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August 11, 2011

***EX PARTE* NOTICE**

VIA ECFS

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Re: Connect America Fund, WC Docket No. 10-90
A National Broadband Plan for Our Future, GN Docket No. 09-51
Establishing Just and Reasonable Rates for Local Exchange Carriers, WC Docket No. 07-135
High-Cost Universal Service Support, WC Docket No. 05-337
Developing a Unified Intercarrier Compensation Regime, CC Docket No. 01-92
Federal-State Joint Board on Universal Service, CC Docket No. 96-45
Lifeline and Link-Up, WC Docket No. 03-109
Petition for Declaratory Ruling That tw telecom inc. Has the Right to Direct IP-to-IP Interconnection Pursuant to Section 251(c)(2) of the Communications Act, as Amended, for the Transmission and Routing of tw telecom's Facilities-Based VoIP Services and IP-in-the-Middle Voice Services, WC Docket No. 11-119

Dear Ms. Dortch:

On August 9, 2011, Joe Gillan of Gillan Associates, outside consultant to COMPTEL and tw telecom inc. ("tw telecom"), Dave Malfara, President and CEO of ETC Group, LLC, outside consultant to COMPTEL, Nirali Patel of Willkie Farr & Gallagher LLP, outside counsel to tw telecom, and the undersigned, Vice President of Regulatory Affairs for COMPTEL, met with Marius Schwartz, Chief Economist, and Eric Ralph of the Wireline Competition Bureau.

The presenters urged the FCC to explicitly confirm without delay that IP-to-IP interconnection is subject to Sections 251 and 252 of the Communications Act, as amended

("Act"). Interconnection is fundamental to the provision of telecommunications and the Act is technology neutral on this matter.

In its February 9, 2011 Notice of Proposed Rulemaking ("NPRM") and Further NPRM on intercarrier compensation reform, the Commission asked what additional actions it should take to encourage the transition to IP technology and how IP-to-IP interconnection arrangements for the exchange of VoIP traffic fit within existing legal and technical frameworks (*see* NPRM ¶ 679). Mr. Gillan explained that the most important action the Commission can take to attain its overarching goal of promoting the deployment of broadband and IP technology is to confirm in no uncertain terms that IP-to-IP interconnection is subject to Sections 251 and 252 of the Act. Such a confirmation is not only in accordance with the Act, but is necessary to ensure that incumbent LECs—which have much stronger bargaining power than their competitors—enter into good faith carrier-to-carrier negotiations of just and reasonable terms and conditions for IP-to-IP interconnection. Mr. Malfara explained that such a confirmation is also necessary to ensure that competitive LECs do not continue to incur the unnecessary service quality erosion, costs and inefficiencies associated with converting IP calls to TDM format, including the costs of purchasing, operating, and maintaining numerous media gateways.

In addition, the presenters emphasized that the Commission does not need to establish detailed technical regulations governing IP-to-IP interconnection at this time. Rather, it is sufficient for the Commission to allow such details to be addressed in bilateral negotiations between incumbent LECs and competitive LECs, subject to state regulatory commission oversight under Section 252 of the Act.

Finally, the presenters explained that IP-to-IP interconnection is fundamentally different from Internet peering. To begin with, Internet backbone networks that can be substituted for one another, and which transmit best-efforts public Internet traffic, cannot be relied upon to exchange facilities-based VoIP traffic, which is provided using a managed-packet architecture. Additionally, the inability to rely on an intermediate transport provider, like Internet backbone providers, gives competitive LECs no choice but to seek direct IP-to-IP interconnection with incumbent LECs. Incumbent LECs, however, have no incentive to establish such interconnection because they have substantially more end-user customers than competitive LECs.

Mr. Gillan also distributed the attached materials. Please do not hesitate to contact me if you have any questions regarding this submission.

Respectfully submitted,

/s/ Karen Reidy

Karen Reidy

cc (via email): Marius Schwartz
Eric Ralph

The Next Step for Next Generation Technology: Interconnecting Managed Packet Networks to Preserve Voice Service Quality and Competition

Joseph Gillan, Gillan Associates[1]

Executive Summary

Packet technology is the future of voice communications. A key development in packet technology – the emergence of carrier-designed "Managed Packet" networks – is beginning to transform the traditional public switched telephone network ("PSTN") into an all-packet environment. Managed Packet networks are noteworthy because (among other features) they apply specific instructions to the routing of voice packets, thereby combining the efficiency of packet technology with the quality and reliability of the legacy circuit-switched voice network.

To be clear, Managed Packet networks should not be confused with the Internet or retail VoIP services. Managed Packet networks are fundamentally different from the public Internet, where packets move on a best efforts basis, with associated deficiencies in quality and security. Managed Packet networks are carrier-grade facilities, replacing traditional circuit-switched networks. These networks permit the quality-of-service levels needed for voice service, while retaining the capability to support other data streams and services as well. Managed Packet technology thus offers unparalleled flexibility and cost savings over traditional transport platforms.

The evolution in technology to Managed Packet networks, however, should not diminish the universal interconnected nature of voice networks. Most importantly, incumbent local telephone companies should be required to interconnect their Managed Packet network facilities with competitors, just as they are required to interconnect with competing circuit-switched networks today. Any other conclusion would discourage investment in packet networks, deter broadband deployment, and risk degradation of voice service quality and competition.

Despite the clear advantages that come from directly interconnecting Managed Packet networks, competitors thus far have had to convert packet-voice traffic to its legacy circuit-switched form to interconnect with incumbents. ILECs appear to be imposing this requirement even though they are actively deploying Managed Packet transport networks themselves, and even though the direct interconnection of Managed Packet carrier networks for the exchange of voice traffic (i.e., without conversion to legacy form) is not only possible but more efficient.

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[1] Mr. Gillan is a economist with a consulting practice focusing on the economic consequences of regulatory policy and technology in the communications industry. Comments on this paper can be directed to Mr. Gillan at joegillan@earthlink.net.

Furthermore, early indications suggest that at least some ILECs are taking the position that their interconnection obligations only apply in a circuit-switched world. These ILECs apparently claim that Sections 251 and 252 of the Telecommunications Act only apply to circuit-switched networks, and that those obligations drop away as ILECs (and other carriers) evolve to Managed Packet transport facilities. These ILECs assert an absolute right to set the terms of Managed Packet interconnection without any regulatory oversight, and without regard to their continuing market power.

The Telecommunications Act, however, recognizes that an ILEC's dominance is a consequence of its historically-derived market position, and not the particular equipment and network facilities it uses over time. There is no basis for the ILEC's claim that its interconnection obligations evaporate merely because it has deployed a different transport architecture.

The technical parameters and business rules for the exchange of voice traffic between traditional circuit-switched networks are well established, but did not become so without controversy and oversight. The Telecommunications Act, and the regulatory backstop it provides, have been crucial to this process. Going forward, the basic elements of interconnection – i.e., the physical link, interface, signaling and database access – will be just as important to Managed Packet networks as they have been to traditional circuit-switched facilities, even if the particulars of each differ. And similarly, the role of regulators as backstops to interconnection negotiation will remain crucial in a Managed Packet environment.

I. Introduction

The voice communications industry stands at the brink of fundamental change. A transformative technology – Managed Packet – is enabling carriers to apply specific routing protocols to voice packets, thereby combining the quality-of-service of the traditional voice network with the efficiency and flexibility of packet-based networks. Networks now can transport real-time voice services alongside data services in packet-based format without sacrificing quality, reliability and security.[2]

[2] It is important to make clear at the outset that the Managed Packet networks that are the focus of this paper are not, and should not be confused with, the Internet, with respect to the operations and policies appropriate to each. First, Managed Packet *carrier networks* are not the same as the *public Internet*. Because Managed Packet networks frequently share a common protocol with the Internet – an IP protocol favored because of its open standards and the widespread availability of equipment – the networks are sometimes confused as one. The fact that Managed Packet networks use the same protocol as the Internet, however, does not mean that such networks make use of the Internet, anymore than an F-14 becomes part of the Commercial Air Transport System, merely because both it and commercial passenger aircraft rely on the same physical law (Bernoulli's Principle) for lift. Nor do these networks "peer" in the way that public Internet backbone providers exchange packets on a best efforts basis.

Managed Packet technology holds the promise of lower prices and exciting new services for consumers and businesses. Cable companies and other competitive carriers are leading the deployment of Managed Packet Networks that support voice service at defined levels of quality. ILECs, especially the largest carriers such as AT&T and Verizon, also are actively deploying Managed Packet technology to reduce costs and obtain new functionality. Managed Packet is already widespread in ILEC transport networks and will increasingly support end-to-end applications as local broadband connectivity expands.

The purpose of this paper is to explain the benefits of Managed Packet technology and the importance of establishing efficient and cost-based Managed Packet voice traffic exchange arrangements between entrants and incumbents. Efficient interconnection of Managed Packet networks is necessary to ensure that the voice quality expected by consumers continues, while accommodating the new services made possible by this transformative technology. Such interconnection is an absolute precondition to the end-to-end digital broadband network that is this nation's goal, and its implementation would accelerate the deployment of broadband networks while simultaneously positioning those networks for more efficient operation.

But a potential cloud is on the horizon. Some ILECs have suggested that their obligation to interconnect with competitors to exchange voice traffic is limited to circuit-switched facilities, and evaporates as they replace their local networks with Managed Packet technology. This position is inconsistent with the Telecommunications Act, and the technical feasibility standard of Section 251. It will be important for regulators to speak clearly in defense of their powers (and the ILECs' obligations) to ensure competitive interconnection in the evolving Managed Packet environment. Doing so will minimize unnecessary controversy in this area, and advance the nation's interest in broader deployment of next generation networks.

