

**Before the  
Federal Communications Commission  
Washington, D.C. 20554**

In the Matter of	)	
	)	
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 an 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

**COMMENTS OF HYPERCUBE TELECOM, LLC**  
**ON FURTHER INQUIRY PUBLIC NOTICE**

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## EXECUTIVE SUMMARY

Consistent with the National Broadband Plan and the FCC’s four core principles espoused in the NPRM, HyperCube Telecom, LLC (“HyperCube”) provides services that help “accelerate the transition from circuit-switched to IP networks.”<sup>1</sup> By bridging emerging and traditional networks, and by translating calls to and from TDM and IP formats, HyperCube’s cost-effective solutions benefit consumers and will continue to play a critical role in ensuring that the nation makes a smooth transition to all IP networks. For example, if a rural carrier or other provider is unable to accept or send traffic in IP format with its existing infrastructure, HyperCube can assist the provider in achieving IP-to-IP interconnection in a timely and seamless manner and with minimal capital costs by providing its network bridging services, gateway services, protocol translation services, signaling, billing, database queries and other services. In any order reforming the intercarrier compensation system that results from these proceedings, the FCC should explicitly acknowledge this valuable role that competitive network bridge providers continue to play.

If the Commission is to encourage the shift to IP-to-IP interconnection, as recommended in the National Broadband Plan,<sup>2</sup> it must reaffirm explicitly that section 251(a) of the Act<sup>3</sup> requires that carriers provide for direct or indirect IP-to-IP interconnection.<sup>4</sup> In light of the widespread

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<sup>1</sup> *Connect America Fund, A National Broadband Plan for Our Future, Establishing Just and Reasonable Rates for Local Exchange Carriers, High-Cost Universal Service Support, Developing a Unified Intercarrier Compensation System, et al.*, WC Docket Nos. 10-90, 07-135, 05-337, 03-109, GN Docket No. 09-51, CC Dockets No. 01-92, 96-45, 26 FCC Rcd. 4554, Notice of Proposed Rulemaking and Further Notice of Proposed Rulemaking, FCC 11-13, at ¶¶ 10, 14 (rel. Feb. 9, 2011) (“NPRM”).

<sup>2</sup> Omnibus Broadband Initiative, *Connecting America: The National Broadband Plan*, GN Docket No. 09-51, at 49 (Recommendation 4.10), 59, 153 (2010) (“the FCC should clarify interconnection rights and obligations and encourage the shift to IP-to-IP interconnection”) (the “National Broadband Plan”).

<sup>3</sup> 47 U.S.C. § 251(a).

<sup>4</sup> As set forth in section III below, the FCC also has authority under sections 201(a) and 256 of the Act to impose an IP-to-IP interconnection obligation.

availability of competitive network bridging and protocol translation services, there is no technical or economic reason why providers without the present capability to convert voice-over-IP (“VoIP”) calls to TDM or TDM calls to VoIP would not be able to achieve direct or indirect interconnection under section 251(a) should the FCC require it. Thus, the FCC should establish new rules that clarify existing obligations and require *all* providers to interconnect either directly or indirectly (through a network bridge provider), at any technically feasible point, with other providers to terminate VoIP and other traffic on rates, terms and conditions that are just and reasonable. In addition, the FCC should endorse the use of commercially-negotiated agreements in the first instance for such interconnection, but ensure efficient dispute resolution processes are available before the FCC and state commissions in the event that commercial negotiations breakdown.

The FCC should also exercise its authority under the Act to obligate *by contract* all recipients of support from the new Connect America Fund (“CAF”) to interconnect directly or indirectly to exchange IP traffic as a condition of receiving support from the CAF. The FCC has authority under Sections 254(b), 214 and 706 of the Act to condition CAF support on the obligation to provide direct or indirect IP interconnection on reasonable terms and at reasonable commercial rates, and has conditioned similar funds in the past.

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**COMMENTS OF HYPERCUBE TELECOM, LLC**  
**ON FURTHER INQUIRY PUBLIC NOTICE**

HyperCube files these comments on the Federal Communication Commission’s (“FCC” or “Commission”) Further Inquiry into Certain Issues in the Universal Service-Intercarrier Compensation Transformation Proceeding (“Further Inquiry”), Public Notice No. DA 11-1348.<sup>5</sup>

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<sup>5</sup> *In the Matter of Connect America Fund, A National Broadband Plan for Our Future, Establishing Just and Reasonable Rates for Local Exchange Carriers, High-Cost Universal Service Support, Developing a Unified Intercarrier Compensation System, et al.*, WC Docket Nos. 10-90, 07-135, 05-337, 03-109, GN Docket No. 09-51, CC Dockets No. 01-92, 96-45, Further Inquiry into Certain Issues in the Universal Service-Intercarrier Compensation Transformation Proceeding, DA 11-1348, (rel. Aug. 3, 2011) (“Further Inquiry”).

## **I. Network Bridge Providers Play a Crucial Role in Promoting IP Interconnection, Which Is a Key Goal of the Commission**

In the NPRM, the Commission has asked what specific actions it should take “to encourage the deployment of more efficient technologies and interconnection,” and “how IP-to-IP interconnection arrangements for the exchange of VoIP traffic fit within existing legal and technical interconnection frameworks.”<sup>6</sup> Further, the FCC states that in reforming intercarrier compensation, it will achieve “four core principles,” one of which is to “[m]odernize and refocus USF and ICC to make affordable broadband available to all Americans and *accelerate the transition from circuit-switched to IP networks*, with voice ultimately one of many applications running over fixed and mobile broadband networks.”<sup>7</sup>

There is substantial consensus in the industry and the FCC has recognized that “the transition to IP can result in cost savings, including reductions in circuit costs, switch costs, space needs, and utility costs, as well as the elimination of other signaling overhead.”<sup>8</sup> This and other factors have prompted the Commission to establish the rapid deployment of IP-networks as a principal goal in both the National Broadband Plan and the NPRM.<sup>9</sup> HyperCube concurs with the FCC that it should act to “accelerate” the transition to IP networks and underscores that network bridge providers, such as HyperCube, can play a crucial role in smoothing the transition to all IP networks, a role that the Commission should acknowledge in any order reforming the intercarrier compensation system that results from these proceedings.

