Successful IMS Implementation Methodologies

IP Multimedia Subsystem (IMS) is becoming more of a reality with each passing day. Wireless and wireline operators continue to converge and compete for a better position in the escalating race to give consumers what they want: one network with fixed / mobile convergence (FMC) propelling an intriguing list of integrated voice, data, and multimedia services. Meanwhile, handset manufacturers are aggressively working toward giving consumers a single device for accessing blended lifestyle services, including IP telephony, push-to-talk, presence, music, video, GPS, gaming, and more.

To make this happen, however, service providers will need the assistance of network equipment providers (NEPs) that offer scalable, reliable network platforms integrated with IMS elements and functionality. NEPs, in turn, must look continually for ways to provide additional value to network operators, mostly by focusing on quality of service and differentiated applications designed to raise average revenue per user (ARPU). The starting point is an integrated IMS approach that marries standards-based software and hardware while leveraging best-practices implementation methodologies from proven 3G Wireless and Voice over IP (VoIP) deployments.
Navigating The ‘Value Line’—Buy Below, Innovate Above

This is a crucial time for NEPs. Now, more than ever, they must understand how the rules of engagement with service providers are changing. NEPs’ traditionally lengthy network platform development and equipment production cycles are giving way to flexible “buy or build” methodologies for assembling the transport, call control, and service / application layers of IMS networks. By focusing on the uppermost service / application layer, NEPs offer service providers the greatest value with tailored applications that accommodate unique nuances and preferences while still meeting accelerated time-to-market goals.

NEPs should focus engineering resources on developing a continuous stream of innovative applications and services, including:

• Location-based services
• Push-to-talk
• Presence
• Short-messaging services
• Video conferencing
• IPTV
• eWallet

When it comes to addressing layers below the applications, NEPs are best served by buying pre-integrated, high-performance network service-ready platforms. Such platforms are comprised of software and hardware such as IMS protocol stacks, high-level APIs, carrier-grade computing capabilities, storage, high availability middleware, and distributed fault tolerance. These standards-based, integrated platforms fit below the application “value line” as Figure 1 depicts.

Tier Two and Tier Three NEPs, in a quest to grab early leadership positions with 3G Wireless and VoIP deployments, have reaped early time-to-market benefits from buying network elements below the value line [see sidebar on Spatial Wireless]. These smaller, more nimble NEPs not burdened with legacy gear know their fate is hinged on time to market. They are predisposed, therefore, to working with partners that can deliver proven, interoperable software and hardware elements.

With Tier One NEPs, on the other hand, old habits die hard. While today they would never consider developing their own silicon chips, just a few decades ago, it was their reality. Up until five years ago, many Tier Ones still built their own operating systems, even though the opportunity to add value to such software had largely diminished.

Over the years, this stubborn reliance has proven short-sighted as some NEPs now are facing serious end-of-life issues with older proprietary technology, which will impede IMS deployments while adding undue complexity to their future integration process. Forward-thinking Tier One NEPs are beginning to carefully navigate the value line to buy time-tested, field-proven software and hardware, enabling them to focus on customizing applications designed for maximum differentiation.

A prime example of the “value line” approach involves the Call State Control Function (CSCF), typically one of the first steps in getting started with IMS. This network element provides a contact point within a service provider’s network that lets subscribers register, route, and forward their Session Initiation Protocol (SIP) messages while providing a mechanism to capture and charge for each transaction. Instead of creating their own protocol stacks and compute solutions to provide CSCF functionality, NEPs can purchase pre-integrated platforms, freeing their engineering teams to concentrate on specific application requirements.

In this fashion, NEPs can expedite phased-in development of other IMS building blocks, such as the Home Subscriber Server (HSS) – a distributed database containing vital subscriber profile data. Today, NEPs can buy 90 percent of the software and hardware to expedite assembly of this essential network element. Similarly, more than half of the hardware for developing a softswitch now is available in fully tested, interoperable configurations for meeting a variety of capacity and networking needs.

It is also important to note that the value line will continue to rise with increasing availability of pre-integrated IMS network elements and each generation of product development. For instance, pre-integrated platform management and high availability middleware are gaining ground in reducing project risks and expediting development cycles for central office functions such as billing, operations, administration, maintenance, provisioning, call processing, and network element management.

