PipelinePub.com

September, 2006 | Volume 3, Issue 4

IMS:
Convergence that Works

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Internal and external forces of convergence are taking hold of the telecommunications industry. Consolidation of local and national voice services dramatically changed the telecom landscape, as competition flourished. Now, voice and data services are converging rapidly. Soon, customers will be able to access any content or application seamlessly from a multitude of networks, using any device of their choosing.

Industry players are gearing up to harness the potential of converging technology, networks, devices and content to develop multimedia services and solutions of ever-increasing sophistication on a single Internet Protocol (IP). As shown in Figure 1, today's multiservices (e.g., voice, data and video) and multiprotocol (e.g. TDM/SS7, VoIP/SIP) environments require an infrastructure that enables them to be more responsive, variable, focused and resilient. Evolving customer demands for content from an increasing variety of sources will require telecom providers to engage in a complex web of collaboration with the media and entertainment, IT and consumer electronics industries.

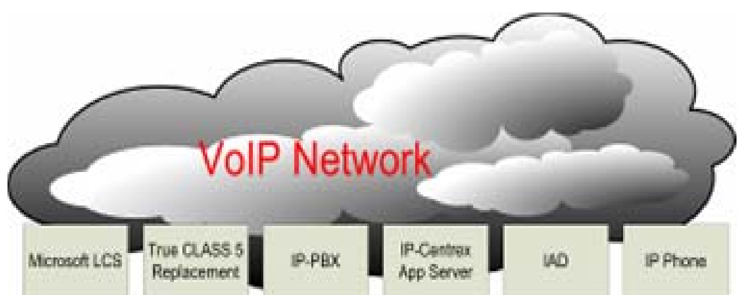

Figure 1, State of the industry; a collection of legacy CLASS 5s

In the core network, fixed, wireless and cable operators are all converging on a single, long-term architecture that incorporates IP and its underlying components. Timing is imperative, as the transition remains critical yet uncertain. The network infrastructure for convergence is just beginning to be deployed as softswitches continue to be installed in fixed, wireless and cable networks, allowing operators to deploy early market or technology trials. Policy management functions for QoS, bandwidth management and user-defined SLAs are beginning to appear in both fixed and cable networks. Fixed network equipment for WiMAX is becoming available as are dual mode phones that easily operate between fixed and wireless networks.

As depicted in Figure 2, today's infrastructure is complex and rigid. Because many of today's infrastructures are based on industry-specific protocols, such as SS7, SIP, H.323, etc., employing proprietary hardware and software – delivered well before industry standards were established – it is difficult to make all the pieces work together. It is even more challenging to make them deliver the flexibility necessary to support today's dynamic, highly competitive business environment.

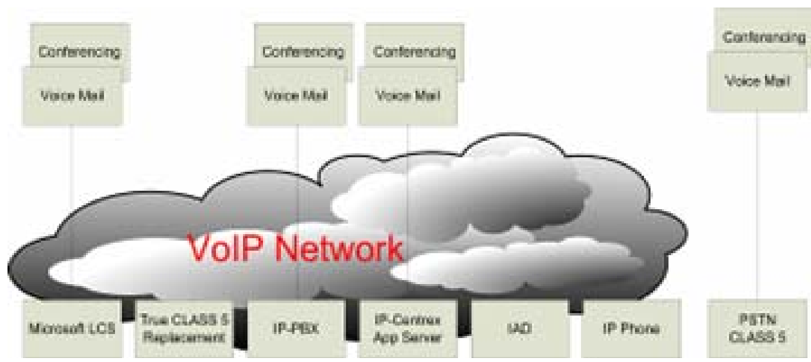

Figure 2, Mutli-vendor, multiprocool environment

With respect to IMS, these issues are especially significant in ensuring the orchestration of the different elements in a converged service. The actual implementation is hidden from the requester of a service, so service coordination and feature interaction are a convenient way to achieve application integration. By allowing new and existing applications to be quickly combined into new contexts, existing applications are 'adapted' to service declarations. As shown in Figure 3, "Service Coordination and Interaction Manager" (SCIM) is responsible for synchronizing the offerings of one or more application services across various service-enabling technologies and platforms to produce valued services for IMS subscribers. SCIM provides resource management and resolve service interaction at call time and coordinates among features and capabilities provided by multiple application servers. This function is critical to realizing the ultimate goal of enriched services blending multiple features and capabilities envisioned for IMS.

