Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

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
	)	
Universal Service Reform -- Mobility Fund	)	WT Docket No. 10-208

COMMENTS OF VERIZON

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INTRODUCTION

The Commission has undertaken important, fundamental reform and modernization of the intercarrier compensation system, including reductions in terminating access charges. Now, the Commission should take additional steps to complete the job and achieve fully its goal of "an incentive-based, market-driven approach that can reduce arbitrage" and "enable carriers to invest modern, IP networks."[2] Specifically, the Commission should transition originating switched access rates down using a framework similar to that now in place for terminating rates. With respect to the *USF-ICC Transformation Order*'s transition, the Commission should recognize

[1] The Verizon companies participating in this filing are the regulated, wholly owned subsidiaries of Verizon Communications Inc., and Verizon Wireless ("Verizon").

[2] *Connect America Fund, et al*., Report and Order and Further Notice of Proposed Rulemaking, WC Docket Nos. 10-90 *et al*., FCC 11-161, ¶ 9 (Nov. 18, 2011) ("*USF-ICC Transformation Order*").

that while a bill-and-keep system can work when traffic flows are relatively balanced, it can create significant distortions where there are imbalances. Finally, the Commission should not impede the ongoing market-based transition to IP networks by imposing new regulatory requirements for IP voice interconnection.

The Commission correctly took an incremental approach to intercarrier compensation reform and rate reductions in the *USF-ICC Transformation Order*. Given the pervasive arbitrage during the last several years and the widely divergent terminating rates that characterized the system, it was appropriate to start the transition to a more rational regime with terminating rates. But the *USF-ICC Transformation Order* only answers half the question. The Commission is correct that remaining intercarrier compensation rate elements must also be harmonized, and it now should move forward to address the other half of the question: originating access. And as it did with respect to terminating rates, it should focus in particular on areas that present significant arbitrage issues, such as toll free 8YY traffic, which is more like terminating access traffic than originating.

The new intercarrier compensation framework calls for intercarrier compensation rates, eventually, to transition to zero. That scenario can be an efficient regime when carriers are sending each other a relatively equal amount of traffic. But the default rate of zero can create distortions and arbitrage opportunities if the traffic exchanged between two carriers instead is out of balance. As the Commission plans the eventual transition to bill-and-keep, it should carefully consider how to prevent that abuse. Otherwise, new arbitrage schemes may emerge, creating new distortions when the Commission eliminated old ones.

As these rates transition, the network evolution and transition of voice traffic away from the circuit-switched Public Switched Telephone Network (PSTN) towards IP based networks is

already underway, and it promises innovative services and new benefits for consumers. The Commission should encourage and facilitate that transition by eliminating legacy regulations that would otherwise impede it. Providers should be free to design interconnection consistent with the new technology. They should not be required to overlay the legacy network and regulatory architecture on new IP networks. As Voice over Internet Protocol (VoIP) grows more popular, existing business incentives to interconnect will only grow stronger, and negotiated commercial agreements will ensure that IP interconnection for voice continues to develop efficiently.

The Commission has already determined that all carriers must accept VoIP traffic. Long distance and wireless traffic is already being exchanged in IP, and negotiations are underway towards direct exchange of additional traffic. New regulations – even ones that may at first seem innocuous – by contrast would disrupt the transition and harm consumers.

The Internet's tremendously successful experience demonstrates that negotiated commercial agreements are the most effective way to ensure efficient interconnection arrangements and efficient network deployment. The Internet developed through purely voluntary commercially negotiated agreements that interconnect a series of individual networks owned and operated by many different entities.

By contrast, government-imposed rules regarding IP interconnection would lead to economic and technological inefficiencies. New government regulations would be less likely to fully take advantage of advanced technologies and network configurations, inadvertently resulting in more costly interconnections that impose unnecessary costs on consumers. Importantly, any decision to regulate IP interconnections for voice would send exactly the wrong signals to the International Telecommunication Union just as many countries are attempting to impose international regulation that could be devastating to the Internet.

Regulatory history amply demonstrates that, especially in industries marked by rapid technological change, rules based on static assumptions about technology and markets quickly become obsolete—and worse, can lead to unintended negative consequences, including stifling investment and innovation. Policymakers "are often wrong both in their predictions of how the market will develop and in their judgments of what regulatory measures will best promote consumer welfare."[3] Guessing wrong about the "right" IP interconnection requirements at this early stage in the industry's transition to IP could profoundly retard the industry's future development and slow the speed at which consumers receive the next-generation technologies' benefits.

I. THE COMMISSION SHOULD TRANSITION DOWN ORIGINATING ACCESS RATES.

There is no reason for the Commission to stop intercarrier compensation reform at the terminating side of rates. Originating access charges remain too high in many cases and should be reduced just as the Commission required for terminating access.[4] And like switched access terminating rates, originating access rates vary to an illogical extreme for performing the same function. For VoIP-PSTN traffic, the Commission has already established that originating access charges are to follow the same transition as terminating charges, and as a result they are subject to the transitional rates for VoIP-PSTN traffic that took effect on January 1.[5] The Commission should take the next step and adopt a framework for reducing originating access generally as well.

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[3] Jonathan E. Neuchterlein & Philip J. Weiser, Digital Crossroads: American Telecommunications Policy in the Internet Age (2005), at 428.

[4] *See USF-ICC Transformation Order*, ¶¶ 1297-1304.

[5] *See id*. ¶ 961; *see also id*. n.1976, ¶ 940, ¶ 944, & Appendix A, ¶ 31 (proposed revisions to 47 C.F.R. § 51.913).

The Commission has acknowledged that, although a "permanent regime for section 251(b)(5) traffic" cannot govern origination charges, the Commission can address such charges as part of its transition regime.[6] The Commission should — at a minimum — set a schedule for transitioning down originating access rates.

As a first step, the Commission should act immediately to reduce originating access charges on toll-free, 8YY-dialed traffic. While consumers are able to choose all-distance services from the same provider for most originating calls, the same is not true of toll-free traffic, where the carrier that serves the toll-free customer pays originating access charges to the carrier that delivers the traffic to it. The sensible place to start to implement originating access reform is with this 8YY traffic, which is more similar to terminating access than originating access charges on 1+ dialed traffic.

It is also necessary to start phasing out originating access charges quickly to cut off new arbitrage schemes that are proliferating with toll-free traffic. Verizon is already seeing inflated invoices for 8YY database dip charges, involving similar scenarios to terminating access charge traffic pumping. Several CLECs, for example, have engaged in an autodialer scheme that not only costs carriers and their customers, but also results in harassing hang-up calls at all hours to the carriers' 8YY customers. The 8YY callers use autodialer machines that sequentially dial 8YY numbers, even though section 227(b) of the Communications Act explicitly prohibits using an automatic dialing system to place calls to a service for which the called party is charged for the call.[7] The callers make no attempt to speak with the call recipient; the calls are either hang-up

[6] *Id.* ¶ 961 n.1976.

[7] *See* 47 U.S.C. § 227(b).

calls lasting only a few seconds or are fax machine calls. The CLECs generate revenue from the 8YY database dip charges, which they charge to the carriers.

Other arbitrage opportunities are also on the rise. These schemes harm consumers by diverting resources away from broadband deployment and other laudable public policy objectives. In the long run, the arbitrage can only be purged by eliminating the economic incentives through a single, low default intercarrier compensation rate, which includes origination functions and also encompasses other rate elements, like transport, signaling, and other fixed and transaction-based charges.[8] But the first step the Commission should take with respect to originating access charges is to reduce immediately the rates associated with 8YY calls, including the dip charges.

Related to any continuing intercarrier compensation rates in the new regime, the Commission also asks about how to address physical interconnection points, so-called network edge issues, and potential state regulatory roles in a bill-and-keep system.[9] These are important issues, but they are not yet ripe for further Commission action. The bill-and-keep regime will not be fully implemented for several years, and both the industry and federal and state regulators are only now working through the first steps to operationalize rate reductions. As a dry run, there likely will be much to learn from the early transition to bill-and-keep with CMRS-originated, LEC-terminated intraMTA traffic.[10] In the *USF-ICC Transformation Order*, the Commission correctly took these intraMTA wireless traffic issues head-on and settled the ballooning problems that were a result of a historical lack of clarity regarding the proper rate for this traffic.

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[8] *See USF-ICC Transformation Order* ¶¶ 1306, 1311, 1314.

[9] *See id*. ¶¶ 1316, 1320.

[10] *See id*. ¶ 978.

At the same time, the new intraMTA structure will provide insight into how a bill-and-keep system may function successfully.

Likewise, for years there was no Commission guidance regarding the proper rate for CLEC-terminated, intraMTA wireless traffic, and the many resulting problems – including endless, resource-draining litigation, state regulatory proceedings, and new arbitrage schemes – teach an important lesson. Whatever role state regulators will have in the new regime with respect to physical interconnection and network edge matters, the Commission must issue specific, clear guidance that is consistent with a national intercarrier compensation structure. The Commission must also be clear that states are not free to deviate from this structure. Any other approach has the potential to unravel all of the benefits of a rational, comprehensive federal regime.

