of the walled garden, carriers must look to how they can monetize their Network as a Service (NaaS), opening the garden gate to the application developer communities and creating the network-wide App Store. New walled and open garden services add value to the customer experience, strengthen brand identity and reduce churn. In essence, mobile carriers must transform from “*mobile network provider*” to

“*mobile services provider.*”

The keys to success for the new mobile services provider are:

- Service scalability
- Ubiquitous access
- Trust between parties

Interoperability of applications between devices, networks and most importantly across networks is paramount to success. Core to the new open services model is trust between providers who in some cases compete (e.g., the telecommunication carrier and the over-the-top internet application provider) and trust between application providers and end users. This creates the need for an independent brokerage function between the different players, providing a trusted environment for information exchange and asset exposure.

The technology transformation from *mobile network carrier* to *mobile services provider* requires investments beyond core network capacity. Implementation of new multi-media services will require investments in additional resources and skill sets across applications, session core and access networks. Mobile carriers can benefit by taking advantage of outsourcing the deployment and operation of these new technologies to a trusted partner. This will result in reductions to the overall capital and operating costs while greatly reducing risk and providing a secure service

The new open “services” paradigm creates the need for a trusted independent brokerage function between the different players to provide a trusted environment for information exchange and asset exposure.

delivery environment.

Neustar’s approach to service delivery extends the internet cloud computing and Software as a Service (SaaS) models into the telecommunications environment, creating a new Communications as a Service (CaaS) paradigm. The Neustar CaaS model provides a trusted

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enabler for the delivery of next generation multi-media services without the need for significant capital investment, reduces overall operational costs and results in faster revenue generating new service introduction.

The Changing Business Environment

Declining ARPU

Traditionally, mobile carriers have experienced a high-growth market, with impressive year-over-year growth in the number of subscribers and significant premiums on mobile services (e.g., in-network call charges and messages) and mobility (e.g., out-of-network call charges, messages and roaming). However, the forces of market saturation, competition and regulatory pressure are driving down average revenue per user (ARPU) and shrinking margins. Chetan Sharma Consulting research revealed that in 2009 voice ARPU declined by 98 cents for U.S. carriers, while data ARPU increased by only 4 percent to 53 cents as overall ARPU decreased 45 cents on the year.² The result: mobile carriers are becoming

Carriers need new options to reverse the trend of declining ARPU.

increasingly cost-sensitive.

Voice and Short Message Service (SMS) revenue, historically the mainstay of carrier earnings, are declining year over year. While new services such as mobile broadband are currently bolstering the situation in terms of overall ARPU, these newer services are being delivered at significantly slimmer margins than their predecessors and cannot make-up the short fall of the declines in traditional services. Carriers need new options to reverse the trend of declining ARPU.

Internet goes mobile

The significant increases in data usage driven by Internet-enabled mobile devices such as Apple's iPhone and Google's Android, which accounted for more than 50% of the total data traffic for their

carriers³, as well as the proliferation of data only devices (e.g., netbooks, laptops, electronic books) are stressing today's mobile Internet fabric.

Social networking is driving the mass adoption of the mobile Internet, with subscribers using their mobile phones to access online communities such as Facebook, MySpace, Hi5 and V Kontakte. Mobile broadband data traffic is forecast to grow at 108% per year through 2014, driven primarily by mobile video and mobile web/data.⁴

The tremendous growth in bandwidth consumption requires increased network capacity and is a catalyst for the deployment of newer, more efficient technologies such as High Speed Packet Access plus (HSPA+), Long Term Evolution (LTE) and LTE Advanced. Mobile carriers must look to bolster margin while investing in new network technologies, as they can expect significantly lower earnings per hertz/megabyte than historically obtained from voice and SMS services.

Threat of low-value bit pipe

Customers view bandwidth and connectivity as a commodity in the same manner as gas and electric transport utilities. Customers are not interested in buying bit pipe bandwidth, fixed minutes or messages. Their expectations have been set at virtually unlimited bandwidth for a low monthly fee.