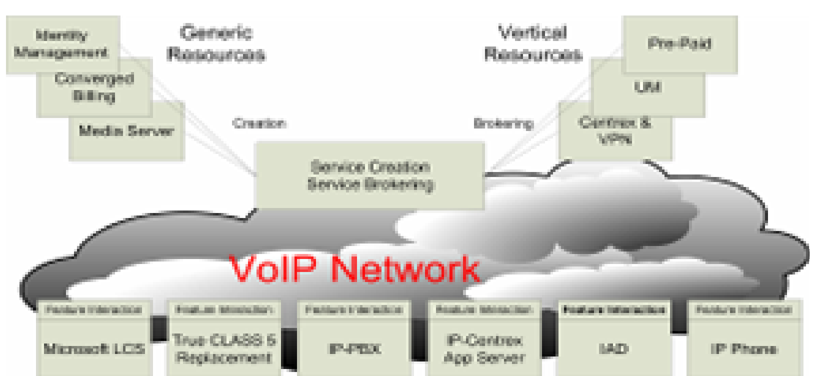

Figure 3, Service Coordination and Interaction Manager Creation

Service providers are already in the midst of a gradual evolution from PSTN to IP-based infrastructures. Most of the evolution so far has taken place in the transport and access parts of the network as well as in the development of IP infrastructure elements, such as gateways and softswitches. Now, the market for next-generation services is beginning to take shape and SIP-based application/feature servers have been developed to deliver actual revenue-generating services for carriers. Once SIP is implemented beyond call control functions, The Insight Research Corporation believes that the following services will be the primary enhanced services implemented in the NGN environment in the near-term:

- Audio conferencing/video conferencing;
- Web/data conferencing;
- Mobility management/presence/follow-me services;
- Multiple simultaneous streams
- Unified messaging; and
- Instant messaging (IM) linked to Microsoft Outlook and Exchange and other desktop solutions including IBM, Nortel, RIM etc.

These services already have circuit-switched equivalents in operation-generating revenues or displaying the potential to become large revenue IP offerings. They may be service enablers or components for more complex services operating new infrastructures on platforms such as media gateways and media servers.

Although many of the next-generation providers that were focused on pure IP applications have retrenched or disappeared from the scene, ILECs and small independents view IP applications platforms and gateways as a means to launch their slow migration to a fully converged NGN. The lack of a standard SIP implementation (although defined in IMS) is a major concern among operators and will deter interoperability among various SIP-based devices. While SIP was considered the panacea for interoperability, significant problems exist today. Insight Research anticipates that this migration may last over a five- to ten-year period, with carriers investing on the order of $14 billion over the next five years.

Many incumbent operators are choosing to implement NGN offerings as an overlay-network design. Taking this approach (using various forms of IM-SSF), carriers do not have to replace PSTN network elements and components that usually have minimal ongoing operational expenses.

To better meet their customer's needs, operators want to converge mobile with fixed access and voice with multimedia data services. Adding to the challenges that operators face today is the necessity to move from traditional circuit-switched IN to value-added IP-based multiservice networks that utilize softswitches, media servers and other service delivery platform (SDP) components to deliver revenue generating services (all future-ready and open investments).

