



## **IMS NGN Report Card**

**IMS and NGN Forum**  
**In cooperation with the University of New Hampshire InterOperability Lab**  
**November 2008**

### **Executive Summary**

This document seeks to dispel confusion and misinformation regarding the IP Multimedia Subsystem (IMS) and Next Generation Network (NGN) migration strategies and to present a true testament from our unique vantage point as to the readiness of the technology. Despite a flood of conflicting information about IMS, much has been done to demonstrate its practical realities. Vendors from around the world have come together at the IMS NGN Forum's IMS Plugfest interoperability events and have built IMS networks with real applications running over them in a matter of days.

By its nature, IMS demands interoperability in a way that the PSTN never did. This involves interoperability between new components and also with legacy networks. The access agnostic nature of the specification makes it one of the most ambitious and comprehensive standardization efforts to date specifically addressing the evolution to next-generation telecom infrastructures. Although an all-IP platform at first may appear more complicated, IP networks make it easier to create, add, manage, bill for, and modify multiple services across various platforms and access technologies. As was the case with the Internet and VoIP, IMS is evolving and maturing beyond its early hype and is now in the process of being deployed in various forms in carrier networks around the world.

### **Introduction**

The IMS architecture was one of the most hyped developments within the networking industry throughout 2006 and 2007, but the technology became "real" in 2008. Early, conflicting information from some vendors and service providers, both in favor of and against, distorted the understanding of IMS. Proprietary IMS architectures created the illusion of inherent interoperability, reliability, or availability



problems in IMS-based services, while numerous companies claimed IMS capabilities for products that delivered little or nothing new.

IMS provides a standards-based approach for deploying multiple NGN and mobile IP services over a common architecture. The coming year (2009) promises a strong push toward, if not actual deployment of, carrier-branded and bundled services over NGN technologies driven by the practical success of IMS architectures.

Proponents thus see IMS as an open and practical standards-based blueprint for IP-enabling the carriers. For example, carriers providing video over IP could use IMS to easily deliver branded IPTV or related services regardless of the customer's location and access device. IMS's ability to measure IP streams, provide QoS, and utilize service intelligence allows the network to know what services to supply and how much bandwidth to use based on who is requesting them and whether the customer is watching IPTV in their living room or opening a video chat on a smart phone far from home.

Despite the lack of consensus, most service providers have begun either exploring or deploying IMS architectures of various stripes in staging as well as working networks. RFPs are being generated, roll-outs are being scoped, and IMS is delivering on its promise of a cost-effective common platform for delivering converged IP services over wireline, cable, DSL, GSM, UMTS, 3G, Wi-Fi and WiMAX networks.

Objections to the IMS architecture on the grounds of its lack of interoperability, its immaturity, or its complexity are no longer tenable. Work is ongoing to port additional standards and protocols, such as IPTV. Operators are making slow and steady progress toward simplifying their network architecture to all-IP based routers and soft switches. Meanwhile, the true benefits and the business case for IMS are only now beginning to become clear.

It is one of the missions of the IMS/NGN Forum to seek and find common ground, those intersections that are common to most carriers. Proprietary enterprise solutions and carrier back-office systems that are unique to each service provider are at the moment beyond the scope of the IMS/NGN Forum's activity. These back-office systems will need to be integrated and tested against IMS interfaces for example, and



the process will be different for every service provider. It should be pointed out that this is no different from other technologies that service providers have had to integrate over time, as in the evolution to softswitching and VoIP technologies. IMS by itself poses no significant new challenges in this regard and in fact is almost entirely based upon SIP, the VoIP handshake protocol used in networks the world over.

The purpose of the IMS Report Card is to provide factual information based on the IMS Plugfests to clarify the state of IMS as a technology.

### **Rationale**

The IMS NGN Forum's mission is to accelerate the interoperability of IMS applications and services, enabling enterprise and residential consumers to quickly benefit from the delivery of quadruple play voice, video, Internet and mobile services over broadband via cable, mobile and fixed networks. IMS applications and services comprise video/audio streaming, residential VoIP, push-to-X (chat, video), video telephony, entertainment including IPTV and interactive gaming, IP Centrex / hosted IP Telephony, IMMM (Instant Multi-Media Messaging) and business Unified Communications including fixed-mobile converged services, instant messaging, videoconferencing and web-collaboration. For example, among the applications to be tested at the next test event, IMS Plugfest 6, are an IMS conferencing application and a PC-based iPhone app created with Apple's iPhone SDK.