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<sup>6</sup> NPRM, at ¶ 679 (rel. Feb. 9, 2011).

<sup>7</sup> NPRM, at ¶¶ 10, 14 (rel. Feb. 9, 2011) (emphasis added).

<sup>8</sup> See, e.g., NPRM, at ¶ 506; *In the Matter of TW Telecom Inc. Petition for Declaratory Ruling Regarding Direct IP-to-IP Interconnection Pursuant to Section 251(c)(2) of the Communications Act*, WC Docket No. 11-119, Comments of Google, Inc., at 2, 4 (Aug. 15, 2011) (“IP networks decrease provisioning and circuit costs, switch costs, space needs, energy costs, signaling costs, and associated overhead while improving network reliability and survivability.”) (“Google Comments”).

<sup>9</sup> NPRM, at ¶¶ 506, 527 (2011); National Broadband Plan, at 49 (Recommendation 4.10), 59, 153.

The FCC and others have recognized that the current system is hindering progress to all-IP networks because some carriers require that an interconnecting carrier convert VoIP calls to time-division multiplexing (“TDM”) in some instances so that these carriers may continue to collect intercarrier compensation revenue.<sup>10</sup> CompTel notes that the practice of some carriers requiring conversion from IP to TDM often “increases inefficiencies and costs and reduces voice quality through unnecessary protocol conversion.”<sup>11</sup> Moreover, as the FCC observed, while “this may be in the short-term interests” of certain carriers, “it actually hinders the transformation of America’s networks to broadband.”<sup>12</sup> Further, the FCC has recognized that the “challenge for our country is to ensure that as IP-based services replace circuit-switch services, *there is a smooth transition* for Americans who use traditional phone service and for the businesses that provide it.”<sup>13</sup>

Providers of network bridging, gateway and translation services, such as HyperCube, offer a crucial solution to these problems that can help ensure a “smooth transition” while enabling the FCC to achieve its goal of accelerating deployment of all IP networks. For example, if a rural carrier or other provider is unable to accept or send traffic in IP format with its existing infrastructure, HyperCube can assist the provider in achieving IP-to-IP

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<sup>10</sup> NPRM, at ¶ 506 (“the current system is hindering progress to all IP networks. For example, the current regime creates the perverse incentive to maintain and invest in legacy, circuit-switched-based [TDM] networks *to collect intercarrier compensation revenue.*”), ¶ 527 (“Specifically, certain carriers may require an interconnecting carrier to convert IP traffic to [TDM] traffic even if IP-to-IP interconnection would be more efficient, *to ensure the continued collection of intercarrier compensation.*”) (emphasis added); *In the Matter of TW Telecom Inc. Petition for Declaratory Ruling Regarding Direct IP-to-IP Interconnection Pursuant to Section 251(c)(2) of the Communications Act*, WC Docket No. 11-119, Comments of CompTel, at 2-5 (Aug. 15, 2011) (“CompTel Comments”); *see also* Cablevision Comments in re NBP PN #25 at 2 (filed Dec. 22, 2009) (“[E]ven as [ILECs] upgrade their legacy networks to IP, they refuse to provide IP interconnection to their competitors on reasonable terms or at all. As a result, each IP voice call initiated on a competing carriers’ network must be reduced to TDM, transmitted over an electrical DS-0 or similar connection, and routed to an ILEC customer over the legacy hierarchical circuit-switched network, with all of its associated costs, inefficiencies, and limitations”).

<sup>11</sup> CompTel Comments, at 3.

<sup>12</sup> National Broadband Plan, at 49, 59, 142.

<sup>13</sup> National Broadband Plan, at 59 (emphasis added).

interconnection in a timely and seamless manner and with minimal capital costs by providing its network bridging services, gateway services, protocol translation, signaling, billing, database queries and other services. As AT&T acknowledges, there are “a variety of market-based options for converting [VoIP] traffic into TDM format before handing it off to TDM-based carriers - including services offered by Neutral Tandem, HyperCube and others.”<sup>14</sup> Thus, there is no technical or economic reason why providers without the present capability to convert VoIP calls to TDM or TDM calls to VoIP would not be able to achieve such a standard should the FCC require it.

The FCC should expressly acknowledge that emerging providers such as HyperCube and traditional providers that perform competitive network-bridge functions serve a critical role in the transition to all-IP networks by providing, in an efficient manner, “network bridges” between IP networks and networks using various other platforms and technologies, including TDM.<sup>15</sup> HyperCube has the ability to convert the calls received into the protocol required by the terminating provider regardless of the platforms and protocols used by the originating and terminating providers and to provide customized solutions and alternatives to legacy network tandems. HyperCube’s next-generation network can move any type of traffic across any network element while maintaining routing, jurisdiction, and critical call information intact to the destination regardless of originating or terminating technologies. In sum, HyperCube, like others, provides an existing market-based, competitive solution that can provide interconnection

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<sup>14</sup> *In the Matter of TW Telecom Inc. Petition for Declaratory Ruling Regarding Direct IP-to-IP Interconnection Pursuant to Section 251(c)(2) of the Communications Act*, WC Docket No. 11-119, Opposition of AT&T, at 3 (Aug. 15, 2011) (“HyperCube and others have made providing such IP-to-TDM conversions a cornerstone of their business strategies.”).

