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*2005 **TELEPHONY** supplement describing ATIS's role in shaping the Next Gen Network.*

4   CONSEQUENCES AND IMPLICATIONS

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5   ISSUES FOR DISCUSSION

N/A

Next Gen

NETWORKS

The Definition of Next

ATIS charts telecom's
architectural evolution

NEW CONNECTIONS:
Why device interface
standards are critical

Shaping the applications of tomorrow

Clarity For What's Next

There are certain terms in the industry lexicon that differ in meaning depending on who uses them and how. As a result, these terms end up having no meaning—or their meanings become so vast and varied that they actually lose definition.

"Broadband" is a good example: It is used as both adjective and noun, as a descriptor for transmission speed and an entire industry sector—and really the evolving industry as a whole. And yet, there still exists no true definition of "broadband."

The concept of the "next-generation network" is another example. It certainly is a fluid descriptor: "Next-generation" could easily be altered to describe anything that is not of the moment.

All that changes when something moves from concept to industry standard, and that's exactly what happened when the Alliance for Telecommunications Industry Solutions gave definition to the concept of the next-gen network (NGN). With the introduction of its NGN Framework, ATIS began to delineate the precise components of the NGN architecture.

This supplement, a collaborative effort between *Telephony* and ATIS, attempts to provide even more clarification to exactly what defines the next-gen network. Through extensive interviews with representatives of ATIS members that contributed directly to the creation of the NGN Framework, our writers produced detailed analysis of various aspects of the NGN.

Our goal in producing this publication was to explore and analyze many of the critical elements of the NGN standardization effort and shed more light on the NGN concept. That effort takes several forms, from Executive Editor Vince Vittore's extensive look at how the NGN Framework was developed and its realistic meaning for today's service providers, to Senior Editor Tim McElligott's examination of next-gen services that the architecture was designed to support. Contributor Phil Britt also takes a look at the important interfacing issues that must be addressed in NGN migrations. Appropriately, we close with ATIS President and CEO Susan Miller, who outlines the organization's goals in creating this framework and expectations for its application.

Among those goals is giving shape to the previously nebulous idea of NGN. This publication puts several aspects of that effort into narrative form, offering an accessible look at a standardization effort from its earliest stages through implementation—and helping to give further definition to the concept of the NGN.

—Jason Meyers
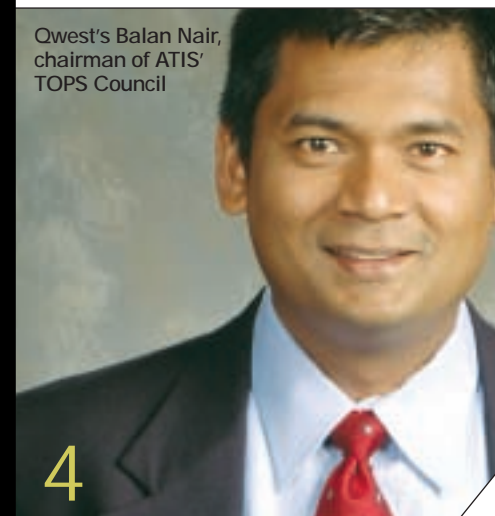
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Shaping the Next-Gen Network

It's high time to nail down a common definition of the NGN. ATIS aims to do just that with its recently published framework, outlining all the elements for NGN implementation.

BY VINCE VITTORE

For a term that has been bandied about for several years and adopted by virtually every carrier and vendor at some point, Next-Generation Networks, or NGNs, still have a surprisingly non-specific definition. And even in the current environment, where carriers are facing enormous competitive pressure from within—and outside—the traditional service provider group, most have differing descriptions of the ingredients that comprise the NGN.

