

**BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554**

In the Matter of)	
)	
Numbering Policies for Modern Communications)	WC Docket No. 13-97
)	
IP-Enabled Services)	WC Docket No. 04-36
)	
Telephone Number Requirements for IP- Enabled Services Providers)	WC Docket No. 07-243
)	
Telephone Number Portability)	CC Docket No. 95-116
)	
Developing a Unified Intercarrier Compensation Regime)	CC Docket No. 01-92
)	
Connect America Fund)	WC Docket No. 10-90
)	
Numbering Resource Optimization)	CC Docket No. 99-200
)	
Petition of Vonage Holdings Corp. for Limited Waiver of Section 52.15(g)(2)(i) of the Commission's Rules Regarding Access to Numbering Resources)	
)	
Petition of TeleCommunication Systems, Inc. and HBF Group, Inc. for Waiver of Part 52 of the Commission's Rules)	

COMMENTS OF HYPERCUBE TELECOM, LLC.

Robert W. McCausland
Vice President
HYPERCUBE TELECOM, LLC
3200 W. Pleasant Run Road
Suite 300
Lancaster, TX 75146
(469) 727-1510 tel

Helen E. Disenhaus
LAMPERT, O'CONNOR & JOHNSTON, P.C.
1776 K Street, NW
Suite 700
Washington, DC 20006
(202) 887-6230 tel
(202) 887-6231 fax

Counsel for HyperCube Telecom, LLC

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EXECUTIVE SUMMARY

HyperCube Telecom, LLC (“HyperCube”) is a competitive local exchange carrier (“CLEC”) offering, among other services, wholesale intermediate services that allow the seamless transmission of communications between providers of all types. In HyperCube’s view, if direct access to numbers is made generally available to interconnected Voice Over Internet Protocol (“VoIP”) service providers, such direct access should be subject to reasonable conditions necessary to protect the public by preserving scarce numbering resources and ensuring the robustness and integrity of the telecommunications network. The Commission should therefore apply to all VoIP providers receiving direct access to numbers the same conditions applied in the *SBCIS Waiver Order*, as clarified as suggested by HyperCube. In addition, the Commission should apply additional conditions recommended by state commissions, including the Public Service Commission of Wisconsin; should require VoIP providers to fulfill their obligations with respect to utilization of numbering resources and intercarrier compensation; and should require VoIP providers to afford other providers interconnection consistent with the Section 251/252 regime, including, as HyperCube has recommended, direct IP – IP interconnection to those with traffic equivalent to 4 T-1s to exchange. In addition, to maintain a robust network throughout the IP transition, and an environment where there is ubiquitous call completion, the Commission should require VoIP providers to maintain a back-up routing of last resort with homing to a LEC tandem.

In the event that the Commission decides to disassociate numbers from geography, requiring use of the Jurisdiction Information Parameter in call signaling information will provide additional jurisdictional information that will improve identification of the originating location of a call for public safety purposes.

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COMMENTS OF HYPERCUBE TELECOM, LLC

HyperCube Telecom, LLC (“HyperCube”) files these comments in response to the *Direct Access NPRM/NOI*¹ of the Federal Communications Commission (“FCC” or “Commission”).

¹*Numbering Policies for Modern Communications, et al., Notice of Proposed Rulemaking, Order and Notice of Inquiry*, 28 FCC Rcd. 5842 (2013) (“*Direct Access NPRM/NOI*”). See also *Wireline Competition Bureau Announces Comment Cycle for NPRM and NOI on Direct Access to Telephone Numbers, Public Notice*, WC Dkt. 13-5 *et al.*, DA 13-1430 (rel. Jun. 24, 2013). In granting Vonage Holding Corporation authority to conduct a limited trial of direct access to numbers, the Commission recognized that direct access may raise questions of “number

HyperCube is a leading competitive local exchange carrier (“CLEC”) offering, among other services, wholesale intermediate services that allow the seamless transmission of communications between providers, regardless of their service offerings or the technologies they deploy.

I. THE NUMBERING SYSTEM MUST CONTINUE TO BE ROBUST.

The Commission must take steps to ensure that the nation’s telephone numbering system remains robust and able to function effectively throughout the transition to Internet Protocol (“IP”) based networks. The goal should be continuation of engineering to a P.01 grade of service and current high NER (network effectiveness ratio)² throughout the IP transition, and regardless of the technology used by the service provider. There will continue to be a mixed time division multiplexing (“TDM”)/IP environment for years to come,³ and TDM-based and IP-based voice calling systems must operate together seamlessly during the transition period to maintain the continued integrity of the network.⁴ Because the numbering system is a critical component of voice communications, numbering failures affect everybody, but they harm consumers most of all.