<sup>15</sup> *Connect America Fund, A National Broadband Plan for Our Future, Establishing Just and Reasonable Rates for Local Exchange Carriers, High-Cost Universal Service Support, Developing a Unified Intercarrier Compensation System, et al.*, WC Docket Nos. 10-90, 07-135, 05-337, 03-109, GN Docket No. 09-51, CC Dockets No. 01-92, 96-45, Reply Comments of HyperCube, at 2-3 (April 18, 2011) (“HyperCube Reply Comments”).

that would, for some carriers, not be available without such intermediate network bridge providers.

## **II. The FCC Should Mandate Direct or Indirect IP Interconnection and Recognize the Critical Role that Network Bridge Providers Such as HyperCube Play**

The FCC recognized in the National Broadband Plan that as we move to all IP networks:

Basic interconnection regulations, which ensure that a consumer is able to make and receive calls to virtually anyone else with a telephone, regardless of service provider, network configuration or location, have been a central tenet of telecommunications regulatory policy for over a century. For competition to thrive, the principle of interconnection—in which customers of one service provider can communicate with customers of another—*needs to be maintained*.<sup>16</sup>

Accordingly, the National Broadband Plan recommends that the FCC “clarify interconnection rights and obligations and encourage the shift to IP-to-IP interconnection where efficient.”<sup>17</sup> The National Broadband Plan concludes that “the FCC should confirm that all telecommunications carriers, including rural carriers, have a duty to interconnect their networks.”<sup>18</sup>

HyperCube supports these forward-looking recommendations of the National Broadband Plan. In order to accelerate the transition to IP networks and remove regulatory uncertainty that impedes investment in IP networks, the FCC should establish new rules that clarify existing obligations and require *all* providers to interconnect either directly or indirectly (through a network bridge provider), at any technically feasible point,<sup>19</sup> with other providers to terminate

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<sup>16</sup> National Broadband Plan, at 49 (Recommendation 4.10) (emphasis added) (“Without interconnection for voice service, a broadband provider, which may partner with a competitive telecommunications carrier to offer a voice-video- Internet bundle, is unable to capture voice revenues that may be necessary to make broadband entry economically viable.”).

<sup>17</sup> National Broadband Plan, at 49 (“Accordingly, to prevent the spread of this anticompetitive interpretation of the Act and eliminate a barrier to broadband deployment, the FCC should clarify rights and obligations regarding interconnection to remove any regulatory uncertainty.”).

<sup>18</sup> National Broadband Plan, at 49.

<sup>19</sup> With respect to the interconnection obligation imposed by section 251(c)(2), the FCC has defined “technically feasible” as a limitation that encompasses only “technical or operational concerns, rather than economic, space, or site considerations.” *Implementation of the Local Competition Provisions in the Telecommunications Act of 1996*, Docket No. 96-98, First Report and Order, 11 FCC Rcd 15499, at ¶¶ 198, 202-203 (A traditional provider must accept “the novel use of, and modification to, its network facilities to accommodate the

VoIP and other traffic on rates, terms and conditions that are just and reasonable. In addition, the FCC should endorse the use of negotiated commercial agreements for such interconnection, but ensure efficient dispute resolution processes are available in the event that commercial negotiations fail.

Finally, in addition to clarifying that all providers must interconnect pursuant to Section 251(a), the FCC should exercise its authority under the Act to obligate *by contract* all recipients of support from the new Connect America Fund (“CAF”) to interconnect directly or indirectly to exchange VoIP traffic as a condition of receiving support from the CAF. Recipients of CAF, whether they be Rural LECs or other entities, should be required to exchange traffic with providers that prefer VoIP interconnection through indirect interconnection when direct interconnection is not available. Network bridge providers such as HyperCube can provide interconnection facilities and protocol translation services in an efficient and cost effective manner, thereby enabling such CAF recipients to exchange in TDM format traffic that is originated or terminated by other providers in IP format while maintaining the billing and signaling information needed to satisfy their rights and obligations.

Google and others have urged the Commission to “clarify the IP traffic interconnection obligations of local carriers.”<sup>20</sup> Google, for example, has taken the position that: “Facilitating IP

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interconnector.”) (“First Local Competition Order”). The FCC’s rules provide that a type of interconnection may be “technically feasible” even if the traditional provider is not currently using it, and even if the traditional provider must incur additional costs. The FCC has determined that: “[t]he fact that an incumbent LEC must modify its facilities or equipment to respond to such request does not determine whether satisfying such request is technically feasible.” First Local Competition Order, at ¶¶ 198-202; 47 C.F.R § 51.5; Cablevision, at 9.

<sup>20</sup> See, e.g., Ex parte comments of Google, Inc., at 2 (Aug. 1, 2011); *In the Matter of TW Telecom Inc. Petition for Declaratory Ruling Regarding Direct IP-to-IP Interconnection Pursuant to Section 251(c)(2) of the Communications Act*, WC Docket No. 11-119, Petition for Declaratory Ruling of TW Telecom, Inc., at 1 (June 28, 2011) (“TW Telecom Petition”) (TW Telecom files this Petition “requesting that the Commission adopt a declaratory ruling clarifying that TWTC has the right under Section 251(c)(2) of the Act to establish direct IP-to-IP interconnection with incumbent LECs for the transmission and routing of TWTC’s facilities-based Voice over internet Protocol (“VoIP”) services.”); Ex parte of Google, Skype, Vonage, and Sprint, WC Docket No. 10-90 *et al.*,

interconnection is a necessary part of this process [of moving to IP networks] . . . [t]o this end, Google believes it would be useful for the FCC to clarify and *affirm the statutory obligations of local telecommunications carriers to offer IP interconnection.*<sup>21</sup> Similarly, the New Jersey Division of Rate Counsel, a consumer advocate, recently argued that:

Regulatory clarity is essential so that as consumers migrate away from “traditional” telecommunications services to those that rely on newer forms of technology, *these essential interconnection obligations are not eroded*. ILECs have been able to construct and maintain a public switched telephone network as a direct result of their historic monopoly and their historic access to a source of ratepayer-guaranteed revenues. Consumers have a unique and compelling interest in ensuring that the public switched telephone network — which they have helped to fund — is configured and operated in a manner that encourages efficient and seamless interconnection, regardless of providers’ choice of technology.<sup>22</sup>

Thus, as the industry moves toward all IP networks, clarifying the interconnection obligations of traditional carriers is also in the consumer’s best interests. Moreover, as others have noted, “[w]hen Congress enacted the [1996 Act], it was well aware that telecommunications technology had never been static.”<sup>23</sup> Nothing in Section 251(a) indicates that it was intended to be limited to a particular form of transmission technology (*e.g.*, circuit-switched traffic). If the Commission is to encourage the shift to IP-to-IP interconnection, as recommended in The National Broadband Plan, it must explicitly confirm that IP-to-IP interconnection is subject to Section 251(a).<sup>24</sup> Otherwise,

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at 9 (Aug. 18, 2011) (“Interconnection is the glue that holds together the network, and the statutory obligation to offer interconnection should not be obscured by this transition” [to IP interconnection].).

<sup>21</sup> *In the Matter of TW Telecom Inc. Petition for Declaratory Ruling Regarding Direct IP-to-IP Interconnection Pursuant to Section 251(c)(2) of the Communications Act*, WC Docket No. 11-119, Comments of Google, Inc. at 2 (Aug. 15, 2011).

<sup>22</sup> *In the Matter of TW Telecom Inc. Petition for Declaratory Ruling Regarding Direct IP-to-IP Interconnection Pursuant to Section 251(c)(2) of the Communications Act*, WC Docket No. 11-119, Comments of New Jersey Division of Rate Counsel, at 3 (Aug. 15, 2011) (emphasis added) (“Regulatory uncertainty complicates new entrant’s ability to negotiate interconnection agreements and therefore could inhibit private investment and deprive consumers of the competitive choice that would otherwise exist.”) (“Comments of N.J. Rate Counsel”).

<sup>23</sup> Comments of N.J. Rate Counsel, at 4.

<sup>24</sup> The National Broadband Plan, Recommendation 4.10 (The FCC should clarify interconnection rights and obligations and encourage the shift to IP-to-IP interconnection where efficient).

continued regulatory uncertainty on this point will impede the transition as many carriers continue to refuse to interconnect on an IP-to-IP basis.<sup>25</sup>

### **III. The FCC Has Legal Authority Under Sections 251(a), 201(a), and 256 of the Act to Impose IP-To-IP Interconnection On All Providers**

The FCC should reaffirm that Section 251(a)(1) of the Act mandates that all carriers, including rural carriers, interconnect directly or indirectly with IP networks. Section 251(a) provides ample legal support for imposing such an obligation.<sup>26</sup> Section 251(a)(1) provides that “[e]ach *telecommunications carrier* has the duty -- to interconnect directly or indirectly with the facilities and equipment of other telecommunications carriers.”<sup>27</sup> A “telecommunications carrier” is defined as a provider of “telecommunications services,”<sup>28</sup> which are defined as “telecommunications” that are offered “for a fee directly to the public, or to such classes of users as to be effectively available directly to the public.”<sup>29</sup> Thus, the Section 251(a) obligation reaches all telecommunications carriers.

In the *Time Warner Order*, the FCC emphasized that “the statutory classification of a third-party provider’s VoIP service as an information service is irrelevant to the issue of whether a wholesale provider of telecommunications may seek interconnection under Section 251(a) and (b).”<sup>30</sup> The FCC recognized that information service providers “use” telecommunications services as inputs in their information services. Accordingly, the FCC found that a LEC

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<sup>25</sup> See, e.g., Petition of TW Telecom, at 5; Comments of Google, at 5 (“IP interconnection barriers imposed by some local carriers can arbitrarily increase the operating costs of connecting network providers and degrade service quality, preventing them from realizing the full benefits of IP network upgrades.”).

<sup>26</sup> Comments of Google, at 5; Comments of N.J. Rate Counsel, at 2 (“There are no statutory escapes or qualifications that excuse a carrier from complying with this fundamental obligation.”).

<sup>27</sup> 47 U.S.C. § 251(a)(1) (emphasis added).

<sup>28</sup> 47 U.S.C. § 153(44).

<sup>29</sup> 47 U.S.C. § 153(46).