As part of an effort to get the industry into some converged vision of NGN, the Alliance for Telecommunications Industry Solutions late last year published a North American framework of requirements for NGN. The document, called the ATIS NGN Framewor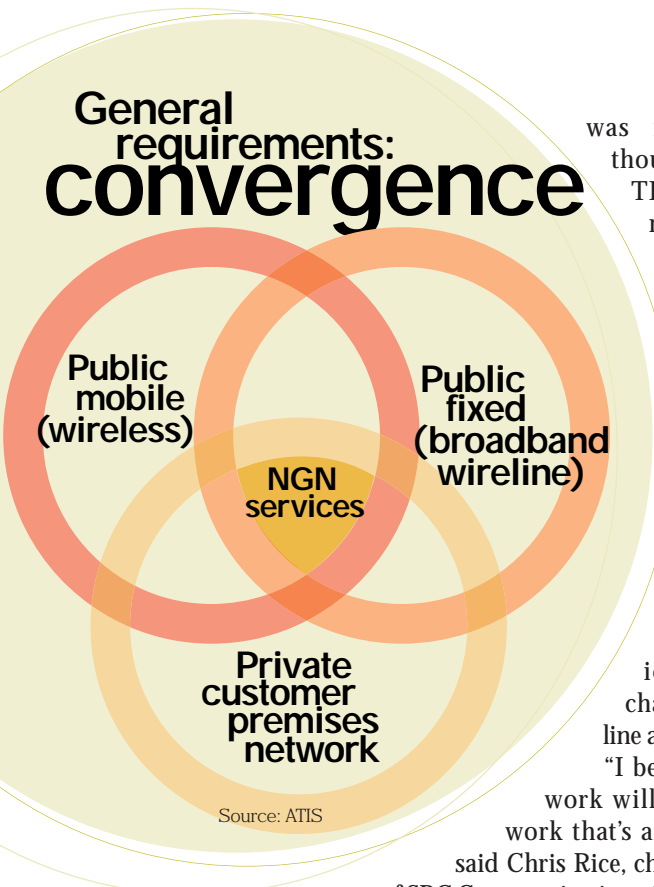k, has been submitted to the International Telecommunication Union as part of an effort to develop a global definition and set of standards for NGN.

Among the major issues tackled in the framework is the basic definition of the high-level architecture that will be used by participating carriers in building out their own versions of NGN. Perhaps most important, though, is that virtually every large carrier in the U.S. participated and signed off on the framework. "The reason we're really interested in this is because it's such a large amalgamation of things, so we wanted to publish a document that helps us prioritize how that implementation should go," said Balan Nair, vice president and chief technology officer for Qwest and chairman of ATIS' Technology and Operations (TOPS) Council, which developed the framework.

To be sure, the document comes about not simply from the desire to get the largest carriers in the industry thinking along the same lines, but also because of economic reasons. One of the first stated objectives in the document is to "focus on the variety of new, value-added, IP-centric services and applications." Just as important is the reality that, regardless of how many legal battles incumbent carriers win in court or Congress, the future of telecommunications is likely to be significantly more competitive. To survive, carriers must be able to build networks that don't follow the same economic model as in the past, when incumbents could expect to command nearly 100% of the market for any given service.

"This is going to come more from a service creation standpoint," Nair said. "This is something that has business rationalization behind it."

Recognizing that the NGN won't exist in a vacuum and likely will take many years to develop, the TOPS Council built the new architecture by borrowing liberally from existing standards and other documents developed by organizations such as the Internet Engineering Task Force, the DSL Forum and the National Emergency Numbering Association. Perhaps none

General requirements:
convergence

Public mobile (wireless)

Public fixed (broadband wireline)

NGN services

Private customer premises network

Source: ATIS

was more important, though, than the ETSI TISPAN extended IP multimedia system (IMS) session-based architecture. IMS, certainly one of the hottest buzzwords this year, came out of the Third-Generation Partnership Project (3GPP) and has been adopted by several carriers as a base to build services that cross the chasm between wireline and wireless worlds.

"I believe that the NGN work will build on the IMS work that's already been done," said Chris Rice, chief technical officer of SBC Communications. "The intent wasn't to go out and build something that was brand new. 3GPP was more wireless-centric, though.

"The purpose [of the NGN document] really had to do with that fact that you had wireless going off with 3GPP, and as you looked at what was going on in the wireline side, there really was no single vision of what was going to be the next-generation network," Rice continued. "That would drive a higher-cost network. Like the other TOPS work, it was really to go down and identify the set of requirements that need to be articulated for the NGN and identify who's working on it."

Ultimately, the NGN is designed to blend the wireline and wireless worlds with private customer premises equipment networks into a single, cohesive and IP-based environment (see figure above). Among the most key elements of the NGN plan, at least initially, is to reflect the concerns of North American carriers and the unique challenges they face. Like much of the other work done by ATIS, the NGN plan will continue to evolve and become a significant part of the ITU definition of next-generation networks.

"Fundamentally, we see this as a North American view but with a global outlook," said Brian McFadden, chief research officer for Nortel Networks. "We're trying to map this into the global bodies that will enable the service set." And though one of the objectives of the NGN is to create a network that will require significantly less capital, traditional telecom vendors have an incentive to build toward that model if only because they have no other choice, McFadden added.

"In today's world, the network is bigger than any single vendor, and it's unlikely that any single vendor will be able to address all elements of a next-generation network," he said. "Our view is that a common approach to

building these networks around the world will not only be good for the industry but also be good for the consumers. We don't believe any one of us could have a more sustainable advantage without this kind of work."