The IMS Plugfests, held approximately every six months, bring together industry-leading IMS vendors from around the world, all of whom are focused on real-world, revenue-generating services and best practices for the industry. The IMS NGN Forum would like the Plugfests to serve as implementation proving grounds for removing barriers to the adoption of IMS, and the Plugfests plan eventually to add industry-recognized certification for IMS applications and services interoperability.

The host lab for the Forum's IMS Plugfests, the University of New Hampshire InterOperability Lab (UNH-IOL) is a neutral third party laboratory and does not endorse any products, services, technologies or forums. However, through the cooperation of the IMS NGN Forum and the UNH-IOL, it has occurred to both sides that a wealth of data and objective information has been generated that would perhaps benefit an industry audience beyond the circle of engineers, product managers and QA technicians who



attend the IMS Plugfests. The five IMS Plugfests that have taken place since January 2007 have proved what before were only concepts and yielded a number of “proof points” for the health and readiness of IMS-based services deployment. While detailed results are under non-disclosure, this Report Card provides enough information to be a useful tool for assessing the technology and markets for IMS.

The “IMS Report Card” captures those proof points and matches them against the myths and realities clouding IMS’s actual state of health and market-readiness. Ideally, this snapshot provides a clear and comprehensive picture in so far as it can be revealed by the admittedly limited (but in many cases surprising) metrics and proof points obtained in the UNH-IOL lab during the first two years of IMS Plugfest interoperability, reliability and security testing.



## IMS Report Card

	Myth	Reality	Proof Points
<b>IMS Core</b>	<p>IMS is seen as too complex and lacks adequate security.</p> <p>“The IMS movement has been severely overhyped and is mired in various obstacles ranging from the technical [too complex, security concerns] to the business side [service providers are still very siloed, lack of killer applications create a business chicken and egg syndrome].”</p> <p style="text-align: right;"><i>- Yankee Group analyst Brian Partridge “IMS Hype is Officially Dead!” 2/2/2008</i></p>	<p>While no more complex than any new technology, the IMS core is service-ready for deployment today. Misperceptions persist regarding its complexity and soundness. Technically, IMS brings with it no greater or lesser security concerns than TCP-IP has always had for network operators. (See “complexity” section, below)</p> <p>“Despite the fact that IMS solves some of the issues faced by service providers today, the build-up of new services will happen gradually, hence operators embracing it today should allow for a wider time window to realize the full benefits of the technology. In other words, IMS will be an evolutionary, not revolutionary framework ... enabling carriers to rationalize their network structures and giving them more control over their costs, as part of a network transformation exercise.”</p> <p>Frost &amp; Sullivan Principal Analyst Ronald Gruia, “IMS Ready for Prime Time?” 2007 report</p>	<p>Plugfest II successfully deployed an IMS network capable of serving 250,000 + active subscriber lines, the maximum allowable by the hardware tested.</p> <p>The following Plugfests further demonstrated ease-of-deployment, proved the core’s basic protocol interoperability, and continued to refine multi-vendor implementations.</p>



