In light of the potential benefits to consumers from IP technology, the FCC is encouraging deployment of IP networks under the premise that certain core elements of the PSTN—universal access, Service Provider interoperability and public safety being paramount—be retained. In the FCC's USF/ICC Reforms Order released in late 2011, the Commission encouraged Service Providers to interconnect using IP in addition to existing technologies. The FCC also has ordered the Industry to eliminate terminating access charges by the year 2018; this is the same billing treatment used today for pure Internet traffic.

In addition to rising demand on the network itself, the Industry is experiencing an explosion of connected devices; smart phones, e-readers, tablets, televisions, cameras, and a host of machine-to-machine (M2M). Tese devices support applications such as telematics, navigation, health care, energy conservation, and just about anything that developers can imagine operating over the telecommunications network. Over 500M connected devices are projected to be connected to the North American networks from homes, businesses, infrastructure, and vehicles by 2020—and a high proportion of these devices will require telephone numbers.

Creating a Foundation for TN 3.0

All these developments imply changes to the way telephone numbers are administered, assigned to Service Providers, and used to authenticate devices and users on the network. TN 3.0 will involve three fundamental and related changes in the way the Industry interacts with telephone numbers.

First, the migration to IP networks opens opportunities for a more consolidated and efficient framework for interconnection. The PSTN's geographical constraints on TN allocation and assignment (e.g. central offices and LRNs per LATA) will no longer be necessary, and will give way to the publication of IP endpoints for all TNs (designated either by Internet addresses such as URIs). This will lower Service Provider interconnection costs, enable more efficient routing between Service Providers, and open up new opportunities for efficient number utilization.

Second, TNs can be assigned to and returned by Service Providers as needed, based purely on the demand driven by consumers, enterprises, and connected devices on the network. As has been discussed by Service Providers in the past, Individual Telephone Number Pools can be established for IP-based Service Providers, to alleviate the need to allocate thousands blocks or Central Office codes for LRNs. This will extend the lifetime of the North American Numbering Plan indefinitely and provide maximum accommodation for growth.

Why the NPAC/SMS

The NPAC/SMS's unique characteristics make it essential as a foundation for TN 3.0

- Carries information to the 10-digit level, allowing TNs to be assigned to consumers and network routes without the constraint of fixed ranges
- Built upon a real-time universal broadcast capability, with the power to authenticate and broadcast thousands of updates to the entire telecom network in seconds
- Supports multiple interface options, including CMIP, XML, a web poral, and an expert-staffed help desk for manual tasks
- Supports both PSTN and IP routing technologies, to support carrier needs for at least the next ten years
- Guarantees neutral administration and prohibitions on commercial exploitation for all data shared by its Users
- Operates under an fixed price business model with no incremental charges based on usage

Third, over time the complex processes for maintaining and synchronizing the nation's various numbering registries (NPAC/SMS, NANPA, SMS800, PA, and LERG) can be simplified and consolidated, eliminating the need for interfacing with multiple organizations and systems, and reducing Service Provider overhead.

The implementation and Industry adoption of TN 3.0 is a multi-year effort, requiring the collaboration of Service Providers, technology vendors, state regulators, and the FCC. In actuality, the process is already underway, signaled by discussions at the NANC, the INC, and the LNPA working group regarding the future of telephone numbers. Neustar, in cooperation with Service Providers and regulators, has begun to explore and address the requirements of registry consolidation and IP address exchange under the umbrella of TN 3.0. (See http://www.neustar.biz/tn-3.0 for our presentation on NTN 3.0, created by Neustar Fellow Tom McGarry, given in May 2012). Many of our customers have informed us that the highest priorities in the transition are to create maximum participation and adoption by Service Providers, at the lowest possible cost and risk of disruption. This is best accomplished by building upon the foundation of the Industry's existing numbering architecture and governance.

