

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of

Nationwide Number Portability

Numbering Policies for Modern Communications

WC Docket No. 17-244

WC Docket No. 13-97

COMMENTS OF NEUSTAR, INC.

December 27, 2017

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I. INTRODUCTION AND SUMMARY

Neustar, Inc. (“Neustar”) hereby submits the following comments in response to the Federal Communication Commission’s (FCC or Commission) *Notice*.¹

Neustar strongly supports the Commission’s efforts to facilitate Nationwide Number Portability (NNP), which will accelerate the transition from the Public Switched Telephone Network (PSTN) to next generation IP networks and begin the vital process of modernizing and creating more efficient number administration in the United States. A deliberate and innovative approach to NNP offers the ability to revamp interconnection, numbering, security, and routing for the Internet age, which would benefit the industry and consumers alike.

NNP would represent the latest step in the FCC’s ongoing efforts to transform numbering in the United States. From combatting illegal robocalling to addressing toll free numbers,² the Commission has demonstrated an unwavering commitment to changing the

¹ *Nationwide Number Portability*, Notice of Proposed Rulemaking and Notice of Inquiry, FCC 17-133, WC Docket No. 17-244 (rel. Oct. 26, 2017) (“*Notice*”).

² *See, e.g., Call Authentication Trust Anchor*, Notice of Inquiry, FCC 17-89, WC Docket No. 17-97 (rel. July 14, 2017); *Toll Free Assignment Modernization*, Notice of Proposed Rulemaking, FCC 17-124, WC Docket No. 17-192 (rel. Sept. 28, 2017).

numbering status quo. Equally important is the FCC's recent action in revamping the North American Numbering Council (NANC) to be more focused on providing meaningful and timely advice to the FCC and creating issue-specific Working Groups with a clear mandate and a limited life, such as the Nationwide Number Portability Issues Working Group (NNP WG).³ The NNP WG should take a leadership role in developing actionable recommendations for the adoption of an NNP solution.

Neustar believes that the Non-Geographic Location Routing Number (NGLRN) solution, which is described in Section 8 of the NNP Technical Report prepared by the Alliance for Telecommunications Industry Solutions (ATIS), is the only viable solution to NNP.⁴ The NGLRN solution ports geographic telephone numbers (TNs) to a location routing number (LRN)⁵ from a new non-geographic area code, i.e., an NGLRN. The NGLRN provides a bridge from the legacy PSTN to next generation IP networks, which the Commission and the industry should embrace, without requiring any PSTN development to deploy NNP.

The new non-geographic area code also provides the ability to allow service providers to assign non-geographic telephone numbers (NGTNs) to consumers for standard voice and text service and provides a platform for modernizing number administration. The solution requires NNP TNs⁶ to be served by either a mobile or Voice over Internet Protocol (VoIP) network, which will require no changes for 911 service and will accelerate the ability to deploy call

³ Public Notice, *FCC Announces the Chair, Vice Chair and Membership of the North American Numbering Council*, DA 17-1110 (rel. Nov. 14, 2017).

⁴ ATIS Technical Report on a Nationwide Number Portability Study (June 20, 2016), https://apps.fcc.gov/edocs_public/attachmatch/DOC-340865A1.pdf (NNP Technical Report).

⁵ The LRN is a geographic TN that serves as the address of the network of the ported TN. Networks use the first six digits of the LRN (the area code and central office code) to route calls to the ported TN.

⁶ Geographic TNs ported to an NGLRN and NGTNs.

authentication services. There will be no need for ten-digit dialing regulation, and in fact Neustar recommends the elimination of all dialing plan regulations, allowing service providers to best determine how their customers interact with their networks.

Finally, to facilitate the modernization of number administration, Neustar supports the Commission's recommendations to clear the regulatory underbrush by eliminating outdated rules. Specifically, the Commission should eliminate the N-1 query requirement and all interexchange dialing parity requirements. These requirements are the relic of a bygone regulatory regime, and their elimination will facilitate the deployment of NNP and enable the transition of the PSTN to next generation IP networks.