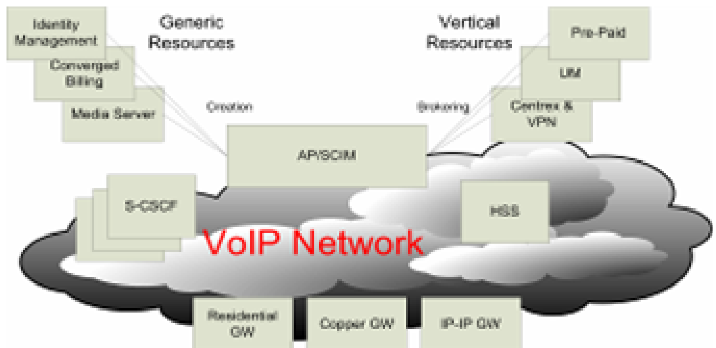

Figure 4, IMS architecture view

IMS, an IP/SIP-based architecture, has its origins in Europe for GSM migration into 3GPP networks as a means to provide multimedia applications in a wireless environment. The basic concept is to create an infrastructure design that allows any session based feature (voice as well as non-voice applications, such as messaging or content) to be added easily and without cross product impact. Today, IMS is designed to enable IP services for mobile, cable TV, and traditional fixed-line operators; although, standardization is still somewhat slow.

The 3GPP Group, comprising mobile operators and equipment vendors, designed the IMS architecture to address the need for consistent service delivery over all IP mobile networks by both the network operator and a variety of third-party service providers. Increasingly, fixed and mobile operators are seeing this architecture as the basis for a more general convergence in all networks, and as the basis of an evolution strategy to take them from circuit- and IN-based solutions to IP multimedia services.

Figure 4 details the IMS capabilities that enable the connection of people, processes and information in a way that allows service providers to become more flexible in response to the dynamics of markets, subscribers and competitors around them. IMS offers operators the opportunity to build an open IP-based service infrastructure that enables deployment of new services combining standard voice service with a variety of data and multimedia features. For example, it is now possible to use a WiFi network in an office, cellular on the move, and WiFi in the home (via a VPN), using the same number with the same look and feel by using local SIP clients to maintain feature sets while switching the handsets from mobile use to fixed line use.

From the onset, IMS applications are configured for single mode operation such as push-to-talk. To support multi-functional applications and integrated services from IN and IP systems, service brokering functions are mandatory. In order to provide access to multiple applications through a self-service portal/cockpit, IMS requires interoperability and event integration from among legacy systems such as voice mail, short message, OSS, etc. and NGN applications such as presence and identity. Interoperability across network boundaries and transport protocols is extremely difficult to accomplish. This is why very few applications work across network boundaries (e.g., mobile networks across to fixed networks) without substantial application modifications and gateway customizations.

Application Servers are not actual components of the IMS network, but rather sit above the network. Figure 5 details the Application Servers accessible to the users of the IMS network to provide value-added multimedia services to those service subscribers. The application servers will have the ability to submit charges to the IMS for the services they provide to the IMS user community.