The NPAC/SMS already supports connection to all Service Providers in the U.S. over standard and secure interfaces, in an environment of high performance and neutrality. Extending the NPAC/SMS to accommodate the requirements for TN 3.0 will accelerate the benefits of Service Providers' IP transitions, while also ensuring full backward compatibility and maximum participation at no incremental expense. By comparison, the cost of building a new telephone number registry, defining new user terms and conditions, and integrating it with thousands of Service Provider IT and network systems could generate hundreds of millions of dollars in new capital and operational costs for the Industry.

Neustar's proposal for the next contract term includes, at no incremental cost, working with the various Industry groups to identify the appropriate pace and scope of the migration to TN 3.0, along with all development, testing, and deployment of Industry requirements. Given the broad implications, a subcommittee of the NANC and/or LNPA Working Group (which Neustar is prepared to lead) should be established to evaluate Service Provider perspectives and finalize requirements. The following sub-sections describe Neustar's current assessment of TN 3.0 benefits and requirements.

National IP Interconnection

The first and most important requirement TN 3.0 must solve for is to develop an Industry-wide solution for translating TNs to Internet addresses. While both PSTN and IP networks are expected to coexist at least through 2020, IP will eventually replace TDM as the primary technology over which TN-addressed traffic is routed between networks. While LRNs can still be used to denote IP endpoints, most people familiar with this challenge have focused their attention on ENUM, a protocol created by the Internet Engineering Task Force (IETF) that converts a TN into an Internet domain name, and then uses DNS to obtain the Internet IP address for the point of interconnection (POI).

An ENUM-based solution is the best alternative for implementing Industry-wide IP interconnection in the near term (i.e., within 1-3 years). To create an Industry-wide ENUM solution for country code 1, Service Providers and technology vendors must not only rely on a common registry, but also collectively determine the appropriate provisioning, discovery, and authentication protocols. There have been attempts made over the last five years to establish such a function outside the NPAC/SMS—but none have succeeded, given the challenges of driving wide participation at manageable costs. The NPAC/SMS, however, already includes built-in, high-performing connectivity to Service Provider networks and back-office systems, and is likely to inspire wide adoption at the lowest possible cost. All NPAC/SMS functionality that is required to use the NPAC/SMS in this manner is already in place:

- Secure and reliable provisioning and distribution interfaces between all Service Providers
- Attributes to carry IP addressing information as well as for the PSTN
- Support for all North American telephone numbers (including non-ported and non-pooled, based on Pseudo-LRN technology).

Neustar has begun working with Service Providers and technology partners who wish to utilize the NPAC/SMS as the nation's common and trusted source for ENUM provisioning. In 2012, Neustar conducted the Industry's first trials to prove the viability of NPAC/SMS-based IP Interconnection. In 2013, in its role as a neutral third party and partner in collaboration, Neustar has begun establishing the requisite community forums to develop and foster the broadest possible collaboration and participation in IP interconnection. These forums, which include Service Providers from all segments of the market plus a number of strategic technology partners, will establish the appropriate data formats and protocols for the Industry to use the NPAC/SMS URIs.

For additional details regarding Neustar's proposed approach for IP endpoint provisioning, see attached white paper "Data Format Recommendations for Voice/SMS/MMS URI Fields in the NPAC."

Consolidation of Points of Interconnect (POIs) and Dynamic Route Provisioning

In TN 2.0, LRNs are associated to Service Providers per switch, and per LATA—meaning that for each geographic area where a carrier provide service (approximately 200 nationwide), they must be assigned a 10K-block of TNs and must request an LRN. Maintaining these PSTN-based rules in TN 3.0 not only implies the use an ever rising quantity CO codes (leading to faster area code and NANP exhaust), but also forces Service Providers transitioning to IP to replicate the existing TDM infrastructure—that is, with an IP point-of-interconnect (POI) in every LATA across the country. This is unnecessary and inefficient.