In order to ensure consumers continue to receive the benefit of numbers, and to protect the integrity of network operations, before the Commission makes direct access to telephone

exhaust, number porting, VoIP interconnection or intercarrier compensation.” *Direct Access NPRM/NOI* at ¶ 2.

² See Series E: Overall Network Operation, Telephone Service, Service Operation and Human Factors, Recommendation E.425, ITU Telecomm. Standardization Sector, Int’l Telecomm. Union (March 16, 2012).

³ See *Connect America Fund, et al., Report and Order and Further Notice of Proposed Rulemaking*, 26 FCC Rcd. 17663, ¶ 892 (2011) (“*USF/ICC Transformation Order*”), *pets. for review pending sub nom. In re: FCC 11-161*, No. 11-9900 (10th Cir. filed Dec. 8, 2011).

⁴ *Direct Access NPRM/NOI* at ¶ 16.

numbers generally available to interconnected Voice Over Internet Protocol (“IVoIP”) service providers,⁵ there must already be in place agreed procedures and/or rules for the use of numbers and routing of calls that apply to all providers with direct access to numbers. As the routing of this “new” overlay evolves, care must be taken to prevent opportunistic disruption in call flows. Otherwise, calls will be dropped or misdirected, numbers may be prematurely exhausted, and consumers will lose the high quality services on which they have come to depend.

In addition, the Commission must closely monitor the implementation of direct access to numbers by IP-based providers and be prepared to step in to assume oversight responsibility if a state commission is precluded by state law from exercising regulatory authority⁶ over all numbering use within its geographic jurisdiction.⁷ Unless the FCC is prepared to fill any

⁵ See *Direct Access NPRM/NOI* at ¶ 6 n.6 (citing 47 C.F.R. § 9.3). While HyperCube supports the development of innovative telecommunications technologies, the Commission should first gain experience with the impact of direct access to numbers by IVoIP providers on number utilization and exhaustion, call routing, etc., before opening numbers to new providers for non-voice IP-based services. Cf. *Direct Access NRPM/NOI* at ¶¶ 71, 72 (inquiring if the Commission should also extend direct access to numbers for services other than IVoIP, including machine-to-machine services). By taking a phased approach, the Commission will minimize disruption to the public’s voice services until the FCC has had an opportunity to develop effective means for managing this transition.

⁶ The Commission’s current rules require applicants for direct access to numbers to demonstrate they are authorized to provide service in the areas for which the numbers are requested. *Direct Access NPRM/NOI* at ¶ 5 and n.3; see also *Numbering Resource Optimization, Report and Order and Further Notice of Proposed Rulemaking*, 15 FCC Rcd. 7615, ¶ 97 (2000) (“*NRO First Report and Order*”) (establishing, *inter alia*, the authorization requirement (47 C.F.R. § 52.15(g)(2)(i)). Some state regulators, however, lack regulatory (including certification) authority over VoIP providers. See *Direct Access NPRM/NOI* at ¶ 20 n.65 (citing Letter from Randall B. Lowe, Counsel, SmartEdgeNet, to Marlene H. Dortch, Secretary, Federal Communications Commission, CC Dk. 99-200 (filed Jun. 26, 2012) (stating that at least 24 jurisdictions have precluded their utility commissions from regulating VoIP service, including barring them from issuing certificates of public convenience and necessity)).

⁷ The FCC has plenary authority over numbers pursuant to Section 251(e) of the Communications Act. 47 U.S.C. § 251(e) (2013). The FCC may—and, since 1998, has—delegated authority to state regulators to implement number conservation measures, including

numbering regulation void that may develop as a result of a lack of state oversight, the pro-active measures that have prevented substantial harm to the public from number exhaust and that have resulted in numerous public benefits may disappear.

II. DIRECT ACCESS TO NUMBERS BY IVOIP PROVIDERS MUST BE SUBJECT TO CONDITIONS NECESSARY TO PROTECT CONSUMERS AND PRESERVE COMPETITIVE NEUTRALITY.