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<b>Deployment</b>	<p>Myth: IMS is just an idea that no one is taking seriously.</p>	<p>“Service providers’ service needs, and the long-term strategies that underlie them, will ultimately drive IMS sales. This in turn will spur a wave of new products and product revisions between 2009 and 2010 that will remove the lion’s share of the service providers’ barriers to implementation.” - Pyramid Research, may 2008</p> <p>Numerous rollouts have already been announced, including high-profile public deployments by British Telecom, KDDI (Korea), NTT DoCoMo (Japan), Telefonica (Spain), Vodafone (Czech Republic), SoftBank (Japan), Mobilkom Austria, and many others.</p> <p>Many Tier-1 carrier premises remain siloed, but most carriers appear mindful of the model’s limitations in the world of converged service delivery.</p> <p>“The disaggregation of transport, control, and application driven by IMS empowers carriers to achieve service velocity, or the ability to quickly and efficiently introduce new multimedia services that can rapidly respond to changing market conditions”</p> <p>Frost &amp; Sullivan Principal Analyst Ronald Gruia, “IMS Ready for Prime Time?” 2007 report</p>	<p>Current member Acision has announced deployment by Glo Mobile, a dominant service provider in Ghana, of its IMS-based applications: Acision SMSC (test messaging), Acision MMSC (multi-media), Acision Voicemail, Acision High Speed Proxy for mobile data services and Acision Prepaid System, to provide compelling value-added services in an increasingly competitive market.</p> <p>Mavenir Systems has announced that its IP SMSC Converged Messaging service (integrated using Mavenir’s IMS Centralized Services solution) is currently deployed with a Tier 1 operator in N. America.</p> <p>A fully deployed all-IP, all-IMS infrastructure built on Plugfest-tested technology from early participant Argela today allows Kuzey Kýbrýs Turkcell subscribers around the globe to talk, send and receive SMS or MMS to each other with local rates and to chat and use file transfer for free.</p>
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	Myth	Reality	Proof Points
<b>Legacy network integration</b>	<p>Myth: It is expensive and time/resource-draining to implement IMS in current carrier networks.</p> <p>In particular, integration of IMS into billing is very complex and expensive.</p>	<p>Migration from proprietary carrier TDM networks to unified IMS will evolve following the path of softswitching; Plugfests have demonstrated basic PTSN to IMS calls via currently available and already deployed gateways using existing TDM and IP infrastructure.</p> <p>The billing integration myth has been clearly proved baseless by the Plugfests, which demonstrated that IMS charging can certainly leverage existing billing infrastructure while introducing a cost-effective, highly scalable, real-time charging layer. (See “Applications” section for details)</p>	<p>Multi-subscriber IMS networks were created rapidly at all of the Plugfests in a way that would utilize existing TDM hardware. E.g. TDM-to-IMS phone calls and packet-to-Wi-Fi phone calls via FMC applications as early as Plugfest II.</p> <p>Thanks to the standards-based charging platforms, charging/billing for IMS services can be introduced with minimal integration effort and time.</p>
<b>Complexity</b>	<p>Myth: IMS is too complicated and too complex.</p> <p>“It is embryonic and evolving, and every piece is designed to address a different level or aspect of network technology.” -VON Magazine, April 2007</p>	<p>While the IMS standard itself is complex in as much as it dictates workings between components, at its core IMS comprises only two common protocols, SIP and Diameter, both of which are widely understood and deployed. No single engineer will be expected to know all of “IMS”. Implementation requires a learning curve like any technology.</p>	<p>Plugfest II deployed working end-to-end services in a multi-vendor IMS network <i>within 48 hours</i>.</p>



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<b>Interoperability</b>	<p>Myth: There are many interoperability problems.</p> <p>“No one is expecting IMS to emerge overnight or even anytime soon.... Three-quarters of the market does not expect general IMS-based interoperability (plug and play at <i>most</i> levels)” to come of age for 3-7 years.</p> <p>- Results of E-mail Survey, Edwin Mier Consulting, VON Magazine 4/2007</p>	<p>Enough interoperability has been tested to enable multi-vendor service deployment today.</p> <p>Vertical interoperability between networks (e.g. “cable companies, vertical integration fixed-mobile) is still fragmented and additional integration (e.g. fixed/mobile) will likely evolve from the application down.</p>	<p>~25 companies from various facets of the IMS industry built multi-vendor cores and ran applications end to end during the first five IMS Plugfests.</p>
<b>Business Case</b>	<p>Myth: There is no business case for IMS. It is merely an attempt to sell more IP services.</p>	<p>A clear business case has been made for IMS based on two goals – ROI from delivering consistent branded services across multiple networks and operational savings from administering a single network for multimedia services. For example, IMS enables standardized database access and application interfaces for converged mobile apps.</p>	<p>Interoperability is a major factor in achieving the business case: it controls costs and supports richer applications and services.</p> <p>Standard, interoperable pieces do not create, but do improve the business case.</p>