One aspect of the plan that is virtually irrefutable is its basis in IP. Without that basic agreement, virtually none of this could move forward, said Bill Smith, chief technology officer for BellSouth.

"Moving to IP is a common denominator for all forms of next-gen communications, whether its IPTV or voice calls over wireless network," he said. "We think that gets people looking more broadly rather than people going off and solving whatever immediate problem they were facing."

Beyond its packet-based foundation, the plan includes a number of other basic requirements, including a separation of access technology from application- and service-creation capabilities. The goal is to let carriers as well as application service providers (ASPs) offer converged service regardless of what device the end users may have. Rice cites the example of someone who establishes a broadband connection to watch streaming video on a wireless device in Dallas, then drives to Chicago while maintaining his connection the entire time. In that instance, the user likely passes through several carriers' networks but is able to not only keep the connection going but have his connection passed among different service providers while maintaining the same quality of service (QOS) and passing through various layers of security.

"This architecture is going to be pretty complex by the end just because of all the subsystems that go with it," Rice said. "But the thing that's going to drive profitability is a push to mobility and portability. The real key to this is making all of the communications services—whether it be voice, data or video—truly mobile."

Getting to that point, of course, will require an enormous effort on behalf of several carriers and participation from vendors. It also will take unprecedented cooperation among potential competitors. Vendors that participated in shaping the plan seem to un-

derstand the need to talk to each other on a number of different levels.

"Everybody knows that the NGN systems are no longer a monolithic approach," said Harald Braun, president of the carrier networks division for Siemens. "It's a component issue. It consists of six, seven or eight components, and these components need to talk to each other."

For carriers, though, the plan also requires a new openness, though not as much as some would like. Sketched out in the ATIS plan is a series of standardized inter-

We wanted to publish a document that helps us prioritize how that implementation should go.

—BALAN NAIR, QWEST

faces that will allow ASPs to offer services over carriers NGN infrastructure. In addition, it includes standard interfaces between networks, as well as between networks and devices, regardless of their access technology (see story on page 9).

In some respects, that aspect of the NGN already is reflected in IMS for wireless carriers. "When I think of NGN, I always reference myself back to IMS," Rice said. "You can be the infrastructure provider but not be the application service provider. I may be the service provider and may go out and buy applications from companies that I host on my IMS architecture."

Operational aspects

From an operational perspective, however, implementing the NGN architecture—and separating access and applications—ultimately will benefit carriers. One of the biggest benefits will be in the way they deploy, monitor and support new services. For example, under most current network architectures, an application that is tied to a Class 5 switch needs to be deployed on a very distributed basis. In the NGN world, it can be deployed on a regional or national basis from one location. It also allows carriers to better leverage existing Layer 1 technology and provides an incentive to invest, according to BellSouth's Smith.

"You can centralize a lot of your capabilities. Instead of going out and deploying something in every one of our 1650 central offices, we can deploy capability on a more centralized basis," he said. "At BellSouth, I would like to move to a much more logical network. I would like to use all the fiber we have in place today and extend it to the point where we have a mile or less of copper to customers."

Many other parts of the network will undergo radical change. Billing and operations support systems, for example, will have to be able to track and monitor services across the architecture in ways that they don't currently. "From a subsystem standpoint, billing isn't something we look at as proprietary," SBC's Rice said. "We look at it as having a standard interface. Regardless of who puts in that solution, you have to have standard interfaces."

Under the NGN architecture, carriers also will have a common approach on implementing QOS, an attribute that currently is handled in multiple ways. That does not mean carriers will lose the ability to use QOS as a major attribute in differentiating services. Instead, the NGN design eventually will put standard attributes and definitions around QOS. It's also one of the more difficult issues to solve.

"On the signaling paradigms, we've all got to come to agreement," Nair said. "In the next-gen network, we don't see so much as whether you recognize DiffServ, but agreeing that a specific bit means this or that."

Smith added that the addition of QOS parameters is one of the areas where NGN would be a natural evolution of IMS. "IMS is a very important portion of the framework, but IMS is looking more at the control plane for lack of a better term," he said. "We need to include thing such as QOS and also how inter-carrier QOS is delivered. IMS is an incredibly important ingredient, but it's not the entire NGN framework."

Maintaining QOS in an environment where carriers are all using IP, a technology that is fundamentally designed for best-effort service, is one of the biggest challenges, Braun said. Given that the NGN is still in its early stages, though, he's confident the industry will be able to come up

with a workable solution. "We can't say that IP networks have five-nines reliabilities," Braun said. "You have to remember that the TDM network was developed over 25 or 30 years, and in the beginning, it wasn't five-nines reliable. We are working on the resilient telecommunications technology, but at the moment, we're not there."