Second, and similarly, it is important to distinguish the voice services provided over Managed Packet networks from "*over the top*" Voice over Internet Protocol ("VoIP") offerings (such as that offered by Vonage) that rely, in whole or in part, on the "best efforts" public Internet. Confusion can arise because the provision of voice service over a Managed Packet network also is sometimes referred to as "VoIP." But carriers design their Managed Packet networks, among other reasons, specifically to enable voice transport service with the quality associated with the traditional circuit-switched PSTN. In contrast, "over the top" VoIP offerings relying on the Internet cannot carry service quality commitments, including those associated with time of delivery, accuracy, or security.

Finally, it is not necessarily uncommon for the same transport infrastructure to be used for Managed Packet and Internet services, just as it is not uncommon for the same physical plant to be used to provide switched services and private line services in the traditional phone network. But this does should not alter the interconnection laws and policies applicable as the PSTN moves to Managed Packet technology.

To be clear, the continuing need for a regulatory backstop to negotiations for *wholesale* voice traffic exchange has no bearing on whether or how *retail* voice services offered to end users are regulated. Regulation of IP-enabled retail voice services is a matter of ongoing debate, both as to the social policy obligations that such services should bear (such as universal service contribution, E911 or CALEA) and as to whether any entry or economic regulation should apply to them. But importantly, those questions are independent of the issue addressed here: How carriers should interconnect their Managed Packet networks, and what regulatory obligations ILECs (and other requesting carriers) bear in that context?

II. A Primer on the Evolution of Managed Packet Voice Networks

To understand the importance of interconnecting Managed Packet networks for the exchange of voice traffic, it is useful to start with a brief discussion of exactly what a Managed Packet network (also called a Next Generation network) is, and how it differs from a traditional circuit-switched network.[3] In lay terms, the critical features of a Managed Packet network are that: (a) the network is *packet*-based (most likely based on the same protocols employed by the Internet);[4] (b) the network has the ability to assign a *specific* routing priority to voice service (and is thus able to support defined service quality); and, (c) the network operates in a manner that defines the service *independently* of the transport technology.[5]

The basic elements of a Managed Packet voice call involve a series of steps, some familiar, others new. As with the legacy phone network, the network first accommodates the fact that humans speak in analog waves, thereby (like today's network) requiring conversion to digital form. Consequently, the first step in the process (as with the legacy network) is that the voice call (termed "media" in this context) is converted to digital form. Unlike the traditional phone network, however, which controls call paths from a centralized node that establishes a constant bit-rate (typically 64kbps) path from start to destination, a Managed Packet network relies on the originating end-point to "invite" the terminating end-point to an agreed-upon session.

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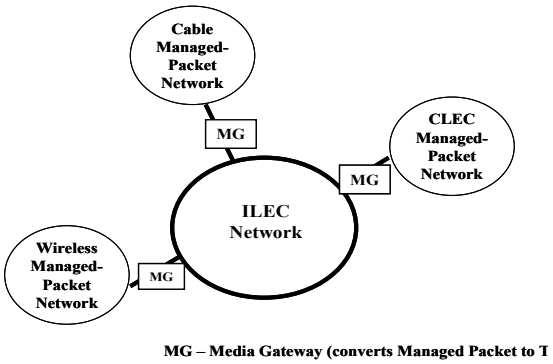
[3] It is somewhat unfortunate that the industry adopted the term "Next Generation" as the label of choice for this particular technological advancement. The term suggests that the technology is "on the horizon" when, in fact, it is readily available and being actively deployed today.

[4] Manufacturers commonly develop equipment for Managed Packet networks with an eye towards the open standards and large market potential for internet-compatible technology.

[5] http://www.itu.int/ITUT/studygroups/com13/ngn2004/working_definition.html

Figure 1: First Stage Deployment of Managed Packet Networks



The most common protocol used to establish and manage these sessions is the "Session Initiation Protocol" or SIP.[6] Call Agents (sometimes known as "user agents" when located at the customer premise) establish the sessions between the requested end-points, identify the packets as relating to voice service, and release the call into the transport layer for actual transmission. Within a single carrier's network, these agents access the necessary databases and end-points to manage packet flows so as to provide subscribers with the appropriate quality of service ("QoS") for a real-time application such as voice.[7]

As represented in Figure 1, the first stage in the deployment of Managed Packet voice networks has occurred in the form of isolated islands in which individual companies have been able to ensure *within*-network QoS for their voice products. The problem has come when traffic leaves the Managed Packet network "island" for termination on another network, particularly a legacy circuit-switched transport network of the incumbent. During these early days of Managed Packet deployment, these next-generation networks have had to adapt to the legacy network by giving up the advantages of packet transport. To reach the large majority of subscribers still served by an incumbent, entrant-networks have been designed to impersonate legacy facilities by converting to TDM-format at the edge as a requirement for interconnection to the ILEC.[8] See Figure 2 (following page). Thus, the benefits of Managed Packet technology today stop at the voice network owner's gate because traffic exchange arrangements that would maintain the voice service in Managed Packet form are not yet in place.

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[6] Other protocols exist, including H.323, which is a protocol based on an early recommendation from the ITU. Media Gateways have the ability to bridge networks relying on different protocols.

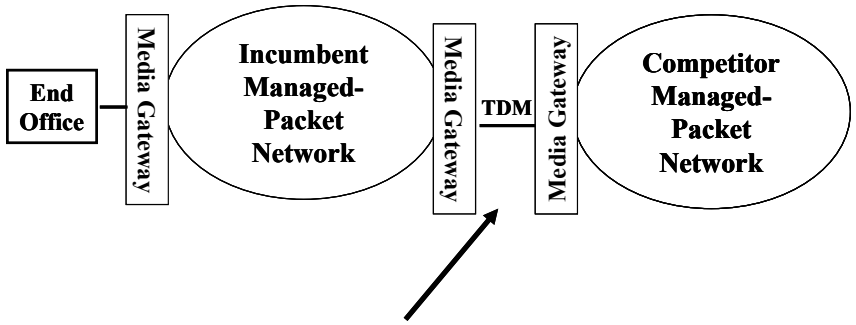
[7] A database critical to a Managed Packet voice architecture is the ENUM registry that maintains the location and routing information of network subscribers. ENUM is derived from the term "T*E*lephone *NU*mber *M*apping," and is a suite of protocols developed by the IETF to unify the traditional telephone numbering system and the Internet addressing system using an indirect lookup method.

[8] Time Division Multiplexing ("TDM") is the method by which voice traffic is assigned a time-defined circuit on a digital network. By assigning a specific time-slot to an individual conversation, TDM reserves a "circuit" for the continuous transmission of the digital bytes associated with a particular phone call. As the terms are used in this paper, "TDM" and "circuit-switched" are interchangeable.

III. The Next Step: The Interconnection of Managed Packet Networks

Importantly, the era of "Managed Packet islands," with its inherent inefficiency, is coming to a close. Managed Packet technology not only supports *within*-network voice QoS; the technology also enables the seamless *exchange* of voice packets between networks in a manner that respects the priority requirements of each. In this way, quality voice service is possible not only within the Managed Packet network of a single carrier, but can be provided across networks on an end-to-end basis.

Figure 2: An Inefficient Interconnection Between Managed Packet Transport Networks Using TDM Conversion



The participants most critical to the development of Managed Packet traffic exchange arrangements, however, are the incumbent local exchange carriers that have the largest base of voice subscribers – and therefore control the largest volume of exchanged voice traffic[9] – in their respective regions. Most significantly, the incumbents are *themselves* actively deploying Managed Packet networks, thereby obviating the need to rely on legacy technology for interconnection arrangements between neighboring Next-Generation networks.

Requiring a Managed Packet network to mimic legacy circuit-switched facilities to interconnect -- especially where the incumbent itself has deployed a Managed Packet transport network[10] -- increases cost, reduces quality and discourages the wider

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[9] Interconnection volume is generally related to market share, with local traffic representing the largest category of traffic exchanged between carriers. As such, the key to Managed Packet traffic exchange will be the manner in which the Managed Packet networks of competitors are interconnected to the Managed Packet networks of incumbents.

[10] The benefits made possible by interconnecting Managed Packet networks in their native packet form are not limited to the traffic of customers that have subscribed to packet-based services. Significant efficiencies can be achieved wherever the incumbent has deployed a

deployment of Next Generation networks and applications by diverting investment to what is, *at best*, a valueless activity.[11]

The ILECs, and particularly AT&T and Verizon, are aggressively deploying Managed Packet networks as substitutes for their older circuit-switched technology, initially in their transport networks but also increasingly to the customer premise. This trend, in which the traditional PSTN is replaced by a Managed Packet network, is irreversible. As explained by Ralph de la Vega, AT&T Group President, Regional Telecommunications and Entertainment: "Customers just want voice to work, whether it's VoIP or not. It's a big step forward for us because we're putting all our services -- U-verse TV, broadband, voice -- over the same IP (Internet protocol) infrastructure using the same billing system. It begins a transition to the future where we can dismantle the (older) voice circuits."[12]

Where an incumbent has deployed a Managed Packet transport network,[13] its legacy circuit-switched transport capacity will either be devoted to low-priority applications where efficiency is not the goal, or retired altogether.[14] If efficiency were its only goal, the incumbent would want to transport the competitor's traffic using its Managed Packet transport capacity to achieve cost savings and maximize scale. Once the incumbent has deployed a Managed Packet transport network, even that carrier would incur unnecessary costs if voice traffic must go through a two-step conversion process -- from Managed Packet to TDM and then immediately from TDM back to Managed Packet -- as part of traveling between two Managed Packet transport networks. Such an approach requires back-to-back media gateways that perform the protocol conversions, increasing

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Managed Packet *transport* network, even as most of its subscribers continue to be served using legacy (i.e., circuit-switched) end offices.