II. THE NANC'S NNP WG SHOULD TAKE A LEADERSHIP ROLE IN DEVELOPING ACTIONABLE RECOMMENDATIONS FOR THE ADOPTION OF AN NNP SOLUTION

Number administration – which includes allocation, assignment, and portability – has not kept pace with the modernization of communications networks. While infrastructure is rapidly evolving to IP technology, number administration has lagged behind, managed as if TDM were still the predominant communications technology. The FCC has already taken a significant step in modernizing number administration by creating the three, new issue-specific NANC working groups, including the NNP WG. Now, the Commission should take an additional step by affirming the leadership role of the NNP WG to recommend an NNP solution.

The problem posed by NNP is how to port a TN associated with one geographic area to a different geographic area. Unfortunately, there is currently no industry definition of NNP, which is an issue the NNP WG can help navigate.⁷ The FCC should give the NNP WG clear direction

⁷ Neustar proposes the following definition: NNP is the ability to port a geographic TN to an address not restricted to the geography of the porting TN.

to propose a solution to NNP; merely providing feedback on why NNP may be difficult to accomplish or identifying roadblocks that must be overcome would not be helpful.

The NNP WG should be able to consult recognized industry experts in evaluating NNP solutions and should have the ability to refer issues to other industry committees, such as ATIS or the Internet Engineering Task Force (IETF), when appropriate. The IETF is currently working on protocols that are relevant to the management of NGLRNs and NGTNs. The Secure Telephone Identity Revisited (STIR),⁸ Automated Certificate Management Environment (ACME),⁹ and Managing, Ordering, Distributing, Exposing, & Registering telephone Numbers (MODERN)¹⁰ working groups are all important to the NGLRN solution, as well as modernizing number administration in general. These working groups are defining Internet-based mechanisms for issuing certificates for identifiers (ACME), authenticating caller identities (STIR), and managing the acquisition and resolution of TNs in an IP environment (MODERN). In addition, ATIS has developed a technical standard document, called Signature-based Handling of Asserted information using toKENs (SHAKEN),¹¹ which defines implementation of STIR protocols by service providers, as well as an IP Network to Network Interface Profile document,¹² which could be used for interconnection on the IP network.

⁸ Secure Telephone Identity Revisited Working Group,
<https://datatracker.ietf.org/wg/stir/about/>

⁹ Automated Certificate Management Environment,
<https://datatracker.ietf.org/wg/acme/about/>

¹⁰ Managing, Ordering, Distributing, Exposing, & Registering telephone Numbers,
<https://datatracker.ietf.org/wg/modern/about/>

¹¹ Signature-based Handling of Asserted information using toKENs,
https://access.atis.org/apps/group_public/download.php/32237/ATIS-1000074.pdf

¹² ATIS/SIP Forum IP NNI Profile,
https://access.atis.org/apps/group_public/download.php/22841/ATIS-1000063-SIPForum_TWG-6.pdf

The NNP WG can and should leverage these resources in crafting an NNP solution. However, if NNP is going to be implemented in a timely manner, it is imperative to have a single industry group tasked with leading that effort. The NNP WG should assume this leadership role by vetting carefully NNP alternatives and making actionable recommendations for the adoption of an NNP solution. The NNP WG cannot discharge its responsibilities by ceding important decisions to other industry groups or by failing to provide the information necessary for the Commission to adopt an NNP solution.