Securing the borders

In the world envisioned by those behind the NGN plan—where users freely jump across inter-carrier borders and ASPs have open interfaces to carrier networks—security also will be among the more difficult tasks. The NGN, in fact, includes a security focus group and lays out eight dimensions of security: access control, authentication, non-repudiation, confidentiality,

users across networks and not open up user devices or the network itself to attacks.

"The points of attack will be there, and we need to answer the security questions from a point-of-entry level, from a device level and from a network level," Braun said. "It could be that all the end points on this thing are attacked. You need to look at what you can do at the end point, what you can do at the application level and what you can do at the network level. You can't afford the downtime, and you can't afford the interruptions we have at the moment."

Beyond securing the NGN, some elements of the security plan should be able to create additional revenue, Nair said.
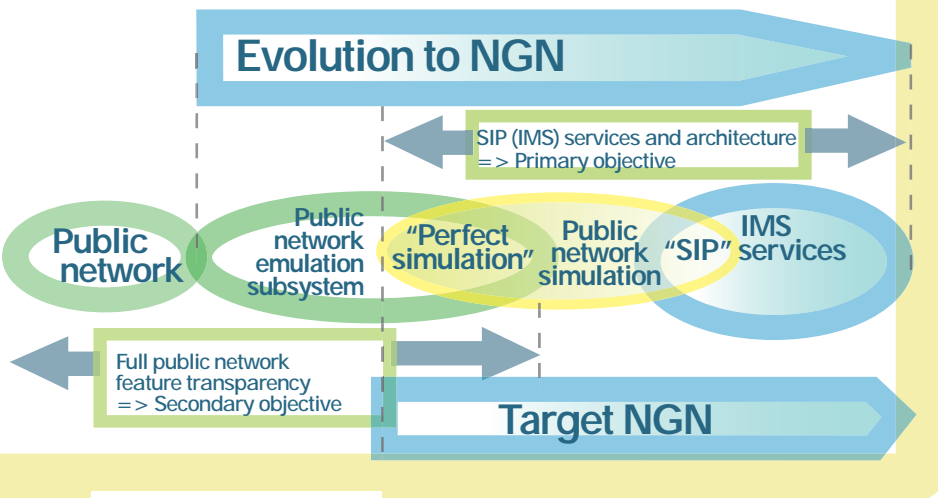
Getting to the point where carriers can proclaim that they have implemented the NGN will take years, though. The next step for ATIS is developing a "gap analysis," which will include input from several international organizations including the ITU. That should be completed by mid-year, according to Jim McEachern, head of carrier VoIP standards strategy for Nortel and the author of the vendor's contribution to the NGN plan.

After taking into account the gap analysis, the hope is to get a publishable standard in the next 12 months, Nair said. "The gap analysis is there so we don't reinvent the world," he said.

General requirements: infrastructure evolution

Evolution to NGN

SIP (IMS) services and architecture => Primary objective

Public network

Public network emulation subsystem

"Perfect simulation"

Public network simulation

"SIP"

IMS services

Full public network feature transparency => Secondary objective

Target NGN

Source: ATIS

communications security, data integrity, availability and privacy. While not endorsing any specific technologies for security, almost everyone involved in developing the plan agrees that the industry must take a multi-layered approach to security.

"All the different carriers are going to implement their security in different ways, and that's one of the reasons the standards are important," Nair said. "The standard for NGN just enhances the overall security."

However, the structure of the NGN also makes security that much more important, SBC's Rice added. In the previous network architecture transitions, such as moving from in-band signaling to SS7, the only entities connecting into the network were service providers that looked exactly alike, he said. "This [NGN] environment is very much like the Internet," Rice said. "Why we have so many problems with worms and viruses is that there is no definition of who can be a service provider. The openness makes this [network transition] much more significant."

But security must encompass more than just making sure rogue users don't have access to the network. It must include the ability to identify trusted

Implementation of the plan, though, will vary significantly depending on the carrier. BellSouth, for instance, is looking at an implementation plan under which it will have about 50% of its traffic riding on top an NGN architecture in three to five years, Smith said.

SBC, meanwhile, anticipates a phased approach, according to Rice. "I'd like to think that [the NGN plan] will get finalized sometime in the 2006 time frame, with product being available in the 2007 time frame," he said. "I see this as being more significant from the complexity of what was done in the past. It's [like] a phenomena that takes place once every 50 years." +

Interfacing
Takes on
Multiple
Meanings
in NGN

*ATIS takes
its first steps
toward the
development
of infrastructure
that will support
this century's
applications.*

BY PHIL BRITT

A mong the most important issues in developing the Next Generation Network architecture, developed by the Alliance For Telecommunications Solutions, will be interfacing the new systems with other networks while figuring out the transition from legacy systems.