The Commission should include, with some modifications, the conditions on direct access to numbers first imposed in the *SBCIS Waiver Order*⁸ and also imposed in the Vonage numbering trial⁹ in any future waivers or rule changes granting direct access to numbers by IVoIP providers that are not certificated carriers. The Commission should, however, clarify how these requirements are to be implemented. In addition, the Commission should impose certain additional requirements proposed by state commissions, and require compliance with existing intercarrier compensation (“ICC”) requirements and interconnection obligations to preserve call flow and address routing requirements.

A. Compliance with *SBCIS Waiver Order* and State-Recommended Conditions

The Commission should impose, with some modification, the requirements it adopted in

rationing and utilization optimization procedures. See 47 U.S.C. § 251(e)(1) (2013); 47 C.F.R. §§ 52.9(a), (b) (2013); *Petition for Declaratory Ruling and Request for Expedited Action on the July 15, 1997 Order of the Pennsylvania Public Utility Commission Regarding Area Codes 412, 610, 215, and 717*, Memorandum Opinion and Order and Order on Reconsideration, 13 FCC Rcd. 19009, ¶ 2 (1998), *Numbering Resource Optimization Second Report and Order*, 16 FCC Rcd. 306, ¶¶ 76–80 (2000). Because state commissions exercise numbering authority under federal law, by delegation from the FCC, a state commission prohibited by state law from generally regulating IVoIP providers may nonetheless be empowered to exercise numbering authority with respect to IVoIP providers. See 47 C.F.R. § 52.15(i) (detailing the role of the states in reclaiming numbering resources).

⁸ *Administration of the North American Numbering Plan*, Order, 20 FCC Rcd. 2957, ¶ 9 (2005) (“*SBCIS Waiver Order*”).

⁹ *Direct Access NPRM/NOI* at ¶ 105.

the *SBCIS Waiver Order* on all grants to non-carrier IVoIP providers of direct access to numbers. The Commission should also provide additional guidance as to implementation of these requirements.

1. Compliance with numbering utilization and optimization requirements.

The first *SBCIS Waiver Order* condition requires compliance with FCC numbering utilization and optimization requirements, numbering authority delegated to the states, and industry guidelines and practices, including filing NRUF Reports.¹⁰ In addition to the specific technical and number usage responsibilities in the *SBCIS Waiver Order* condition,¹¹ the Commission should expressly require compliance with number pooling responsibilities. As the Commission has noted, an IVoIP provider is required to become a Code Holder, with its attendant responsibilities and obligations, when the IVoIP provider establishes a Local Routing Number (“LRN”) in a LATA.¹² Critical to avoiding number exhaust, a Code Holder must

¹⁰ State commissions regularly monitor semi-annual Number Resource Utilization and Forecast (“NRUF”) reports to determine whether conservation measures should be implemented. *Direct Access NPRM/NOI* at ¶ 12 n.29 (“The NRUF Report is used by the Commission, state regulatory commissions, and the [North American Numbering Plan Administrator] to monitor numbering utilization by carriers and to project the dates of area code and [North American Numbering Plan] exhaust.”). *See also* 47 C.F.R. § 52.15(f)(3) (requiring carriers to file NRUF Reports).

¹¹ The Comments of GVNW Consulting, Inc., WC Dkt. 13-97 (filed Jul. 12, 2013) at 5–6, summarize the detailed procedures for implementing number utilization responsibilities and database maintenance obligations.

¹² It is unclear how this LRN will be established, given that having access to numbers does not provide access to the local exchange routing guide (“LERG”). Thus, having numbers does not provide an underlying routing schema. While alternative tandem providers may provide one possible option, *see* Comments of IntelPeer, Inc., GN Dkt. 13-5 (filed Jul. 8, 2013) at 5, this approach, while feasible, raises its own set of disruptive issues. For example, today homing arrangements are already designed around the legacy ILEC tandem offices so that there is always a “route of last resort” when trying to complete a call. How unregulated tandem providers will coexist in the current mixed TDM-IP ecosystem has yet to be determined. Networks may become isolated as pockets develop where peering is not desired or the economics become unbalanced. This has serious implications for consumers, similar to the effects on consumer

“return to the Pooling Administrator any unused blocks of numbers from that code for use by other service providers.”¹³