III. THE NGLRN SOLUTION IS THE ONLY VIABLE SOLUTION FOR NNP

Today, number portability relies on the geographic structure created by local access and transport areas (LATAs), as each TN and LRN is associated with a specific LATA.¹³ Because of its reliance on TDM technology, the rules that govern the database that manages number portability, the Number Portability Administration Center (NPAC), does not permit a TN to port to an LRN in a different LATA. If a TN is ported to an LRN in a different LATA, calls to this TN are identified as a problem and can fail.¹⁴ Beyond porting, telecommunications networks,

¹³ The United States is divided into 204 distinct LATAs, which were created as part of the Modification of Final Judgement's (MFJ) "plan of reorganization" by which the Bell Operating Companies (BOCs) were divested from AT&T. *See United States v. Western Elec. Co.*, 552 F. Supp. 131 (D.D.C. 1982), *aff'd sub nom. Maryland v. United States*, 460 U.S. 1001 (1983); *United States v. Western Elec. Co.*, 569 F. Supp. 1057 (D.D.C. 1983) (Plan of Reorganization), *aff'd sub nom. California v. United States*, 464 U.S. 1013 (1983). Pursuant to the MFJ, "all BOC territory in the continental United States [was] divided into LATAs, generally centering upon a city or other identifiable community of interest." *United States v. Western Elec. Co.*, 569 F. Supp. 990, 993 (D.D.C. 1983). The purpose of establishing the LATAs was only to delineate the areas within which the respective BOCs would be permitted to provide telecommunications services (*i.e.*, intraLATA services). With the implementation of the Telecommunications Act of 1996, the BOCs were eventually authorized to transport calls between LATAs rather than having to hand off calls to interexchange carriers (IXCs). Nevertheless, the LATA structure remains a fundamental underpinning of the PSTN.

¹⁴ The LATA restriction in the NPAC has been lifted a few times during emergencies, but not without incident. *See* NANC's Local Number Portability Administration Working Group, Final Report on Out of LATA Porting and Pooling for Disaster Relief After Hurricane Katrina

particularly the networks built and operated by incumbent local exchange carriers (LECs), were designed according to this LATA structure in many ways including routing, call processing, query processing, rating, and billing.

The NNP Technical Report identifies four potential options to deploy NNP: National LRN; Commercial Agreements; GR-2982-CORE (Portability Outside the Rate Center or PORC); and NGLRN. The NGLRN solution is the only viable solution.

National LRN proposes assigning LRNs that are in a different LATA than the porting TN. As described above, the PSTN has been designed to include LATA-based restrictions. It would not be an efficient use of the industry's time to research potential problems caused by this option and recommend solutions, especially given that solutions would require changes to TDM infrastructure, which is rapidly disappearing.

The Commercial Agreements option requires the service provider to contract with another provider that has nationwide PSTN interconnection. This approach only simulates NNP and is not a true NNP solution.¹⁵ Indeed, it would be excluded as a solution under Neustar's proposed definition of NNP.

The PORC option was developed twenty years ago to enable location portability for the PSTN. It provides the ability to include rate center information in call signaling. PORC would require new features for TDM infrastructure and is therefore not a viable solution.

(footnote cont'd.)

(April 12, 2006), *available at* https://apps.fcc.gov/edocs_public/attachmatch/DOC-274287A1.pdf (documenting the issues caused by lifting the LATA restriction in the NPAC during Hurricane Katrina).

¹⁵ See North American Numbering Council, Summary: Nationwide Number Portability NPRM/NOI (Dec. 7, 2017), *available at*, http://www.nanc-chair.org/docs/mtg_docs/Dec17_NANC_NNP_Presentaton_12_7_17_FINAL.pdf

In the NGLRN solution, a TN is ported to an LRN from a new non-geographic area code, which is set up specifically to enable NNP. The NGLRN, like an LRN, identifies a switch; multiple NNP TNs can be associated to a single NGLRN.

The NGLRN indicates to the PSTN that it is a call to an NNP TN that needs to be routed to an IP network for further call processing. Because the area code is specific to NNP, PSTN operators will simply need to route these calls to their own IP networks or to a partner that can handle calls to next generation IP networks.¹⁶ Numbers on next generation IP networks are not associated with a physical location or LATAs and therefore are not limited by geography. Porting numbers from the PSTN to next generation IP networks will further facilitate the IP transition.