At the top of the to-do list is devising the interface for the growing proliferation of devices, including some of the newer Internet- and video-enabled mobile phones, pagers and wired hardware as well as other devices still under development, said Nick Adamo, segment vice president for U.S. service providers at Cisco Systems. Cisco is one of the companies helping devise the interface standards for the NGN. "You have to take all of these [different] devices into consideration and make sure that you deliver the functionality promised in the next-generation network," Adamo said.

Each of these devices has its own inherent hardware technology, and de-

pending on the communications provider, these devices may connect using different network technologies. Also, because existing systems won't disappear immediately, the interface must address capabilities for older public network-based devices.

The key element in providing access for all these systems will be to employ open standards wherever possible, which would help NGN designers ensure that the interface is seamless, according to Adamo. Open standards also will help ensure that yet-to-be-developed devices will be able to use the same interface.

"There's no way that any single vendor or service provider will provide all of the [telecom service] suites that people will use," Adamo said. "We'll need to enable [interfaces for] multiservice providers, nomadic phones and PDA service providers. So we'll have to have an awful lot of intelligence in the network to make this go forward."

Adamo added that packet-based technology will occupy the core of the

converge on this common architecture. "By using a service platform [IMS] that is common between the wired and wireless world, the NGN will allow our industry to provide consistent services in different environments, leverage third-party developers of new services, get greater return from the investments in network infrastructure, and help integrate the various access networks by making services transportable across networks," Pellon said. "So the interface will enable network capabilities regardless of a user's access device or location."

In addition, the NGN should be able to support security efforts, notification of an

izations such the International Telecommunication Union are meeting with carriers, network providers and others within the industry to ensure security and QOS. "There's not a lot of disagreement in the industry about this," Adamo said.

Adamo expects usage of deep packet inspections at the core network level to help protect against these security threats. Some companies already do this for internal purposes, but the technology to perform this procedure at the core network level is just starting to become available, Adamo said.

Sophisticated QOS
Industry participants also agree that interfaces also will have a significant impact on QOS in the NGN. Among the specifications in ATIS' document is that QOS tools will ensure the availability of specific details about scaling voice, video and pure data communications. "When someone starts an e-mail session, he wants to know that there's capability to handle [the transmission] at all endpoints," Adamo said.

The next-generation service provider could provide various levels of QOS to the ASP for communicating with its users. Though the ASP may not provide the customers' packet transport, it might relay information between customers of the application service. For example, in the current Internet model, an ASP providing e-mail services to its customers might relay the communications, but it wouldn't route the IP packets between customers based on an IP address. Yet an ASP typically would provide a value-added service that requires manipulating the information. For example, the e-mail provider might provide user-defined filters for an anti-spam service.

Similarly, the next-gen service provider could provide differentiated services or dynamically requested QOS. The ASP or its customer could request the QOS agreement. Or the carrier could maintain a business relationship with the ASP so that the cost of the QOS agreement is bundled into the ASP's service. For example, if a customer has an audio streaming or video streaming service,

General requirements:
interconnection
two major goals:

{ Specify a packet-based interconnection, suitable for carrier interconnect, that will support:
- Security
- QOS
- Reliability
- Billing support
- Service transparency
- Performance measurements, monitoring, codecs, etc.

} Support interconnection between different classes of service providers (such as next-gen service providers and application service providers)

Source: ATIS

the ASP could generate the ASP-to-customer QOS request from the next-gen service provider without alerting the customer.

New applications also could be developed and provided over the NGN via software installed at each endpoint without requiring notification to the carrier network. Among the most typical ASP services currently offered are e-mail, gaming, e-commerce, Web hosting and content caching. New services ASPs could provide over the NGN could include Web services, grid networking and other services.

The next-gen service provider, on the other hand, would provide services such as transport that would enable the ASP to communicate efficiently with its customers. Basic transport includes routability and packet transport. Differential routing could reserve transport resources for specific customers, specific traffic types and specific times.

The next-gen service provider also could handle multicast services for the ASP. This would enable the ASP to more efficiently use its bandwidth while providing these services to customers. The multicast support would include support of multicast routing as well as enabling ASP customers to join and leave multicast groups for services offered by the ASP.

Similarly, the next-gen service provider could provide "anycast" services for ASP resources so that a resource would exist in multiple locations but have a "close" locator address.

Part of this capability includes accounting information the network must provide to the ASP. ATIS says this information should include packet flow-based accounting information as well as session accounting information. The core network should also provide the ASP with usage and performance metrics.