II. THE TRANSITION TO BILL AND KEEP SHOULD INCLUDE MEASURES TO PROTECT AGAINST GAMING.

The Commission adopted in the *USF-ICC Transformation Order* "a uniform bill-and-keep framework as the ultimate end state for all telecommunications traffic exchanged with a LEC," finding that bill-and-keep would "driv[e] greater efficiency in the operation of telecommunications networks."[11] In some cases, bill-and-keep can be economically efficient, but where traffic flows are not balanced, there is a potential for significant distortions, which would undermine the Commission's comprehensive intercarrier compensation reform efforts.

A regime that requires networks to exchange traffic on a bill-and-keep basis without regard to whether they provide each other with an equivalent value exchange—and, therefore, to let one network pay nothing for any additional benefits it receives—could, under some circumstances, lead to economically inefficient behavior. In the intercarrier compensation

[11] *USF-ICC Transformation Order* ¶ 34; *id*. ¶ 741.

context, a bill-and-keep regime that does not ensure that traffic is generally balanced would give some networks the right to insist on a free ride on other networks. In the analogous Internet space today, settlement-free traffic exchange agreements are found in a commercial setting only when both networks perceive that they receive a sufficiently equivalent exchange of value. Bill-and-keep arrangements can be economically rational under certain circumstances – including in some negotiated interconnection arrangements for the exchange of Internet traffic.

Providers generally consider many factors as they decide whether to enter into a settlement-free or paid arrangement with another provider's network, but one of the principal factors that has long been central to that determination is the relative traffic flow between their respective networks.[12] All else being equal, networks generally enter into settlement-free arrangements for Internet traffic only where the traffic flows between the networks are roughly in balance. Where the traffic ratios are significantly asymmetrical, it is common for one provider to pay for the exchange of traffic, either through paid peering or transit, or some other exchange of value.

There is good reason for this, and these arrangements have been crucial to the Internet's development and continuing expansion. By ensuring that providers are compensated in some form for their greater relative costs when they receive disproportionately larger traffic volumes, these arrangements create a disincentive for parties to profit by dumping their traffic onto someone else's network to avoid the bulk of the costs associated with carrying that traffic, rather than investing to expand the reach and capacity of their own networks. Similarly, if receiving networks were not compensated in some form to carry disproportionately larger volumes of traffic for others, it could undermine continued investment by those networks to enhance their

[12] *See, e.g.,* Faratin, Clark, et al, "The Growing Complexity of Internet Interconnection," 72 Communications & Strategies 51, 56 (2008).

capacity to handle the growing traffic volumes that would result. The result would be less overall investment and lower quality service as networks became more congested and capacity expansion failed to keep pace with demand.

Likewise with intercarrier compensation, without protections that ensure that traffic is not significantly out of balance in order for it to be subject to bill-and-keep, some carriers will figure out how to abuse the system in creative ways. The Commission therefore should carefully consider how to prevent arbitrage schemes or other inefficient practices in any bill-and-keep arrangement, such as where some carriers dump potentially large traffic volumes onto other carriers' networks without a corresponding flow of traffic in the other direction—a result that would cause the receiving carriers to incur material costs simply from the large volume of one-way traffic. The traffic on the receiving party's network could also cause congestion and negatively impact the quality of the services that the terminating carrier provides to its customers. History and economics teach that any regulatory regime that places unbalanced regulatory burdens on different parties can create significant economic distortions and incentives to engage in arbitrage. Because a bill-and-keep system will make it free for other carriers to use networks, without adequate protections, there would be no incentives for other carriers to manage traffic flows efficiently. Accordingly, the Commission should consider carefully how to prevent inefficient practices in any bill-and-keep regime it ultimately implements.

III. VOLUNTARY COMMERCIAL AGREEMENTS WILL ENSURE EFFICIENT IP INTERCONNECTION FOR VOICE.

A. Broadband and the Internet are revolutionizing the way we communicate.

The technology that drives the Internet, and the network facilities that route and carry IP traffic, are not add-ons to the legacy circuit-switched PSTN. They are wholly new networks and wholly new technologies. With the increased demand for broadband and the wealth of services it

supports, IP-based networks are displacing the PSTN. As the Commission has correctly observed, "[t]he transition away from the PSTN is already occurring, and is likely to accelerate."[13] Consistent with the Commission's desire to promote the many consumer benefits resulting from the "transition to IP networks" and "innovation in the broadband ecosystem," [14] the Commission should encourage and facilitate the transition by eliminating legacy regulations that would otherwise impede it.

Without the regulatory constraints that incumbent LECs faced, the cable companies have been able to invest as new entrants in new broadband networks. No longer are an incumbent's facilities the only vehicle for communications to travel the last mile to the customer. And no longer does one technology or platform dominate over another. Neither the business model nor the technologies underlying the Communications Act of 1934 and the Telecommunications Act of 1996 exist as they did when those laws and the resulting regulations came into being. In this innovative new world of IP networks, there are no incumbents. Everyone is a new entrant, and it makes no sense to regulate these new networks and technologies based on a regulatory model that developed around a very different set of circumstances.

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[13] *FCC Workshops on the Telephone Network in Transition*, Public Notice, *26 FCC Rcd 16354*, at 1 (2011).

[14] *See, e.g., USF-ICC Transformation Order* ¶ 655; *Joint Statement on Broadband*, 25 FCC Rcd 3420, ¶ 3 (2010); *see also Amendment of Part 27 of the Commission's Rules to Govern the Operation of Wireless Communications Services in the 2.3 GHz Band*; *Establishment of Rules and Policies for the Digital Audio Radio Satellite Service in the 2310-2360 MHz Frequency Band*, Report and Order and Second Report and Order, 25 FCC Rcd 11710, ¶ 196, n.483 (2010) (adopting enhanced build-out requirements for WCS licensees designed to spur investment that will "promote the rapid deployment of innovative broadband services to the public ..."); *Amendment of Parts 1, 21, 73, 74 and 101 of the Commission's Rules to Facilitate the Provision of Fixed and Mobile Broadband Access, Educational and Other Advanced Services in the 2150-2162 and 2500-2690 MHz Bands*, Fifth Memorandum Opinion and Order and Third Notice of Proposed Rulemaking, 24 FCC Rcd 12258, ¶ 26 (2009) (noting the Commission's desire to "promote the provision of innovative services, and promote rapid service to the public"); *see also* 47 U.S.C. § 157 ("It shall be the policy of the United States to encourage the provision of new technologies and services to the public").

The PSTN – including the underlying circuit-switched network architecture and the regulations that govern it – developed over decades, dating back to the early years of the last century. For most of those years, communications options were limited. If they weren't writing letters or telegrams, consumers communicated by talking on the telephone, and they got their telephone service from Ma Bell. Broadband, the Internet and the new communications vehicles they have enabled – including VoIP, Internet-based social media, video conferencing, texting, instant messaging, and email – were well off in the future.

In 2012, all this has changed. Telephony, or voice service, is fast becoming a commodity, an add-on to other broadband and entertainment services that competing providers offer over different platforms and technologies. "Local" and "long-distance" are anachronistic terms that have no bearing on VoIP providers' business models. The Internet hasn't yet brought us aerocars, but, much like the Jetsons, two people anywhere in the world can videoconference with one another over thin tablets affixed to their refrigerators or walls—all over the Internet, never using the PSTN. Consumers now have access to innovative communications services fueled by broadband that cable companies, wireless providers, VoIP providers, and other companies offer over different technologies and platforms. Broadband and the Internet are revolutionizing the way we communicate.

The Internet meets consumer demands efficiently, in part because it has developed without regulation. The commercial arrangements that underlie and self-regulate the Internet enable it to adapt quickly to market changes and innovations, and technology changes, to best fit consumer needs and evolving demands.

As the industry continues to evolve and transitions away from the circuit-switched PSTN to IP networks for voice, the regulatory path we choose will have enormous influence over new

network development, new services, and new possibilities for consumers. In the *USF-ICC Transformation Order*, the Commission took steps to replace the "outdated" universal service and intercarrier compensation systems in order to "address[] the communications infrastructure challenges of today and tomorrow."[15] In doing so, the Commission acknowledged that the legacy systems were "based on decades-old assumptions that fail to reflect today's networks, the evolving nature of communications services, or the current competitive landscape."[16] The regulations that govern the PSTN are, in many cases, just as outdated. To facilitate an efficient transition to IP networks for voice service, the Commission should eliminate inhibitive legacy regulations. Attempting to overlay the legacy network and regulatory architecture on new IP networks, and assuming a structure in which there are incumbent providers who have market power to wield, would be a profound mistake.

B. Companies today are connecting with one another and sending each other IP voice traffic over IP connections.

The transition to IP networks and IP interconnections for voice traffic is underway. Providers that use IP format to transport their own voice traffic have incentives to exchange that traffic with others in IP format. For many companies, the sensible place to start the transition is with interexchange traffic, and that traffic is being exchanged in IP format today. Likewise, any-distance wireless traffic in many instances is being transported and exchanged between carriers in IP format today. These exchanges frequently take advantage of services that providers offer that allow VoIP providers to connect with their networks in IP. In addition to Verizon, Level 3,[17]

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[15] *USF ICC Transformation Order* ¶ 1.

[16] *Id.* ¶ 6.