The point at which NEPs engage outside technology partners will vary. NEPs must start with a gut check on the current location of their value line as it relates to their business, technology, and customer demands. Once determined, NEPs should follow the value line’s one simple rule: Buy below, innovate above.
Platform Integration—Avoiding The Pitfalls

Taking measured IMS deployment steps below the value line can speed time to market anywhere from 15 to 30 percent. The ability to configure pre-built, standards-based network elements in unlimited combinations gives NEPs unprecedented flexibility in tailoring applications but also raises some important interoperability issues.

Today, the Number One hurdle NEPs need to clear is achieving seamless platform integration. Unfortunately, familiar “old school” practices of buying “pieces and parts” only exacerbate the complexity of integration while stretching development schedules. The hurdle isn’t any easier to clear when NEPs insist on pursuing a “best of breed” approach for acquiring network elements. In terms of real-world deployment, a collection of the “best” network elements may leave NEPs with the worst integration nightmare – and substantially higher operational expense over the long run.

New times require new thinking. After all, achieving true integration requires more than assembling components or plugging in cards and loading software. Even relying on standards-based technologies requires astute “reading between the lines” as slight software modifications can have serious impact on hardware functionality. In most cases, the fastest and most economical route is purchasing pre-integrated solutions that offer unlimited combinations of protocol software with proven and tested hardware configurations, many of which already are being deployed in 3G Wireless, WiMAX, and VoIP networks.

NEPs embracing pre-integrated solutions can shave off months from development cycles to reduce total cost of ownership by about 40 percent. In seeking partners to assist in interoperability efforts, NEPs need to identify companies with real-world network implementations and substantial experience in “heavy lifting”—interoperability testing, systems integration, distributed fault tolerance, “five nines” availability, and NEBS compliance. Equally important is ensuring seamless interworking between IMS elements such as the HSS and existing network elements such as the Home Location Register (HLR). Coordination between new and legacy elements will be critical to successful IMS migrations; offloading these tasks to a partner can free up TEM bandwidth to focus on the bigger picture.

Equally essential is avoiding major integration pitfalls. To that end, NEPs should:

• Abandon the “pieces and parts” mentality for a more holistic view of the network and top-down return on investment objectives over a five to ten year timeframe.

• Tackle software interoperability before worrying about hardware computing power—getting the application to run is the first order; scaling it comes later.

• Prove interoperability in the integration lab first. This is the best place to identify potential problems and isolate concerns before development schedules are impacted.

• Limit finger pointing by reducing the number of technology partners. Imagine the challenge faced by one major mobile operator that reportedly is integrating software and hardware from more than 200 vendors in building its 3G Wireless network. Simply put, the more partners, the bigger the integration challenges, the longer it takes to get to market, and the more headaches when it comes time to troubleshoot.

• Engage a technology / integration partner as early as possible in the development cycle. This will reduce in-house research and development costs while letting NEPs take full advantage of their partner’s expertise to sidestep potential problems and ease interoperability with existing equipment.

• Seek partners with real-world 3G Wireless, WiMAX, and VoIP deployment expertise since interoperability and integration experience in these environments will ease IMS migration; many of the same network elements and underlying technologies are required.

• Identify pre-integrated platforms that serve as a single source for everything from hardware elements to protocol stacks, robust APIs, distributed fault tolerance, and high availability network elements.

Early IMS applications are making their way into interoperability labs and early trials. Over the next 12 to 18 months, major milestones will occur that will demonstrate how well IMS network elements from different NEPs work together in service providers’ networks. The time is right for NEPs to develop partnerships, align product roadmaps, and begin making savvy use of standards-based software and hardware combinations capable of powering a range of application services for next-generation networks of all kinds.

The Beauty Of The Blade—Scaling For The Future

Once the challenges of software interoperability and platform integration have been addressed, capacity planning and scalability considerations are the next logical steps. NEPs looking to “future proof” their platforms are moving beyond “speeds and feeds” to quantify their platforms in terms of cost-per-subscriber or cost-per-channel.

Again, a major shift in technology approach and business practice must take place for NEPs to stop fixating on Gigahertz, RAM, and clock speeds and pay more attention to subscriber-based cost models. Of course, cost-per-subscriber estimates need to encompass purchase costs (i.e., capital expenditures) as well as operational expenses (i.e., power, cooling, real estate, maintenance), which currently involve lots of gray areas.
A central theme in most “cap ex / op ex” discussions is the theory that NEPs will incur twice the cost to operate compared with what they spend to deploy compute-intensive, high-capacity equipment. In addition to the substantial upfront investment, operating expenses remain high during the entire product lifecycle, well before subscriber demand will dictate the additional resources. A better plan would be to opt for lower-cost entry points that let NEPs grow over time as subscriber numbers rise—without requiring “forklift” upgrades. For this reason alone, a bladed architecture is optimum for building highly scalable, IMS-enabled network platforms.