This accounting information will help different network participants determine where handoffs of communications occur for revenue and profit purposes. The more efficient the interface, the better profit margins that network participants should expect. ✦

"There's no way that any single vendor or service provider will provide all of the suites that people will use."
—NICK ADAMO, CISCO SYSTEMS

network. "That's what you have to build around," he said. The packet-based network will provide opportunities for enhanced services and reduced costs, Adamo added, so using packet-based interfaces is the most appropriate method for interconnecting packet-based networks. But if these networks must be interconnected using technologies like TDM and ISDN user part before the Next Generation Network (NGN) architecture is finalized, the core network won't be able to deliver all of the promised efficiencies.

The way in which signaling protocols are implemented within the network and the way in which services are provided at the interconnection point also must be specified, Adamo said. The network context and service definition for the interconnect will provide the framework for the packet interconnect specification. By working with ATIS, various standards bodies are moving forward in this arena, Adamo said, pointing to the dual-mode Wi-Fi and mobile phones that are just starting to come to market. In fact, while the NGN interfaces are significant, much of what is sketched out in ATIS' plan is based on existing infrastructure technology. One example of a sound basis for the NGN is EV-DO.

Interface development "has a positive start," according to Miguel Pellon, vice president of standards for Schaumburg, Ill.-based Motorola. As its basis, the interface will rely on deploying IP multimedia subsystem (IMS) as an architectural component in the NGN. IMS can act as a bridge between the services available in the wired and wireless worlds.

This approach is the same as that used in developing 3G, Pellon said. In the NGN, 3G capabilities would be moved from the edges to the core of the network. Once standards are agreed upon, it will be relatively easy to

application service provider's (ASP's) customer connectivity status, and the proxying of authentication, authorization and accounting to the ASP.

Securing the Interface
"The second key element is security," Adamo said. "The server and network security need to have some standards. That will require a huge amount of work."

For the security to work while maintaining interfaces with different devices, Adamo expects to see protections set in the core network. Otherwise, potential threats could take down large sections of the network. Security issues are so important that they often are tied to other areas such as the ability to provide intercarrier quality of service (QOS) standards, Adamo said.

In an effort to address that, ATIS is working in different countries to ensure that they all abide by the same centralized security standards. In addition, ATIS executives and leaders of other standards organ-

Services Driving New Network Architecture

The only things less defined than the next-gen network architecture are the anticipated hoard of services for which it is being built. Ironically, that is by design.

BY TIM McELLIGOTT

Despite being incredibly necessary, the process of molding the next-gen architecture likely has been tedious and even heated at times for the creators of the ATIS Next-Generation Network Framework—a document subtitled "Part 1: NGN Definitions, Requirements, and Architecture," which provides a high-level description of the NGN that standards bodies can use to guide them in their efforts. This is the first time operators have tried this ap-proach on a major network transformation, such as those from telecom's history that include the conversion from analog to digital or from inband signaling to SS7.

"We live in different times," said Mark Wegleitner, senior vice president of technology and chief technology officer for Verizon Communications. "The industry is much bigger now with many more players and suppliers and moving parts to the process."

Recent technological evolution and the emerging application timeline are occurring at a much faster pace than with traditional systems. "The need for guaranteeing security and privacy has also increased. Therefore, the transformation is more urgent and complex," said Oliver Valente, chief technology officer and vice president of technology development for Sprint.

The structural and operational aspects of defining the NGN indeed are taking on a different tack (see story on page 4). And in many ways, TOPS Council is motivated by services.

"This is all about offering new services that the current [public network] or cellular network were never designed to offer," said Balan Nair, vice president and chief technology officer for Qwest and chairman of the ATIS' TOPS Council. "It's about taking service creation to a new level. It's the next phase of how we monetize the network."

It's also about something else: It's about something that goes to the heart of the idea that it is not the job of service providers to develop applications and services—not even the one or two mega-services that, in some minds, will justify this enormous investment in the NGN—even though it is supposed to be more about enabling a lot of specialized and even temporary applications and services. It's about cre-ating the killer environment, said Harald Braun, president of the carrier networks division for Siemens. "You can't wait for the killer application. You need to create the killer environment."

The NGN document, 93 pages of a molded yet still pliable framework, provides several use cases for identifying requirements for converged networks. The use cases include: interactive voice, content and video, multimedia conferencing, content sharing, interactive gaming, sensor and control networking, and mobility management across wireless and wireline networks.

Around these use cases, the ATIS document defines several "service enablers" that are required for specific applications. Common across nearly all of the use cases is the requirement for quality of service (QOS); however, other enablers include: presence, location, service and content discovery, multicasting, digital rights management, and authentication and authorization.

All these definitions and requirements must adhere to what the documents calls "The Guiding Principals for Services in a Converged Network," which states that the technology for developing services should be network- and application protocol-independent. All else flows from there in terms of services.