[11] Although this paper focuses on the efficiency gains possible by the direct interconnection of Managed Packet transport networks (i.e., interconnection without conversion to legacy form), it is also important to understand that the conversion of a packet-call to a circuit-switched format strips the call of any packet-enabled functionality. Thus, the conversion compounds the drag on economic efficiency by increasing cost and making the service less useful.

[12] *AT&T Set To Include Internet Telephony in Product Bundles*, Investor's Business Daily, October 1, 2007.

[13] This paper does not suggest that an incumbent should be required to deploy a Managed Packet transport network to accommodate competitive entrants where it has not done so. However, as discussed above, incumbents already are deploying Managed Packet transport networks for their own purposes to take advantage of network efficiencies and position themselves to offer new services to their subscribers.

[14] Obviously, to the extent that the incumbent relegates its legacy transport network to marginal uses, it would be discriminatory for one such use to be the "transport and termination" of a rival's voice traffic.

cost while degrading voice signal quality, all to effect a conversion that is neither efficient nor required.[15]

Investment in unneeded media gateways to convert Managed Packet traffic to legacy format is wasteful and counterproductive. Such conversions are nothing more than engineering "busy work," adding no value.[16] In addition to being inefficient, the unnecessary conversions impose higher operational costs by requiring carriers to manage both the logical networks that define the Next-Generation architecture and the physical networks that characterize the legacy approach. Spending scarce capital in such a wasteful exercise runs counter to sound economics and rational public policy. Every dollar diverted to an unnecessary task is a dollar that would otherwise be available to expand the carrier's Managed Packet network, increasing the availability of advanced services.

Equally troubling are the indirect costs associated with conforming to legacy architectural rules, including requirements to establish "dedicated" trunks to certain end offices, one-way trunk groups, or specific trunks for particular types of traffic.[17] These network restrictions are grounded in the past and have no reason to exist in a packet environment.[18]

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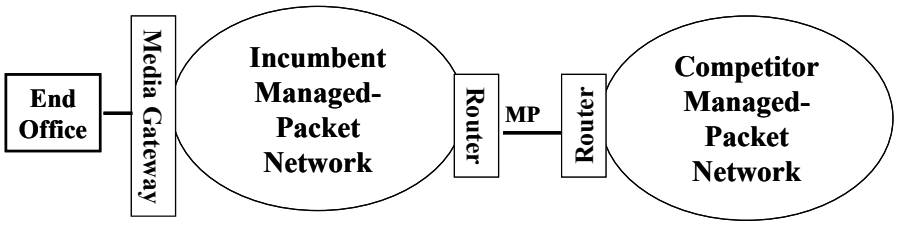
[15] One would hope that incumbents would eventually welcome the exchange of voice traffic in packet form, as the incumbent's Managed Packet transport networks replace their circuit-switched architecture of the past. Early in the adoption of such arrangements, however, incumbents have the incentive to impose additional costs on rivals that have deployed more efficient Managed Packet technology by requiring that competitive entrants interconnect through the incumbent's obsolete circuit-switched technology, even where a more efficient Managed Packet transport facility is available.

[16] Converting Managed Packet packets to a TDM bit rate – only to be converted back to Managed Packet form for transport in the ILEC's own Managed Packet network – also reduces voice quality through unnecessary protocol conversion.

[17] The deployment of Managed Packet technology has implications for other issues. For instance, legacy interconnection arrangements commonly require that carriers separate "local" and "toll" traffic, as well as establish separate trunk groups for originating and terminating calls. There is simply no reason to allow such practices to reduce the efficiency of packet networks by continuing these requirements in perpetuity. This is separate from the question of how compensation for traffic termination should be assessed. This paper focuses on network interconnection, not intercarrier compensation, and the former does not presuppose any particular rules for the latter. Moreover, the vast majority of traffic poised to benefit by the interconnection of Managed Packet networks is local traffic, where compensation issues are less contentious.

[18] Another example of artificial boundaries that haunt the architecture of legacy networks and interconnection arrangements are the Local Access and Transport Area (LATA) boundaries. Such boundaries, drawn 25 years ago as part of the AT&T divestiture, no longer constrain the RBOCs and should play no further role in defining the scope of interconnection. When drawn, such boundaries were "first approximations" of the subscriber concentrations needed to support long distance entry given the technology of the time (microwave). LATA boundaries answer

**Figure 3: The Next Step in the Evolution to a Packet Future --
Interconnection Between Managed Packet Networks in Packet Form**



Unnecessary conversion to TDM can be avoided, with traffic exchanged between Managed-Packet Networks in packet form, with QoS established end-to-end.

It is important that interconnection arrangements between Managed Packet networks not be forced to conform to legacy policies merely because they once applied to the circuit-switched network. When traditional voice interconnection arrangements were first deployed, the incumbent's network "occupied the field" and interconnection points were generally established in geographic proximity to its network. Today, however, privately operated "carrier hotels" have been specifically constructed in many areas to facilitate interconnection, with expansive "meet point" rooms designed for this very purpose. The incumbent is typically located at such facilities, alongside most carriers providing service in that area. All forms of interconnection should be encouraged at such locations, including interconnection between the Managed Packet networks of incumbents and their competitors.

Finally, establishing direct connections between the Managed Packet networks of incumbents and entrants for voice will accelerate the development of innovative new services that are only possible when a packet-architecture is maintained throughout the communication end-to-end (*i.e.*, both end points subscribe to an packet-based service). Although Managed Packet interconnection with the ILEC will initially unleash the efficiencies inherent in these Managed Packet *transport* networks that have been deployed, both Verizon (and, to a lesser extent, AT&T) are beginning to establish a base of packet-enabled subscribers.[19] Over time, the realized benefits of Managed Packet interconnection will be determined more from the innovations made possible by *end-to-end* Managed Packet services over different Managed Packet networks, than from the

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poorly the wrong question for the wrong century, and cannot be reliably used to define any parameter relevant to the interconnection of Managed Packet networks today.

[19] Subscribers to Verizon's FiOS service -- and, more recently, AT&T's UVerse network – receive packet-based voice service all the way to the customer's premise.

cost efficiencies that can be realized by establishing direct interconnection between Managed Packet *transport* networks today.

These issues are not hypothetical. AT&T has made clear that its goal is to replace its circuit-switched network with packet technology, pointing "to the future where we [AT&T] can dismantle the (older) voice circuits."[20] Verizon has been replacing its circuit switches with soft switches as part of deploying its Managed Packet transport network, yet advising others that they must continue to interconnect in legacy form.[21] The nation's march to an all-packet, digital broadband future must soon include interconnection between these modern Managed Packet networks on nondiscriminatory terms, just as interconnection and traffic exchange arrangements were needed between circuit-switched networks in the past.

IV. Interconnection of Managed Packet Networks Under Sections 251 and 252

The legal foundations for the interconnection of next generation Managed Packet networks already are anticipated in existing telecommunications law. This is not surprising, for the policy concerns underlying the law are technologically neutral and designed to accommodate the evolution of technology over time.

Nevertheless, at least some ILECs appear to be taking the position that they have no legal obligation to interconnect with CLECs as these incumbents substitute Managed IP for circuit-switched transport technology. For example, Verizon has asserted that it would be a "radical change" to require ILECs to interconnect with CLECs outside of a circuit-switched environment. Verizon made this comment in response to a seemingly unexceptional statement by the National Cable & Telecommunications Association ("NCTA") in the context of comments on a Verizon forbearance petition. NCTA had observed that:

> Congress imposed mandatory interconnection obligations on ILECs pursuant to Section 251 in recognition of the fact that they alone have ubiquitous local networks. .... The fact that an ILEC is in the process of transitioning from a circuit-switched, copper-based network to an IP/packet/broadband/optical network does nothing to diminish the advantage of ubiquity or the potential exercise of market power over interconnection that would arise in the absence of regulation. For example, it should not be the case that an ILEC can avoid all Title II obligations, including interconnection obligations, merely by replacing a TDM switch

[20] *See* note 12 *supra*.

[21] For instance, Verizon announced the replacement of a number of DMS 100 switches in California with Nortel's Succession Packet Switches (*see* Notice of Network Change, Verizon, June 15, 2004). Similar changes have been announced in other states. The common denominator, however, has been that "Verizon will use a trunk gateway to interface with the packet switches so that the existing means of interconnection will be unchanged."

> with a packet switch. Under Section 251(c)(2), ILECs are required to permit interconnection where it is technically feasible. The statute contains no exception for IP/packet/broadband/optical technology and there is no reason for the Commission to create one, particularly considering the ongoing migration by ILECs and other providers to IP-based softswitch technology.[22]

Verizon, however, was quick to respond to NCTA's comment, aggressively challenging the observation that Section 251 continues to apply in a Managed Packet environment. Verizon characterized NCTA's position as "radical" and unsupported by law. Verizon accused NCTA of "seeking to expand the scope of [Sections 251 and 252] to impose legal interconnection and traffic exchange mandates on IP networks — thereby regulating for the first time a currently unregulated and highly competitive market segment, contrary to the requirements of the 1996 Act and Commission policy — such radical changes" that are beyond the FCC's authority.[23] AT&T has committed less to paper, but has echoed these same themes in public discussions addressing Managed Packet interconnection.

