The Smart Network

Premium Services, Profitable Solutions

Abstract

This white paper defines GENBAND’s Making Networks Smarter vision and how its implementation will enable telecommunications service providers and enterprises to overcome the many challenges of today’s highly competitive market to deliver innovative IP communications solutions while meeting the expectations of end users and creating new sources of revenue. GENBAND’s Smart Networks vision and SMART CORE, SMART EDGE, and SMART EXPERIENCE solutions are the culmination of a decade-long strategy – buoyed by organic development and acquisitions – to assemble the software, services and technologies required to compete and thrive in a highly challenging and ever-changing 21st century communications market.
Experience Matters

**User Expectations Driving Change.** It’s staggering to contemplate the accelerated rate of evolution in the communications industry over the past few years. The number and diversity of devices, for example, have increased dramatically, as well as their intelligence. Applications are now downloaded by the millions and the quantity of connected mobile communications devices will soon exceed the number of humans on the planet. At the same time, voice communications have steadily migrated to packet-based networks, while communications have evolved from voice to a rich and diverse set of multimedia and social networking options.

Underlining these developments is a confluence of mobility, high-speed broadband and the emergence of Internet Protocol (IP) as the preferred channel for social interaction, information, and entertainment. This confluence has forever altered the communications landscape and is asserting pressure on traditional communications service providers to deliver an increasingly powerful and personalized user experience. Today’s communications subscribers now demand a completely uninhibited user experience, where they can access information or connect with others in a variety of modes, regardless of where they are or the devices they are using.

Accordingly, “the User Experience” has become the defining competitive differentiator for service providers. With IP’s emergence, the classic economic “barriers to entry” that once allowed large service providers to dominate are now greatly diminished. Today’s communications vendor options are nearly endless, with competitors around every corner, garnering niche customers with unique offerings tailored to a particular need or customer set.

This hypercompetitive market is forcing operators to develop go-to-market models that attract new subscribers and retain existing ones, accomplishments that are highly dependent on their ability to offer a catalog of high value, experience-centric services. As well, the proliferation of equipment vendors, competitors and applications has created a commoditizing effect on all forms of communications, which in turn is mandating flexible, cost-effective business models for service providers that are easy to use and accessible across a large cross-section of devices, networks and operating systems.

The User Experience is highly dependent on the underlying network. While the Web is for the most part a bastion of continuity, with the single protocol of IP serving as the lingua franca, traditional telecommunications networks are anything but contiguous. In addition to being vertically organized into silos, telecommunications networks are often segmented by technology type or technology generation, with each contributing its dedicated protocols, interfaces and codecs to an alphabet stew that never seems to congeal. This incongruous nature of today’s telecommunications networks and their make-shift linkages to adjacent networks is generally incompatible with the delivery of a seamless user experience.

For the consumer, enterprise, and service provider, “experience matters” more than ever before.

**Networks Must Adapt.** While service providers have managed to stitch together the disparate components of their networks with an assortment of gateways and transcoding devices to deliver basic voice services and some data offerings, a more holistic approach, one that is infused with end-to-end intelligence across all technologies (TDM, IP) and network types (mobile, fixed, enterprise) will be required to enable service providers to meet the future expectations of 21st-century IP communications subscribers.

Even the most sophisticated and modern telecommunications networks are ill-equipped to meet the demands of today’s communications marketplace. As users’ appetites for seamlessly connecting across networks, devices, social networking sites and technologies increase, the rigidity and adaptability shortcomings of current telecommunications infrastructures continue to be further exposed, severely restricting future revenue opportunities and jeopardizing the operator’s most valuable asset – subscriber loyalty.
For service providers to meet these challenges, they will require software and technology with the intelligence to span the multiple technology and compatibility chasms at the core, edges and application layers of networks. GENBAND’s Smart Network solutions are designed to alleviate roadblocks that exist in the network’s core, its edges and in the application layer, which is the wellspring for compelling end user applications. A unifying layer of intelligence across the network is imperative for service providers fighting to retain their decades-old prominence in the telecommunications value chain and grow new revenue through the delivery of highly personalized IP communications services.