Instead of insisting that there be one point of interconnect for each Service Provider per LATA, the Industry should use the transition to TN 3.0 as an opportunity to reduce the assignment of CO codes, and create greater flexibility for Service Providers to route calls based on the attributes such as location of the caller and agreements between the Service Providers – not simply based on the geography of the telephone number itself.. IP-based Service Providers in particular do not require 200 POIs across the country; the assignment rules should recognize the potential efficiencies of allowing Service Providers to consolidate their POIs based on an optimal organization of the network. Exhibit 1.5-1 illustrates the difference between the number of LATAs (each requiring a PSTN point of interconnections) with the number of Internet Exchange Points, (IXPs) for three of the major commercial IXP providers.

This implies, over time, an elimination of the edits and business rules limiting telephone numbers and LRNs within geographically segmented boundaries. These edits have already been suspended on occasion (for example, following Hurricane Katrina), allowing telephone numbers to be assigned LRNs outside their LATAs. Over time, there should be no reason that an LRN cannot signify a point of connection on the IP network that terminates call traffic to multiple LATAs or even NPAC/SMS regions (presuming the NPAC/SMS remains national in scope, and is not divided among multiple vendors). Telephone numbers could then be assigned the appropriate LRN based not upon their dialed digits, but based on the locations, service characteristics, and behaviors of the subscribers to which they are assigned. When LRNs give way to URIs for direct IP addressing, the same principles hold—URIs have no fixed and published geography, they simply map to network endpoints as optimally defined by Service Providers.

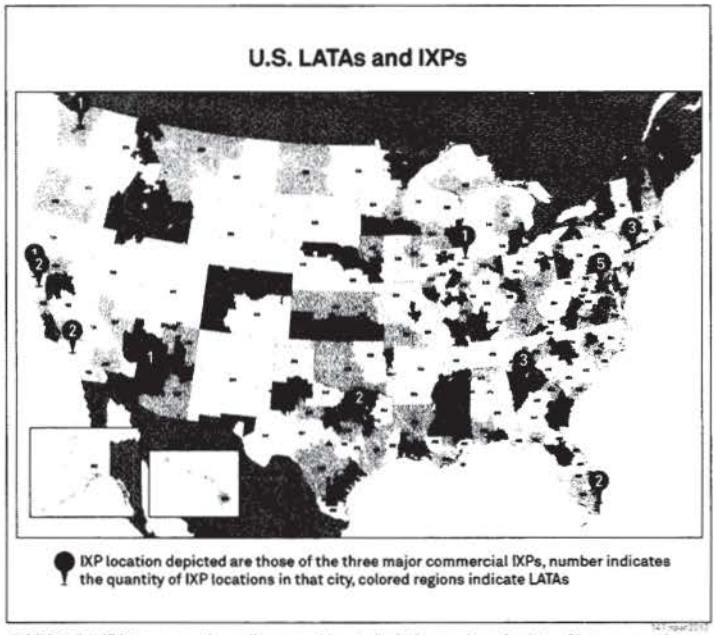

Exhibit 1.5-1: **IP interconnections allows providers to limit the number of points of interconnection; compare almost 200 LATAs vs. 23 major Internet exhange points.**

In the last fifteen years, the NPAC/SMS has proven to be a highly reliable, always-on resource for the Industry, agnostic to underlying network technology for the telephone numbers under its stewardship. Recognizing this, a number of opportunities for cost savings and optimal routing are possible today that may not have seemed prudent during the initial NPAC/SMS deployment. One of these opportunities comes in the arena of dynamic, network-aware endpoint provisioning in the NPAC/SMS. For example, wireless Service Providers are currently in the midst of rolling out VoLTE application over their LTE networks, replacing the 3G infrastructure in phases. During this transition, which is expected to last several more years, mobile subscribers remain likely to move between 3G and VoLTE coverage areas with some frequency. Subscribers homed in VoLTE coverage areas are assigned LRNs that signal a device's eligibility for 4G coverage – and the LRN remains assigned even when those subscribers roam outside the VoLTE coverage area, and into a region still operating on 3G. When this occurs, terminating traffic will be sent first to the VoLTE network and then re-routed to the carrier's 3G network, using up capacity on gateway ports in the VoLTE network, and potentially degrading call quality. If, however, the wireless provider reacted to its subscriber's movement into the 3G area by publishing new routing instructions to the NPAC/SMS in real time, calling parties would then seamlessly begin sending traffic directly to the subscriber attached to the appropriate 3G network, bypassing the VoLTE network while the subscriber was out of the coverage range. Neustar has assessed the potential benefits of a dynamic route provisioning approach that reacts to subscriber movement, and has estimated industry savings of up to $95M in reduced capital and operational network expense, depending upon the overall pace of migration to VoLTE.