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<b>Key Features</b>	<p>Myth: Key features of IMS are lacking</p> <p>“You don’t need IMS to launch new services rapidly – mashups can take care of that.”</p>	<p>All of the building blocks for supporting reliable and secure IMS architectures exist today. As standards evolve, further security, billing and accounting function refinements remain to be added and tested.</p> <p>The reality is that while those mashups do allow a faster new service introduction, they are still “siloesd” implementations, and as carriers deploying services this way will realize, the more of those they introduce, the higher the cost of switching away from them will be. However, “mashups” can be “future proofed” by being “IMS ready”. Telefonica (Spain) is brining the best of both worlds (IMS and Web 2.0 mashups) with its WIMS initiative. See <i>IMS Magazine</i>:  <a href="http://www.tmcnet.com/ims/0808/analysts-corner-0808.htm">http://www.tmcnet.com/ims/0808/analysts-corner-0808.htm</a></p>	<p>More than three dozen “key” features of IMS have been rapidly deployed and tested and found working.</p>
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<b>SIP Integration</b>	<p>Myth: “Mobile SIP” will obviate the need for IMS.</p> <p>Myth: Support for SIP- and non-SIP-based services is required.</p> <p>Myth: IMS will not work because SIP has problems.</p>	<p>As a protocol, SIP is no replacement for the IMS network architecture. In fact, SIP is an integral portion of the IMS standards; in one sense IMS could be thought of as a network architecture built basically on incremental enhancements to SIP. While carriers are not required to implement SIP, they will do so by default in implementing 90% of the VoIP solutions on the market. “Mobile SIP” is a marketing term, not a standards-defined category.</p>	<p>SIP is internal to IMS. SIP interoperability is ad hoc; no formal SIP “golden reference” or certification process exists. However, SIP was designed with interoperability in mind from the start, and well-attended SIP-Forum “SIPit” interoperability test events are a regular occurrence in multiple locations worldwide.</p>
<b>Standards</b>	<p>Standards are immature and vendors’ solutions are not interoperable.</p> <p>“Some [IMS] standards exist while others are still in development and without a resolution most operators are hesitant to move forward. This issue is particularly a problem for smaller Tier 2 operators that can't afford to deploy proprietary IMS elements in their network.” – Fierce Wi-Fi</p>	<p>“IMS standards will reach a pivotal level of stability sometime in 2009.” –Pyramid Research, May 2008</p> <p>Standards development always happens in parallel with implementation and deployment. IMS Release 7 is available commercially and the standards groups are working on Release 8. Additionally, major standardization efforts are being undertaken by ETSI for fixed line IMS and Cable Labs for IMS over cable.</p> <p>“Fully standard compliant” is not applicable to IMS, as no one vendor is currently capable of delivering all of IMS’s components in an end-to-end “IMS infrastructure.”</p>	<p>British Telecom’s “BT21C” had to use multiple interoperable vendors’ solutions to build out a complete IMS network.</p> <p>Companies seen at the Plugfests are already delivering fully interoperable solutions using existing standards. Successful Plugfest implementations continue to show that the standards are working.</p>



## Scope of the Plugfests

### Phase I: Completed

1. Define and establish “reference” IMS test network
2. Basic interoperability between control and application layers (HSS, x-CSCF, MGF, AS, UE)
3. Device registration
4. Subscriber database interactions
5. Basic call flows and charging for them
6. IP-to-TDM interactions (media/signaling gateways)
7. Examine interaction of north/south interfaces to application servers

### Phase II: In Progress

1. Enhanced interoperability and interaction east/west (AS to AS)
2. Nomadic services (moving profiles between multiple IMS core networks)
3. Presence services
4. VoIP, Instant Messaging
5. Video & Multimedia
6. Downtime Prevention/Service Assurance: Reliability, Availability and Security
7. User & Application Profile Handling
8. Testing and certification of the 'gm interface'
9. Basic Roaming (visited networks)
10. Billing Applications – online and offline charging

### Phase III: Future Testing

1. IPTV
2. FMC
3. Forward migration, moving from 2G to “3G IMS” (inclusive of cable, mobile and fixed)
4. Service Level Traffic Variations to Maintain High Quality Services, Prevent Downtime and Customer Churn More sophisticated Online Charging scenarios
5. Additional Services for Businesses & Unified Communications using a Common IMS architecture
6. IMS Clients



## Findings / State of the IMS Industry

### I. Advantages and limitations of the methodology used to generate the IMS Report Card

- We have tried to confine our conclusions, recommendations and predictions to principles traceable to actual results observed at the Plugfests.
- We are aware that our snapshot of the industry cannot be the “big picture” of IMS for everyone; each service provider is different, and specific concerns are largely specific to each individual carrier.
- That said, we feel that the data obtained thus far from Plugfest testing provides a unique window into the reality of the technology and its fitness for deployment.