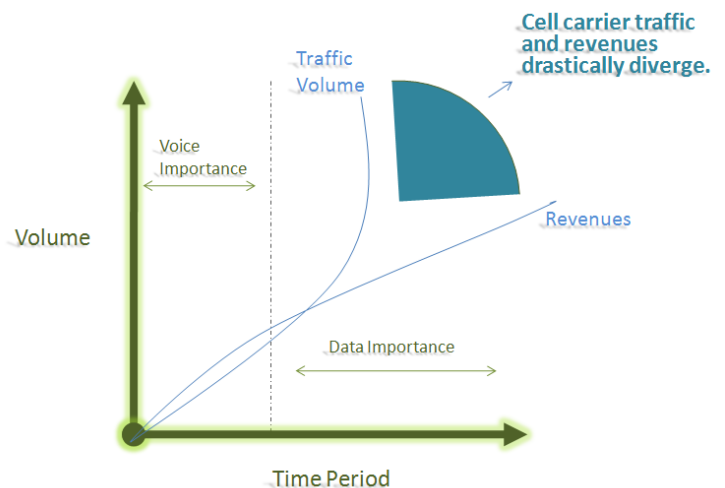


Figure 1: Bandwidth demands increase as ARPU declines

The obvious risk of a bit pipe business is the communications services become an over the top play, where the carrier provides the bit pipe, but the services come from the Internet. If voice revenue goes to GoogleTalk, text goes to Microsoft Messenger or Twitter and the future address book sits on a community site such as Facebook, then the mobile carrier is reduced in the value chain to a wholesale partner with virtually zero wholesale revenue.

To avoid the siphoning of value and reduce the risk of becoming a commodity bit pipe provider, mobile carriers must rapidly build out flexible new services on top of mobile broadband.

To avoid the siphoning of value, mobile carriers must focus on the service experience specifically in relation to the communications mechanisms, creating value through connectivity and security of service. Mobile carriers need to rapidly build out flexible new services on top of mobile broadband to reduce the risk of becoming a commodity bit pipe for over the top services and remain relevant to the communications experience of customers.

Risks and complexity of new service introduction using old paradigms

Consumers are demanding innovative new services. Remaining competitive requires investments in new service enablers for next generation multi-media communications such as IP Multi-media Subsystem (IMS) or Multi-media domains (MMD). If following the old paradigm and taking on the challenge alone, a mobile carrier will need to develop new skill sets and competencies in order to deliver new service enablers as well as deal with the complexities of multi-media interconnect.

Carriers must embrace new paradigms on service delivery by choosing flexibility and openness over proprietary solutions and exclusivity.

New IP services running over mobile broadband will require significant investments in upgrades to network capacity to meet the demands. Beyond the core capacity build out, these new technologies and services require additional investment, resources and skill sets across applications (Web, RCS, OneVoice), session core (IMS) and access networks (HSPA+, LTE, LTE Advanced).

Time to market for the introduction of new services requires the flexibility of a new open approach to application development supported by a larger development community than can be supported by proprietary walled garden service approaches. With new applications comes the greater risk of failure and high rates of churn as certain applications become popular and replace others. One of the keys to success of a service is ubiquitous availability across different networks and client devices. This drives the need for interoperability and open cross-network support.

Creating the Mobile Service Provider

Building on ubiquitous communications

Mobile carriers successfully built a business around controlling the communications experience and ensuring ubiquity. SMS profitability and success is directly related to the omnipresence of its service. Customers can send messages to anyone, anywhere, regardless of carrier or terminal type. Services introduced that require a specific terminal or specific network carrier have only met with limited success. Adoption of Multimedia Messaging Services (MMS) has been slow, primarily driven by its perceived poor cross-network interoperability. Historically, services requiring downloadable clients have struggled to gain mass market adoption. While this model is changing with the introduction of the iPhone and Android, these devices still account for a small percentage of the overall global mobile phone population. Fragmentation of the 'smartphone' market also has resulted in client issues, even across different operating system releases of the same device.

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Customers expect nothing less than universal, seamless communications experience for all services. Carriers need to ensure ubiquity of services through inter-networking of communications and applications to obtain the greatest adoption of new services.

Creating a rich communications experience

The first step in meeting customer expectations is for carriers to take advantage of their strengths by enhancing the communications experience with universally available services within the walled garden. Walled garden services add value to the customer experience, build brand identity, while reducing churn. The *de facto* industry standard from the Global Systems for Mobile communication Association's (GSMA) Rich Communications Suite (RCS) provides for a strong anchor point to build the communications experience, with strong support from carriers, equipment and handset vendors. RCS will enable the walled garden to build on the personalization of the device (and, specifically, the contacts and address book) to drive the communications experience.