[17] http://www.level3.com/en/solutions/industry/wholesale/voice-service-providers/.

AT&T,[18] CenturyLink,[19] and XO[20] all offer services that provide an IP-based connection to a VoIP provider and route VoIP traffic to whatever destination it needs to reach.

Verizon, for example, offers its SIP Gateway Service, which allows VoIP providers to connect with Verizon in IP format and send Verizon all of their voice traffic over those IP connections. Many SIP Gateway customers send all their IP voice traffic to Verizon, but others send some to Verizon and some to the other providers that offer competing services. SIP Gateway, a standardized offering available throughout the country, offers VoIP providers complete access to all domestic end points.

In order to connect with Verizon and use its SIP Gateway Service, a VoIP provider would enter into a commercial contract with Verizon and configure its soft switch and routing equipment to send calls to IP addresses that Verizon provides. The VoIP provider would also deploy the hardware necessary to create an IPsec tunnel connection – essentially a virtual circuit that ensures call set-up information security and prevents spoofing and other network misuse – to Verizon's VoIP gateways. The VoIP provider can create the IPsec tunnel over Verizon's IP network or through a third party's network. The IPsec tunnel authenticates and encrypts the IP packets that carry the SIP signaling information, and it then encapsulates those packets into a new packet with a new IP header, so that the information can travel securely across the virtual tunnel from the VoIP provider to Verizon's SIP signaling elements. The media – in a VoIP call, the IP packets that carry the conversation – travel from the VoIP provider to Verizon's VoIP gateways via the Public Internet (either Verizon's IP service, or another IP provider) or via a Verizon-provided Internet Dedicated Access connection. If necessary, Verizon will convert the

[18] http://www.business.att.com/wholesale/Family/ip-solutions-wholesale/voip-wholesale/.

[19] http://www.centurylink.com/wholesale/national/ipvoice.html.

[20] http://www.xo.com/services/carrier/voip1/Pages/termination.aspx.

traffic from IP to Time Division Multiplexing (TDM) before handing it off to the terminating carrier. SIP Gateway has proven to be popular, handling well over one billion minutes of voice traffic per month.

As technologies evolve, so will companies' incentives to move to new interconnections and network configurations. As with any transition to new technologies and network architectures, this process naturally will be iterative. While companies logically started by exchanging interexchange traffic in IP format, as more and more customers switch to VoIP services, companies will have natural incentives to explore interconnecting in IP to exchange IP-originated traffic. Verizon currently has one agreement in place covering its FiOS Digital Voice VoIP traffic, and we are negotiating others. And as more and more services become IP, providers will naturally expand their IP interconnections for voice efficiently, through negotiated agreements by which two willing parties find a match and work out the technical details. And choosing the proper path for that expansion is essential.

C. Efficient IP interconnection should be based on the IP network's infrastructure.

Verizon and other providers are pursuing efficient IP interconnection arrangements and IP-based networks on their own, without a regulatory requirement, because IP interconnection for voice services offers efficiencies that result from the vast differences between the legacy circuit-switched TDM network architecture and an IP-based network architecture. To maximize those efficiencies, IP voice interconnection efforts should focus on maximizing the efficiencies of IP technology.

In a circuit-switched communication, in order to deliver a call to its destination, a provider has to ensure a single, dedicated physical circuit that covers the entire distance from the calling party to the called party, for the call's duration. To enable that connection, a provider

must either build or lease TDM transmission facilities and deploy a network of switching equipment devoted to call processing. Often, one provider passes traffic to another to create or extend the required dedicated pathway.

By sharp contrast, VoIP is an IP-based voice application that relies on the same packet switching technology that other IP applications use to transmit data. Packet-switched communications rely on connectionless routing, in which providers divide calls into digital packets that they often disperse among multiple circuits that travel different paths to their destination. IP networks transmit those packets along with other packets carrying other information.

In an IP network, there is no need for a dedicated physical connection to carry a call all the way to the terminating party, and the switches that separate calls into local, tandem, and interexchange segments can be eliminated. And in an IP network, there can be far fewer network interconnection points. Two VoIP providers could directly interconnect in IP, or they could interconnect through intermediaries. The concept of a local exchange carrier selling wholesale interconnection services within local exchange areas does not fit at all with the IP interconnection model.

For example, one efficient IP interconnection architecture model for voice would involve a VoIP provider configuring its network and routing its traffic on its own private IP backbone to an IP hub at a mutually agreed upon telecommunications collocation center known as a carrier hotel. A physical interconnection with another VoIP provider's network would take place here. Verizon has IP hubs in major carrier hotels throughout the United States, and most VoIP providers can easily access those hubs. The two interconnecting VoIP providers would look at where there are efficiencies and commonalities and work together to determine which IP hubs

best suit both providers' needs. The two VoIP providers could satisfy all their voice interconnection needs at just a few IP hubs, where they would physically interconnect, although their respective gateways and border control equipment could be located at each carrier's network operations sites. The gateways and border control equipment could in turn be connected to the IP hubs through various means, including an efficient Virtual Private Network over the Public Internet, or via dedicated facilities. The Virtual Private Network would ensure call security, including the call identification information, signaling information, and call content. The traffic would emerge at an edge router that would route the traffic to a VoIP gateway designated by the terminating VoIP provider, and that VoIP provider would have to build into its backbone the necessary intelligence to determine how to get the call from that point to its VoIP customers.

This would effectively eliminate the many ports and intermediate switching steps between the two end points, because they are no longer necessary. The call would go from its origination point, through one VoIP provider's private IP backbone, through the cloud on a Virtual Private Network, to the other VoIP provider's private IP backbone, to its end point. The router network takes the call through the IP cloud and delivers it where it needs to go.

An interconnection model like this could have the potential to yield material consumer benefits by using and leveraging IP technologies that would allow providers to provide more efficient and effective communications. There are other models, too, that could support IP interconnection for voice. For example, providers could use dedicated transmission facilities or Public Ethernet services instead of Virtual Private Networks to connect to the network interconnection points at the carrier hotel. But although there is not yet a uniform interconnection method across the industry, an efficient IP interconnection model for voice will build off of the

capabilities of IP architecture, enabling new and innovative products and services. And because the VoIP network elements that comprise an IP network are more efficient, take up much less physical space, and require much less energy, they leave a much smaller carbon footprint.

D. The current interconnection options for VoIP have allowed VoIP to flourish.

The current system of exchanging VoIP-PSTN traffic, under which the VoIP provider performs the conversion, remains the most efficient interconnection method for that traffic. The gateways that perform the protocol conversions are already in place, and because the VoIP provider, not the local exchange carrier (or other provider with whom it may request interconnection) knows the traffic volumes it expects to generate, the VoIP provider knows if and when it will need additional conversion capacity. With that knowledge, the VoIP provider can size and build out gateways as needed. And if the VoIP provider does not want to perform the conversion, there are many third parties in the market who will accept the traffic in IP format and convert it to TDM on the VoIP provider's behalf. By contrast, a direct IP interconnection would not eliminate the need for a conversion to TDM, and it would be no more efficient. Rather, it would only shift the conversion costs and responsibility from one party to another party.

The current interconnection options for VoIP-PSTN traffic have not hindered the growth in VoIP in the least. To the contrary, among the many different competitive communications choices consumers currently can choose, VoIP is quickly becoming very popular. While almost one-third of American telephone households have cut the cord and have only a wireless phone,[21]

[21] Blumberg & Luke, *Wireless Substitution: Early Release Estimates From the National Health Interview Survey, January to June 2011*, Center for Disease Control National Center for Health Statistics, http://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless201112.pdf (Dec. 2011). The Commission routinely relies upon the CDC's studies of wireless substitution in its market analysis. *See, e.g., USF-ICC Transformation Order* ¶ 164 (citing a 2010 CDC study).

even looking just at wireline services, the Commission's own data show vibrant competition. In December 2010, there were 117 million traditional switched access lines in service and 32 million interconnected VoIP subscriptions nationwide.[22] Interconnected VoIP subscriptions continued to increase at a consistent annual rate, by 22 percent during 2010 (from 26 million to 32 million subscriptions).[23] And traditional retail switched access lines continued their rapid decline, decreasing by another eight percent, from 127 million lines to 117 million lines (this follows a ten percent decline the previous year, similar to prior years).[24] In December 2010 nearly one-third of wireline residential connections were interconnected VoIP subscriptions (28.2 percent were non-ILEC interconnected VoIP subscriptions, and 2.9 percent were ILEC interconnected VoIP subscriptions).[25] And consumers have even more voice service options from over-the-top VoIP providers like Vonage (which has 2.4 million subscribers)[26], Internet video and other calling services, and satellite voice service providers.

All of which is to say, VoIP is flourishing. And it is flourishing under current interconnection rules, without any regulatory mandate to transition to IP-enabled services or to interconnect in IP format. Under the Commission's decisions, there is no question that carriers

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[22] *See Local Telephone Competition: Status as of December 31, 2010*, Industry Analysis and Technology Division, Wireline Competition Bureau, http://fjallfoss.fcc.gov/edocs_public/attachmatch/DOC-310264A1.pdf, at 1-4 (FCC Oct. 7, 2011).

[23] *Id*. at 2.

[24] *Id*.