It is understandable why the ILECs would want to escape their statutory interconnection duties. However, the basis for the ILEC obligations – their disproportionate share of voice subscribers – is not eliminated simply because the technology used to transport the traffic has evolved. The Telecommunications Act specifically anticipated the need for efficient interconnection new technologies, such as the "next-generation" Managed Packet networks discussed here.

For example, as NCTA noted, Section 251(c)(2) allows requesting carriers with the right to interconnect with an ILEC's network on technology neutral grounds. Nothing in that statute limits its application to the network facilities of the ILECs as they stood in 1996. To the contrary, by allowing interconnection at "any technically feasible point" pursuant to Section 251(c)(2)(B), the Act contemplates that, as technology evolves, the scope of what is "feasible" also will evolve.

No one can argue that direct interconnection of Managed Packet networks is not feasible today. As the FCC stated in its initial order implementing the Act, "successful interconnection ... at a particular point in a network, using particular facilities, is substantial evidence that interconnection or access is technically feasible at that point, or at substantially similar points in networks employing substantially similar facilities. In comparing networks for this purpose, the substantial similarity of network facilities may

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[22] Letter of the National Cable & Telecommunications Association, Federal Communications Commission, WC Docket No. 04-440, at 5 (Aug. 6, 2007) (emphasis added).

[23] Opposition of Verizon, Federal Communications Commission, WC Docket No. 04-440, at 11-12 n.19 (Aug. 13, 2007).

be evidenced, for example, by their adherence to the same interface or protocol standards."[24]

Furthermore, the Telecommunications Act provides that ILECs must provide operators of Managed Packet networks the same quality of interconnection that they provide to themselves and their affiliates. *See* Section 251(c)(2)(C). This non-discrimination standard was adopted to ensure that as network technology advances, and is implemented in the ILEC network, other network operators similarly can implement such technology and interconnect their voice networks on an economically efficient basis, notwithstanding the market power otherwise held by the ILEC. Thus, as ILECs interconnect their own Managed Packet network facilities, they also have an obligation to interconnect with third party CLECs.

Finally, the Telecommunications Act provides a duty on the part of both the ILEC and the requesting interconnecting carrier to exchange traffic for transport and termination on a reciprocal basis. *See* Section 251(b)(5). This provision also is technologically neutral, and therefore creates an obligation on the part of one carrier to accept and transmit the Managed Packet voice traffic of another on reasonable and reciprocal terms.

The FCC has properly taken pains to preserve network interconnection obligations, even in situations where it otherwise has been willing to give ILECs regulatory relief. For example, the Commission recently granted certain ILECs forbearance from regulation of their packet-switched broadband services.[25] But at the same time, the FCC made clear that this relief did not in any way impact the ILECs' interconnection obligations under Section 251 and 252. As the Commission observed, interconnection obligations "foster the open and interconnected nature of our communications system, and thus promote competitive market conditions" in the public interest. [26] Similarly, the FCC stated in the *Omaha Forbearance Order*, eliminating interconnection-related obligations would give an ILEC "the ability to exercise market power over interconnection."[27]

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[24] *First Report and Order, Implementation of Local Competition Provisions in the Telecommunications Act of 1996*, 11 FCC Rcd 15499, 15606 (1996) (emphasis added).

[25] *Memorandum Opinion and Order, Petition of AT&T for Forbearance Under47 U.S.C. § 160(c) from Title II and Computer Inquiry Rules with Respect to its Broadband Service*s, FCC 07-180, at para.12 (Oct. 12, 2007) ("*AT&T Forbearance Order*"); *Memorandum Opinion and Order, Petition of ACS of Anchorage, Inc. Pursuant to Section 10 of the Communications Act of 1934, as amended, for Forbearance from Certain Dominant Carrier Regulation of its Interstate Access Services and for Forbearance from Title II Regulation of its Broadband Services, in the Anchorage Alaska, Incumbent Local Exchange Carrier Study Area*, WC Docket No. 06-109, FCC 07-149, at para. 129 (rel. Aug. 20, 2007);

[26] *AT&T Forbearance Order*, supra, at para. 68.

[27] *Memorandum Opinion and Order, Petition of Qwest Corporation for Forbearance Pursuant to 47 U.S.C. § 160(c) in the Omaha Metropolitan Statistical Area*, WC Docket No. 04-

Direct interconnection of Managed Packet networks also is supported by Section 706 of the Telecommunications Act. Section 706 creates a general obligation on the FCC and state regulators to promote the deployment of broadband infrastructure, and that requirement directly implicates the interconnection of independent Managed Packet networks.[28] It is stating the obvious to observe that broadband networks are advanced by interconnection policies that support efficient voice traffic exchange, including Managed Packet traffic meeting quality of service expectations of end users. Conversely, refusals to interconnect voice traffic on efficient terms by ILECs would impose costs on competitors and deter broadband deployment.

Last, but hardly least, regulators also have broad public interest mandates under their governing statutes to ensure that Americans continue to enjoy the same quality of voice service that they historically have expected as the underlying network transitions from circuit-switching to IP.[29] Interconnection policies for next generation networks must protect and promote long-established consumer quality expectations (not to mention new applications supported by Managed Packet networks), and do so not only within the Managed Packet network of a single carrier, but also across the networks of interconnecting carriers.

Notwithstanding Verizon's rhetoric, none of this is a "radical" departure from basic telecommunications law. The Telecommunications Act accommodates AT&T's plan to "dismantle the older voice circuits" as it replaces its own network with Managed Packet technology. The Act contemplates similar evolution of other ILEC networks. And as emphasized at the outset, network interconnection oversight in no way bears on how one may or may not regulate retail voice services provided over these wholesale network meet points.

The legal footings for interconnection of Managed Packet networks are already in place. All carriers have a legal duty to interconnect their Managed Packet voice networks and provide transport and termination on a reciprocal basis. ILECs have a further responsibility under Section 251(c) to provide non-discriminatory MP-to-MP interconnection "at least equal" to that they provide themselves, and do so "at any technically feasible point" within their network. The terms of Managed Packet

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223, 20 FCC Rcd 19415, para. 1 (2005), *aff'd Qwest Corp. v. FCC*, 482 F.3d 471 (D.C. Cir. 2007).

[28] *See* 47 U.S.C. § 157 nt. (directing FCC and state utility commissions to encourage the deployment of advanced telecommunications capability to all Americans through measures that "promote competition in the local telecommunications market" and remove "barriers to infrastructure investment").

[29] *See, e.g.*, 47 U.S.C. § 151 (requiring FCC to promote efficient communications services for the public).

interconnection are subject to negotiation and arbitration under Section 252, just like interconnection of circuit-switched networks.

Section 252 is likely to play an important role in the advancement of Managed Packet services in the future. Verizon's public statements -- and more generally the history of controversy over interconnection with ILECs -- suggest that ILECs will resist their obligation to provide for the interconnection of Managed Packet networks.[30] It is not the purpose of this paper to anticipate and catalog the ways that ILECs might refuse to provide "technically feasible" interconnection for the exchange of voice traffic over Managed Packet networks. Indeed, experience shows that some ILECs are more likely to cooperate than others, and that (importantly) the scope of what is technically feasible will evolve.

This is why Section 252's arbitration provisions are such an important legal backstop to the advancement of Managed Packet networks. ILECs will know that if negotiations with competitors fail, state regulators (guided by FCC policies) will ensure that consumers receive the full promise of Next Generation networks through reasonable and cost-efficient interconnection. With that backdrop, ILEC-competitor negotiations are more likely to progress successfully. But no matter what, ILECs should not be able to deter such progress by requiring requesting carriers to make unnecessary protocol conversions prior to traffic exchange. ILECs should not be able to impose unnecessary costs on Managed Packet networks by forcing multiple interconnection points mirroring the increasingly historical circuit-switched TDM world. And ILECs should not be able to degrade voice service transported over Managed Packet networks of other competitors by refusing to exchange (or stripping) packet instructions used to assure quality of service for end users.[31]

Regulators can minimize their own long-term burden by making clear to ILECs that the replacement of circuit-switched network equipment does not relieve them of their obligations under Section 251 and 252. This principle should not be a matter of controversy and debate. Once recognized and affirmed in the context of Managed Packet networks, it can shape interconnection through the negotiation and arbitration processes

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30 A refusal to directly exchange Managed Packet voice traffic would be tantamount to the kind of blocking of traffic exchange that the Commission previously has condemned. *See Order and Consent Decree, Madison River Communications, LLC*, DA 05-543, 20 FCC Rcd 4295 (Enforcement Bureau, 2005); accord, *Memorandum Opinion and Order, Time Warner Cable Request for Declaratory Ruling that Competitive Local Exchange Carriers May Obtain Interconnection Under Section 251 of the Communications Act of 1934, as Amended, to Provide Wholesale Telecommunications Services to VoIP Providers*, 22 FCC Rcd 3513, DA 07-709 (March 1, 2007).