In addition, compliance with the number utilization and optimization condition must obligate the non-carrier IVoIP provider to pay its proportionate share of the costs of numbering administration. By statute, telecommunications carriers have an obligation to pay the costs of numbering administration.¹⁴ Especially given that telecommunications carriers have already borne all the costs of numbering administration to date, “competitively neutral” cost-sharing¹⁵ requires that all providers receiving direct access to numbers bear their proportionate share of ongoing costs. IVoIP providers receiving direct access to numbers should also be responsible for their costs to conform with industry practices with respect to entering and updating data in commonly used databases, such as the Telcordia Business Integrated Routing and Rating Database System (“BIRRD”).¹⁶

traffic of the “peering wars” going on with respect to transmission of over-the-top video content. Cf. FierceTelecom, “Level 3, Comcast call truce in peering fight” (Jul. 16, 2013), <http://www.fiercetelecom.com/story/level-3-comcast-call-truce-peering-fight/2013-07-16>.

¹³ *Direct Access NPRM/NOI* at ¶ 24 n.79.

¹⁴ 47 U.S.C. § 251(e)(2) (“The cost of establishing telecommunications numbering administration arrangements and number portability shall be borne by all telecommunications carriers on a competitively neutral basis as determined by the Commission.”).

¹⁵ Cf. *Direct Access NPRM/NOI* at ¶¶ 66–68 (discussing “competitively neutral” cost sharing).

¹⁶ IVoIP providers continue to have the option of obtaining numbering resources from carrier partners; if they instead wish to obtain direct access to numbers prior to the end of the IP transition glide path timetable, they should be solely responsible for any additional costs attributable solely to their direct access to numbers prior to completion of the TDM-IP transition glide path. Otherwise, rather than being “competitively neutral,” the cost sharing regime would require a subsidy by certificated carriers for the business plans of competing providers.

2. *Thirty-day prior notice requirement.*

The Commission should continue to require IVoIP providers to file requests for numbers with the FCC and relevant state commission(s) at least 30 days before requesting numbers from the number administrators. The Commission should clarify that this obligation applies to requests to both the North American Numbering Plan Administrator and the Pooling Administrator. The Commission should also adopt its proposal to allow a state regulator to reject requests for numbers in rate centers without pooling if the state commission finds that “allowing direct access in non-pooling rate centers will contribute substantially to number exhaust.”¹⁷

Additionally, while Vonage had proposed having a 65% utilization rate across its number inventory,¹⁸ non-carrier IVoIP providers should be held to the same utilization standards as now apply to carriers with numbers. These utilization standards are LATA-specific, and in some cases require number utilization as high as 90% before new numbers will be issued. Furthermore, there are numbering and usage reports to support these requests that must also become obligations of any carrier that participates in number utilization directly.

3. *Compliance with the “facilities readiness” requirement.*

The Commission should continue to condition direct access to numbers on compliance with the “facilities readiness” requirement of 47 C.F.R. § 52.15(g)(2)(ii) (*i.e.*, on the provider’s demonstrating that it has the capability to begin providing services within 60 days of a grant of numbers). The standard for compliance with the “facilities-readiness” requirement must include the IVoIP provider’s either having a standard, state-approved interconnection agreement, or having subscribed to a generally available tariff through which IP interconnection can be

¹⁷ *Direct Access NPRM/NOI* at ¶¶ 26, 32.

¹⁸ *See id.* at ¶ 93 n.237.

purchased.¹⁹ If a state commission no longer has the authority to oversee this requirement, then the Commission should be prepared to fill the void to determine facilities readiness.²⁰

4. *Processing port requests directly.*

The Commission should continue to require that, rather than going through a local exchange carrier (“LEC”), an IVoIP provider with direct access to numbers process port requests directly.²¹ The Commission should also make clear that compliance with this condition requires compliance with all the implementation procedures and porting intervals applicable today to certificated carriers. Non-carrier IVoIP providers should also be required to be familiar with and conform to “industry best practices” with respect to number porting,²² and they should be strongly encouraged to become active participants in industry groups addressing such critical functions as number porting.

¹⁹ See *Direct Access NPRM/NOI* at ¶ 29 (where the Commission interpreted the *SBICS Waiver Order* as requiring a demonstration of facilities readiness either through having a state-approved interconnection agreement or a tariffed interconnection service generally available to IP-based voice services providers).