For additional details regarding Neustar's proposed approach for dynamic point-of-interconnect routing, see attached white papers "Enhancing NPAC's Role in Dynamic Addressing and Routing" and "Optimal VoIP Call Routing Using NPAC."

Accommodating the Demand from Machine-to-Machine

One of the most recent sources of demand for numbering resources are connected devices, such as iPads, tablets, eBooks, etc. This is a precursor to a wider category of communications service known as machine to machine (M2M). M2M services cover a wide range of devices that have no direct human interaction, including meter readers, data collectors for utility services, sensors for health care monitoring devices, and more. Many of these devices operate over the cellular network, and therefore require the use of telephone numbers. These TNs are used for customer identification, billing, and auditing communications between M2M devices and application servers—but are typically not used for traditional voice and text interoperability.

Nearly 500 million M2M devices are expected to be connected to U.S. Service Provider networks over the next ten years—a potentially significant consumption of North American Numbering resources. This increase in demand could prove disruptive to the management of conventional telephone numbers, if not managed properly and with sensitivity to the consumer impacts of area code exhaust. Given the demand for M2M devices the Industry and the corresponding burden upon the NANP, the Industry is beginning to assess now the various mechanisms available to administer M2M numbering resources, and in so doing conserve geographic area codes.

Neustar has recommended, as part of the TN 3.0 evolution, that the Industry work to guide M2M-related demand to the 5YY series of non-geographic area codes, otherwise known as personal communications service (PCS) numbers. Demand for these resources has already begun to tick up, exhausting three PCS area codes in the past four years; to account for this, as a start 29 additional PCS area codes have been reserved in the NANP.

There are still limitations, however—today, non-geographic numbers are not addressable between Service Provider networks. This has implications for Service Provider billing and ordering platforms, and will require a solution to enable interoperability between networks (for example, consumers using SMS messaging to their home numbers to "wake up" energy saver or security devices). Neustar's proposal involves the provisioning of 5YY numbers assigned to Service Providers in the NPAC/SMS, along with the ability to populate a new M2MURI field for the purpose of Service Provider interconnection.

Using the NPAC/SMS to allocate and administer non-geographic resources for M2M will permit the Industry to monitor usage and demand for these critical resources. In addition, since the vast majority of inter-Service Provider communication for M2M will traverse the IP network, the NPAC/SMS's URI fields permit a secure, efficient, and auditable mechanism for exchanging endpoint information.

For additional details regarding Neustar's proposed approach for M2M, including how to leverage the NPAC/SMS to provide inter-carrier application services, see attached white paper "M2M Number Administration, Interoperability, and Service Enablement."

Individual Telephone Number Pooling (ITN)

The majority of telephone number demand over the next decade will be driven by mobile and IP-based service offerings, and by M2M. Currently, the FCC is considering mechanisms to allow pure VoIP Service Providers direct access to numbering resources. The best way to conserve consumer resources for the long term, and to pave the way for removing geographic constraints for telephone numbers completely, is to allow exceptions to the requirements of assigning carriers blocks of telephone numbers in large ranges limited to specific rate centers. The Industry, in collaboration with state regulators and the FCC, has the opportunity now to begin the process of

developing the means to allocate telephone numbers to carriers in direct proportion to their need. We refer to this concept as just-in-time assignment, or Individual Telephone Number Pooling (ITN). This concept could be offered initially for the use of interconnected VoIP SPs, and subsequently expanded to allow all carriers to participate. Over time, numbers could be harvested from existing stands of stranded numbers presently assigned to specific rate centers. The process would require national standards, which could be developed by the appropriate industry numbering committees with guidance from the FCC.