To overcome numerous challenges and evolve their networks to redefine the 21st-century IP communications experience, service providers require the network-wide intelligence of Smart Network solutions to accomplish multiple tasks, including the following:

- Create unique, valuable and competitive services
- Utilize new technologies to enable phenomenal user experience
- Implement solutions that enhance market breadth and speed time-to-market
- Converge and consolidate multiple, disparate networks
- Leverage existing communications assets where possible
- Analyze network behavior to ensure efficient use of infrastructure assets
- Reduce complexity via simplified management and maintenance
- Reduce costs and gain flexibility via software-centric platforms and solutions
- Manage the growing multitude of vendors, technology and peering partners
- Utilize external resources to enable network deployments and maintenance

**The Smart Network, Broadly-Defined.**

The Smart Network fortifies and enhances telecom infrastructures with the software, services and technologies that enable service providers to overcome the challenges of complexity, discontinuity, costs and new competitive forces, while at the same time redefining the IP communications user experience. A Smart Network empowers operators to mine new sources of revenue by enabling the creation of differentiated business models, the forging of partnerships and the delivery of a satisfying, useful user experience that engages customers and ensures ongoing growth and retention of subscription services revenues.

The concept of a “Smart” network is not new to the telecommunications industry. Various vendors and service providers have applied that modifier to a particular service or network function, such as the gathering of analytical information or the operations of the policy control and charging subsystem. While these address important issues and play significant roles in the ongoing operator evolution, those applications of “Smart” are far too narrow. What service providers require is intelligent features, functions, and capabilities that permeate every corner of their networks, existing or new, as well as intersections into adjacent networks, such as those of peering partners, the Internet and enterprises.

GENBAND’s Making Networks Smarter vision, however, reaches much farther than the network. For service providers to thrive in the highly competitive communications marketplace, they will need to revitalize nearly every aspect of their business, including their operations, go-to-market strategy and services organizations. Accordingly, the defining characteristics of the Smart Network are that it is holistic, flexible, contiguous, cost-effective, experience-centric, and profitable. Operators will need to leverage the Smart Network to navigate through the next decade of change and disruption to their traditional service offerings and status in the communications ecosystem. Only by infusing their infrastructure with the necessary intelligence can service providers forge smart partnerships, assemble smart business models, and deliver smart solutions to increasingly demanding customers.
Smart Networks from the Core to the Edge to the Experience
GENBAND’s Smart Network solutions address three critical components and capabilities of service provider networks: core, edge and experience.

SMART CORE
Though the network core is far removed from direct subscriber touch, the components and solutions at the center of a service provider’s network critically impact the end user experience. The core portion of the vast majority of service provider networks, both mobile and fixed, are characterized by a layering of protocols and capabilities that are highly fragmented or segmented. The challenge in the core is to enable seamless and smooth switching, translation, and signaling to enable communications to get from one place to another.

For example, a simple voice call between IP and TDM/circuit switched domains (whether mobile or fixed) can clearly not proceed without a translating mechanism – IP is one protocol, TDM is another. But it goes much deeper and wider than that. TDM comes in multiple flavors, which have many dozens of their own variants as well. In addition, countries have their own variants. For efficiency’s sake, signaling (such as a flashhook) often gets separated from the media, creating even more complexity. Then there is IP which, because of its inherently-designed flexibility, is almost limitless in variation. With IP, there are so many protocols, signaling, security, network types, media types, devices, and interface specifications – that it is a literal alphabet soup that gets more complex every day.

SMART EDGE
Secure, intelligent connections and interworking for networks
Leveraging hybrid and IP networks to monetize network investments
Secure, intelligent connections and interworking for networks
Delivering the User Experience, connecting people, devices and communities

SMART EXPERIENCE
Each communication event has a purpose, but rarely does each one live in its own world. Some telecom platforms in use today (whether service provider or end user-based) are ancient by modern standards, and even the more recent mobile and fixed platforms can have many generations of variants. As a result, sophisticated intelligent interworking and switching is required to enable the communications experience. This implies many things including the ability to interpret and translate the network traffic; implement rules, features and guidelines; and securely connect the communications to the right network equipment or device. By harmonizing these many generations of network assets, operators can alleviate user experience limitations and wring out unprecedented cost inefficiencies through the adoption of a common control and application environment.

With so many variants and generations of network equipment, operators and enterprises are confronted with the question “Why not just rip it out and start anew?” Indeed, some believe that IP was supposed to achieve that. However, IP is so adaptable that it has arguably become more complex and sophisticated than any TDM/circuit-switched network ever was. Combined with the inability of industries or countries to fund a broad-scale, flash-cut replacement of infrastructure, the telecom landscape...
becomes increasingly littered with successive generations of diverse equipment in the network core – all requiring intelligent interworking and switching to communicate with each other.

GENBAND’s SMART CORE solutions enable operators to manage and grow their networks across a continuum of existing and new devices, avoiding a costly and disruptive complete replacement of the network(s). These solutions allow operators to grow revenue and ARPU, create new service offerings, improve network performance, and reduce network costs. Existing and state-of-the-art network technologies are harmonized through mediation and transcoding, enabling service providers to transform their networks at a cost-efficient pace and in a non-disrupting manner, where the migration of users can be managed a customer at a time.