31 Related issues exist as to the pricing of Managed Packet interconnection, as well as of transport and termination of Managed Packet voice services. While pricing issues certainly are important in their own right, they are beyond the scope of this paper, which focuses on the need to address non-price issues facing Managed Packet interconnection.

that already are familiar to all. In this way "next generation" network deployment, and the new broadband services they permit, can proceed without jeopardizing voice service quality and competition.

V. Conclusion

There is general consensus that Managed Packet networks will replace circuit-switched technology as the architecture of choice for the provision of voice services. Although there is agreement about this end-point, to date there has been little discussion as to the path the transformation will take.

The first step is clear, with the deployment by individual carriers of Managed Packet technology that supports the voice quality and reliability that the consumers and businesses have come to expect. The result is the emergence of "Next Generation" islands, where a carrier's own network prioritizes voice-packets to meet accepted standards. However, today the traffic is converted back to its legacy form (TDM) so that it may be exchanged with the incumbent.

Obviously, this practice cannot continue indefinitely. With both entrants and incumbents deploying Managed Packet transport networks, it makes no sense to limit the interconnection needed to exchange traffic between them to facilities that have not been upgraded to new technology. Not only does this unnecessary conversion increase cost, it robs potential Managed Packet interconnection arrangements of the scale needed to accelerate further deployment of Next Generation networks by both.

The answer is equally obvious: To promote the continued expansion of Managed Packet networks, these networks should be interconnected in packet form. Such arrangements would avoid the costs of needless TDM conversions, while ensuring that the benefits of Managed Packet transport are realized as deep into the network as possible.

The basic framework of the federal Act – negotiation with the backstop of arbitration if needed – is just as appropriate to Managed Packet networks as it is to circuit-switched facilities. The Act anticipated that competition would encourage the development of new technologies, and its most core provisions (such as those addressing interconnection) were structured to adapt over time. The next step in the evolution of Next Generation transport networks is to interconnect Managed Packet networks directly, respecting the prioritization required to maintain quality voice services. The Telecommunications Act requires as much, and provides the necessary backstop against the local market power of the ILECs.

Before the
Federal Communications Commission
Washington, DC

In the Matter of	)	
	)	
International Comparison And Consumer Survey Requirements in the Broadband Data Improvement Act	)	GN Docket No. 09-47
	)	
A National Broadband Plan for Our Future	)	GN Docket No. 09-51
	)	
Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act	)	GN Docket No. 09-137

COMMENTS OF
CBEYOND, COMPTEL, COVAD, INTRADO,
NUVOX AND TW TELECOM
IN RESPONSE TO NBP PUBLIC NOTICE # 25

On December 1, 2009, the Commission released Public Notice # 25 asking whether a Notice of Inquiry (NOI) should be issued to address questions arising from the inevitable transition from a circuit-switched PSTN to an IP-based network.[1] Specifically, the *Public Notice* asks "which policies and regulatory structures may facilitate … the efficient migration to an all IP world."[2] These comments address a single issue critical to the full realization of an "all-IP" future – that is, the replacement of today's TDM-based interconnection and traffic exchange agreements between incumbent local exchange

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1 Comment Sought on Transition from Circuit-Switched Network to All-IP Network, NBP Public Notice # 25, GN Docket Nos. 09-47, 09-51, and 09-137, DA 09-2517 (rel. Dec. 1, 2009 ("*Public Notice*").

2 *Ibid.* at 2.

carriers ("ILECs") and entrants with comparable arrangements in IP-form. Importantly, the regulatory structure most important to this transition is one that already exists and applies – *i.e.,* the interconnection and traffic exchange obligations of the federal Communications Act ("Act") as set forth in sections 251 and 252.

As explained in more detail in the attached letter submitted September 22, 2009,[3] the Act sets forth the appropriate framework to govern the negotiation and implementation of modern IP-based traffic exchange arrangements. Section 252 of the Act calls for carriers to negotiate interconnection arrangements and publicly file the agreed terms with state utility commissions for approval. Such agreements, once reached, are then available to other parties through section 252(i).

Recognizing the enormous share-advantages and dominant position of the incumbent local exchange carriers, the Act also includes a regulatory backstop – arbitration under section 252 – where the incumbent and entrant cannot agree. In this way, an independent third party (*i.e*., the state commission or, in certain circumstances, the FCC) resolves disputes without regard to the private interests of the individual parties, but in furtherance of the public interest.

Significantly, these key provisions of the Act are not dependent upon any particular technology. For instance, section 251(c)(2) specifically provides requesting

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[3] *See* September 22, 2009 Letter from William H. Weber, Cbeyond, et. al. to Marlene H. Dortch, Federal Communications Commission GN Docket No. 09-51 ("*IP Interconnection Ex Parte*"), attached hereto as Attachment A.

carriers the right to interconnect with an incumbent's network at "any technically feasible point." Nothing in the Act limits its application to the network facilities of the ILECs as they stood in 1996. By allowing interconnection at "any technically feasible point," the Act's obligations and protections remain as technology evolves. Consequently, any NOI issued by the Commission should recognize that the Act has *already* answered the fundamental question as to what regulatory structure should govern interconnection and traffic exchange between IP-networks, and the Commission should limit its focus to whether additional rules are needed to provide greater definition and effect.[4]

The Commission has experienced similar technology transitions, with the *Public Notice* referencing the transition from analog mobile service to digital mobile service, and from analog broadcast television to digital broadcast television. The transition most relevant to this issue, however, is the invisible transition that occurred as the nation moved from a largely analog-based public switched telephone network to the digital network that exists today.[5] Significantly, the transition between these technologies was implemented without any material change in interconnection policy.

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[4] For instance, end-office conversions from IP-to-TDM will still be required in those ILEC networks that have deployed IP technology for transport, but which still serve many end-users using circuit switches. It will take many years before all circuit-switches are removed from the network, but IP-to-IP interconnection does not need to await that end-point. So long as the ILEC has deployed IP-transport facilities, IP-to-IP interconnection can occur, even if some IP-to-TDM conversions are required to reach some end-users. These transitional considerations, however, do not diminish the larger conclusion that the Act governs interconnection and traffic exchange obligations in a technologically neutral manner.

[5] When the Commission first established detailed "interconnection" requirements for long distance competition (such as the various Feature Group access arrangements that interconnected long distance networks to the local exchange), the PSTN was largely characterized by analog transmission and in-band signaling. Over the years, this analog architecture was replaced with digital transmission and switching, and in-band signaling was replaced by Signaling System 7

Unfortunately, some ILECs are seeking to use the transition from a circuit-switched architecture to IP technology to evade their interconnection and traffic exchange obligations under the Act. For instance, Verizon recently responded to a request by Bright House Networks for an interconnection agreement that would include the exchange of telecommunications traffic in IP format as an "outrageous" demand,[6] asserting that Bright House has no legal right to an IP-based exchange of traffic because (according to Verizon) "IP-to-IP interconnection will evolve just as the Internet has – via voluntary commercial agreements."[7]

The Internet, however, did not have as its starting point a market dominated by incumbent local exchange carriers that are the product of decades of statutorily-protected monopolies. As the Commission's most recent local competition report shows, incumbent local exchange carriers still serve over 80% of the local market, with the remaining share divided among multiple competitors.[8] The mere fact that an incumbent has changed its network architecture from a circuit-based to IP-format does not change its

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(SS7). These changes were no less fundamental than today's transition from a TDM-based to an IP-based digital network.

[6] Verizon Florida LLC's Response to Bright House Networks Information Services (Florida) LLC's Petition for Arbitration of Interconnection Agreement, Florida Public Service Commission Docket No. 090501-TP, filed December 7, 2009 ("*Verizon Response*"), at 6.

[7] *Ibid*. Verizon's position ignores the fact that the Act also embraces negotiation as the favored means of reaching agreement between entrants and incumbents. Where the Act's call for negotiation differs from Verizon's view of "commercial negotiation," however, is that the Act does not reward an incumbent's refusal to accept reasonable terms with stalemate, but rather provides for arbitration to resolve any dispute.

[8] Local Telephone Competition: Status as of June 2008, Industry Analysis and Technology Division, Wireline Competition Bureau, Federal Communications Commission, July 2009 at Table 1.

market position, and the important interconnection and non-discrimination protections of the Act do not disappear just because Verizon says they should.[9]

Preserving the Act as technology changes is no small matter. Non-discriminatory interconnection and traffic exchange arrangements are fundamental to achieving the nation's transition to an all-IP network. Verizon's assertion that IP-interconnection is "voluntary" is simply a polite way to claim that it may deny – or, equally troubling, define – interconnection on its own terms. Even AT&T acknowledges that imposing unnecessary TDM-architectural requirements discourages investment in more efficient IP-based technologies:

> The impact of COLR [carrier of last resort] obligations is exacerbated by the fact that, in many states, COLR requirements are defined by reference to a particular technology or include obligations (such as equal access requirements) that presume a particular network architecture – that is, TDM. These requirements effectively force carriers of last resort to continue investing capital to maintain their legacy, TDM networks – capital that could be used to deploy next generation broadband network facilities and services.[10]

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[9] The *Verizon Response* raises secondary issues concerning technical aspects of IP-to-IP interconnection that are ancillary to the fundamental concern expressed here. Regardless of the merits (or lack thereof) of Verizon's technical positions regarding specific contract language or the interconnection configuration proposed by Bright House, the relevant issue is Verizon's threshold position that it has no legal obligation to interconnect in IP-form to exchange traffic and will only do so under terms that Verizon has decided further its private interest. It is not the purpose of these comments to address these secondary issues raised by Verizon, including its remarkable claim that it does not have an IP-based network in Florida (*Verizon Response* at 6), despite Verizon's listing of multiple packet switches and call agents in the Local Exchange Routing Guide (LERG). These issues pose factual questions (for instance, identifying how many Verizon wire centers are reachable with its IP transport network) and, to the extent they remain in dispute, the arbitration provisions of the Act establish an appropriate forum for resolution.