²⁰ The Commission should also be proactive in ensuring that no ILEC can evade its Sections 251 and 252 interconnection obligations by using direct access to numbering resources in forming an unregulated entity that would replace its existing regulated service offerings, and then seek to avoid its direct interconnection obligations or require interconnection through a wholesale VoIP provider offering such as the AT&T AVOICS product. AT&T, *AT&T VoIP Services: AT&T Voice Over IP Connect Service (AVOICS) 1* (last visited July 8, 2013), available at http://www.business.att.com/content/productbrochures/AVOICS_1169.pdf. Cf. 47 U.S.C. § 251(g) (“Continued enforcement of exchange access and interconnection requirements”); 47 U.S.C. § 251(h) (2) (“Treatment of comparable carriers as incumbents”). In return for direct access to numbering resources, IVoIP affiliates of ILECs must agree to be bound by the same obligations as their regulated carrier ILEC affiliates.

²¹ *Direct Access NPRM/NOI* at ¶ 12.

²² See, e.g., Number Portability Administration Center (“NPAC”), Local Number Portability Administration Working Group, “Local Number Portability Best Practices,” <http://www.npac.com/lnpa-working-group/lnp-best-practices>.

5. *Compliance with state-recommended procedures.*

HyperCube also supports recommendations made by a number of state commissions concerned about the impact on numbering oversight²³ and the potential for acceleration of number exhaust issues. Adoption of the state recommendations would facilitate state oversight of number utilization, prevent number exhaust, and improve call routing. These recommendations include the proposals of the Public Service Commission of Wisconsin that would require an IVoIP provider receiving direct access to numbers to:

1. Provide regulatory and numbering contact information to a state commission with their first request for numbers in a state;
2. Consolidate reporting of all its numbers under a unique Operating Company Number (“OCN”)²⁴ assigned to the provider by the National Exchange Carrier Association;
3. Enable all customers to access all N11 numbers in use in the state;
4. Obtain numbers from pooling rate centers; and
5. Maintain the original rate center designation of all numbers in its inventory.²⁵

B. Additional Essential Conditions on IVoIP Direct Access

To preserve network integrity and ubiquitous call routing, at a minimum, the *quid pro quo* for obtaining the numbering benefits of certificated carrier status should be compliance with the interconnection and ICC obligations that are essential to call completion on a competitively

²³ HyperCube has previously expressed concern about the ability of non-carriers with number resources to serve as Code Holders of pooled NXXs, with responsibility to ensure “N-1” default routing. See Comments of Bandwidth.Com, Inc., HyperCube, LLC, Level 3 Communications, LLC, Pac-West Telecomm, Inc., and COMPTTEL, CC Dkt. No. 99-200 (filed Jan. 25, 2012) at 10 (“CLEC Comments”). A mechanism for addressing this issue must also be agreed upon.

²⁴ See ATIS-0300251, *Codes for Identification of Service Providers for Information Exchange*.

²⁵ See *Direct Access NPRM/NOI* at ¶ 13 n.43 (citing Comments of the Public Service Commission of Wisconsin, CC Dkt. 99-200 (filed Jan. 25, 2012)).

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neutral basis throughout the IP transition.²⁶ IVoIP providers should be subject to FCC oversight for failure to follow conditions imposed on IVoIP providers as a result of obtaining direct access to numbers, as well as for failure to comply with existing obligations that affect numbering rights and intercarrier compensation obligations.

Unless all providers in the call path fulfill their ICC obligations, there is a real danger that, in maximizing call completion, RLECs and other carriers will be harmed by being forced to incur call costs for which they are not compensated.²⁷ These ICC obligations can, of course, be satisfied either by bilateral negotiated agreements or by paying compensation to a carrier at its tariffed rates.²⁸

Similarly, while Vonage had proposed offering “IP interconnection” to other providers,²⁹ for competitive neutrality, and to ensure the public continues to receive high quality service throughout the IP transition, the interconnection obligation of non-carrier IVoIP providers must be broader than merely “offering IP interconnection” in some unspecified, limited way. Carriers,

²⁶To aid the Commission in numbering administration, IVoIP providers seeking numbers should provide information demonstrating that they are eligible to provide IVoIP services in the areas they will serve (which information may be a state certification, another form of state authorization, a reference to a blanket state grant of authority, or a citation to a state law exempting providers of the planned services from any prior authorization requirement). IVoIP providers seeking numbers should also provide the basic FCC Form 477 information suggested by the Commission. *Direct Access NPRM/NOI* at ¶ 20 (suggesting use of pages 2 and 36 of FCC Form 477 as used by IVoIP providers to obtain p-ANI codes). IVoIP providers are already required to file FCC Form 477. *Id.* at ¶¶ 10 n.23, 20.