This requirement benefits both the equipment manufacturers and service providers by cutting the cost of developing customized equipment to meet the needs of carriers using competing standards. "And it creates higher unit volumes, which ultimately will result in reduced costs to each carrier that buys that equipment," Wegleitner said.

These standards also will create a greater variety of sources for application development, he said. "One of the attributes I see in the NGN architecture is the distribution of intelligence, and with that comes the ability to introduce applications at various places in the architecture with open application interfaces."

Hard to pick a favorite

The NGN architecture, as defined by the council, also will help people look more comprehensively at the way applications get developed, said Bill Smith, chief technology officer for BellSouth. He used the example of an application that could be accessed through either a cell phone, a PDA or even a television set-top box. "If an application developer is starting from a frame of reference that a customer may want to program, say, his personal video recorder from his cell phone, the application will need to be developed so it can interface with all that access media, so obviously you want to have as much commonality as possible," Smith said.

As for service enablers, Smith said it is hard to pick which may be the key ingredient for making services deployable and profitable. "It's like asking which of your children you love the most," Smith said. "They're all important."

However, he did add that having a lot of features without proper security is "a non-starter." Assuming that requirement is met, Smith said, "For us, quality and reliability is a paramount priority. They are first and foremost in our minds."

Sprint identified several key attributes for deploying profitable services that are key to realizing its vision: being service-agnostic, interoperability, differentiation, time-to-market and the ability to deploy them rapidly. "The NGN, though standardized, provides opportunities for innovation to create differentiated services in the marketplace," said Sprint's Valente.

As for QOS, it must cross multiple provider domains, regardless of access type,

and it must be tunable, Valente said. The latter cannot be defined in a document, however. "Fine-tuning QOS will have to come from experience," he said.

The network itself must be tunable in a way as well, according to Brian McFadden, chief research officer for Nortel Networks. "People want multimedia, and they don't want to adapt to the network; they want the network to adapt to them. They want connectivity wherever they go," he said.

One of the primary reasons for the TOPS Council taking on this project and collaborating on defining the NGN is because carriers can't meet this requirement by themselves. "There are all sorts of implications on the economics of NGN and how various entities make money off what they are doing. You can't really stop that, so if this is the way everybody is going, then

General Requirements:
access independence

Cable
xDSL
Private lines
Wi-Fi
Wireless

ATIS does not specify that the NGN must support all access technologies

Core NGN subsystems

Instead, ATIS identifies conditions for support of the IP connectivity access network
• IP
• Support version of QOS consistent with Y.1541
• Transport-level encryption restricted to IPCAN
• May support admission control
• Mobility management consistent with NGN core

Source: ATIS

[we] better get to work and define the network that will provide that experience or [we] will lose the customer," McFadden said.

This requirement goes far beyond simple interconnection. In section 2.1.1 of the document, the council gives standards bodies and industry forums plenty of areas to address regarding services.

"Services must operate seamlessly across NGN infrastructures provided by multiple network providers. Interconnection should extend to security, OAM (operations, administration and maintenance) and restoration and repair with the goal of providing consistent service quality end-to-end, improving security and billing/accounting, and reducing operating costs. Providing robust, scalable, billable, QOS-enabled and service transparent interconnection arrangements between network providers will require significant enhancements to the definition, specification and operation of trust-based networks."

The solutions to these issues are not all technical. "The ability to control QOS across multiple networks is a combination of technical standards and business relationships," Qwest's Nair said.

BellSouth's Smith agreed. About the standards, he said, "If I have a cus-

tomer running applications that are vital and doing it across multiple carrier networks, I can't guarantee that customer will get a good experience if we are not all following the same rules."

Valente says multi-domain QOS is complex, especially when combined with the various access types and with real-time applications. While noting that getting this right will take experience and can't be done within the scope of a framework document, Valente did say in order to get these services up and running quickly, open software development environments such as JAIN, Parlay, XML and SIP servlets must be enhanced.

The bottom line regarding QOS is that the world won't stand still while the industry studies its frameworks and develops its standards to ensure the best quality, a characteristic of the old architecture that may never be seen again, at least not without a price.

"People are racing to the market," Wegleitner said. "It's a residual effect of the free enterprise system where people race to market with a product they think is either close enough to the standard or easily upgradeable to the standard when it is finally available. [They think] the product is so much in demand that they can take it to market early."

Many residential voice-over-IP services have come to market with little concern for true quality. However, as more large enterprises that require reliable, converged services begin to convert to IP, quality becomes very important, and these standards become more necessary.

"It really comes down to what the customer requirements are and how you architect the value proposition that addresses that," Wegleitner said. "Our job is to prioritize new technology initiatives so we can help guide the standards creation process and to make sure the technology is available when we need it in the way we need it."