[10] Comments of AT&T Inc. – NBP Public Notice # 19, Federal Communications Commission GN Docket Nos. 09-47, 09-51, and 09-137, December 7, 2009 at 20. Without accepting AT&T's claim that its so-called COLR obligations are a burden, we agree with its underlying point that forcing TDM-investment where it is no longer needed deters next generation investment that would further the Commission's aims here.

AT&T clearly understands the consequences of waste when regulatory requirements (allegedly) require that they invest in antiquated TDM facilities. Such waste is even more unjustified when the product of an incumbent's unilateral demand that interconnection is only available through obsolete technologies. There is no legal basis for Verizon's assertion that the Act's interconnection obligations are frozen with TDM-technology as it existed in 1996. Consequently, the Commission should make clear that the *predicate* to its NOI is a technology-neutral Communications Act and limit its questions to how best implement the unambiguous interconnection requirements of sections 251/252.

Respectfully submitted,

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ATTACHMENT A

September 22, 2009

Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: In the Matter of a National Broadband Plan. GN Docket No. 09-51

Dear Ms. Dortch:

The purpose of the National Broadband Plan is to identify policies and actions that would encourage broadband deployment and adoption throughout the United States.[1] As part of that task, the Commission should work to eliminate any unnecessary barriers to the deployment and expansion of next generation (NextGen) networks.[2]

Consistent with this goal, the undersigned carriers come together to ask the Commission to ensure that the National Broadband Plan makes clear that the interconnection and traffic exchange obligations of the Telecommunications Act continue to apply even as networks transition from circuit-switched to packet-based technology. In doing so, the Commission will prevent possible gamesmanship and remove a potential barrier to the full utilization – and, therefore, further deployment – of advanced telecommunications networks.

The circuit-emulation capabilities of next generation technology are transforming the public switched telephone network ("PTSN") to an all packet-network, just as the PSTN previously evolved from analog to digital transmission as that technology developed.[3] Substantial segments of the PSTN already have been replaced with NextGen technology, particularly in the transport network. It is estimated that 90% of the interLATA PSTN has been replaced by IP technology, and 60% of the intraLATA PSTN as well.[4]

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[1] American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, 123 Stat. 115 (2009) (Recovery Act).

[2] Next Generation technology enables carriers to define specific class-of-service policies to minimize latency and assure quality. This ability means that next generation facilities can transport real-time voice services alongside data services in packet-based format without sacrificing quality, reliability or security.

[3] As AT&T describes, the nation is in the midst of an "inevitable transition from a narrow-band, voice-centric infrastructure to the broadband, any-application infrastructure of the 21st century." *See* Ex Parte Letter from Robert W. Quinn, Jr., Senior Vice President, Federal Regulatory, AT&T Services, Inc., to Chairman Kevin Martin, Federal Communications Commission, CC Docket No. 01-92, July 17, 2008 at 1.

[4] Presentation of Carl Ford, Vice President, Crossfire Media, to National Association of Regulatory Utility Commissioners, Staff Telecommunications Subcommittee, February 14, 2009. It is a mistake to judge the importance of NextGen networks to the PSTN solely by the much

In the initial stages of deployment, NextGen networks typically have been required to convert traffic to legacy TDM-format prior to delivering it to the incumbent LEC. The ILEC has required such conversions even where the incumbent itself has deployed NextGen facilities and could otherwise transport the traffic in packet form on its own network.[5] Such conversions require unneeded media-gateways at the network edge, in addition to SS7 signaling. In some instances, back-to-back conversions are used such that traffic ultimately is carried in packet-form, even though TDM arrangements are required at the point of traffic exchange. Requiring a NextGen network to convert traffic to legacy circuit-switched form as a condition of interconnection and traffic exchange with another NextGen transport network increases cost, reduces quality and discourages the wider deployment of NextGen networks by diverting investment to what is, at best, a valueless activity.

Directing scarce investment capital to unnecessary media gateways is wasteful and counterproductive. Such conversions are nothing more than engineering "busy work," adding no value. Every dollar diverted to an unnecessary task is a dollar that would otherwise be available to expand the carrier's NextGen network, increasing the availability of advanced services. In addition to being inefficient, the unnecessary conversions impose higher operational costs by requiring carriers to manage both the logical networks that define the NextGen architecture and the physical networks that characterize the legacy approach. Finally, converting NextGen packets to a TDM bit rate – only to be converted back to NextGen form for transport in the ILECs' own NextGen network – reduces voice quality through unnecessary protocol conversion.

No matter the perspective, imposing back-to-back conversions solely so that voice traffic may be exchanged between NextGen transport networks is to turn one's back on the future. Some of the highest-capacity network links in existence are the interconnection facilities between incumbents and their competitors. The national commitment to a broadband future requires that all such networks exchange voice traffic in modern, packet, form wherever possible.[6]

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smaller count of *end-users* that subscribe to NextGen voice services offered by incumbents, when the most relevant measure is the amount of overall capacity that is now operating in IP form. As noted, large portions of the PSTN have converted to next generation transport facilities, even where end-users continue to subscribe to circuit-switched services. Over time, as the number of subscribers served by soft-switches and other IP-devices increases, the level of end-to-end packet services will become increasingly more important. That trend (*i.e.*, the growth of end-user services), however, should not be confused with the ongoing substitution of next generation access and transport facilities within the network overall.

[5] For instance, Verizon has been replacing legacy switches with Nortel's Succession Packet Switches, yet combines the architecture with trunk gateways so that carriers must continue with traditional interconnection. *See* Notice of Network Change, Verizon, June 15, 2004. Similar changes have been announced in other states.

[6] In some instances, ILECs may be operating parallel packet and TDM networks and, as such, do not *necessarily* perform back-to-back conversions when they choose to direct

Unfortunately, some incumbents have suggested that competitors have no statutory rights under Sections 251 and 252 of the Act if they want to interconnect and exchange traffic directly in packet form. The ILEC position appears to be that Sections 251/252 only apply in the increasingly obsolete TDM world, and hence competitors must hand off traffic in TDM to retain the oversight and the regulatory backstop (where negotiations fail) provided for by the Act.[7]

A year ago, for example, USTA argued this position on behalf of its members in opposing a NARUC resolution on this subject. NARUC nevertheless rejected the USTA view. It found that "carriers are substituting Next Generation Network technology in order to reduce the costs of providing voice telecommunications services" and resolved to protect "carriers' interconnection rights and traffic exchange obligations, under Sections 251 and 252, in a technologically neutral manner."[8]

Any further debate concerning the application of 251/252 can easily be avoided by the FCC simply making clear, as did NARUC, that the interconnection and traffic exchange obligations of the Act *are* technology neutral and do not disappear as packet-based facilities are deployed and used for the transport and termination of telecommunications traffic.

Providing this statement does not require that the Commission establish any new law or policy, but that does not make it any less important. Such action by the Commission will foster the goals of the National Broadband Plan by removing any potential for further ILEC obfuscation or delay in interconnecting efficiently with packet-based networks of competitors.[9] The Telecommunications Act is deliberately

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interconnected traffic to legacy facilities. As a general policy, however, the Commission should be *encouraging* the network's migration to packet technology and competitors should not be limited to TDM interconnection and TDM facilities when a packet alternative has been deployed. Although conversion to TDM may be necessary at the end-office for those subscribers of TDM-based services, that fact alone does not mean that IP-transport cannot be utilized to reach the end-office prior to conversion and termination through the switch.

[7] Of course, ILECs and competitors could today negotiate interconnection for packet-based traffic without regulatory involvement. But the Act also ensures that the backstop of Section 251 and 252 would continue to protect against ILEC abuse of market power. This is consistent with the Commission's conclusions that ILECs retain market power in this area. *See* notes 11-13 *infra* and accompanying text. The ILECs do so notwithstanding technology changes in how traffic is transported.

[8] *See* NARUC Resolution Regarding the Interconnection of New Voice Telecommunication Services Networks, adopted by NARUC Board of Directors, July 23. 2008, and "NARUC Telecom Committee Adopts 'Interconnection Rights' Resolution," *Telecommunications Reports*, July 22, 2008.

[9] It is useful to note that this discussion does not address interconnection and nondiscrimination obligations (if any) that should apply to Internet traffic. The mere fact that NextGen facilities may *also* support Internet services, however, does not relieve such facilities

technology-neutral. For instance, Section 251(c)(2) specifically provides requesting carriers the right to interconnect with an ILEC's network at "any technically feasible point." Nothing in that statute limits its application to the network facilities of the ILECs as they stood in 1996. To the contrary, by allowing interconnection at "any technically feasible point," the Act contemplates that, as technology evolves, the scope of what is "feasible" also will evolve.[10]

Moreover, the Telecommunications Act imposes a duty on the part of both the ILEC and the requesting interconnecting carrier to exchange traffic for transport and termination on a reciprocal basis. *See* Section 251(b)(5). This provision is also technologically neutral, and therefore creates an obligation on the part of one carrier to accept and transmit the NextGen voice traffic of another on reasonable and reciprocal terms. There is nothing in the Telecommunications Act to suggest that any of its provisions disappear as new technologies replace the old.