<sup>30</sup> *Time Warner Cable Request for Declaratory Ruling*, DA 07-709, Memorandum Opinion and Order, 22 FCC Rcd 3513, at ¶ 15 (March 1, 2007) (“*Time Warner Order*”).

providing PSTN connectivity to a VoIP provider on a wholesale basis was entitled to interconnection under Section 251(a)(1) and 251(b)(5), but did not address the obligation to provide cost-based interconnection under Section 251(c)(2).<sup>31</sup> Moreover, under the FCC's existing rules, "[a] telecommunications carrier that has interconnected or gained access under section 251(a) . . . of the Act, may offer information services through the same arrangement, so long as it is offering telecommunications services through the same arrangement as well."<sup>32</sup> Thus, as observed by the N.J. Rate Counsel, "there is no basis for anyone to argue that the introduction of new and improved technology voids this unqualified mandate" to interconnect pursuant to section 251(a).<sup>33</sup>

The FCC also recently issued a declaratory ruling regarding the scope of section 251(a) and other provisions in which it affirmed the *Time Warner Order* and held:

We clarify that LECs are obligated to fulfill all of the duties set forth in sections 251(a) and (b) of the Act, *including the duty to interconnect and exchange traffic, even if the LEC has a rural exemption* from the obligations set forth in section 251(c).<sup>34</sup> We also clarify that the rural incumbent LECs' obligations under sections 251(a) and (b) can be implemented through the state commission arbitration and mediation provisions in section 252 of the Act. Finally, we reaffirm that providers of wholesale telecommunications services enjoy the same rights as any other telecommunications carrier under sections 251(a) and (b) of the Act. We believe the guidance provided in this Declaratory Ruling is necessary to remove substantial uncertainty regarding the scope of sections 251 and 252 in state commission proceedings.<sup>35</sup>

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<sup>31</sup> *Time Warner Order*, at ¶¶ 15, 17.

<sup>32</sup> 47 C.F.R. § 51.100(b).

<sup>33</sup> Comments of N.J. Rate Counsel, at 2.

<sup>34</sup> The so-called rural exemption is set forth in Section 251(f)(1) which provides: "Subsection (c) of this section shall not apply to a rural telephone company until (i) such company has received a bona fide request for interconnection, services, or network elements, and (ii) the State commission determines (under subparagraph (B)) that such request is not unduly economically burdensome, is technically feasible, and is consistent with section 254 of this title (other than subsections (b)(7) and (c)(1)(D) thereof). 47 U.S.C. § 251(f)(1).

<sup>35</sup> *In the Matter of Petition of CRC Communications of Maine, Inc. and Time Warner Cable, Inc. for Preemption Pursuant to Section 253 of the Communications Act*, 26 FCC Rcd. 8259, 8260, FCC 11-82, WC Docket No. 10-143, GN Docket No. 09-51, CC Docket No. 01-92, at ¶¶ 2, 7 (May 26, 2011) ("CRC Order").

Thus, the FCC has already held that rural LECs are subject to the obligation to interconnect directly or indirectly under section 251(a) even if they are otherwise exempt from the direct interconnection obligation under section 251(c)(2). In addition, the FCC has also determined that the section 251(a) interconnection obligation can be subject to state commission mediation and may be arbitrated before a state commission under section 252.<sup>36</sup>

In addition to section 251(a), the FCC has authority under section 201(a) to impose an IP-to-IP interconnection obligation.<sup>37</sup> Section 201(a) provides:

It shall be the duty of *every common carrier* engaged in interstate or foreign communication . . . to furnish such communication service upon reasonable request therefor; and, in accordance with the orders of the Commission, in cases where the Commission, after opportunity for hearing, finds such action necessary or *desirable in the public interest, to establish physical connections with other carriers*, to establish through routes and charges applicable thereto and the divisions of such charges, and to establish and provide facilities and regulations for operating such through routes.”<sup>38</sup>

Thus, the FCC clearly has authority under section 201(a) to require “every common carrier,” including rural carriers that may otherwise be exempt from section 251(c)(2) direct interconnection obligations, to “establish physical connections,” including direct or indirect IP-to-IP interconnections, with other carriers whenever the FCC determines that it is “in the public

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<sup>36</sup> CRC Order, at ¶ 3 (competitive providers “may submit a request for interconnection under section 251(a) and (b) and may invoke the arbitration procedures of section 252 if the parties are unable to reach a negotiated agreement.”). In the CRC Order, the FCC “found inapposite prior Commission decisions suggesting that the procedures of section 252 are not applicable in matters involving section 251(a) alone” because the CRC Petition arose from requests to interconnect with rural LECs pursuant to section 251(a) and 251(b). CRC Order, at ¶ 21, n.76.

<sup>37</sup> *In the Matter of TW Telecom Inc. Petition for Declaratory Ruling Regarding Direct IP-to-IP Interconnection Pursuant to Section 251(c)(2) of the Communications Act*, WC Docket No. 11-119, Comments of O1 Communications, Inc. and Vaya Telecom, Inc., at 5-6 (Aug. 15, 2011) (“Because it remains to be seen when and how the Commission will ultimately classify VoIP services generally, O1 and Vaya file these comments to encourage the Commission to instead rely on its clear authority under section 201(a) to require ILECs to directly interconnect with CLECs on an IP-to-IP basis.”) (“Vaya Comments”).

<sup>38</sup> 47 U.S.C. § 201(a) (emphasis added).

interest.”<sup>39</sup> Relying upon this authority under section 201(a) has the advantage of not requiring the FCC to resolve the issue of whether VoIP services should be classified as telecommunications services or information services, should the FCC be reluctant to make such a determination in this proceeding.<sup>40</sup>

Finally, section 256(a) provides an independent source of authority for the Commission to impose an IP-to-IP interconnection obligation on all providers. Section 256 states:

It is the purpose of this section--(1) *to promote nondiscriminatory accessibility by the broadest number of users and vendors* of communications products and services to public telecommunications networks used to provide telecommunications service through-- (A) coordinated public telecommunications network planning and design by telecommunications carriers and other providers of telecommunications service; and (B) public telecommunications network interconnectivity, and interconnectivity of devices with such networks used to provide telecommunications service; and (2) to ensure the ability of users and information providers to seamlessly and transparently transmit and receive information between and across telecommunications networks.<sup>41</sup>

Thus, the FCC has broad authority under section 256(a) to “promote nondiscriminatory accessibility by the broadest number of users and vendors” to communications networks to, among other items, “ensure the ability of users and information providers to seamlessly and transparently transmit and receive information between and across telecommunications networks.” This broad authority can readily support imposition of the obligation for all providers to connect either directly or indirectly on an IP-to-IP basis.<sup>42</sup>

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<sup>39</sup> Section 201(a) has been used to impose an automatic roaming requirement on CMRS carriers which is similar to an interconnection obligation. *In the Matter of Roaming Obligations of Commercial Mobile Radio Service Providers*, WT Docket No. 05-265, at ¶ 23 (Aug. 16, 2007).