[25] *Id*. at 4.

[26] *See* Vonage, About Us, http://www.vonage.com/corporate/index.php?lid=footer_about&refer_id=WEBAU0706010001W1 (last visited February 20, 2012).

must accept IP-originated traffic through existing interconnection arrangements.[27] The conversion that has to occur between a VoIP network and a TDM network has not hampered competition or VoIP's development at all.

E. Commercial agreements will lead to efficient IP interconnection for voice.

Verizon projects that Verizon IP-originated voice traffic will increase five-fold by 2015. As the number of IP end points grows, the efficiencies that IP interconnection presents will lead providers to negotiate and enter into commercial agreements. VoIP's growth will naturally facilitate the industry-wide network restructuring that is already occurring.

Relying upon commercially negotiated voluntary agreements for IP interconnection has an important and famous precedent. The Internet, itself, is a series of individual networks owned and operated by many different entities that entered into purely voluntary interconnection agreements over time, without a regulatory mandate.[28] Those agreements may contain different terms, depending on the various networks' needs, but each assumes a perceived equitable value exchange between the interconnecting parties. For example, if each network receives equal value from the mere fact of interconnection, the parties may agree to exchange traffic on a settlement-free basis to avoid the hassles and burdens that billing each other for roughly even traffic flows would create. By contrast, if one network receives greater value from interconnection, then that network will compensate the other network.

These negotiated, commercial agreements have been tremendously successful, and they have fueled the rapid growth in the Internet's capacity. They have created a flexible framework

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[27] *See 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*, Memorandum Opinion and Order, 22 FCC Rcd 3513 (2007).

[28] *See* Comments of Verizon, *Developing a Unified Intercarrier Compensation Regime*, CC Docket No. 01-92, at Exhibit A, Declaration of Lyman Chapin ¶¶ 5-8 (May 23, 2005).

for networks to evolve in order to address new demands quickly. For example, providers' agreements have evolved to facilitate new arrangements, like content delivery networks, to meet the growing demand for video traffic. The flexibility inherent in these commercial agreements permits parties to handle issues as they arise, and the Internet works well as a result.

While some networks interconnect directly, others interconnect via transit arrangements through third parties. But whether two networks are directly or indirectly interconnected, the Internet is always fully interconnected. Because of the wide availability of connection points and the Internet's architecture, there is little possibility that a network would be disconnected from the Internet, even if it were unable to reach agreement on interconnection terms with one or more networks. And when sometimes, particularly during market or technological shifts, there have been commercial disagreements, time and again the industry-wide incentive for networks to be interconnected efficiently has led to eventual commercial resolutions.

The negotiated commercial agreements that underpin the Internet resulted from networks' strong incentives to interconnect efficiently. If allowed to develop through similar, industry-led commercial arrangements, IP interconnection for voice traffic will develop in economically efficient ways that provide opportunities for new applications and services that cannot run over existing narrowband connections. And the Internet experience demonstrates that negotiated agreements are the most effective way to ensure efficient interconnection arrangements and efficient network development.

By contrast, economic literature is replete with findings that inappropriate regulation can substantially reduce consumer welfare by harming innovation and delaying the expansion of output. For example, one study concluded that delays in the introduction of voice messaging services because of line-of-business restrictions and delays in introducing cellular telephone

service each imposed multi-billion dollar losses in consumer welfare.[29] Even what might seem to be an innocuous mandate, like a regulatory mandate to negotiate IP interconnection in good faith, could have unexpected, harmful results for consumers. In a commercial context, when a dispute arises, the parties have incentives to find a resolution, as has occurred time and again with the Internet. As discussed below, direct IP interconnection also requires complex negotiations to resolve new technical issues. With a regulatory mandate, however, instead of negotiating towards the most efficient solutions, parties may ask a regulator to prescribe interconnection terms. In addition to disrupting or distorting negotiations, that could delay the new IP services' benefits, and increase costs to consumers. Ultimately, if the burden of serving VoIP customers is new regulatory mandates, those requirements could reduce the incentive to invest in IP in the first place.

F. A regulatory mandate for IP voice interconnection would jeopardize Internet freedom by encouraging international efforts to regulate the Internet.

Neither standards-setting bodies nor governments have attempted to mandate prescriptive interconnection rules for the Internet. As the Telecommunication Standardization Sector of the International Telecommunication Union (ITU-T) recently observed, "international Internet connection is typically determined by negotiations between the concerned parties."[30] The ITU-T provided an overview of "possible approaches for measuring IP traffic flow between networks," and emphasized that the overview simply provided "general considerations … to be referred to in

[29] *See* Jerry Hausman, *Valuing the Effect of Regulation on New Services in Telecommunications*, *in* Brookings Papers on Economic Activity, Microeconomics (Martha V. Gottron & Anne Lesser, eds. 1997).

[30] ITU-T, Supplement to Recommendation ITU-T D. 50, "General Considerations for traffic measurement and options for International Internet Connectivity," http://www.itu.int/rec/T-REC-D.50-201104-I!Sup1, Article E 36603, at 1 (Geneva, Apr. 2011).

bilateral negotiations."[31] ITU-T noted that "[a]s technologies and networks evolve, new methods could be developed for measuring traffic flow."[32]

Nevertheless, many countries are actively advocating for international regulation of the Internet, and several countries among the ITU's 193 member states want to renegotiate the ITU treaty to expand the ITU's reach into regulating the Internet backbone and other matters related to the Internet.[33] As Commissioner McDowell remarked in the *Wall Street Journal* just this week, the treaty that the ITU adopted in 1988 "insulated the Internet from economic and technical regulation and quickly became the greatest deregulatory success story of all time…. [The Internet's] explosive growth is the direct result of governments generally keeping their hands off the Internet sphere."[34]

Commissioner McDowell's words echoed former Chairman Kennard's, who warned in 1999 against applying legacy regulations to the Internet and "pick[ing] up this whole morass of regulation and dump[ing] it wholesale" on broadband services.[35] And as Congress has made clear, "[t]he Internet and other interactive computer services have flourished, to the benefit of all Americans, with a minimum of government regulation, and, "It is the policy of the United States…to preserve the vibrant and competitive free market that presently exists for the Internet and other interactive computer services, unfettered by Federal or State regulation."[36] Departing

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[31] *Id*.

[32] *Id*.

[33] *See* Robert M. McDowell, "The U.N. Threat to Internet Freedom", Wall St. J. (Feb. 21, 2012).

[34] *Id*.

[35] Remarks of William E. Kennard, Chairman, "Consumer Choice Through Competition," National Association of Telecommunications Officers and Advisors 19th Annual Conference, at 7 (Atlanta, GA Sept. 17, 1999).

[36] 47 U.S.C. §§ 230(a)(4), (b)(2).

from that model and imposing a regulatory mandate on IP interconnection for voice would send precisely the wrong signals to the ITU and to those countries pushing to regulate the Internet.

G. Industry cooperation can resolve the complicated technical issues.

Bilateral IP interconnection for voice between two VoIP providers involves, at a minimum, a physical interconnection (the "physical layer," or Layer One in the Open Systems Interconnection model), an IP interface (the "network layer," or Layer Three), and call signaling and set up (the "session layer," or Layer Five). At all three layers, the interconnecting parties must negotiate specific technical considerations. Because there is not yet a mature feature set for IP-to-IP interconnection for voice traffic, in each of these areas, interconnecting providers must reach agreement on the technical issues. Industry, not the Commission, is in the best position to work through the complicated, detailed requirements.

At the Physical Layer (Layer One), the interconnecting parties must agree on where they interconnect their fiber, and at what capacity. Verizon envisions IP interconnections occurring at a few IP hubs per VoIP provider – far fewer than are required for TDM. The two interconnecting VoIP providers would negotiate the optimum number of IP hubs, which could be a half dozen or less, depending on their needs, and they would be able to choose IP interconnection points without reference to PSTN vestiges like LATAs or rate centers. The IP hubs can be anywhere. One or both parties could host the Network Level (Layer Three) interconnections, or it can occur at the IP hub. The parties could use existing connectivity, like Internet connectivity, to interconnect their VoIP networks through an IP Virtual Private Network, instead of establishing physical or network interconnections dedicated to VoIP. They could also use private network connectivity to interconnect their VoIP networks. Once the parties agree on physical locations, they then must negotiate the capacity at which they interconnect. Some providers may need only

1GB of capacity per interconnection. Others will need more, and for larger interconnections, a 10GB interconnection may be the right answer.

And at the Session Layer (Layer Five), the parties will negotiate certain call setup information. In the PSTN, the SS7 signaling system is well-established and is subject to industry standards. In IP routing, the analogous signaling system is SIP. But SIP is still a relatively new signaling method, and there are many variations on the ways in which network providers enable VoIP capabilities using SIP. As a result, the interconnecting parties must agree on how they will exchange calling party number, called party number, and other critical call setup information. Different networks might also use different codecs. Codecs – devices or software programs that encode or decode an audio signal to and from a digital data stream – are typically used in the VoIP world to encode analog speech to allow it to travel the IP network, and then to decode that speech and return it to analog on the call's other end. The interconnecting parties must agree about how they will code their traffic to enable voice communication between the two networks. In some cases, one network or the other must provide transcoding (conversion from one encoded format to another) in order to allow their respective subscribers to communicate. Providers must negotiate which will do this, in what cases, and how they will be compensated.