IV. THE NGLRN SOLUTION CREATES A GLIDE PATH FROM THE PSTN TO NEXT GENERATION IP NETWORKS

In addition to numbering, the NGLRN solution will address another challenge associated with the PSTN: interconnection. Interconnection in the PSTN largely relies on incumbent LEC tandems.¹⁷ The remaining BOCs maintain a tandem switch in each LATA, where many carriers elect to interconnect. A connection to an incumbent LEC tandem is the quintessential form of “PSTN interconnection.”

Interconnection and numbering go hand in hand. A service provider must have interconnection to get numbers, and the Number Administrator requires proof of interconnection before allocating numbers to a service provider. Calls to those numbers are routed over that connection, within the LATA, to the service provider. Service providers must evaluate what

¹⁶ This is the only requirement necessary to implement the NGLRN solution.

¹⁷ A tandem switch is an intermediate switch between the originating call location and the termination of the call. Tandem switches serve as aggregation points for traffic from the multiple end offices that subtend a particular tandem.

numbers they need, and therefore in which of the 204 LATAs they need interconnection. This is a complex, cumbersome and costly process that is unnecessary in an IP environment.

The core of the next generation IP network in the NGLRN solution consists of IP switches, called Non-Geographic Gateways (NGGW), which are operated by service providers on a competitive basis.¹⁸ The NGGW in an IP network is the equivalent of the ILEC tandem in the PSTN. They will connect originating networks to terminating networks. Terminating service providers could operate their own NGGW or they could contract with another company to operate it for them. On one side of the NGGW is a connection to the originating service provider and on the other side is a connection to the terminating service provider.¹⁹

Unlike the incumbent LEC tandems, however, the NGGWs have no dependence on geography; they can serve any number from any LATA, which allows service providers to deploy NGGWs based on market drivers, not regulatory mandates. Because the NGLRN solution also is geographic agnostic, it would provide additional incentives for providers to transition to next generation IP networks.²⁰

¹⁸ The tandem services market includes service providers such as Peerless, Inteliquent, and West Telecom that offer intermediate switching services in addition to the incumbent LECs. *See, e.g.,* Comments of AT&T Services, Inc., WC Docket No. 10-90, CC Docket No. 01-92, at 17-19 (filed Oct. 26, 2017) (“tandem and transport services, whether provided by ILECs or anyone else, ... are now highly competitive in most areas of the country”); Comments of Peerless Network, Inc.; West Telecom Services, LLC; Peninsula Fiber Network, LLC; Alpha Connect, LLC; Rural Telephone Service Company, Inc. d/b/a Nex-Tech; Nex-Tech, LLC; and Tennessee Independent Telecommunications Group, LLC d/b/a Iris Networks, WC Docket No. 10-90, CC Docket No. 01-92, at 2-3 & 25 (filed Oct. 26, 2017) (“intermediate carrier services are competitive and are used by sophisticated carrier customers on a voluntary basis”).

¹⁹ The originating and terminating service providers could contract with a transport provider to connect their network to the NGGW.

²⁰ The services offered by the NGGW providers are critical to the proper functioning of next generation IP networks. To ensure all service providers can complete calls to all numbers, it may be necessary for providers to adhere to a minimum set of requirements. The NNP WG should evaluate the need for such requirements and make appropriate recommendations to the FCC.

V. THE NEW NON-GEOGRAPHIC AREA CODE PROVIDES A PLATFORM FOR MODERNIZING NUMBER ADMINISTRATION

Because the NGLRNs and NGTNs will be routed to the terminating IP network, number administration for these numbers should leverage IP capabilities. Number administration functions would be streamlined and would become more efficient.

NGLRNs and NGTNs would not be allocated in blocks of ten thousand or a thousand. There would be no block-based routing on IP networks, *i.e.*, calls would be routed on a ten-digit basis.²¹ NGLRNs and NGTNs would be allocated individually or in ranges, and would be enabled on IP networks immediately.²²

Calls likely would be routed based on an Internet-enabled address, such as a URI, that would identify a specific NGGW. Number administration would track and update both the service provider information, as well as the IP routing information.