<sup>40</sup> *See, e.g.*, Vaya Comments, at 5.

<sup>41</sup> 47 U.S.C. § 256(a) (emphasis added).

<sup>42</sup> Comments of Google, at 5; *In the Matter of TW Telecom Inc. Petition for Declaratory Ruling Regarding Direct IP-to-IP Interconnection Pursuant to Section 251(c)(2) of the Communications Act*, WC Docket No. 11-119, Comments of the Michigan Internet and Telecommunications Alliance, at 3 (Aug. 15, 2011).

**IV. Apart from its General Legal Authority to Impose IP Interconnection on All Providers, the FCC Has Authority to Impose IP Interconnection Contractually as a CAF Obligation.**

In the *Further Inquiry*, the FCC noted that under the ABC Plan “recipients of CAF support incur service obligations only to the extent they agree to perform them in explicit agreements with the Commission.”<sup>43</sup> The FCC then asked what specific rule changes would be necessary to implement this approach.<sup>44</sup> As noted by the FCC, the ABC Plan proposes a procurement model, in which recipients of CAF support incur service obligations in explicit agreements with the FCC in return for CAF funds. The ABC Plan contemplates that the FCC will impose several obligations on CAF recipients through ten-year contracts. For example, the Plan provides that “[n]o later than five years after it is awarded CAF support, the CAF recipient must make broadband service available to a minimum number of service locations in the supported areas.”<sup>45</sup> Also, under these agreements, it is contemplated that the CAF recipient will have five years to build out its network to any unserved areas, and that its broadband services will meet minimum standards for upload and download speeds.<sup>46</sup> HyperCube simply proposes that the FCC add an additional obligation to these CAF agreements to require that all CAF recipients make available VoIP interconnection to other providers either directly or indirectly.

The FCC has authority under Sections 254(b) and 706 of the Act to condition CAF support on the obligation to provide direct or indirect VoIP interconnection on reasonable terms and at reasonable commercial rates, and has conditioned similar funds in the past. As the FCC stated in the NPRM, “[r]equiring recipients of support to offer broadband service would be fully

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<sup>43</sup> *Further Inquiry*, at 5.

<sup>44</sup> *Id.*

<sup>45</sup> *Connect America Fund, Developing a Unified Intercarrier Compensation Regime, et al.*, WC Dockets Nos. 10-90, 01-92, 07-135, 05-337, 03-109, *et al.*, ABC Plan, Attachment 1, at 7 (July 29, 2011) (“ABC Plan”).

<sup>46</sup> ABC Plan, at 7-8.

consistent with and promote Congress’s overall objectives as stated in sections 254(b) and 706.”<sup>47</sup> The same is true of imposing an IP-to-IP interconnection obligation. As the FCC noted, “[n]othing in section 254 prohibits the Commission from conditioning the receipt of support, and the Commission has imposed conditions in the past.”<sup>48</sup> Similarly, both the states and the Commission may impose eligibility conditions as part of the eligible telecommunications carrier (“ETC”) designation process under section 214(e).<sup>49</sup> Thus, the FCC has long conditioned the receipt of universal service fund (“USF”) monies on adherence to certain obligations and there is no impediment to conditioning CAF funding upon the provision of direct or indirect VoIP interconnection as proposed by HyperCube.

As the FCC acknowledged in the National Broadband Plan, “[t]his is not the first time the United States has overseen a transition in communications.”<sup>50</sup> The FCC recognized that in these other cases, “government policies helped ensure that legacy regulations and services did not

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<sup>47</sup> 47 U.S.C. §§ 254(b)(2)-(3), 1302(a); NPRM, at ¶ 71. Section 706 directs the FCC “to encourage deployment of advanced telecommunications capability to all Americans . . .” 47 U.S.C. § 157 nt. The VoIP 911 Order expressly contemplated that VoIP providers would obtain access to and interconnection with the PSTN through competitive carriers. *Time Warner Order*, at ¶ 13; VoIP 911 Order, 20 FCC Rcd 10267, at ¶ 38.

<sup>48</sup> NPRM, at ¶ 71. For example, the Commission requires ETCs to certify that universal service support will be used only for the facilities and services for which the support is intended as a condition of receiving support. 47 C.F.R. §§ 54.313(a)-(b), 54.314(a)-(b) (federal high-cost support “shall only be provided to the extent” the requisite certification is provided). Also, the Commission previously considered imposing service quality and technical conditions on the receipt of high cost support, but concluded that the conditions were not warranted at that time. See *Federal-State Joint Board on Universal Service*, CC Docket No. 96-45, Report and Order, 12 FCC Rcd 8776, 8831, ¶ 98 (1997) (*Universal Service First Report and Order*) (subsequent history omitted).

<sup>49</sup> Section 214(e) provides: “A common carrier designated as an eligible telecommunications carrier under paragraph (2), (3), or (6) shall be eligible to receive universal service support in accordance with section 254 of this title and shall, throughout the service area for which the designation is received -- (A) offer the services that are supported by Federal universal service support mechanisms under section 254(c) of this title, either using its own facilities or a combination of its own facilities and resale of another carrier's services (including the services offered by another eligible telecommunications carrier); and (B) advertise the availability of such services and the charges therefor using media of general distribution.” 47 U.S.C. § 214(e).