In particular, network platforms built upon Advanced Telecom Computing Architecture (ATCA) offer compelling benefits for facilitating “go as you grow” capabilities without sacrificing performance, reliability, or service flexibility. ATCA utilizes a central chassis with a series of interchangeable and removable blades, resulting in the ability to “mix and match” functionality and processing capabilities as needed for adding more application servers or increasing power. For NEPs, an ATCA approach to product development can yield an 18-month or more lead over in-house builds. The result can be the difference between being a market leader or an also-ran. ATCA also lets NEPs take fuller advantage of new computing capabilities as they become available, thus more readily improving processor speed and solution capacity.

In sizing up the proper mix of hardware functionality, NEPs need to determine which blades they need and which chassis size and storage capacity best fit those requirements. What goes “into the box” depends largely on the application and the service provider’s rollout expectations, but the good news is that many of the IMS components are common to a number of different network elements. By embracing ATCA, it’s easier to re-use these platforms across different applications, which yields improved margins while simplifying inventory management. This capability also reinforces one of the most attractive aspects of a blade approach: common equipment can scale faster and easier to suit escalating network requirements.

For example, at the start of a rollout, IMS logical elements, such as the three types of CSCF, the Media Gateway Control Function (MGCF) and Policy Density Function (PDF), all may be located in the same box. At the outset, this provides an attractively low cost of entry for supporting some fundamental IMS services. As subscriber counts begin to rise, these vital functions can be segmented onto different blades while the same architecture can be re-used to offer expedited, seamless scalability. With ATCA, additional blades can be deployed rapidly to meet increased service or I/O demands.

**Spatial Wireless: Leveraging Pre-Integrated 3G Wireless Solutions For Rapid Roi**

By choosing to adopt a pre-integrated solution as part of its product development, a TEM start-up realized exceptional time-to-market for its innovative wireless softswitch—and was rewarded with a big payday.

In late 2004, Spatial Wireless was purchased for $250 million. Alcatel, which acquired the company, made the acquisition because the move made the giant TEM uniquely positioned to leapfrog traditional mobile switching technologies with a commercially available next-generation network (NGN) solution—designed and ready for IMS.

Now called the Alcatel 5020 Spatial Atrium softswitch, the solution controls distributed media gateways and manages call / session control for voice and data services. Working seamlessly in GSM / EDGE, 3G / UMTS and CDMA networks, it also enables a smooth evolution to 3GPP Release 5 and Release 6 networks via software-only upgrades, thus ensuring long-term investment protection for the introduction of IMS. According to Alcatel, the Spatial Atrium Distributed MSC solution already has achieved market dominance, and is in commercial use around the world with Tier One mobile operators.

The blade approach also assists NEPs in lowering total cost of ownership while retaining better long-term control over platform architecture because the NEPs no longer are bound by their own—or someone else’s—proprietary ways. In addition, ATCA means less exposure to risk, as NEPs are better positioned to act—and react—to changing customer needs and fluctuating market conditions. In an industry undergoing continuing transformations marked by major changes every couple of months, ATCA gives NEPs the highest level of confidence they can respond advantageously to any scenario placed before them.

**Making The First Moves**

All NEPs have a universal goal of adopting a common platform to fuel delivery of next-generation network services. Across all tiers, there is significant movement to adopt standards-based approaches in the hope of easing early IMS migrations. Keeping with standards minimizes the impact on NEPs, both financially and technologically, as their applications and engineering efforts continue to move closer to IMS applications. Once this is achieved, NEPs are set to ride the technology wave while being able to focus on the creation of new revenue-generating applications and services.
Many moves will be contingent upon further clarification of network operators’ rollout plans. Still, NEPs can’t afford to wait before proceeding with their platform development plans. While they have every right to be cautious about making monumental changes to their business and technology deployment models, first movers are sure to realize the most market traction.

In the shifting priorities of today’s telecommunications market, a platform’s overall worthiness will be best judged on a set of new criteria led by capability, scalability, time-to-market and return on investment. By adopting a network service-ready platform that seamlessly blends all necessary software and hardware elements for IMS, NEPs can achieve these goals faster while also attracting more third-party application developers to expedite delivery of exciting and innovative services network operators demand. For NEPs, taking the journey with a trusted technology partner with proven software and hardware expertise, as well as real-world deployment experience, is the best way to negotiate the twists and turns in the road ahead.