Administration would provide a credential to service providers. The credential would be used for subsequent interaction with the administrator. In the case of NGTNs, the credential could be used for call authentication. The same administration process used for allocating resources would also enable portability for NGTNs. This would simply be a change to the service provider and routing information.

Given that the non-geographic area code can provide NGTNs for consumers, the new area code should be an easily recognized code (ERC) to distinguish it from geographic area

²¹ Geographic numbers on the PSTN are routed based on the first six digits (the area code and central office code).

²² NGLRNs and NGTNs would also be enabled immediately on the PSTN, because they route based on the area code, which is already active.

codes.²³ However, the codes should not be reserved. Demand for NGTNs is currently unknown, and other NANP countries that choose to deploy them may want flexibility in assigning growth. There should be no expectation that the NGTNs will have a specific format such as toll free, i.e., 8YY.

The NNP WG should make a recommendation to the FCC for a process to administer the new non-geographic area code that leverages the benefits of IP technology and a recommendation for a specific area code. In addition, the NNP WG should evaluate the possibility of a distributed registry model.²⁴

VI. THE NGLRN SOLUTION ACCELERATES THE ABILITY TO DEPLOY CALL AUTHENTICATION SERVICES

Elimination of illegal robocalls is a top priority for the FCC. Illegal call spoofing, in particular, remains an ongoing problem. All the industry's efforts have been based on VoIP call processing.²⁵ This work is mature and ready for deployment by service providers. Because NGTNs and NNP TNs would be served by IP networks, these numbers would be able to take advantage of these advanced caller authentication solutions.

²³ ERCs are in the format NYY, where N represents digits 2-9 and Y represents repeated digits, e.g., 22, 33, etc. ERCs exclude the N11 format to avoid conflicts with the N11 abbreviated dialing codes.

²⁴ Number administration in the PSTN relies on single authoritative registries. Distributed registries allow for a model where there is no single authoritative provider. The Distributed Registry Protocol (DRiP) at the IETF is being specifically designed for this use case. <https://datatracker.ietf.org/doc/draft-wendt-modern-drip/>

²⁵ Multiple IEFT Working Groups and the joint ATIS/SIP Forum IP-NNI Task Force have been working on standards for call authentication. The IETF STIR Working Group is now turning its attention to the TDM network.

VII. THE COMMISSION SHOULD ELIMINATE DIALING PLAN REGULATION SO SERVICE PROVIDERS CAN BEST MEET THEIR USERS' NEEDS

It has been suggested that the FCC should mandate ten-digit dialing²⁶ to facilitate the deployment of NNP. Ten-digit dialing regulation is unnecessary because NNP does not introduce anything new. It is already common for users to have TNs with area codes that are different than the area code in which they are geographically located.

Adding more regulation to the existing regulations will not be constructive.²⁷ Dialing plan regulations should be eliminated, and each service provider should be able to determine their own dialing plans. They are in the best position to understand how their customers should interact with the network.²⁸

Historical reasons for dialing plan regulation are no longer valid. Dialing plan regulation has come about for three reasons; 1+ as a toll indicator, competitive dialing parity, and customer confusion. None of these regulatory justifications is relevant anymore. Most companies do not bill calls based on distance, therefore 1+ as a toll indicator has become obsolete. When local competition was introduced in the mid-1990s, there was concern that when a new area code was introduced the incumbent carrier's customers would have a disproportionate share of the existing area code resulting in the competitor's customers dialing ten digits more often. This generated regulation requiring ten-digit dialing in overlay area codes. The competitive landscape is much different today. Finally, customers are much more sophisticated about dialing plans and are used

²⁶ Typically, the term used is "mandatory ten-digit dialing," meaning service providers would require their customers to always dial ten-digits for calls within the NANP, and seven-digit calls would be rejected. Presumably, this assumes a permissive 1+, meaning users could dial 1+ ten-digits, or ten-digits and calls would complete.