²⁷ See Letter from Michael R. Romano, Senior Vice President, NTCA, to Marlene H. Dortch, Secretary, Federal Communications Commission, WC Dkt. 10-90 (Jul. 19, 2012) at 2.

²⁸ The Section 251/252 interconnection regime must remain an essential requirement of IP-IP interconnection for voice services to ensure that the “peering wars” of the IP data networks are not extended into the voice calling space, with resulting adverse effects on ubiquitous call completion.

²⁹ *Direct Access NPRM/NOI* at ¶ 32.

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at least those with four T-1s of traffic to exchange, should be entitled to direct IP–IP interconnection with IVoIP providers and with other carriers pursuant to Sections 251 and 252 of the Telecommunications Act.³⁰ As the Commission has recognized, “giving interconnected VoIP providers direct access to numbers does not, by itself, convey rights or responsibilities under sections 251 and 252.”³¹

As a further condition of receiving direct access to the public’s scarce numbering resources, rather than obtaining numbers through a carrier already responsible for regulatory compliance, a non-carrier IVoIP provider should be subject to the no-notice forfeiture process and the “redlighting” procedure that would prohibit access to numbers if the provider is not in compliance with Commission obligations.³² This both promotes competitive neutrality and protects the public from providers with no incentive to follow accepted industry practices and adhere to numbering and intercarrier compensation and interconnection³³ requirements.

Thus, in return for direct access to scarce numbering resources, IVoIP providers should be required to comply with the key obligations essential to protect the integrity of the network and ensure a seamless IP transition. These include adherence to numbering requirements, procedures, and financial obligations, as well as intercarrier compensation and Section 251/252 interconnection obligations. To ensure compliance, IVoIP providers receiving direct access to

³⁰ See Comments of HyperCube Telecom, LLC, GN Dkt. 13-5 (filed July 8, 2013) at 17 – 18 (“*HyperCube Trials Comments*”); see also Comments of HyperCube Telecom, LLC, WC Dkt. 10-90, *et al.* (filed Feb. 24, 2012) at 5-7; Reply Comments of HyperCube Telecom, LLC, WC Dkt. 10-90, *et al.* (filed Mar. 30, 2012) at 3-11.

³¹ *Direct Access NPRM/NOI* at ¶ 56 n.156.

³² See *Direct Access NPRM/NOI* at ¶¶ 37–39.

³³ See *supra* n.20.

numbers should also be subject to the same forfeiture and redlighting enforcement procedures as other providers with direct access to numbers.

III. TO MAINTAIN A ROBUST NUMBERING SYSTEM, THE COMMISSION AND THE INDUSTRY SHOULD ADDRESS CRITICAL TECHNICAL ISSUES IN ADVANCE OF GENERAL IVOIP DIRECT ACCESS TO NUMBERS AND ANY DISASSOCIATION OF NUMBERS FROM GEOGRAPHY.

Because critical call routing and call signaling requirements have not usually been a part of Session Invitation Protocol (“SIP”) messages used in the IP environment, measures are necessary to prevent incorrect call routing, signaling, and billing if IVoIP providers that are not certificated carriers receive direct access to numbers.

A. Call Routing Procedures Must Be Agreed On and Implemented.

Before there can be direct access to numbers by non-carrier IVoIP providers, there must be an agreed methodology for identification of an IVoIP provider’s switch, which would not appear in the Local Exchange Routing Guide (“LERG”).³⁴ There have been a variety of suggested approaches that show promise as techniques for addressing this issue,³⁵ but no methodology has been tested or agreed upon. As HyperCube³⁶ and others,³⁷ including the Commission’s Technology Advisory Council,³⁸ have previously recommended, the Commission

³⁴ *CLEC Comments* at 8 – 9.

³⁵ See, e.g., *Direct Access NPRM/NOI* at ¶ 43 n.149 (“Some carriers who interconnect in IP bilaterally have apparently identified a modified method of routing using carrier ENUM or SIP Redirect queries after locating the Service Provider Identification Number in a locally cached LERG database.”).

³⁶ See *HyperCube Trials Comments* at 15–17.