### II. Summary

NGN convergence is happening piece by piece; pre-full NGN architecture can still use IMS modules. IMS network operators are implementing IMS on a *per-service* basis. For the major carriers, the time for watching and waiting appears to be over, with many carriers implementing IMS components in particular areas in which favorable return on investment is clear. In other words, the marketplace is segmenting various versions and pieces of IMS and carriers are deploying them because they represent the “best” solution for a particular application in that network at that point in time. Overall, it is believed that IMS offers the means of a profitable migration path to IP.

Service providers and carriers for years have known that they must reduce the cost of delivering existing services while providing a platform for new ones, but the urgency has perhaps never been as keenly felt as it is today, given the renewed thrust of the smartphone market and new choices for IP communications such as Google’s Android, launched in October 2008. That said, service providers have little choice but to IP-enable their networks to meet these challenges with an eye toward the future. IMS gives them a standard set of blueprints to do just that.

The convergence of IP and legacy communications technology is not only finally becoming real, it is now occurring at an accelerated rate. Given their different goals, business models, and sometimes even radically different infrastructures, the service providers will each respond differently. In the end, many will select various features and specifications for numerous application-delivery scenarios, seizing upon what serves their needs and discarding the rest. IMS will continue to evolve over time relative to each service provider’s specific needs. As new aspects of the business case become clear, additional devices and protocols will be brought up to speed. For example, the IMS standard has been shown to correctly interoperate with at least one software set-top box, but no hardware set-top boxes have been available for testing yet, because the standard for interoperating with hardware set-top boxes has yet to be finalized.

In a sense then, the IMS infrastructure is evolving from the inside out, starting with individual applications at the core service layer and spreading from there. The immediate need served is service deployment and the long-term benefit is the beginning of a common foundation for existing and new mobile and converged services as they emerge.



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What's certain is that it is expensive for providers to continue to deliver new services using outmoded infrastructure or "one off" proprietary solutions that aren't interoperable ("siloes"). It remains an open question whether we will ever see a proliferation of "all-IMS networks" – the complete architecture as described by the various standards bodies. But we will most certainly see networks built using those elements of IMS that are fundamental to building IP enabled infrastructures.

While service providers may "bolt on" IMS in a piecemeal fashion to suit their own unique needs, new "killer" applications may yet emerge once the infrastructure has been put in place. Perhaps, just as the spreadsheet emerged as the "killer app" for the PC, a "killer app" will emerge to take advantage of IMS. However, that "killer app" may in fact not be a single application but the sum of evolutionary changes in data, communication, and media services and how people use them. We may be seeing the first stage of this in the advent of the Apple's iPhone and other new network appliances designed to give users ubiquitous access to multiple services whenever they want no matter where they may be. Time will tell.

Of course, additional pieces must fall into place to support the continued evolution of IMS networks. This we address in the next section.

### **III. Areas for continuing and future development**

IMS-based service uptime is critical to network operator revenue. Reliability, security, billing and roaming (visited networks) are key areas that still need to be addressed further as we move forward. The IMS Plugfest program is on an aggressive ramp to intensify the testing and interoperability of these critical areas as the IMS "ecosystem" matures.

The IMS/NGN Forum in cooperation with UNH-IOL and its membership will continue to be aggressive in its mission to help the IMS industry develop to its fullest potential.

IMS as a technology is maturing, and more work needs to be done as standards continue to evolve, but the good news is that it is a demonstrably real, standards-based technology with real vendors delivering real products and services today.

Participation at IMS and NGN Forum Plugfests are open to all Service Providers and Vendors. For comments and information please visit [www.NGNForum.org](http://www.NGNForum.org) or [www.IMSForum.org](http://www.IMSForum.org) and contact us at [info@IMSForum.org](mailto:info@IMSForum.org).