Mobile carriers can bring a richer communications user experience based on IMS driven from the network address book (NAB), integrating enhanced

What is RCS?

Cross-industry project within the GSMA that has defined a common vision on delivering convergent, rich communications services.

- **Enhanced Address Book** – Enables users to integrate multimedia elements
- **Rich Call** – Exchange various types of content during a call
- **Rich Messaging** – Simplify and unify multiple messaging mediums
- Broadband access for multi-device environment

Advantages of RCS

Assists in rapid adoption of mobile applications and services to deliver rich communications experience to customers

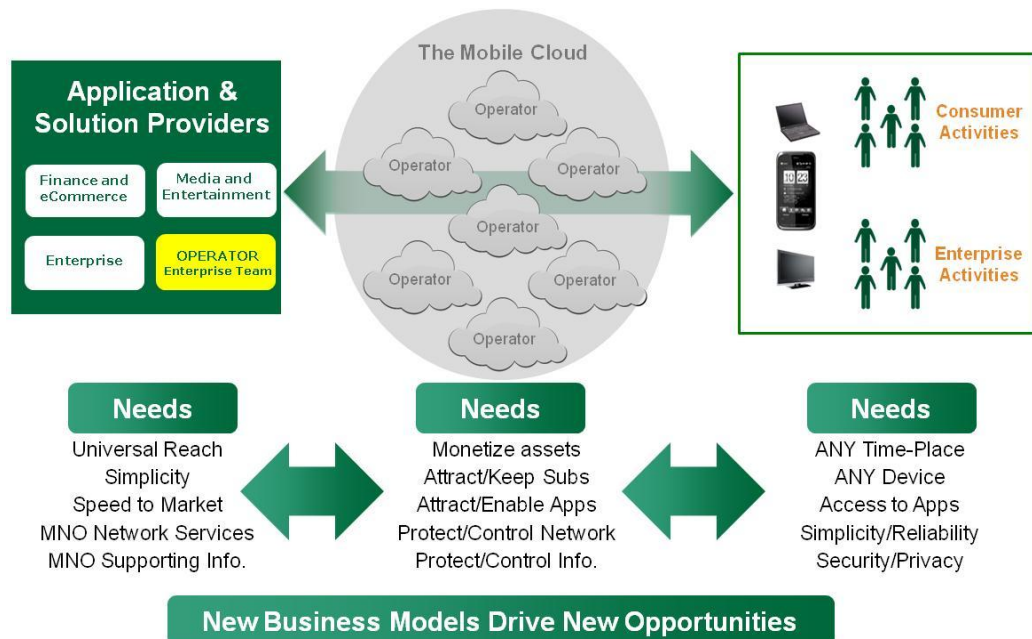


Figure 2: Driving new revenue with the two sided telecom business model

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voice, messaging and content exchange (e.g., video, music, pictures) between users across fixed, mobile and the communities of the Internet.

Opening the garden gate to monetize network assets

Beyond the walled garden services, the App Store model phenomenon of Apple and Google illustrates the advantages of opening service creation to the application developer community. A similar model can be achieved by providing the

The two-sided telecoms business model provides mobile carriers with dual revenue streams from both traditional “downstream” and new “upstream” customers.

Network as a Service (NaaS) to the application developer community. Network services (e.g., presence, location, status messaging, device capabilities, network address book, pre- or post-paid, demographics, identity federation and micro payments) add value to the applications of marketing, enterprise, financial transactions and “infotainment” services. Mobile carriers benefit from monetizing the network assets with the application developer community as well, providing customers access to cross-platform applications. The NaaS model exposes the mobile carrier as the visible face of communications services, strengthens the brand identity and adds value by promoting open innovation on top of, rather than opposed to, network services.

STL Partners/Telco 2.0™ refers to the NaaS concept as a two-sided telecom market⁵. The mobile carrier obtains revenue from both traditional “downstream” customers and “upstream” customers who gain from access to the network assets (e.g., marketing companies, financial services companies, resellers, etc.). This creates a new two-sided telecom business model, with the addition of new upstream customers through the controlled exposure of assets to the internet.