The industry will face these and other challenges as IP interconnection for voice expands and becomes more prevalent. None of these present insurmountable hurdles, but they present complicated technical and logistical issues. There is no reason not to follow the Internet model and rely on the market to lead and deal with this complex transition. The solutions that providers will reach through bilateral commercial negotiations and agreements will address the technical issues as part of the naturally occurring transition to IP interconnection that is already underway. The commercial agreements that should govern IP interconnection for voice will be far more

efficient than a top-down interconnection mandate would be to address the technical issues and also the many other details, including administrative and financial responsibility for the necessary facilities and arrangements.

H. The Communications Act does not require interconnection in any particular format.

The Commission has already held in multiple orders that all LECs, including rural LECs, have an obligation to accept IP-originated voice traffic, and, more generally, information services traffic.[37] This requirement is clear, and is not at issue in this proceeding. Rather, the issue here is whether the Communications Act requires LECs to accept that traffic in a particular format, namely IP format. It does not.

Even though "there historically have not been Commission rules governing IP interconnection,"[38] IP traffic exchanges nevertheless are occurring and expanding through commercial agreements without any regulatory mandate, just as has long been the case on the Internet. Unlike the circuit-switched PSTN, IP networks require providers to invest in and deploy next-generation broadband networks, where there is no legacy regulatory history. There are no incumbent IP network providers. All providers are new entrants, and all providers are equally well situated to invest in this new technology. As the Commission has explained with respect to

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[37] *See Petition of CRC Communications of Maine, Inc. and Time Warner Cable Inc. for Preemption Pursuant to Section 253 of the Communications Act, As Amended*, Declaratory Ruling, 26 FCC Rcd 8259, ¶ 11 (2011); *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*, Memorandum Opinion and Order, 22 FCC Rcd 3513, ¶ 8 (2007); *MTS and WATS Market Structure*, Memorandum Opinion and Order, 97 F.C.C.2d 682, ¶¶ 75-76; *Implementation of the Non-Accounting Safeguards of Sections 271 and 272 of the Communications Act of 1934, As Amended*, First Report and Order and Further Notice of Proposed Rulemaking, 11 FCC Rcd 21905, ¶ 251 n.625 (1996) (describing prior orders).

[38] *Connect America Fund et al.*, Notice of Proposed Rulemaking and Further Notice of Proposed Rulemaking, 26 FCC Rcd 4554, ¶ 679 (2011) ("*USF-ICC Transformation NPRM*").

advanced broadband network infrastructure, "entry barriers appear to be largely the same for both incumbent and competitive LECs," and incumbent LECs "do not appear to have a first-mover advantage."[39]

The Communications Act does not require interconnection in any particular format. And although some argue differently, none of the statutory provisions to which they point mandates or sanctions an obligation to interconnect and exchange traffic in a specific format. That is not to say that IP interconnection for voice will not happen. To the contrary, as explained above, IP interconnection for voice will continue to develop because VoIP providers have incentives to interconnect their networks efficiently. But the Commission should not — and cannot — require interconnection in IP format.

1. *Section 251(a)*

a. Section 251(a) imposes a *duty* on every telecommunications carrier: "to interconnect directly or indirectly with the facilities and equipment of other telecommunications carriers."[40] Section 251(a) does not, however, give any carrier a *right* to insist that another carrier interconnect in a particular way or at a particular location; so long as a carrier is interconnected in some way with other telecommunications carriers, it has met its duty under this section. Moreover, the Commission has held that the carrier providing interconnection is entitled to choose whether to satisfy its section 251(a) duty either through direct or indirect interconnection; that is, a carrier is "permitted" to satisfy its obligation "based upon [its] most efficient *technical*

[39] *Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers*; *Implementation of the Local Competition Provisions of the Telecommunications Act of 1996*; *Deployment of Wireline Services Offering Advanced Telecommunications Capability*, Report and Order and Order on Remand and Further Notice of Proposed Rulemaking, 18 FCC Rcd 16978, ¶ 275 (2003).

[40] 47 U.S.C. § 251(a).

and economic *choice[]*."[41] Section 251(a) is not a rights-granting provision entitling carriers to insist on a particular format for the exchange of traffic.

Accordingly, a carrier can "satisfy its obligation under section 251(a) by agreeing to interconnect directly or indirectly only in TDM."[42] The statute is indifferent about the interconnection format, so long as each carrier satisfies its own obligation to interconnect.[43] Section 251(a) "does not expressly specify how a particular pair of interconnecting carriers will decide whether to interconnect directly or indirectly."[44] The fact that the statute is technology neutral underscores that interconnection in TDM format satisfies this obligation. The Commission cannot constrain this statutory flexibility by mandating a particular interconnection format.

Moreover, section 251(a) by its express terms imposes duties only on telecommunications carriers. And, as explained below, VoIP providers are not telecommunications carriers.

b. Although the Commission has not yet ruled on VoIP's regulatory classification, the Act's text and Commission precedent make clear that VoIP is an information service, not a telecommunications service. Indeed, at least three federal district courts have found that VoIP services are information services.[45]

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[41] *Implementation of the Local Competition Provisions in the Telecommunications Act of 1996*, First Report and Order, 11 FCC Rcd 15499, ¶ 997 (1996) ("*Local Competition Order*") (emphases added).

[42] *USF-ICC Transformation Order* ¶ 1382.

[43] *See*, *e.g.*, Reply Comments of Verizon and Verizon Wireless, *Connect America Fund*, WC Docket No. 10-90, *et al*., at 37-39 (May 23, 2011).

[44] *USF-ICC Transformation Order* ¶ 1383.

[45] *See PAETEC Commc'ns Inc. v. CommPartners*, 2010 U.S. Dist. Lexis 51926, *2 (D.D.C. 2010); *Southwestern Bell Tel., L.P. v. Missouri Pub. Serv. Comm'n*, 461 F. Supp. 2d 1055, 1081-83 (E.D. Mo. 2006), *aff'd*, 530 F.3d 676 (8th Cir. 2008), *cert. denied*, 129 S.Ct. 971

VoIP is an information service because it meets the Communications Act's statutory definition:

> the offering of a capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information via telecommunications, and includes electronic publishing, but does not include any use of any such capability for the management, control, or operation of a telecommunications system or the management of a telecommunications service.[46]

The Commission has recognized that "an inherent feature[] of most, if not all, IP-based services" is that they "offer[] customers a suite of integrated capabilities and features that allow[] the user to manage personal communications dynamically."[47] VoIP is an information service because it offers consumers a suite of integrated capabilities and features that allow customers to "generate, acquire, store, transform, process, retrieve, utilize, or make available information via telecommunications."[48] VoIP providers offer these information-processing capabilities and features as part of a single, integrated service; there is no separate "telecommunications" offering to consumers within those VoIP services.

VoIP also offers the capability to perform a "net protocol conversion" from IP to TDM.[49] As the Commission has explained, a service that enables "an end-user to send information into a network in one protocol and have it exit the network in a different protocol clearly 'transforms'

(2009); *Vonage Holdings Corp. v. Minn. Pub. Utils. Comm'n*, 290 F. Supp. 2d 993, 999-1001 (D. Minn. 2003), *aff'd*, 394 F.3d 568 (8th Cir. 2004).

[46] 47 U.S.C. § 153(24).

[47] *Vonage Holdings Corp. Petition for Declaratory Ruling Concerning an Order of the Minnesota Public Utilities Commission*, Memorandum Opinion and Order, 19 FCC Rcd 22404, ¶¶ 7, 25 n.93 (2004) ("*Vonage Order*").

[48] 47 U.S.C. § 153(24).

[49] *See Southwestern Bell*, 461 F. Supp. 2d at 1082 (explaining that VoIP "involves a net protocol conversion from the digitized packets of the IP protocol to the TDM technology used on the PSTN" and, therefore, VoIP "is an information service").

user information" and therefore "constitutes [an] information services under the 1996 Act."[50] The Supreme Court has also recognized that a protocol conversion is the "ability to communicate between networks that employ different data transmission formats."[51] VoIP services "offer[] [the] capability" to perform that conversion, even if that capability is not used in every communication.[52]

For these reasons, VoIP providers are information service providers. As a result, they could not benefit directly from any decision interpreting section 251(a) — or, as explained below, section 251(c)(2) — to require IP interconnection, because those provisions all apply only to telecommunications carriers, or a subset of those carriers.

2. *Section 251(c)(2)*

For several reasons, section 251(c)(2) does not dictate the format in which ILECs must provide interconnection and, therefore, does not require that ILECs accept traffic in IP format. This is only logical because there are no incumbents when it comes to IP networks.

a. Section 251(c)(2) grants "requesting telecommunications carrier[s]" — a category the Commission has limited to CLECs and CMRS providers — the right to interconnect directly with an ILEC's network at "any technically feasible point within the [ILEC's] network," "for the transmission and routing of telephone exchange service and exchange access," and in a manner that is "at least equal in quality to that provided by the [ILEC] to itself . . . or any other party to which the [ILEC] provides interconnection."[53] But section 251(c)(2) does not allow requesting

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[50] *Implementation of the Non-Accounting Safeguards of Sections 271 and 272 of the Communications Act of 1934, as Amended*, First Report and Order and Further Notice of Proposed Rulemaking, 11 FCC Rcd 21905, ¶ 104 (1996).