It is also the council's job to ensure the transition is as seamless as possible. "The evolution away from today's legacy networks to a full IMS infrastructure needs to be done smoothly while supporting legacy customers' needs. NGN is working to enable this transition," Valente said. ✚

Turning Vision into Action

"With the ATIS NGN Framework in place, work is now underway on the next phase of our NGN standardization effort."

BY SUSAN MILLER

Over the last decade, different service providers and manufacturers have maintained disparate visions of the appropriate migration path from traditional circuit switched networks to the IP "promised land." But as IP technology and its role in the NGN space has matured, so has the industry vision for NGN.

In November 2004, ATIS released its NGN Framework: "NGN Definitions, Requirements and Architecture," the first comprehensive set of NGN requirements delivered internationally from a U.S.-based standards organization. The ATIS Framework defines a high-level architecture for NGN that meets the business and wide-scale deployment needs of telecommunications companies. For the first time, service providers, manufacturers and software companies are working closely together to achieve consensus on what the technology path and action plan should be for NGN.

That ATIS would be the source for an NGN framework is not surprising, given the diverse nature of our organization and the role we play in the industry. ATIS is a technical planning and standards development organization of over 300 leading global communications companies. The result of direct input from senior executives and officers from leading service providers and manufacturers, the ATIS NGN Framework supports a variety of business models, including wholesale, retail, Virtual Network Operator, and Virtual Services Operator segments.

In an increasingly competitive environment, service providers want to grow the value of their networks by offering customers a seamless delivery of applications, independent of any access or transport technology. Many of today's network services are vertically integrated, inhibiting integration with other applications. To make the transition to a fully converged NGN, service providers need a standards-based, service-enabled network architecture that provides the following:

• Open, standards-based interfaces, allowing plug-and-play integration of any number of applications.

• A standardized session control function through which application servers can signal, allowing full convergence of services over a number of access modes.

• A logical subscriber database holding all customer profile data, allowing access from anywhere in the NGN.

• A set of access-independent application and service creation capabilities, so converged applications and services can be adapted to any device and delivered with consistency.

ATIS is communicating its NGN Framework with other global standards organizations, including the Third Generation Partnership Project; the European Telecommunications Standards Institute; and the International Telecommunication Union. It is ATIS' goal to achieve, to the furthest extent possible, a consistent global view of the NGN.

With the NGN Framework in place, work is now underway on the next phase of our NGN standardization effort. ATIS is developing a "release strategy" to produce implementable standards for a defined set of network architecture capabilities that enable the introduction of new NGN services. Among the network architecture capabilities or "enablers" under review are network security, QOS, media gateway functions, session management, presence, and the decoupling of services from access technology. ATIS is establishing a priority list of "enablers," quickly followed up by a standards "work plan" in 3Q 2005.

The ATIS NGN Framework is the industry's vision for NGN — a road map that resolves the numerous technical and standardization requirements we need to move forward and build tomorrow's converged network architecture.

Susan Miller is president and CEO of the Alliance for Telecommunications Industry Solutions.
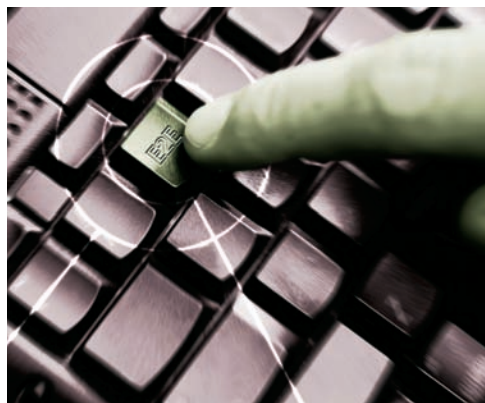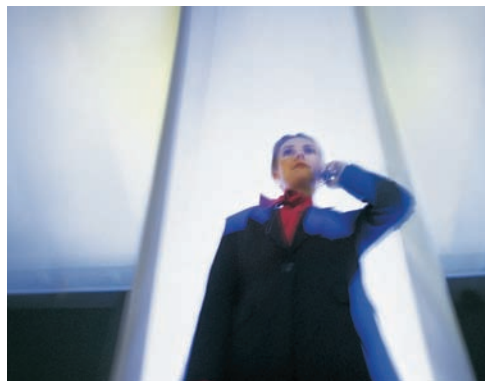
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ATIS is the technical planning and standards development organization for the communications industry— the place where companies drive the business of communications and information technology.

ATIS is leading efforts to define the Next Generation Network… identifying the business and technical requirements… developing the right standards… and supporting the delivery of new products and services in the marketplace.

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