The success factors for the two-sided business model are:

- Service scalability

- Ubiquitous access
- Trust between parties

The model enables a network effect created by interoperability of applications with and between devices and networks, and most importantly *across* networks. Core to the two-sided business model is trust between the various players — trust between players that, in some cases, would compete (e.g., the telecom’s carrier and the over the top internet application provider), and trust between application providers and end users. This creates the need for an independent brokerage function between the different players, providing a trusted environment for information exchange and asset exposure. The independent brokerage function must provide:

- Rich policy and privacy controls over the data being shared
- Clearinghouse architecture for information exchange between carriers, enterprises and third-party application developers

Mobile Carrier Advantages	Content Provider Advantages	Subscriber Advantages
Two-sided income	Easily found by subscribers	Services they want, when they want
Higher ARPU	Standards based delivery	Simple to find and consume
Reduced Churn	Reliable, end-to-end IP delivery	Single point for support

Figure 3: Advantages of NaaS for application enablement and delivery

Outsource to transform technology, to reduce cost and mitigate risk

The transformation from mobile network carrier to mobile services provider requires the introduction of new complex technologies, skill sets and greater investment risk. Outsourcing the deployment and operation of these new technologies reduces the overall capital and operating costs while reducing risk.

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The benefits of a trusted outsource partner become clear when looking at the development and deployment of next generation session and service layers. The technologies fit well within the Software as a Service (SaaS) and Infrastructure as a Service (IaaS) or cloud computing model. The cloud model reduces the higher risk capital investment through the operationalization of spend, with amortization of cost across multiple networks resulting in lower operational costs. Importantly, the cloud model also removes the need for new technology introduction costs. In this way, a new Communications as a Service (CaaS) model achieves the facets of cloud computing and SaaS within the telecommunications environment as it takes advantage of the new distributed models of next generation telecommunications All-IP networks. The CaaS model provides a trusted enabler for the delivery of next generation multi-media services without the need for significant capital investment; reduces overall operational costs and results in faster revenue generating new service introduction.

Finally, building the interconnectivity and interoperability between networks to support global reach will have its own new costs for multi-media services. The ability to have one multi-lateral relationship with a partner who provides for multi-media service interconnect will significantly simplify and reduce the costs of introducing new services with ubiquity of reach in a global market.

This new era of multi-media interconnect brings with it significant challenges for carriers used to the traditional worlds of SS7/C7 interconnectivity for roaming and bi-lateral peering services. Simple E.164 number mapping (ENUM) is no longer sufficient to support the variety of services (e.g., IM, Presence, picture messaging, video sharing, music file transfers, etc.) and the related gateways that will be enabled by All-IP networks. Service discovery through ENUM will become essential to provide for the open distribution of inter-network service and routing data.

Interconnects will need to span both the traditional carrier communities and new social networks of the internet, providing interworking between the different standards and supporting new multi-lateral interconnect models. Cross-network and cross-community interconnectivity will be essential

to ensure the ubiquitous access to services and the network effect it creates.

Benefits of CaaS model

- Deliver new services in hours rather than months
- Reduce the costs associated with technology transformation
- Mitigate risks inherent in technology transformation
- Strengthen position in overall communications experience

Summary

The mobile broadband market is transforming, with multi-media data traffic surpassing an exabyte and growing at over 100% per year. The Internet has gone mobile — and carriers face the risk of a becoming a bit pipe provider while communications services become an over the top play with the services provided on the Internet.

Mobile carriers must focus on delivering ubiquitous high-value next generation rich multi-media services on top of mobile broadband to remain relevant in their customer's communications experience.

Opening the garden gate for service creation to the application developer communities will allow mobile carriers to create a network-wide App Store culminating in a two-sided income model. The open garden services generate greater customer demand, higher ARPU and reduce churn while providing differentiation from competitors.

Control of the communications experience and monetizing the network as a service are paramount to success.

Neustar is the trusted partner providing the framework and expertise to succeed in next generation multi-media services. Neustar's solutions address the challenges faced by carriers by:

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- Creating a richer communications experience
- Ensuring interconnectivity and interoperability of services
- Providing rich policy-controlled exposure of network assets as a service

Neustar's Communications as a Service (CaaS) model for service delivery significantly reduces the costs and risks associated with new technology transformations while enabling the delivery of new revenue-generating services more quickly than ever before.

CONNECT WITH NEUSTAR

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Glossary

ALL-IP Networks — Networks that have migrated their services away from 'legacy' Time Division Multiplexing (TDM) technology to running all services over Internet Protocol (IP) from the access to the core.