An ITN environment allows Service Providers the option of requesting numbers on an as needed basis, from a common pool stewarded by a neutral, non-Service Provider third party, such as the Pooling Administrator (PA) itself. These pools can be established in the NPAC/SMS with minimal effort within existing, unused ranges of TNs in designated area codes, including TNs from blocks with contamination levels too high to permit their assignment today.

Briefly, using largely existing functionality, the PA/NPAC/SMS telephone number assignment process can work as follows:

- Initial Start-up Activity:
  - PA will open ITN pools - telephone number ranges for specified rate areas in NPAC/SMS, under its own Service Provider ID (SPID)
  - NPAC/SMS will ensure each range of TNs opened for Service Provider assignments is available for immediate activation by addressing the "five-day, first-port notification" for the TNs' NPA-NXX
  - VoIP providers will apply for and be authorized by the relevant states to receive NANP numbers
  - NPAC/SMS will change the status of state-authorized VoIP providers from "read-only" to "read-write" for the applicable regions
  - VoIP provider will open an LRN in the NPAC/SMS, drawn from an NPA-NXX code assigned to its PSTN connectivity partner (a CLEC or other facilities-based provider).
- Number Assignment Process:
  - Upon new customer acquisition (not a competitive port of an existing number), the VoIP provider will submit a Create Pending SV request to NPAC/SMS, to obtain a TN for its customer from the common ITN pool. This Pending SV will have an LRN provided by its PSTN connectivity partner, and a VoIP URI for pure IP traffic.
  - The NPAC/SMS will send notification to PA about the ISP's Create Pending SV request.
  - PA will compare SPID making request with any other restrictions at the NPA or state authorization level.
  - PA will respond with "release" message to NPAC/SMS, with concurrence flag set either to "true" or "false".
  - If authorization fails, concurrence flag is set to "false" and VoIP provider is notified by NPAC/SMS that it cannot take the TN.

- Once due date and time on the pending SV are reached, VoIP provider can send an Activation request to NPAC/SMS. If Activation before the Due Date is desired, VoIP provider will first send a Modify Due Date request to NPAC/SMS. Once activated, the NPAC/SMS broadcasts the TN information to the rest of the Service Provider community and the telephone number is seen as now served by the VoIP provider.

- When customer terminates service, the VoIP provider will send a Delete TN message to NPAC/SMS. Deleting the record restores it to the PA's TN inventory in NPAC/SMS.

This entire process can be automated between the PA and the NPAC/SMS, resulting in an immediate assignment of the TN to the VoIP Provider.

Over time, and with the addition of the universe of carrier telephone numbers, ITN can significantly reduce the frequency of area code exhaust by maximizing the utilization of existing resources. That is, there is no requirement for VoIP providers to maintain inventories of spare numbers for assignment. In addition, utilization and forecasting can be accomplished far more efficiently, without each Service Provider needing to report on the consumption of pre-assigned ranges of TNs.

Beyond ENUM: Telephone Number Related Queries (TeRQ)

ENUM was originally created as a consumer solution, not one for Service Providers to connect networks. When Service Providers moved to incorporate ENUM, they put requirements on it that were inconsistent with DNS. For example, they wanted it to be on a secure network, rather than the open Internet, and wanted to authenticate the originator of queries. These and other ENUM shortcomings are covered in a document titled Architectural Considerations on Application Features in the DNS, http://www.ietf.org/mail-archive/web/i-d-announce/current/msg40967.html, issued by the Internet Architecture Board (IAB) that is the oversight committee for the IETF.