[51] *Nat'l Cable & Telecomms. Ass'n v. Brand X Internet Servs.*, 545 U.S. 967, 977 (2005).

[52] 47 U.S.C. § 153(24).

[53] 47 U.S.C. § 251(c)(2)(A)-(C).

carriers to dictate the interconnection *format*. Instead, consistent with its statutory terms, the Commission has interpreted section 251(c)(2) to permit a CLEC or CMRS provider to select only a "point" or "technically feasible method" of interconnection. The Commission has recognized that these "point[s]" are simply the physical facilities at which interconnection occurs.[54] The only "technically feasible methods" are likewise physical facilities: collocation, meet-point interconnection arrangements, and existing entrance facilities.[55] Given the express language, the Commission correctly has never read this section to allow a CLEC or CMRS provider also to dictate the format in which traffic travels through its chosen interconnection point or over its chosen interconnection method. Indeed, the traffic's format is neither an interconnection point nor an interconnection method. For this reason alone, section 251(c)(2) cannot be read to grant CLECs or CMRS providers the right to insist that an ILEC accept traffic over an interconnection arrangement in its preferred format.

b. Even aside from that, a request to interconnect in IP format for exchanging VoIP traffic would not be a request for interconnection "for the transmission and routing of telephone exchange service and exchange access."[56] VoIP traffic is neither "telephone exchange access" nor "exchange access."

The Communications Act defines "telephone exchange service" to mean "service provided through a system of switches, transmission equipment, or other facilities (or combination thereof) by which a subscriber can originate and terminate a *telecommunications*

[54] *See* 47 C.F.R. § 51.305(a)(2) (listing points of interconnection).

[55] 47 C.F.R. § 51.321(a)-(b); *Talk America, Inc. v. Michigan Bell Tel. Co.*, 131 S. Ct. 2254, 2261, 2265 (2011) (deferring to the Commission's interpretation of § 51.321 to include the lease of "existing entrance facilities" as a required "method of obtaining interconnection").

[56] 47 U.S.C. § 251(c)(2); *see Local Competition Order* ¶ 1370.

service."[57] Because VoIP is an *information service*, it is not telephone exchange service, which is a service "by which a subscriber can originate and terminate a *telecommunications service*."[58] Moreover, the Commission has explained that Congress did not "intend[] to extend the telephone exchange definition to encompass carriers that historically have been excluded from common carrier regulation," like information service providers.[59]

The statute defines "exchange access" as "the offering of [1] access to telephone exchange services or [2] facilities for the purpose of the origination or termination of telephone toll services."[60] VoIP does not meet this definition because it does not offer "access to telephone exchange service" — again, because VoIP is an information service, not a telecommunications service. Nor does VoIP meet the definition's second aspect, because it does not offer "facilities for the purpose of . . . termination of telephone toll services." "Telephone toll service" is defined in the Act as "telephone service between stations in different exchange areas for which there is made a separate charge not included in contracts with subscribers for exchange service."[61] Telephone toll service therefore is a communication between two different purchasers of telephone exchange service, who have stations "in different *exchange* areas" and one of whom pays a charge not part of a contract "for *exchange* service."[62] Because VoIP providers do not provide telephone exchange service, their customers are not in an "exchange area," nor do they have contracts with VoIP providers for "exchange service."

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[57] 47 U.S.C. § 153(54) (emphasis added).

[58] *Id.* (emphasis added).

[59] *Deployment of Wireline Services Offering Advanced Telecommunications Capability*, Order on Remand, 15 FCC Rcd 385, ¶ 30 n.72 (1999).

[60] 47 U.S.C. § 153(20).

[61] *Id.* § 153(55).

[62] *Id.* (emphases added).

In the *USF-ICC Transformation Order*, the Commission suggests that VoIP need not be classified as a "telecommunications service" for the provider to be offering "telephone exchange service" or "exchange access," citing two prior orders.[63] But neither order supports that proposition. Instead, both cited orders discuss the Enhanced Service Provider exemption, through which the Commission permitted information service providers to purchase their access to local exchange networks on the PSTN through services offered in state tariffs. The fact that an information service provider can *purchase* telephone exchange service or telephone toll service, however, says nothing about whether the information service provider itself is offering telephone exchange service or telephone toll service. As explained above, it is not. Only telecommunications carriers can offer those services, because both are services that by definition involve telecommunications services. Therefore, a request for IP interconnection is not a request for interconnection for "the transmission and routing of telephone exchange service and exchange access," as the statute requires.[64]

c. That section 251(c)(2) does not entitle a CLEC to demand interconnection with a superior network, or require ILECs to create capabilities to interconnect in IP format that do not currently exist, is well settled. The Eighth Circuit made clear more than a decade ago that, "plainly, the Act does not require incumbent LECs to provide its competitors with superior quality interconnection."[65] Section 251(c)(2)'s "equal in quality" requirement requires access

[63] *USF-ICC Transformation Order* ¶ 1387 (citing *Amendments of Part 69 of the Commission's Rules Relating to Enhanced Service Providers*, Order, 3 FCC Rcd 2631, ¶ 2 & n.8 (1988) and *GTE Telephone Operating Cos., GTOC Tariff No. 1 GTOC Transmittal No. 1148*, 13 FCC Rcd 22466, ¶ 7 (1998)).

[64] *See* 47 U.S.C. § 251(c)(2)(A).

[65] *Iowa Utils. Bd. v. FCC*, 120 F.3d 753, 812 (8th Cir. 1997).

"only to an incumbent LEC's *existing* network — not a yet unbuilt superior one."[66] The "plain terms of the Act" therefore do "not require incumbent LECs to provide [their] competitors with superior quality interconnection" or to "cater to every desire of every requesting carrier."[67]

Even though some "IP-to-IP arrangements exist in the marketplace today," the mere fact that a facility is IP-enabled or capable of recognizing IP protocol traffic does not "demonstrate that IP-to-IP interconnection is technically feasible" at that facility.[68] Similarly, the fact that some ILECs, or affiliates of ILECs, are offering VoIP services to their customers today does not mean that the ILECs' networks are capable of providing interconnection in that format upon request. As explained above, the industry must cooperate and address technical considerations before expanded, widespread IP interconnection for voice becomes a reality.

d. Even aside from the statutory barriers to reading section 251(c)(2) to mandate interconnection in a particular format, any duty this section imposes falls on an even smaller subset of carriers than the section 251(a) duty. As noted above, the duty applies only to incumbent LECs, not to all telecommunications carriers. And the Commission has long held that only a subset of telecommunications carriers — CLECs and wireless carriers — may benefit from that duty.[69] VoIP providers may not benefit directly from any duty under section 251(c)(2) because they are not telecommunications carriers. And telecommunications carriers other than CLECs and CMRS providers would not benefit either. Moreover, any duty under section 251(c)(2) would be non-reciprocal: a CLEC could insist on delivering its traffic in IP format, but

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[66] *Iowa Utils. Bd.*, 120 F.3d at 813.

[67] *Id.* at 812-13.

[68] *USF-ICC Transformation Order* ¶ 1391.

[69] *See Local Competition Order* ¶¶ 191, 1024; *see also id.* ¶ 191 ("A telecommunications carrier seeking interconnection only for interexchange access is not within the scope of this statutory language.").

could refuse to accept traffic in IP format, if that better suits its own capability to deliver traffic to its customers, some of which may still be receiving TDM-based services.

e. Finally, any duties to interconnect in a particular format imposed through section 251(c)(2) would be implemented through the section 252 interconnection agreement process. As a result, disputes about IP interconnection arrangements' specific details would be resolved not by technical experts, but by more than fifty different state public utility commissions applying their own views of appropriate IP interconnection arrangements. Rather than arriving at industry-wide consensus, a Balkanized process like that would likely result in the "imposition of 50 or more additional sets of different . . . regulations" on VoIP service, which would "risk eliminating or hampering this innovative advanced service."[70] Indeed, applying fifty or more sets of statutes and regulations to VoIP providers and other IP-enabled service providers would harm consumers by "discourag[ing] the . . . building [of] next generation networks in the first place."[71]

3. *Section 201*

Section 201(a) says nothing about interconnection format, but instead grants the Commission the authority, "after opportunity for hearing" to require a "common carrier" to "establish physical connections with other carriers," if the Commission "finds such action necessary or desirable in the public interest."[72] The statute is neutral on the format of any traffic routed over those "physical connections." Section 201(b) likewise cannot serve as an independent basis for requiring interconnection in a particular format because that section only

[70] *Vonage Order*, ¶¶ 32, 37.

[71] *Petition for Forbearance of the Verizon Telephone Companies Pursuant to 47 U.S.C. § 160(c)*, Memorandum Opinion and Order, 19 FCC Rcd 21496, ¶ 27 (2004), *aff'd*, *EarthLink, Inc. v. FCC*, 462 F.3d 1 (D.C. Cir. 2006); *see also USF-ICC Transformation NPRM*, ¶ 502 (emphasizing that the current "patchwork of rates and regulations is inefficient, wasteful, and slowing the evolution to IP networks").