App Store — An environment for the digital distribution of applications to mobile devices supporting smartphone operating systems.

ARPU — Average revenue per user. It is the total revenue divided by the number of subscribers.

Bi-lateral peering services — The direct commercial and technical agreement between two operators (bi-lateral) for peering services.

Bit pipe — The actual transport medium (wired or wireless) for voice and data traffic.

CaaS — Communications as a Service. Similar paradigm to cloud computing and SaaS, but within the telecommunications environment. Takes advantage of the new distributed models of the next generation telecommunications All-IP networks.

Cloud Computing (a/k/a IaaS) — Method of running application software and storing related data in central computer systems and providing customers or other users access to them through the Internet. (source: Encyclopaedia Britannica).

Downstream customer — Traditional end-user customer base.

Enhanced Address Book — Enables users to integrate multimedia elements in their address book.

ENUM — A specific service within DNS to allow for the translation of E.164 numbers (a/k/a telephone numbers) to universal resource identifiers as part of service discovery.

Exabyte — Equal to one quintillion bytes. 1018 bytes.

GSMA — Global Systems for Mobile communications Association. The GSMA's mission is to create value for carriers and the mobile industry in the provision of services for the

benefit of end users.

HSPA+ — Evolved High-Speed Packet Access. Wireless broadband standard providing data rates up to 56Mbps downlink and 22Mbps uplink.

IaaS — Infrastructure as a Service. (See definition of "Cloud Computing" above.)

IMPS — Instant Messaging and Presence Service.

IMS — IP Multimedia Subsystem — De facto standard architectural framework for delivering IP multimedia services.

Infotainment — Information-based media content that also includes entertainment to enhance popularity among end users.

LTE — Long Term Evolution. High-performance 3G air interface for cellular mobile telephony.

LTE Advanced — A potential candidate for the International Telecommunications Union's (ITU) 4G technology project IMT-Advanced.

MMD — Multi Media Domain. The 3GPP2 definition of IMS.

Multi-lateral interconnect models — The agreement between an operator and a hub provider to deliver interconnect with multiple (multi-lateral) other operators on their behalf.

NaaS — Network as a Service. Monetizing network assets by opening the garden gate to the application developer communities, creating the network-wide App Store.

NAB — Network Address Book. Single interface to organize and share contacts across different address books and social networks.

OneVoice (a/k/a VoLTE) — an initiative led by a group of mobile carriers, infrastructure vendors and handset vendors to define a profile for voice services using IMS in an LTE environment.

Open garden — Process of monetizing the Network as a Service (NaaS) by opening the walled garden gate to the application developer communities, creating the network-wide App Store.

Over the top services — Services carried over the network, delivering value to customers, without

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any carrier service provider involvement.

Rich Call — Exchange various types of content during a call.

RCS — Rich communications Services. De facto standard from the GSMA. Assists in rapid adoption of mobile applications and services to deliver rich communications experience to customers.

Rich Messaging — Simplify and unifying multiple messaging mediums.

SaaS — Software as a Service. A model of software deployment over the Internet. Allows vendors to develop, host and operate software for customer use.

Smartphone — mobile telephone with a display screen (typically a liquid crystal display, or LCD), built-in personal information management programs (such as an electronic calendar and address book) typically found in a personal digital assistant (PDA), and an operating system (OS) that allows other computer software to be installed for Web browsing, e-mail, music, video, and other applications. A smartphone may be thought of as a handheld computer integrated within a mobile

telephone. (source: Encyclopaedia Britannica).

SMS — Short Message Service. Uses standardized communications protocols that allow exchange of short text messages between mobile devices.

Social networks — Online community of individuals who exchange messages, share information, and, in some cases, cooperate on joint activities. (source: Encyclopaedia Britannica).

Telco 2.0™ — Used to describe the convergence of Web 2.0 and telecom environments.

Upstream customers — New customers and revenue stream available when applying the two-sided NaaS model. Upstream customers can be developers, retailers, governments, Media companies, application service providers.

VoLTE — Voice over Long Term Evolution. (See definition of “OneVoice” above.)

Walled Garden — The environment and set of services offered exclusively by carriers to their customers.

Web 2.0 — A term used to describe the social networks-based evolution of the internet.