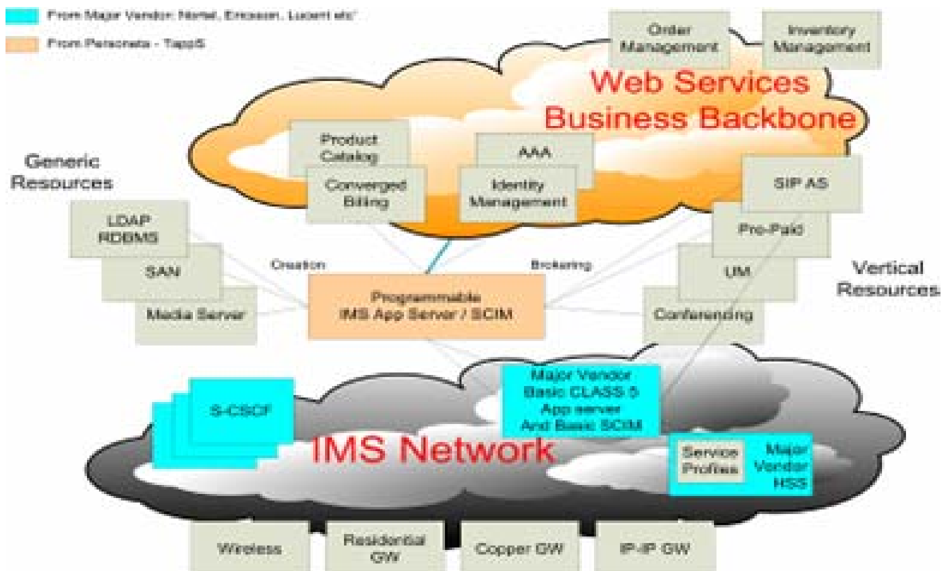

Figure 5, Application Servers in IMS Architecture

To accomplish this interoperability, and to enable IMS multifunctional operation across networks, gateways and platforms that support multiple transport protocols are necessary. Presently, IMS is based on SIP. As addressed earlier, SIP is not a standard implementation; it varies considerably among vendor interpretations and operations thereby creating incompatible implementations and disparate operations. A SIP-only platform cannot accommodate legacy protocols, such as AIN and WIN, for successful deployment of applications in the IMS arena. Within the IMS standards is the call session/state control function (CSCF) – the brains of IMS – that allows all traffic to be carried over an IP network via an IMS service control (ISC) interface, which runs the SIP protocol. Until the infrastructure fully supports CSCF functions, CSCF platforms will be deployed in overlay configurations and not as replacements of infrastructure systems such as SCPs, intelligent peripherals and 800 databases. It is only with multiprotocol platforms that operators can successfully address this service brokering functionality. An organizational model of the converged IMS infrastructure is shown in Figure 6.

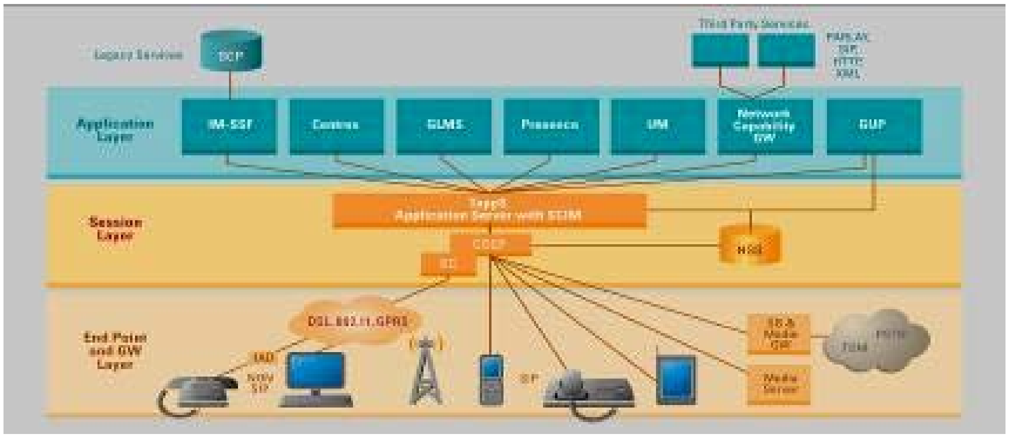

Figure 6, an example detailing the IMS environment with the use of a multiprotocol platform that will allow operators to successfully address a service brokering functionality.

European operators have made significant commitments to IP IMS networks, while US operators are taking a more deliberate migration approach, due in large part to the significant investment in legacy network elements and applications including OSS/BSS. In Asia, IMS is further behind the implementation curve due to the minimal investments in 3G and converged services. Insight Research expects that IMS will experience slow, increasing acceptance with expanded investments and rollouts in 2006/2007 and beyond. In light of this estimation, IMS is on all operators' product roadmaps.

About the Author

Alon Lelcuk is the vice president, chief technical officer and co-founder of Personeta, a leading provider of next generation network service platforms and IMS application servers. Alon has over a decade and a half of experience in network-based IT systems for IP, wireless and fixed carriers. He has served as an expert telecommunications consultant on OSS systems and security issues. Alon was chief technology officer at Liacom, a leading network engineering company. Prior to co-founding Personeta, Alon was vice president and chief technology officer at Macom Networking Ltd, where he led the creation of first-generation eCommerce systems.