³⁷ See Richard Shockey, *Technical Challenges in the PSTN Transition from Plain Old Telephone Service*, attached to Letter from Richard Shockey, Shockey Consulting, to Marlene H. Dortch, Secretary, FCC, CC Docket No. 99-200, et al. (filed Sept. 4, 2012) at 2.

³⁸ Technological Advisory Council, Presentation to the Federal Communications Commission (2012) (“*TAC Presentation*”) at Slide 60, available at

should convene a workshop of industry experts from telecommunications carriers and IVoIP providers to agree upon necessary solutions. All IVoIP providers seeking direct access to numbers should be required to adhere to the agreed-upon procedures as conditions of obtaining direct access.

In the meantime, while a long-term solution to this problem is pending, and recognizing the non-resiliency of the TDM environment with respect to missing signaling information, all non-carrier IVoIP providers receiving number resources should be required to maintain an alternative LEC routing of “last resort” with their switches homed to a LERG-listed LEC tandem,³⁹ as a default routing option. Such back-up arrangements are published as Switch Homing Arrangements (“SHAs”) in the LERG and are therefore readily accessible to all providers in a call path. This back-up routing option is necessary so that no calls will be misrouted or billed incorrectly, or even dropped, because of an inability to identify the originating provider during the period in which there will be a mixed TDM-based and IP-based environment.⁴⁰

<http://transition.fcc.gov/bureaus/oet/tac/tacdocs/meeting121012/TAC12-10-12FinalPresentation.pdf>.

³⁹ See Comments of The Alliance for Telecommunications Industry Solutions (“ATIS”), GN Dkt. 13-5 (filed Jul. 8, 2013) at iii (“It is important to recognize that some existing TDM networks and functions will continue to operate until the migration to IP is complete. Thus, any new databases or modifications to existing databases should accommodate the need for a dual mode telephone routing environment until such time that every telephone number can route successfully in an all-IP environment.”). See also *id.* at 10–11. HyperCube thus recommends that the Commission “require interconnected VoIP providers to maintain carrier partners to ensure that calls are routed properly.” *Direct Access NPRM/NOI* at ¶ 44.

⁴⁰ HyperCube continues to recommend the mandatory use of the Jurisdiction Information Parameter (“JIP”), which is switch-specific and provider-specific, to provide important signaling information with respect to the originating provider and its switch location for jurisdictional purposes. *HyperCube Trials Comments* at 7– 2; Comments of HyperCube Telecom, LLC, WC Dkt. 10-90, et al. (filed Apr. 1, 2011) at 7 n.3. See generally, *id.* at 12-21.

Further, even under current practices, it normally takes 30 days for updated LERG information to be supplied to the database administrator, and 30 additional days before such information is published,⁴¹ but non-carrier IVoIP providers do not have an obligation to provide this information now. Even with an alternative homing arrangement in place, the LERG updating process should be completed before an IVoIP provider commences service using numbers directly assigned to it. Consumers need to receive the same level of service they currently receive from the traditional public switched telephone network during a transition that must be transparent to end-users.⁴² The Commission is already concerned about rural call completion issues, and it should not exacerbate the problem by ignoring the need for alternative routing options during the IP transition and before a long-term solution is in place.⁴³

Furthermore, as these alternative arrangements develop there should be a “must handle” requirement extended to IVoIP providers with direct access to numbers that is similar to that required of traditional regulated carriers. That is, providers should not be permitted to discontinue last resort routings through LEC tandem networks until they have established a clear plan within the TDM environment of the affected local LATA for ensuring the calls will complete. With Vonage and others offering only non-LENG routing schemes, call completion

⁴¹ Although there are one-day LERG update options, they are costly and not necessary today. Because not all carriers subscribe to this service, the 60-day update time frame is typical.

⁴² *TAC Presentation* at Slide 61.

⁴³ At a time when rural local exchange carriers (“RLECs”) are also particularly resource-challenged as a result of the changes effected by the *USF/ICC Transformation Order*, the Commission should be particularly sensitive to exclusive, non-traditional routing arrangements offered to IVoIP providers. These unregulated arrangements are outside the scope of Section 251 obligations and could impose substantial unnecessary new costs on RLECs, as well as other carriers, for building new facilities to numerous peering points far from their territories to ensure ubiquitous call completion.

becomes problematic for the legacy network, creating opportunities for “bad behavior.”⁴⁴