The FCC has properly taken pains to preserve network interconnection obligations, even in situations where it otherwise has been willing to give ILECs regulatory relief. For example, the Commission recently granted certain ILECs forbearance from regulation of their packet-switched broadband services.[11] But at the same time, the FCC made clear that this relief did not in any way impact the ILECs' interconnection obligations under Section 251 and 252. As the Commission observed, interconnection obligations "foster the open and interconnected nature of our communications system, and thus promote competitive market conditions" in the public interest.[12] Similarly, the FCC stated in the *Omaha Forbearance Order* that eliminating

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from the interconnection and traffic exchange obligations relating to telecommunications traffic under the Telecom Act.

[10] Furthermore, the Telecommunications Act provides that ILECs must provide operators of NextGen networks the same quality of interconnection that they provide to themselves and their affiliates. *See* Section 251(c)(2)(C). This non-discrimination standard was adopted to ensure that as network technology advances and is implemented in the ILEC network, other network operators can implement such technology and interconnect their voice networks on an economically efficient basis, notwithstanding the market power otherwise held by the ILEC. Thus, as ILECs interconnect their own NextGen network facilities, they also have an obligation to interconnect with third party CLECs.

[11] *Memorandum Opinion and Order, Petition of AT&T for Forbearance Under47 U.S.C. § 160(c) from Title II and Computer Inquiry Rules with Respect to its Broadband Service*s, FCC 07-180, at para.12 (Oct. 12, 2007) ("*AT&T Forbearance Order*"); *Memorandum Opinion and Order, Petition of ACS of Anchorage, Inc. Pursuant to Section 10 of the Communications Act of 1934, as amended, for Forbearance from Certain Dominant Carrier Regulation of its Interstate Access Services and for Forbearance from Title II Regulation of its Broadband Services, in the Anchorage Alaska, Incumbent Local Exchange Carrier Study Area*, WC Docket No. 06-109, FCC 07-149, at para. 129 (rel. Aug. 20, 2007);

[12] *AT&T Forbearance Order*, supra, at para. 68.

interconnection-related obligations would give an ILEC "the ability to exercise market power over interconnection."[13]

Our request here does not go any farther than the FCC already has in terms of determining the boundary between information services (such as Internet services) and telecommunications services. The FCC has drawn a bright-line between the *carrier*-level functions of interconnection, transport and termination, and the regulatory classification of the *retail*-level services relying on such functions, concluding that the underlying right to interconnection remains whether or not the retail service is an information service.[14] Moreover, the Commission has also expressly found that the wholesale functions of interconnection, transport and termination are telecommunications services.[15] Thus, the FCC has resolved the regulatory classification of interconnection, transport and termination, by separating the question from the classification appropriate to the retail service and then concluding that these wholesale functions are telecommunications services under the Act.

In summary, the Commission should expressly acknowledge that the ubiquitous broadband networks that are the primary goal of the National Broadband Plan will be

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13 *Memorandum Opinion and Order, Petition of Qwest Corporation for Forbearance Pursuant to 47 U.S.C. § 160(c) in the Omaha Metropolitan Statistical Area*, WC Docket No. 04-223, 20 FCC Rcd 19415, para. 1 (2005), *aff'd Qwest Corp. v. FCC*, 482 F.3d 471 (D.C. Cir. 2007).

14 See *Memorandum Opinion and Order, Time Warner Cable Request for Declaratory Ruling that Competitive Local Exchange Carriers May Obtain Interconnection Under Section 251 of the Communications Act of 1934, as Amended, to Provide Wholesale Telecommunications Services to VoIP Providers*, 22 FCC Rcd 3513, DA 07-709 (March 1, 2007) ("*TWC Declaratory Ruling*") at ¶15 (emphasis added):

> The regulatory classification of the service provided to the ultimate end user has no bearing on the wholesale provider's rights as a telecommunications carrier to interconnect under section 251. As such, we clarify that the statutory classification of a third-party provider's VoIP service as an information service or a telecommunications service is irrelevant to the issue of whether a wholesale provider of telecommunications may seek interconnection under section 251(a) and (b). Thus, we need not, and do not, reach here the issues raised in the *IP-Enabled Services* docket, including the statutory classification of VoIP services.

15 See *TWC Declaratory Ruling* at ¶ 2 (emphasis added):

> TWC purchases wholesale telecommunications services from certain telecommunications carriers, including MCI WorldCom Network Services Inc. (MCI) and Sprint Communications Company, L.P. (Sprint), to connect TWC's VoIP service customers with the public switched telephone network (PSTN). MCI and Sprint provide transport for the origination and termination on the PSTN through their interconnection agreements with incumbent LECs. In addition, MCI and Sprint provide TWC with connectivity to the incumbent's E911 network and other necessary components as a wholesale service. (*Id*).

comprised of multi-service next generation facilities that will support both Internet services and telecommunications services. To the extent such facilities are used for the latter, these networks must comply with the interconnection and nondiscrimination obligations of the Telecommunications Act. In this way, NextGen facilities will efficiently become part of the nation's evolving PSTN, for the benefit of all Americans.

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COMPTEL

January 25, 2010

Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: In the Matter of a National Broadband Plan, GN Docket No. 09-51

Dear Ms. Dortch:

COMPTEL has consistently advised the Commission that a critical element of its National Broadband Plan must be the recognition that the interconnection and traffic exchange obligations of incumbent local exchange carriers (ILECs) under sections 251/252 continue to apply, even as these carriers transition from a TDM-based architecture to IP.[1] This view was reinforced by a number of filings in response to the Commission's Public Notice # 25,[2] each emphasizing that existing law already compels interconnection in IP-form and that such interconnection will accelerate the transition from a circuit-switched PSTN to IP-networks.[3]

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[1] *See e.g.*, September 22, 2009 Letter from COMPTEL, Cbeyond, *et al*. to Marlene H. Dortch, Federal Communications Commission filed in GN Docket No. 09-51.

[2] FCC Public Notice, "Comment Sought on Transition from Circuit-Switched Network to All-IP Network," NBP Public Notice # 25, GN Docket Nos. 09-47, 09-51, and 09-137, DA 09-2517 (rel. Dec. 1, 2009).

[3] *See* Cablevision Systems Corp. Comments – NBP Public Notice 25, filed December. 22, 2009 in GN Docket Nos. 09-47, 09-51, 09-137 ("Cablevision Comments") at 1: "A regulatory regime that facilitates direct IP handoff of voice traffic between carriers will speed the myriad benefits of IP networks – in efficiency and innovation – to service providers and customers." *See also* Comments of PAETEC Holding Corp. in Response to NBP Public Notice 25, GN Docket Nos. 09-47, 09-51, and 09-137, Dec. 22, 2009, at 2: "[W]ith respect to what PAETEC believes is the most critical issue that will facilitate the evolution of carrier networks to IP architecture - that of interconnection and exchange of traffic on an IP to IP basis – there is no need for an NOI. Instead, the most important Commission action would be a confirmation that the obligation and regulatory structure under the federal Communications Act ("Act") in Section 251/252 already applies to IP-based infrastructure."

The Commission should affirm that there are no technical barriers to traffic exchange in IP format.[4] In fact, carriers interconnect and exchange traffic in IP form today. For instance, Cablevision reports that "[v]oice providers like Cablevision are already exchanging voice traffic through bilateral IP interconnection arrangements."[5] Small incumbent LECs have established IP traffic exchange arrangements among themselves to reduce cost and gain efficiency. VisionNet is a joint-venture owned by nine small local telephone companies in Montana that rely on a jointly-owned managed IP network to exchange and terminate traffic.[6]

Dominant carriers also interconnect in IP-format for traffic categories and services where they lack market power. For example, AT&T will interconnect in IP-format for domestic and international long distance calling.[7] Obviously, the technology itself does not care about the geographic label (i.e., local or long distance) on a call – the same capabilities used by AT&T to interconnect for the termination of "long distance" calls could be used to terminate "local" calls as well.

Moreover, various providers offer IP-based interconnection and traffic exchange platforms to facilitate the exchange of IP voice traffic,[8] including Sprint[9] and Stealth Communications.[10] NeuStar offers a service specifically designed to manage IP-level interconnection functions (such as policy management and ENUM-based directory services).[11]

To be sure, the level of traffic being exchanged in IP form today is relatively small. The volume of traffic between *any* two networks is fundamentally determined by the community-of-interest of each network's subscribers. As such, the largest traffic exchange partner for any local

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4 Section 251(c)(2) provides requesting carriers the right to interconnect with an ILEC's network at "any technically feasible point."

5 Cablevision Comments at 6.

6 *See* Presentation of Anthony Marcello, MetaSwitch, to OPASTCO 2009 Technical and Marketing Symposium, at 5-6. http://www.opastco.org/doclibrary/1918/Marcello.pdf. *See also* http://www.vision.net/about.php

7 *See* AT&T Voice Over IP Connect Service (AVOICS) available from AT&T Wholesale (description attached).

8 Carriers sometimes refer to interconnection of IP networks for voice-traffic exchange as "voice peering," borrowing the term from the Internet. Use of the term "peering" in this context is misleading, however, because IP-based voice interconnection arrangements involve *managed* IP networks using technologies (for instance, MLPS) precisely to avoid the best-efforts structure of the Internet.