<sup>50</sup> National Broadband Plan, at 59 (“In the past, the country transitioned mobile service from analog to digital and, more recently, transitioned broadcast television from analog to digital.”); Comments of N.J. Rate Counsel, at 3-4 (“IP-IP interconnection is another technological advancement in the long string of advancements, past and present, as we strive towards future achievements.”).

become a drag on the transition to a more modern and efficient use of resources.”<sup>51</sup> HyperCube’s proposals are consistent with past FCC and industry practice during such major technical transformations. For example, multiple providers served as “network bridges” in a role analogous to that proposed here during the transition from MF (CCITT5)<sup>52</sup> signaling to SS-7 signaling by establishing gateways between these signaling systems. Furthermore, in 1986 the FCC adopted an Open Network Architecture (“ONA”),<sup>53</sup> as a result of which gateway and bridging functions became part of the network as alternative means of compliance with this policy.<sup>54</sup>

## **V. The FCC Should Provide an Efficient Dispute Resolution Process**

The FCC should adopt an intercarrier compensation/USF reform plan that requires all providers to negotiate direct or indirect VoIP interconnection in good faith and should endorse the use of commercially-negotiated agreements while making efficient dispute resolution processes available to requesting providers should commercial negotiations fail.<sup>55</sup> As discussed above, carriers should be required to provide direct or indirect VoIP interconnection pursuant to

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<sup>51</sup> National Broadband Plan, at 59 (During such transitions, the FCC has acted to “that consumers did not lose services they needed and that businesses could plan for and adjust to the new standards.”).

<sup>52</sup> ITU-T Recommendation Q.140-Q.180.

<sup>53</sup> *Amendment of Sections 64.702 of the Commission’s Rules and Regulations (Third Computer Inquiry); and Policy and Rules Concerning Rates for Competitive Carrier Services and Facilities Authorizations Thereof Communications Protocols Under Section 64.702 of the Commission’s Rules and Regulations*, CC Docket No. 85-229, 104 FCC.2d 958, FCC 86-252, at ¶¶ 113, 214 (June 16, 1986) (“A carrier providing enhanced services through [ONA] must unbundle key components of its basic services and offer them to the public under tariff, regardless of whether its enhanced services utilize the unbundled components.”) (“Computer III Order”).

<sup>54</sup> Computer III Order, at ¶ 214 (“Such [ONA] unbundling is essential to give competing enhanced service providers an opportunity to design offerings that utilize network services in a flexible and economical manner.”); *Filing and Review of Open Network Architecture Plans*, CC Docket No. 88-2, FCC No. 88-381, at ¶¶ 17-18, 56 (Dec. 22, 1988).

<sup>55</sup> Ex parte of Google, Skype, Vonage, Ad Hoc Telecommunications Users Committee, and Sprint, WC Docket No. 10-90 *et al.*, at 10 (Aug. 18, 2011) (“At a minimum, local carriers should be required to negotiate in good faith IP interconnection requests, and all complaints over IP interconnection disputes should be resolved by the FCC.”) (emphasis added).

section 251(a) at any technically feasible point<sup>56</sup> at rates on terms that are just and reasonable. To resolve any disputes over the terms of such interconnection, the FCC should commit to making its complaint process available to resolve IP voice interconnection disputes involving multiple states.<sup>57</sup> A dispute resolution process is needed to ensure that carriers do not force other providers to adopt network architecture/interconnection arrangements that are inconsistent with or that discourage deployment of highly efficient IP networks.

For disputes involving a single state, the FCC should reaffirm that mediation or arbitration before state commissions is available to any requesting provider should negotiations regarding the terms of VoIP-to-VoIP interconnection reach an impasse. The FCC determined recently in the CRC Order that:

requests made to incumbent LECs for interconnection and services pursuant to sections 251(a) and (b) are subject to state commission arbitration as set forth in section 252, and that section 251(f)(1) does not exempt rural incumbent LECs from the compulsory arbitration process established in that provision. In addition to arbitration, requests for interconnection and services pursuant to sections 251(a) and (b) are also subject to voluntary negotiation remedies, *including mediation* by the state commission. As discussed in greater detail below, our conclusion is consistent with the language, structure, and intent of sections 251 and 252.<sup>58</sup>

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<sup>56</sup> Petition of TW Telecom, at 4, 20-21 (“Nor is there any doubt that establishing IP-to-IP interconnection is technically feasible since TWTC has already established such arrangements with two long distance carriers and a provider of E911 service.”); *In the Matter of a National Broadband Plan*, GN Docket No. 09-51, Ex Parte Comments of CompTel, at 2 (Jan. 25, 2010) (“Dominant carriers also interconnect in IP-format for traffic categories and services where they lack market power. For example, AT&T will interconnect in IP-format for domestic and international long distance calling.”). If interconnection has been established in the past “at substantially similar points in networks employing substantially similar facilities,” then it is likely technically feasible. First Local Competition Order, ¶¶ 204-205; 47 C.F.R. § 305(e).

<sup>57</sup> Ex parte of Google, Skype, Vonage, and Sprint, WC Docket No. 10-90 *et al.*, at 10 (Aug. 18, 2011) (“the details of IP-to-IP interconnection can be left to the negotiation process, with the FCC serving as a backstop to protect end-users, and to allow parties who cannot otherwise agree to have a neutral forum for decision and oversight.”).

<sup>58</sup> CRC Order, at ¶ 19.

The FCC should reaffirm that the state commissions should make mediation and arbitration processes available to providers under section 252 as a backstop to voluntary, commercial negotiations involving a single state.