[72] 47 U.S.C. § 201(a).

provides the Commission with general rulemaking authority "to carry out the provisions of this chapter."[73] The Supreme Court has long since rejected the claim that a general rulemaking section can authorize an agency "to expand its jurisdiction beyond the boundaries" established by the substantive sections of the statute.[74]

Moreover, section 201(a) – no different from sections 251(a) and 251(c)(2) – applies only to telecommunications carriers.[75] Efficient IP interconnection arrangements will involve VoIP providers interconnecting with each other, or through IP-based middlemen, not through the legacy structure of the PSTN with its local exchanges, LATA boundaries, and other largely obsolete geographic distinctions. A requirement to interconnect in a particular format based on statutory provisions limited to telecommunications carriers – whether section 201(a), 251(a), or 251(c)(2) – would channel IP interconnection through the legacy structure by providing a regulatory advantage to those inefficient arrangements, thereby discouraging the more efficient arrangements that providers are developing through commercial negotiations.

4. *Section 706*

A right to interconnect in a particular format cannot be grounded in section 706. Subsection 706(a) provides that the Commission will offer incentives to promote "the deployment on a reasonable and timely basis of advanced telecommunications capability to all Americans."[76] Subsection 706(b) requires the Commission to "take immediate action to accelerate deployment of [advanced telecommunications] capability by removing barriers to

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[73] 47 U.S.C. § 201(b).

[74] *Board of Governors of Fed. Reserve Sys. v. Dimension Fin. Corp.*, 474 U.S. 361, 373 n.6 (1986).

[75] *See, e.g.*, *Virgin Islands Tel. Co. v. FCC*, 198 F.3d 921, 926-27 (D.C. Cir. 1999) (upholding the Commission's determination that telecommunications carrier and common carrier have the same meaning in the Act).

[76] 47 U.S.C. § 1302(a).

infrastructure investment and by promoting competition in the telecommunications market" if it has determined that such capabilities are not "being deployed to all Americans in a reasonable and timely fashion."[77]

Although the Commission recently has relied on section 706 as a basis for action,[78] in doing so it has stretched this section beyond its breaking point. Both the Commission and the D.C. Circuit have recognized that section 706 is not an open-ended grant of authority. And it does not authorize a mandate to interconnect in a particular format.

Section 706 is a deregulatory provision that generally speaks of "incentives" for developing advanced telecommunications service and removing regulatory roadblocks to greater deployment.[79] As for section 706(a), the Commission should not read a statutory provision authorizing "*incentives*" to permit a regulatory *mandate* to interconnect in a specific format, or to create a right in one type of carrier to demand interconnection in that format. The D.C. Circuit has made clear that "an incentive is not a mandate."[80] Such a mandate would extend section 706 well beyond the set of policies that it authorizes, vesting a right in the party requesting interconnection that is not required by the statute.

As the D.C. Circuit recognized in *Comcast*, section 706(a) does not constitute an independent grant of authority" to impose regulations on carriers.[81] Rather, subsection 706(a) is a

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[77] *Id.* § 1302(b).

[78] *See USF-ICC Transformation Order* ¶¶ 66-70; *see also Preserving the Open Internet*, Report and Order, 25 FCC Rcd 17905, ¶¶ 117-123 (2010).

[79] 47 U.S.C. § 1302 (emphasis added).

[80] *Maine Pub. Utils. Comm'n v. FERC*, 520 F.3d 464, 479 (D.C. Cir. 2008) (per curiam), *rev'd in part on other grounds, NRG Power Marketing, LLC v. Maine Pub. Utils. Comm'n*, 130 S. Ct. 693 (2010).

[81] *See Comcast v. FCC*, 600 F.3d 642, 658-59 (2010).

congressional expression of policy,[82] which is not an operative part of the statute. Policy statements alone "do[ ] not enlarge or confer powers on administrative agencies or officers."[83] Within this policy statement, subsection 706(a) calls for *forbearing* from regulating Internet services. It urges "regulatory forbearance" and "other regulating methods that remove barriers to infrastructure investment."[84] Imposing IP interconnection requirements on ILECs would undermine this policy, arming any party unsatisfied with its freely bargained commercial agreement's terms to tie up a carrier in costly litigation. The section 706(a) policy statement also must be read in conjunction with section 230's statement that it is the policy of the United States "to preserve the vibrant and competitive free market that presently exists for the Internet and other interactive computer services, *unfettered by Federal or State regulation.*"[85]

Section 706(b) also provides no authority to adopt a mandate to interconnect in a particular format. The Commission may only use section 706(b) as a basis for authority in line with the limitations in that provision. For example, when the Commission took action under section 706(b) in the context of the Universal Service Fund,[86] it did so in line with its finding that broadband is not "being deployed to all Americans in a reasonable and timely fashion," and targeted its actions at those areas.[87] Section 706(b) cannot serve as the foundation for a rule that would apply nationwide, or to any areas where broadband is already deployed. Nor is there a basis to conclude that such a rule would "accelerate deployment of [advanced telecommunications] capability" or would "remove barriers to infrastructure investment," as

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[82] *See National Cable & Telecomms. Ass'n v. Gulf Power Co.*, 534 U.S. 327, 339 (2002).

[83] *Association of Am. R.R.s v. Costle*, 562 F.2d 1310, 1316 (D.C. Cir. 1977).

[84] 47 U.S.C. § 1302(a).

[85] 47 U.S.C. § 230(b)(2) (emphasis added).

[86] *USF-ICC Transformation Order* ¶ 66.

[87] 47 U.S.C. § 1302(b).

section 706(b) requires. [88] As explained above, a mandate to interconnect in IP format would displace more efficient market mechanisms for developing IP infrastructure, undermining the goal of section 706.

5. *Section 256*

Section 256 provides no authority for adopting a requirement to interconnect in a particular format. The D.C. Circuit in *Comcast* rejected a similar assertion of regulatory authority under section 256, explaining that the statute is limited by its text, stating that "'[n]othing in this section shall be construed as expanding . . . any authority that the Commission' otherwise has under law."[89] The rest of section 256 merely sets forth statutory "purposes," which include "ensur[ing] the ability of users and information providers to seamlessly and transparently transmit and receive information between and across telecommunications networks."[90]

Moreover, sections 256(b)(1) and (b)(2) authorize only limited means for carrying out the section's purposes: namely, the Commission "shall establish procedures" for "oversight of coordinated network planning," and it "may participate . . . in the development by appropriate standard-setting organizations of public telecommunications interconnectivity standards that promote [certain] access."[91] These oversight and coordination duties do not extend to adopting specific interconnection rules that create enforceable rights for carriers seeking to dictate the interconnection format in addition to ILECs' existing statutory duties.

[88] *Id.*

[89] *Comcast*, 600 F.3d at 659 (quoting 47 U.S.C. § 256(c)).

[90] 47 U.S.C. § 256(a)(2).

[91] *Id.* § 256(b)(1)-(2).

The Commission therefore cannot rely on this section to adopt a regulatory requirement that it never previously has exercised, and which is not authorized under any other section of the Act.

6. *Ancillary Authority*

The Commission cannot rely on its ancillary authority to impose mandate to interconnect in a specific format. As the foregoing analysis demonstrates, Congress has not provided any statutory authorization for the Commission to adopt regulations that would mandate interconnection in a particular format. The Commission only may regulate an area under its ancillary authority if that regulation is necessary to accomplish its "statutorily mandated responsibilities."[92] But the D.C. Circuit in *Comcast* made clear that ancillary authority cannot be invoked where "express delegations of regulatory authority" are lacking.[93] That is the case here — the Commission cannot identify any statutory mandate to adopt the requirement to interconnect in a particular format beyond generalized assertions contained in a variety of statutory provisions.

[92] *Comcast*, 600 F.3d at 644 (quoting *American Library Ass'n v. FCC*, 406 F.3d 689, 692 (D.C. Cir. 2005)).

[93] *Id.* at 642.

IV. **CONCLUSION.**

For these reasons, the Commission should transition down originating access charges; should protect against distortions and arbitrage that result from bill-and-keep when the traffic exchanged between two carriers is out of balance; and should not create an IP interconnection regulatory requirement.

Respectfully submitted,

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February 24, 2012

Attachment A

Attachment A

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

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
Universal Service Reform -- Mobility Fund	)	WT Docket No. 10-208

DECLARATION OF IHAB S. TARAZI

Attachment A

DECLARATION OF IHAB S. TARAZI

1. My name is Ihab S. Tarazi. I am vice president of Verizon's Global IP and Transport Planning and Technology organization. In this role, I am responsible for planning and developing Verizon's interconnected Global IP network that spans more than 2,600 cities in 150 countries, touching six continents. I am responsible for developing and expanding Verizon's VoIP, IP and Ethernet network capabilities. I graduated from the University of Maryland and have a Masters Degree in Telecommunications from Southern Methodist University in Dallas, Texas.