GENBAND’s SMART CORE solutions are also network hardened with industry-leading availability and geo-redundancy, having enabled billions of voice and multimedia conversations. A software-centric, virtualized approach, based on commercial-off-the-shelf platforms like GENBAND’s GENIUS, naturally lends itself to unified management, advanced middleware, billing and service assurance support systems.

Implementing a core network transformation typically involves many different types of networks, protocols, equipment types, devices, and systems, mandating a requirement for skilled professional services. GENBAND has a rich history in providing extensive service-based solutions to help service providers and enterprises grow revenues, serve customers, reduce costs, and improve productivity. GENBAND’s Global Professional Services organization has initiated over 20,000 network projects and helped many operators evolve their networks to IP. The organization provides a wide range of services, including FLEX Services that encompass a comprehensive suite of Definition, Deployment & Integration services for GENBAND products and solutions, and Professional Services that include hundreds of NGN, IP Voice, IMS specialists and partners offering technical depth, network breadth and tools to assist customers in all aspects of network modernization.

GENBAND’s SMART CORE Solutions include:

- **IMSLiTE**: provides operators with a simplified, lower cost IMS implementation, removing the complexity of deploying multiple core IMS elements
- **IMS**: GENBAND’s flexible approach to IMS enables mobile and fixed operators to monetize services by enabling the rapid delivery of revenue-generating voice and multimedia applications
- **Rich Communications Services (RCS)**: provides intelligent design and features that allow operators to augment the defined RCS baseline features with enhancements
- **VoLTE Solution**: surpasses 3GPP-based requirements by providing extensive consumer and business services, multimedia collaboration services, RCS/RCS-e services and interworking with social networks
SMART EDGE
Given that nearly all exchanges of IP communications must traverse multiple borders, the importance of an intelligent edge solution in facilitating a quality user experience cannot be overstated. The boundaries between IP networks are very susceptible to security breaches, incompatibility between session and media types, and other delay-inducing or quality-affecting inconsistencies.

Disruption potential in the end-to-end delivery of IP services at network interconnection points is prevalent both in the access portion of the networks as well as the borders between adjacent core networks. In the enterprise – which interconnects with access portions of the service provider network – various security and mediation issues arise. Multiple signaling protocols, or even variations within a single protocol, must be mitigated. Media conversion, given the mixture of TDM and IP-based PBX equipment, is also an issue inside the enterprise, as are security concerns introduced by the number of personal mobile devices that are flooding the workplace.

Security and mediation issues are even more pronounced at the intersection of service provider networks. In this portion of the communications value chain, IP-governed interconnection points must mediate, secure and transcode signaling and media from a variety of different networks, all with different characteristics and protocols. Complicating the already difficult task of traffic exchange is the fact that the make-up of this traffic is no longer predominantly voice. Signaling sessions

GENBAND’s SMART EDGE Solution

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- **Interconnect**
  - Hosted Unified Communications
  - IP Interconnect
  - IMS
  - SIP Trunking
  - RCS-e / VoLTE

- **Access**
  - IP PBX
  - IP Centrex
  - SIP Trunking
  - SIP eXchange (IPX)

Attributes:
- **SIP Trunking**: enables operators to deliver IP-based connectivity between operator and enterprise that is secure, adaptive, interoperable, and enabled with marketing-leading, innovative Unified Communications services
- **IP eXchange (IPX)**: provides standards-compliant IPX capabilities to deliver end-to-end secure and quality-backed VoIP, HD voice, video, IM, and RCS-e services
- **Peering**: provides connectivity between diverse network islands – TDM, legacy mobile, SIP-based NGN and IMS, LTE, and Web-based OTT networks
- **Intra-Network Interconnect**: bridges the technology divides in an operator’s diverse fixed, mobile, and IP networks, creating new value, service differentiation, and revenue growth

Security – Interworking – Session Control
traversing network boundaries are exploding in number and in the diversity of the forms of media, such as voice, video and IM, they direct. Operators require sophisticated equipment capable of understanding a growing list of protocols and codecs. Moreover, that equipment must possess the intelligence necessary to ensure the carrier’s network is secure, robust and optimized for cost efficiency.