9 *See* http://sprint.com/wholesale/partner_interexchange_network.shtml

10 *See* http://www.thevpf.com/about

11 *See* http://www.neustar.biz/services/ip-exchange-services

competitor will be the incumbent serving the same or nearby markets because each is serving the same underlying community-of-interest.[12] The defining importance of the underlying community-of-interest means that the most significant potential for IP traffic exchange will not occur between non-dominant providers with relatively small inter-network volumes (even though such carriers share the same economic incentive for efficiency), but between entrants and incumbents (where the share-imbalance provides the incumbent market power). It is because of the concern that an incumbent would use its share-advantage and resulting market dominance to disadvantage rivals that the Communications Act imposes the all-important, technology neutral interconnection and traffic exchange obligations of sections 251 and 252.

Respectfully submitted,

/s/

Mary C. Albert

[12] This basic property – that is, that traffic-exchange volume is a function of community-of-interest – is also true for smaller incumbent local telephone companies adjacent to a metropolitan area served by a larger incumbent carrier, such that the smaller ILEC's customers create call volumes into the metropolitan area larger than the call volumes in the opposite direction. As such, the interconnection-related concerns of smaller ILECs are likely to be similar to those of competitive carriers seeking interconnection with large incumbents.

AT&T VoIP Services

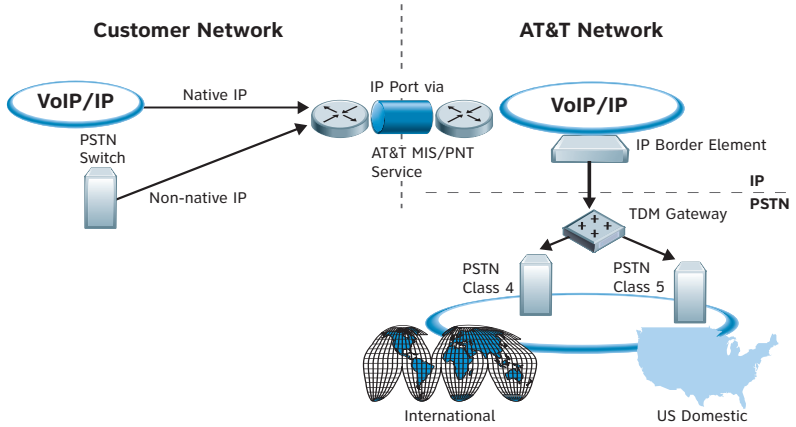
AT&T Voice Over IP Connect Service (AVOICS)

Your VoIP customers expect high quality voice services. With AT&T Voice Over IP Connect Service (AVOICS) you get unbranded and unbundled transport and termination of your domestic and international VoIP traffic with the reliability, security and performance you expect from AT&T. Give your VoIP service a competitive edge by also offering your end users access to unbranded Directory Assistance for the domestic U.S., Canada and Puerto Rico – a great value-added service available with AVOICS.

Your connection to AVOICS is via AT&T's Managed Internet Service (MIS)/Multiprotocol Label Switching – Private Network Transport (MPLS-PNT) service, which provides class-of-service voice quality, key security elements and advanced network reliability. Your service implementation is managed end-to-end by our highly experienced team of VoIP experts. Our multi-layer support structure is designed to provide you with industry-leading customer service every step of the way.

AVOICS accepts your U.S. originated domestic outbound (1+) calls and U.S. originated international outbound (011+) calls using Session Initiation Protocol (SIP) signaling. AVOICS also supports codecs G.711 and G.729 A/B. AVOICS provides long distance termination of "native" IP traffic, defined as traffic that originates as IP and is transported as IP from its point of origination to AT&T. AVOICS accepts U.S. originated domestic outbound (1+) calls and U.S. originated international outbound (011+) calls using Session Initiation Protocol (SIP) signaling. AVOICS also supports codecs G.711 and G.729 A/B. In addition, the AT&T network supports T.38 fax over IP.

AVOICS Connectivity



BENEFITS

- Expand your reach – AT&T's IP domain interoperates with the broader Public Switched Telephone Network (PSTN)
- Cost savings – Offer advanced voice services over your IP network
- Reliability – AT&T is one of the most dependable communication providers in the industry, offering 24/7 proactive network monitoring
- Security – AVOICS employs state-of-the-art security technologies and intrusion detection features

FEATURES

- Class-of-service voice quality
- Domestic and international terminations
- Supports SIP signaling
- Supports codecs G.711 and G.729 A/B
- AT&T network supports T.38 fax over IP
- Flexible options for receiving CDRs
- Proactive and reactive monitoring, 24/7
- Optional access to Directory Assistance

at&t

AVOICS also provides long distance termination of "non-native" IP traffic, defined as traffic that originates as TDM, undergoes a protocol conversion to IP in your network and is then transported as IP from your network to AT&T's.

AVOICS's rate structure is designed to help you better manage costs and accurately bill your end users. AVOICS service for domestic termination has an unbundled rate structure with separate rate elements for transport and terminating access. Connectivity facilities are billed under the applicable agreements for those facilities (e.g., MIS agreement). AVOICS service for international termination has a bundled rate structure for transport and termination and requires connectivity facilities in the same manner as for domestic termination.

On a daily basis, AT&T will collect, format, guide and rate minutes of use for your AVOICS service and create a file of Call Detail Records (CDRs). For your convenience, AT&T offers flexible options for receiving your CDRs, including an electronic interface.

AVOICS is monitored 24/7 by our highly experienced technical staff in AT&T's Global Customer Support Centers (GCSC).

The GCSC performs proactive and reactive monitoring to support problem determination, reporting and resolution. Our state-of-the-art network management systems are designed and maintained to keep your service running smoothly.

For more information contact your AT&T Representative or visit us at www.att.com/wholesale.

09/24/08 AB-1169-04

at&t
Your world. Delivered.

AT&T Discusses Its SIP Peering Architecture[1]

By Doug Mohney, Contributing Editor

AT&T (News - Alert) is gearing up a full-blown SIP transport architecture and plans to peer with **a select number of Tier 1 providers -- everyone else is going to have to purchase transport services.** Further, while not explicitly detailed or stated by AT&T, the company could already be running SIP peering traffic with one or more Tier 1 carriers on the Q-T.

For HD voice and UC video advocates, SIP peering at the Tier 1 carrier level is the primary key to make seamless calls/sessions between end-users regardless of what network they are on. Currently, there are many "islands" of HD voice and UC video calls at the enterprise and ITSP/hosted VoIP level, but few of them can talk to each other, much less to a large Tier 1 carrier.

AT&T's public discussion of SIP transport and SIP peering across its network and with other Tier 1 providers is a significant game changer, given AT&T's status and the number of end-points (i.e. devices and phone numbers) it has, over 90 million between wireline, broadband, and wireless phones in operation.

Details on the company's SIP plans came at the fifth annual IIT VoIP Conference and Expo recently in Chicago. AT&T's Senior VoIP Enterprise Architect/Manager Sumitra Sinha gave a remarkable and thorough presentation free of marketing hype, discussing in no-nonsense terms the company's strategy, business opportunities for SIP traffic, and the underlying architecture the company has setup to make everything run smoothly at a carrier class level.

AT&T will exchange SIP traffic at the access border controller layer (i.e. SBCs, more specifically Acme Packet (News - Alert) SBCs) via IP handoff at a few "strategic locations," directly peering with a select number of Tier 1 carriers. AT&T will also provide transit and direct termination through its network and support all roaming traffic to interwork with other wireless carriers. A PowerPoint slide listed connection points in Los Angeles, New York, Philadelphia and Atlanta.

While a number of VoIP purists have been railing against phone numbers, AT&T is onboard with ENUM in a big way, first using its own internal database for lookup, then accessing the CC1 ENUM Telcordia (News - Alert) database for lookups; CC1 holds/will hold more than 500 million phone numbers in North America, including AT&T and Verizon's, for IP-based interconnect rather than dropping into the PSTN.

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[1] http://sip-trunking.tmcnet.com/topics/enterprise-voip/articles/109840-att-discusses-its-sip-peering-architecture.htm (dated Oct. 19, 2010)

Unlike IP peering, AT&T doesn't believe that SIP peering will be settlement-free. Instead, there will be a number of business models (i.e. rates) with SLAs included in service. Traditional IP peering has been done on a "best effort" basis, but moving up the network stack means that MPLS and QoS come into play to provide the necessary speed for supporting real-time communications (i.e. voice and video).

One use of SIP transport that AT&T is strongly discouraging: Wholesale dumping of vanilla VoIP calls onto AT&T's PSTN network. Sinha said that carriers that tried to dump SIP traffic onto AT&T's TDM network for simplified transit purposes would find their calls rejected. Carriers who wanted such services are encouraged to negotiate with AT&T to use the company's SIP trunks for ingress and egress.

Transcoding for various flavors of codecs will be supported in the architecture, including AMR and AMR-WB, the favorites of the GSM cellular industry. AT&T Wireless currently support AMR, so it's not a big stretch to see AMR-WB to show up in the U.S. in a year or two.

The benefits of SIP transport AT&T expects to see is better voice quality at lower costs. It is a migration the company would like to see happen sooner, rather than later, given the costs of supporting both IP and PSTN/TDM infrastructure.

Last month, both Cincinnati Bell (News - Alert) and Metaswitch said "major carriers" were in discussions as to the ways SIP transport could be used for making money and delivering enhanced services such as video and HD voice. And I've been lead to believe at least one or two Tier 1 carriers could already be plugged into AT&T's SIP transport architecture for initial testing of traffic exchange.