2. My declaration describes the IP interconnected voice services that Verizon already offers, Verizon's business drivers and plans for expanding IP interconnection for voice through negotiated commercial agreements, and why IP voice interconnections should be deployed in a way that maximizes the efficiencies that the IP network architecture offers. Verizon is actively working to expand IP interconnections for voice, which will eventually facilitate voice traffic's transition to IP networks. This is only natural, because routing traffic in IP is far more efficient. It only makes sense that we would want to explore efficient IP-to-IP handoffs for this traffic.

Companies today are connecting with one another and sending each other IP voice traffic over IP connections.

3. Before discussing an IP interconnection architecture for voice that Verizon thinks could become a model for others in the industry, it is important to note that Verizon both receives voice traffic from other companies in IP format and sends voice traffic to other companies in IP format. This traffic, primarily long distance and wireless traffic, is being transported and exchanged in IP, frequently via services that Verizon and other providers offer that allow VoIP providers to connect with their networks and send their traffic over those connections in IP format.

4. For example, Verizon offers a standardized product called SIP Gateway Service. We offer this service through our affiliate, MCI Communications Services, Inc. d/b/a Verizon Business Services, and it has been available in the market since 2006. SIP Gateway offers VoIP providers 100% access to all domestic end points, whether they are on Verizon's network or another provider's network. A VoIP provider need only support and manage its subscriber calling features via its soft switch, and Verizon handles everything else to route the call to its destination, including conversions to terminate IP voice traffic to TDM end points as needed.

5. Verizon's network uses Session Initiation Protocol, or SIP, to signal call set up and other call routing information between IP networks. In order to connect with Verizon and use its SIP Gateway Service, a VoIP provider would enter into a commercial contract with Verizon and configure its soft switch and routing equipment to send calls to IP addresses that Verizon provides. VoIP providers may choose to send all their traffic to Verizon, or they may choose to send some calls to Verizon and some to other competing providers. The VoIP provider would also deploy the hardware necessary to create an IPsec tunnel connection – essentially a virtual circuit that ensures call set-up information security and prevents spoofing and other network misuse – to Verizon's VoIP gateways. The VoIP provider can create the IPsec tunnel over Verizon's IP network or through a third party's network. The IPsec tunnel authenticates and encrypts the IP packets that carry the SIP signaling information, and it then encapsulates those packets into a new packet with a new IP header, so that the information can travel securely across the virtual tunnel from the VoIP provider to Verizon's SIP signaling elements. The media – in a VoIP call, the IP packets that carry the conversation –travel from the VoIP provider to Verizon's VoIP gateways via the Public Internet (either Verizon's IP service, or another IP provider) or via a Verizon-provided Internet Dedicated Access connection. If necessary, Verizon

will convert the traffic from IP to TDM before handing it off to the terminating carrier. VoIP providers can purchase this IP connectivity service from Verizon, as long as the VoIP provider passes a credit check, supports IPsec tunnels, and has soft switches or equivalent platforms that conform to Verizon's SIP Gateway specifications for SIP signaling and media transport. Many SIP Gateway customers send all their IP voice traffic to Verizon, but others send some to Verizon and some to other providers that offer competing services, like Level 3, AT&T, CenturyLink, and XO. While these services vary in some respects, including the access methods by which VoIP providers reach their networks, each service offers an IP-based connection to the customer and routes VoIP traffic to whatever end point it needs to reach.

6. As technologies evolve, so will companies' incentives to move to new interconnections and network configurations. As with any transition to new technologies and network architectures, this process will naturally be iterative. While companies logically started by exchanging interexchange traffic in IP format, as more and more customers switch to VoIP services, companies will have natural incentives to explore interconnecting in IP to exchange IP-originated traffic. Verizon projects that Verizon IP-originated traffic will increase five-fold by 2015. Verizon currently has one agreement in place covering its FiOS Digital Voice VoIP traffic, and we are negotiating others. And as more and more services become IP, providers will naturally expand their IP interconnections for voice efficiently, through negotiated agreements by which two willing parties find a match and work out the technical details. Verizon and other providers are pursuing efficient IP interconnection and IP-based networks on their own, without a regulatory requirement, because IP interconnection for voice services offers efficiencies that result from the vast differences between the legacy circuit-switched TDM network architecture

and an IP-based network architecture. To maximize those efficiencies, IP voice interconnection efforts should focus on maximizing the efficiencies of IP technology.

7. In a circuit-switched communication, in order to deliver a call to its destination, a provider has to ensure a dedicated pathway that covers the entire distance from the calling party to the called party, for the call's duration. To enable that connection, a provider must either build or lease TDM transmission facilities and deploy a network of switching equipment devoted to call processing. Often, one provider passes traffic to another to create or extend the dedicated pathway required for every call.

8. The technology and network facilities that route and carry IP traffic are not add-ons to the legacy PSTN. They are wholly new networks and technologies, very different from TDM. In an IP network, there is no need for a dedicated physical connection to carry a call all the way from where it originates to the terminating party, and the layers of switches that separate calls into local, tandem, and interexchange segments can be eliminated. And in an IP network, there can be far fewer network interconnection points.

9. For example, one efficient IP interconnection architecture model for voice would involve a VoIP provider configuring its network and routing its traffic on its own private IP backbone to an IP hub in a mutually agreed upon telecommunications colocation center known as a "carrier hotel." A physical interconnection with another VoIP provider's network would take place here. Verizon has IP hubs in major carrier hotels throughout the United States, and most VoIP providers can easily access those hubs. The two interconnecting VoIP providers would look at where there are efficiencies and commonalities and work together to determine which IP hubs best suit both providers' needs. The two VoIP providers could satisfy all their voice interconnection needs at just a few IP hubs, where they would physically interconnect (although

their respective gateways and border control equipment could be located at each carrier's network operations sites). The gateways and border control equipment could in turn be connected to the IP hubs through various means, including an efficient Virtual Private Network over the Public Internet, or via dedicated facilities. The Virtual Private Network would ensure call security, including the call identification information, signaling information, and call content. The traffic would emerge at an edge router that would route the traffic to a VoIP gateway designated by the terminating VoIP provider, and that VoIP provider would have to build into its backbone the necessary intelligence to determine how to get the call from that point to its VoIP customers.

10. There are other models, too, that carriers can agree to implement to support IP interconnection for voice, and I will elaborate on some of these below. The key point to note here is that an efficient VoIP interconnection model will build off of the capabilities of IP networks, which have developed over decades, without regulation, and interconnect with one another based on purely voluntary interconnection agreements. Over these networks, IP traffic goes anywhere it needs to go.

11. These interconnection models have the potential to yield material consumer benefits and efficiencies. They can enable new and innovative products and services that require IP connections and networks for delivery. And the VoIP network elements that comprise an IP network are more efficient, take up much less physical space and require much less energy, thereby leaving a much smaller carbon footprint.

The industry will benefit from bilateral carrier agreements on technical issues.

12. Bilateral IP interconnection for voice between two VoIP providers involves at a minimum a physical interconnection (the "physical layer," or Layer One in the Open Systems

Interconnection model), an IP interface (the "network layer," or Layer Three), and call signaling and set up (the "session layer," or Layer Five). At all three layers, the interconnecting parties must negotiate specific technical considerations. Because IP interconnection for voice is complex and varies across implementations, interconnecting providers must reach agreement on technical issues.

13. For example, providers could use dedicated transmission facilities or Public Ethernet services instead of Virtual Private Networks to connect to the points of network (Layer Three) interconnection at the carrier hotel. One or both parties could host the Layer Three interconnections, instead of using a third party's services. They could collocate VoIP peering and Layer Three interconnection. They could use Internet connectivity to interconnect their VoIP peering sites through an IP Virtual Private Network, instead of establishing physical (Layer One) or Layer Three interconnections dedicated to VoIP. They could also use private Level Three connectivity to interconnect their VoIP peering sites. At the Session Layer (Layer Five), the parties will negotiate certain call setup information. In the PSTN, the SS7 signaling system is well-established and is subject to industry standards. In IP routing, the analogous signaling system is Session Initiation Protocol, or SIP. But SIP is still a relatively new signaling method, and the industry standards that govern SIP are less mature. As a result, the interconnecting parties must agree on how they will exchange calling party number, called party number, and other critical call setup information. Different networks might also use different codecs. Codecs – devices or software that encode or decode an audio signal to and from a digital data stream– are used in the VoIP world to encode analog speech to allow it to travel the IP network, and then to decode that speech and return it to analog on the call's other end. The interconnecting parties must agree about how they will code their traffic to enable voice communication between the

two networks. In some cases one network or the other must provide transcoding (conversion from one encoded format to another) in order to allow their respective subscribers to communicate. Providers must negotiate which will do this, in what cases, and how they will be compensated.

14. The industry will face these and other challenges as IP interconnection for voice expands and becomes more prevalent. None present insurmountable hurdles, but they present complicated technical and logistical challenges. The industry, not the Commission, is in the best position to work through the detailed requirements, via bilateral commercial negotiations and agreements, as part of the naturally occurring transition to IP interconnection that is already underway.

15. By contrast, a regulatory mandate could have unintended consequences. Regulatory rules for IP interconnection could lock the industry into requirements based on existing assumptions about technologies and markets. Those assumptions can become obsolete quickly in the fast paced communications industry.

This concludes my declaration.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Date: February 24, 2012