## **VI. HyperCube's Services Reduce Phantom Traffic and Promote Broadband Deployment by Reducing Wasteful Disputes**

As the FCC noted in the NPRM, “phantom traffic” or disguised traffic “today causes carriers to devote substantial resources to resolving billing disputes that could be used to invest or innovate.”<sup>59</sup> The problem arises because the “current disparity of intercarrier compensation rates gives service providers an incentive to misidentify or otherwise conceal the source of traffic to avoid or reduce payments to the terminating service provider.”<sup>60</sup> Accordingly, the FCC has proposed rules to “help ensure that service providers receive sufficient information associated with each call terminated on their networks to identify the originating provider for the call.”<sup>61</sup> These rules would apply to all traffic, including interconnected VoIP traffic.

The FCC proposes to address the phantom traffic problem in part by requiring all originating providers to transmit both the calling party's charge number (“CN”) and calling party number (“CPN”) and by prohibiting the stripping or altering of signaling at any stage of call transmission.<sup>62</sup> Whereas the FCC's existing rule requiring transmission of CPN applies only to interstate traffic, the new proposed rule would extend this requirement to “all traffic originating or terminating on the PSTN,” including intrastate traffic and “traffic transmitted using Internet

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<sup>59</sup> NPRM, at ¶ 37.

<sup>60</sup> NPRM, at ¶ 620.

<sup>61</sup> NPRM, at ¶¶ 37, 620.

<sup>62</sup> NPRM, at ¶¶ 626-628, 631. FCC rules already require carriers using SS-7 signaling to transmit the CPN to subsequent carriers on interstate calls where it is technically feasible to do so. NPRM, at ¶¶ 621, 629; 47 C.F.R. § 64.1601.

Protocols.”<sup>63</sup> The FCC should, however, go further and mandate in its Phantom Traffic rules that the Jurisdictional Information Parameter (“JIP”) be provided.

In addition to providing a network bridge between legacy networks and IP networks to facilitate the transition to VoIP, network bridge providers such as HyperCube provide other valuable services to their customers and the industry such as CABS billing services, database queries and other services. Moreover, they are often able to provide billing information for what would otherwise be unbillable phantom traffic.<sup>64</sup> For example, in its role as a network bridge provider, HyperCube often populates the JIP in order to ameliorate the “phantom traffic” problem and minimize provider disputes over the jurisdiction and billing of traffic.

HyperCube uses a combination of functions, including SS-7 signaling, trunk group mapping, database lookups, and IP Geo-location to properly identify the origin of the call and apply JIP (or other network information) pursuant to ATIS 300011. HyperCube can and does ensure that billing information, as well as the call, gets through. Further, HyperCube’s agreements require customers to follow industry standards and expressly prohibit ANI masking and other measures that may obscure the information needed to determine call routing and jurisdiction.

HyperCube and similar providers benefit the industry and combat phantom traffic by populating the JIP in SS-7 messages and similar fields in session initiation protocol (“SIP”) for VoIP calls, and other protocols (e.g., RFC5503). HyperCube is often able to supplement the call information provided to it by originating providers, by populating the various information

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<sup>63</sup> NPRM, at ¶ 629.

<sup>64</sup> The FCC has “recognized that the ability of service providers to identify the provider to bill appropriate intercarrier compensation payments *depends, in part, on billing records generated by intermediate service providers.*” HyperCube is one such provider. NPRM, at n.957 (emphasis added); Intercarrier Compensation FNPRM, 20 FCC Rcd at 4743, ¶ 133.

parameters, such as the JIP, in accordance with ATIS recommendations. The use of the JIP is now established in the TDM ecosystem, and that use of the JIP is emerging into the IP ecosystem. Thus, requiring the use of JIP and other signaling avoids the imposition of “unduly burdensome costs” which is a key objective of the FCC in crafting its phantom traffic rules.<sup>65</sup> By adding JIP information to the parameters required by the FCC, identification of the provider to be billed is nearly certain. The use of JIP reduces phantom traffic issues and also allows for advanced public safety solutions, such as proper routing of poison control calls originating on wireless networks.

Finally, the FCC should mandate that all carriers and service providers who hold an Operating Company Number (“OCN”) follow the Local Exchange Routing Guide (“LERG”) when routing traffic unless said providers have a commercial agreement that can supersede the LERG via the use of a more modern technology such as ENUM.<sup>66</sup> This mandate is necessary because some LECs are not following the LERG and are thereby failing to recognize alternative tandems within the PSTN. This becomes critical as those tandems take on more network bridging functions.

## **VII. CONCLUSION**

HyperCube commends the Commission for its commitment to reforming the intercarrier compensation and universal service systems to support advanced, broadband networks, and its efforts to accelerate the transition to all IP networks as called for in the NPRM and National Broadband Plan. HyperCube emphasizes that to remove regulatory uncertainty and ensure a smooth and rapid transition to all IP networks, the FCC should confirm that all providers must

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<sup>65</sup> NPRM, at ¶ 620.

<sup>66</sup> ENUM is a proposed standard (RFC 2916) to map all phone numbers to IP addresses. Harry Newton, *Newton’s Telecom Dictionary*, at 357 (22nd ed. 2006).

accept traffic in IP form through direct interconnection or indirect interconnection via network bridge providers such as HyperCube pursuant to section 251(a). Competitive network bridge providers such as HyperCube can provide the needed interconnection facilities and protocol translation services in an efficient and cost effective manner to assist other providers, including rural carriers, in making the transition to all IP networks. HyperCube looks forward to working cooperatively with the Commission and industry to reform current intercarrier compensation policies.

Respectfully submitted,

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