In addition to telecom networks interworking challenges with other telecom networks, the newest interconnect challenge facing service providers is located between their networks and the World Wide Web. In-house telecom services, such as voice, SMS and, increasingly, multimedia-oriented communications services based on the GSMA Rich Communications Suite (RCS) specification, can reasonably interoperate across nearly all carrier networks. These same services, however, exist in isolation from the dozens of Internet-based voice and multimedia communications applications that have attracted billions of subscribers, provided by “Over-the-Top” service providers like Facebook, Google, Baidu, and myriad other look-alikes. To extend the reach of their in-house services to the Web and to the billions of users of OTT communications applications, service providers require intelligent interconnect solutions that leverage emerging technologies, such as HTML5 and WebRTC, to bridge the telecom and Web application domains.

GENBAND’s SMART EDGE solutions are trained on normalizing traffic exchanged at all borders of the service provider’s network – peering points, enterprises and the Internet.

SMART EDGE solutions, such as IPX, Peering and SIP Trunking, are fortified with routing and analytical intelligence, enabling operators to automatically manage media-handling behavior, routing and security to optimize network efficiency and ensure quality and profitability. A software-centric design enables service providers to scale media and signaling resources independently, relieving them from unneeded investments in infrastructure resources.

SMART EDGE solutions also answer service provider demands for flexible licensing models, including a network-wide approach that enables the service provider to optimize resources to meet user demands. Advanced support for multi-tenant capabilities offers service providers increased deployment flexibility and cost efficiencies. Similar to GENBAND’s SMART CORE solutions, SMART EDGE solutions are pre-integrated with GENBAND and third-party products, giving service providers the option of deploying fully integrated solutions from GENBAND or solutions based on a multi-vendor model.

SMART EXPERIENCE

The sobering reality for service providers is that their relevance in the future communications value chain is highly dependent on the quality of experience they can deliver to their subscribers. End user experience, which is largely defined by the reach, sophistication, ease-of-use and portability of IP communications applications and environments, is now the most prominent competitive differentiator for service providers. A similar paradigm occurs in the enterprise, where having a positive employee experience with the provided communications tools is key to the success of the IT organization.

Accordingly, emergence of new competitive forces not only threatens telecommunications service providers’ revenue, but also their identities. These alternatives to traditional voice and multimedia communications services are poised to cut away a significant chunk of telecommunications carriers’ bread-and-butter business. Often riding on the backs of IP networks that are financed, installed, and maintained by facilities-based service providers, OTT providers offer performance and functionality that most subscribers find satisfactory (especially for the price) and sometimes even superior to the services from their traditional providers. Ironically, facilities-based operators have exposed their own services to poaching through expensive network upgrades that have widened broadband pipes more than enough for OTT IP services to deliver acceptable performance.
The good news for traditional service providers is that as the number and sophistication of IP communications options expand, both in the enterprise and for residential users, service providers are best positioned to resolve the customer experience issues related to this growing complexity.

As PSTN voice has given way to IM, video conferencing or numerous proprietary communications applications as alternative means of human interaction, initiating a communications session is no longer as easy as dialing a phone number. Blasting an IM to a small group of acquaintances or business associates, for example, might involve firing up a half a dozen different applications. Keeping tabs on the status of business colleagues or casual contacts could mean consulting several different address books. And if some of those colleagues are still tied to a TDM-powered connection, detecting their presence status is not possible.

The augmentation of voice as just another communications mode, the transition of the public network to packet technology, and the emergence of smartphones and other intelligent communications devices have splintered the communications universe and introduced new complexity to the once-simple process of making an electronic connection. And with new communications and messaging applications arriving daily – all clinging to the closed user group model – the incredible shrinking subscriber universe will only fragment further.

The Smart Network tames the communications chaos that results from the bewildering number of end-user communications options, which are often tied to specific devices, social networking sites or network technologies. The Smart Network provides operators with the tools to bring subscribers a rich and simple-to-use communications experience that bypasses proprietary roadblocks and blends together the best of the telecom and Web communities.
Through GENBAND’s SMART EXPERIENCE solutions, operators are able to deliver subscribers a truly unified communications experience in which all modes of communications utilized by the end user are federated into a single, easy to navigate solution. In addition to enabling behind-the-scenes interoperability across proprietary applications, the Smart Network makes it possible for the introduction of advanced services that cross the boundaries of multiple IP communications channels. Imagine a one-button procedure, for example, that launches a flurry of social networking events, such as the posting of a video on Facebook, a related Tweet and a simultaneous IM to a prescribed group of acquaintances.

Today’s reality is that end users, both enterprise and residential, are now driving the communications industry. The old model, in which service providers dictated the number and scope of applications available to subscribers, has been turned on its head. Communications suppliers must now respond to the varied and rapidly evolving demands of their subscribers for the latest communications tools and functionality, or risk losing the loyalty of those customers. Accordingly, providing end users with seamlessly-integrated communications applications that are simple to use and portable across any network or any device is the top priority of today’s service providers and IT organizations.