Industry workshops also may be appropriate to resolve open issues with respect to imposing obligations on IVoIP providers to comply with industry practices with respect to utilization and maintenance of other databases, such as the SMS/800 database, the Line Information Database, and the multiple “CNAM” (caller name) databases.⁴⁵ As the TAC has pointed out, today there is no integration of the LNP and ENUM databases.⁴⁶

B. Use of JIP Can Mitigate Adverse Public Safety Implications of Use of Non-Geographic Numbers.

In the Notice of Inquiry, the Commission solicited comments with respect to the impact of the removal of the geographic association from numbers.⁴⁷ Use of the JIP in call signaling can mitigate the public safety concerns that may arise from the use of non-geographic numbers. Because the JIP provides the location/jurisdiction of the originating end-office switch, it can help identify the originating provider and location of a specific call,⁴⁸ regardless of whether the originating number has been ported from its original provider or is used in a location different

⁴⁴ HyperCube and others have been contacted by a handful of competitive local tandem providers in various markets with demands to connect to them because various code blocks being homed behind their tandems may no longer be reachable via LEC tandems, imperiling call completion. Usually these types of interconnection “requests” are at an economic disadvantage to those carriers subject to the Section 251/252 regulatory regime, resulting in a form of “uneconomic blackmail.”

⁴⁵ See *HyperCube Trials Comments* at 12–14.

⁴⁶ *TAC Presentation* at Slide 58.

⁴⁷ *Direct Access NPRM/NOI* at ¶¶ 118-19.

⁴⁸ See the ATIS “Rules for Populating JIP, Rule 5” (“Where the originating switch cannot signal JIP it is desirable that the subsequent switch in the call path populate the JIP using a data fill default associated with the incoming route. The value of the data fill item is an NPA-NXX associated with the originating switch or MSC and reflects its location.”). See Letter from Thomas Goode, Associate General Counsel, ATIS Network Interconnection Interoperability Forum, to Marlene H. Dortch, Secretary, FCC, CC Dkt. 01-92 (Feb. 10, 2006), Attachment (ATIS Rules for Populating JIP).

from that indicated by the area code or number block. Thus, use of the JIP can help to minimize adverse public safety effects that may be associated with non-geographic numbers.⁴⁹ Without population of the JIP, when it comes to non-geographic numbering plans, there will not be even a hint in the signaling as to the true originating location in the call. Thus, while mandatory population of the JIP will not fully solve the call-location problem if non-geographic numbering is implemented, it is an easy way of providing some location-specific information in this context. Indeed, as HyperCube has previously pointed out,⁵⁰ if the Commission takes this opportunity to mandate use of the JIP, there will in fact be opportunities for *improved* routing of calls to the appropriate poison control and other public safety agencies.

The Commission must also consider the implications for the Government Emergency Telecommunications Service (“GETS”) and the Nationwide Wireless Priority Service of implementing a non-geographic numbering system, particularly with respect to ensuring that these systems continue to function at their current high levels of effectiveness during any transition to non-geographic numbering.

CONCLUSION

In order to protect the public, and to ensure a robust numbering system throughout the transition to all-IP networks, the Commission must ensure that the numbering system remains robust. HyperCube therefore recommends that the Commission adopt the conditions on direct access to numbers by non-certificated IVoIP providers described above. HyperCube also recommends that the Commission convene a workshop to develop consensus and possible rules

⁴⁹ Further, with some modifications to emergency systems, population of the JIP can aide selective routing for other emergency services. Additionally, during the transition to the all-IP network, the JIP provides information essential to accurate jurisdictional call rating.

⁵⁰ See, e.g., *HyperCube Trials Comments* at 9–10.

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with respect to database utilization and updating by all providers, with “last resort” LEC tandem homing for all IVoIP numbers pending implementation of the long-term solution. Finally, HyperCube recommends that the Commission make population of the JIP parameter mandatory to ensure effective call signaling, routing, and billing in the mixed TDM-IP environment and to minimize the potential for adverse public safety effects of any disassociation of numbers from geography.

Respectfully submitted,



Robert W. McCausland
Vice President
HYPERCUBE TELECOM, LLC
3200 W. Pleasant Run Road
Suite 300
Lancaster, TX 75146
(469) 727-1510 tel

Helen E. Disenhaus
LAMPERT, O’CONNOR & JOHNSTON, P.C.
1776 K Street, NW
Suite 700
Washington, DC 20006
(202) 887-6230 tel
(202) 887-6231 fax

Counsel for HyperCube Telecom, LLC

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