²⁷ Dialing plan regulation is a combination of federal and state regulations. This has created quite a bit of dialing plan variation among different area codes and states, see NANPA dialing plan summary, <https://www.nationalnanpa.com/enas/npaDialingPlansReport.do>

²⁸ Mobile service providers are not subject to these regulations and most, if not all, have evolved to a ten-digit dialing format with a permissive 1+.

to utilizing services that are agnostic to geography.

Ten-digit dialing regulation is not necessary, nor helpful, for deploying NNP. If the FCC believes dialing plan regulations are worth evaluating, it should either charge the NNP WG with conducting that evaluation or create a new issue-specific NANC WG.

VIII. THE COMMISSION SHOULD ELIMINATE THE N-1 QUERY REQUIREMENT AND ALL DIALING PARITY REQUIREMENTS

The Commission should eliminate the N-1 query requirement and all the remaining dialing parity requirements.²⁹ They are outdated, apply to a small number of calls, and create unnecessary complexity to service provider's networks and operations. Eliminating the complexity created by these requirements would facilitate the deployment of NNP.

There are two important things to understand when considering the N-1 requirement. First, it only applies to calls when a service provider has customers that have presubscribed to an IXC, i.e., the dialing parity requirement,³⁰ and the N-1 service provider (the IXC) is not allowed to bill the originating service provider for the query. Second, the service provider that was assigned the number block is allowed to bill a service provider for a query if it receives a call that was not queried. This provides incentive for service providers to query the call early in the process, and thereby avoid tromboning through the service provider's network.³¹

Few calls today are subject to the N-1 requirement, because very few consumers have an IXC that is different than their originating provider. Mobile providers, VoIP providers, and

²⁹ These two requirements are highly correlated – i.e., the N-1 requirement only applies to calls that are subject to the remaining dialing parity requirements.

³⁰ N-1 regulation does not apply in the scenario where a service provider contracts with a transport provider to carry calls on its behalf. The transport provider is not considered the N-1 service provider. That provider may perform LNP queries for the originating provider but that is a contractual agreement, not a regulatory requirement imposed upon the transport provider.

³¹ Tromboning (a/k/a, hairpinning) is when a call unnecessarily goes in and out of a service provider's network.

competing LECs do not offer IXC presubscription. For over a decade every incumbent LEC has been allowed to offer its customers interexchange service, and most consumers utilize the same carrier to handle their local and long-distance calls. This, in effect, has eliminated the N-1 requirement for the majority of incumbent LEC calls, i.e., the originating carrier and the IXC are the same company. Consistent with its decision to eliminate IXC presubscription, the Commission should eliminate all remaining dialing parity requirements.

There is no need to replace the N-1 requirement with a different requirement, such as an originating service provider query requirement. Originating service providers connecting to an IXC could choose to query the call or they could continue to pass the call to the IXC for them to query. There may be a concern that IXCs will start charging originating service providers for querying, but this seems unlikely given the purpose of the N-1 requirement (i.e., IXCs want to perform the query) and the fact that they are doing it today. Because the right incentives are in place to encourage efficient call processing, adding another regulation would be unnecessary and unhelpful.

As already noted, there are a very small number of calls that require dialing parity. Dialing parity also adds unnecessary complexity. Eliminating this requirement would facilitate the deployment of NNP. It is worth noting that eliminating the dialing parity requirement, in effect, eliminates the N-1 requirement because a call that used to involve three service providers would now only involve two.

IX. CONCLUSION

NNP provides an exciting opportunity to create more efficient number administration and would be the latest step in the Commission's ongoing efforts to modernize numbering in the United States. To facilitate the deployment of NNP, the Commission should task the NNP WG with developing actionable recommendations for the adoption of an NNP solution. Neustar

submits this solution should be NGLRN, which also will create a glide path from the PSTN to next-generation IP networks and will accelerate the deployment of call authentication services. Finally, the Commission should eliminate dialing plan, N-1 query, and dialing parity requirements, which are anachronistic relics of a bygone regulatory era.

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Respectfully submitted,

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