GENBAND’s SMART EXPERIENCE solutions ensure a consistent and rich multimedia user experience on any device, network or operating environment by supporting an industry-leading palate of protocols, codecs and technologies, including the latest communications standards, such as HTML5 and WebRTC. SMART EXPERIENCE solutions are fully virtualized and hardware-independent, delivering operators and enterprises the freedom to explore multiple business models and service delivery options including cloud-based options to optimize profitability.

SMART CLOUD

A major component of GENBAND’s Smart Network solution is extending the reach of service providers through the delivery of new business models. Using GENBAND’s cloud-based Unified Communications and RCS service, NUViA™, service providers are able to accelerate time-to-market with compelling multimedia services and quickly extend their service footprint without a budget-busting capital outlay. Powered by GENBAND’s EXPERiUS™ solutions, NUViA offers service providers all of the advantages of cloud-based services, such as a pay-as-you-grow business model, as well as a flexible service delivery model that allows them to fully customize and differentiate their branded services. The NUViA Unified Communications as a Service (UCaaS) offering includes HD voice, video, multimedia messaging, mobility, conferencing, Web collaboration, desktop clients, and fixed and mobile convergence. The NUViA RCS offering also allows wireless operators to quickly take to market extensive multimedia communications services and experiences that go well beyond standard RCS capabilities for consumers.
In addition to assisting operators in overcoming the complexity of today’s IP communications experience, GENBAND’s SMART EXPERIENCE™ solutions, such as SMART OFFICE™, SMART HOME™, and SMART LIFE™, are supported by a cutting-edge business exchange community that continuously extends the functionality of SMART EXPERIENCE solutions through fully exposed APIs and partnerships with the industry’s most prominent names across all segments of the communications ecosystem. In addition to supporting a cloud-delivery model and brokerage between telecom services and the Web, GENBAND is extending the reach of and revenue opportunities of service providers by delivering solutions that are highly customized and targeted at 12 industry verticals.

Mobility is also a major component of the end user experience, as office workers in particular now have high expectations to carry all of their communications and computing applications with them on both personal and company issued smart devices, such as tablets, without compromising functionality or performance. GENBAND’s SMART EXPERIENCE solutions can be pre-integrated on secure smart devices that are capable of delivering an unmatched mobile office experience.

GENBAND’s Smart Experience solutions are also a one-stop shop for all the Unified Communications requirements of service providers and enterprises, including phones, gateways, security devices, conferencing, messaging and collaboration solutions.

GENBAND’s Smart Experience Solutions include:

- **SMART OFFICE**: GENBAND gives small, medium and large enterprises the advanced capabilities to unify and consolidate their voice and multimedia communications across fixed and mobile networks, giving employees more productivity, more collaboration and more efficient communications
- **SMART HOME**: unifies the communications experience for the consumer, consolidates and simplifies the disparate functions of various alternative communications, and provides a sticky service for service providers that improves customer loyalty and retention
- **SMART LIFE**: simplifies the way we communicate, connect, work and live by enabling personas for SMART OFFICE and SMART HOME users
Conclusion
The communications landscape has forever been altered by a confluence of recent events, including the availability of high-speed mobile broadband and the emergence of the Internet and the Internet protocol as the preferred medium for multiple forms of interaction and entertainment. Traditional service providers to this point have for the most part weathered this intensifying assault on their historic position in the telecommunications value chain. But the mass adoption of broadband technology has already impacted multiple long-standing communications-oriented industries, including film, music and the mass media. This unyielding wave of change is now washing over telecommunications operators, both mobile and fixed.

Confronted by these unprecedented challenges, service providers require a new approach to doing business in the 21st century, one that puts them on an evolutionary path toward delivering a unique IP communications experience by harnessing the capabilities of their existing assets and leveraging the popularity of alternative service offerings. GENBAND’s Smart Network solutions enable service providers to deliver an unmatched user experience that is enabled by an intelligent network core and edge. The principal benefits resulting from the adoption of GENBAND’s Smart Network solution include an increase in customer traffic – bringing with it additional revenue – extended service reach, a synergistic and profitable relationship with OTT competitors, reinforcement of the service provider’s brand and a meaningful uptake in customer retention.

GENBAND’s Smart Network solutions are the intelligent choice for service providers and enterprises that are not just looking to survive the ongoing upheaval in the communications industry, but are ready to redefine their dominance in the future telecommunications value chain.