In recognition of some of the long term shortcomings of ENUM, Neustar has been working on a long term solution for IP interconnect called Telephone Number Related Queries, or TeRQ for short. Jon Peterson, a Neustar Fellow, has been spearheading an effort at the IETF for creating a protocol independent framework and data model for queries related to telephone numbers and call routing that breaks through the limitations of ENUM, and can be a foundation for interconnection in the latter half of the decade. The latest draft is attached to this proposal, and can also be found at http://tools.ietf.org/id/draft-peterson-terq-02.txt. A presentation by Mr. Peterson given at IETF 85 in November 2012 can be found at http://tools.ietf.org/agenda/85/slides/slides-85-dispatch-0.pdf.

Neustar's proposal for NPAC/SMS administration includes evolution toward protocols like TeRQ, including aspects for both provisioning and querying. In the future, the NPAC/SMS can be expanded to include a field for a provider's TeRQ information server (similar to the way Caller Name functionality works today with the user of SS7 DPC parameters). Alternatively, the NPAC/SMS can be enhanced to serve queries directly over the TeRQ protocol for telephone number-related data such as geo-location, subscriber presence, and enhanced caller-id.

For additional details regarding Neustar's proposed approach for TeRQ and its potential benefits to Service Providers, see attached white paper "Telephony-related Queries."

1.5.2 The Telephone Number as Identity in an Internet Marketplace

In addition to ensuring that telephone number administration keeps pace with and continues to provide essential value in an all-IP world, Service Providers are also uniquely positioned to expand their mindshare and wallet share by investing in the telephone number as a secure and reliable identifier for users on the Internet. Telephone numbers, unlike many other identifiers used over the Internet, are ubiquitous, globally unique, assigned as a public resource with neutrality in mind, and above all highly trusted. Service Providers' ability to efficiently leverage this key asset is critical, as they navigate the new landscape of non-traditional competitors and raised consumer expectations.

The first step is to ensure that telephone numbers retain their status as secure and reliable identifiers. With the proliferation of IP technology, it is becoming easier for entities to impersonate any TN as the calling TN. This is called spoofing, and is already a rising concern for Service Providers with regard to TNs. It is becoming quite common to spoof the originating telephone number for caller ID—in particular to deliver spam text messages and telemarketer calls. As VoIP and IP interconnection become more common, and as access charges are accordingly reduced, spoofing has the potential to increase in severity and volume. This problem is of great concern when one considers ho TNs are used for two-factor authentication by web-based Service Provider, and given the reliance on TNs by the E911 public safety system.

This problem can be addressed via a standard, secure, and repeatable means of determining who owns a telephone number, and who retains responsibility for services originated from it. Interestingly, this problem of authentication is easier to solve in an all IP environment than it would be for just the current TDM network. The TDM network has the problem of "transitive trust", in which each entity in the chain trusts the entity previous to them. Often there's no often no direct trust relationship between the originator and terminator of a call.

On the Internet, however, digital certificates are commonly used between endpoints to ensure the veracity and trustworthiness of a transaction. They are used in DNS security to verify domain names, and in Resource Public Key Infrastructure (RPKI) to verify IP addresses. The same type of digital certificate, for Internet-based services, can be associated with a telephone number, which binds it to the assignee and allows third parties to assess the veracity of incoming transactions before completion. The TN can thus be authenticated at each link in the supply chain, including the end point.

Neustar's proposal includes an extension to its current interface to enable the association of digital certificates to NPAC/SMS resources, specifically to TNs. Since the NPAC/SMS is an authoritative registry, these certificates can be used to verify that the originator of any transaction is indeed responsible for the TN. Service Providers will be able to request that the NPAC/SMS issue digital certificates for any TN or range of TNs under their management, in such a way that will automatically keep pace with all porting and pooling transactions that impact Service Provider inventory. These certificates can be delegated to resellers and over-the-top providers, so that all elements of the telecommunications supply chain have the ability to securely and reliably authenticate their calls and messages from the TNs assigned to them.

Over time all TNs in the NANP can be associated with an NPAC/SMS certificate; this will reduce nefarious actors' ability to spoof a provider's TNs as a means of disguising their identities, thereby improving quality of service and reducing the impact on subscribers.

This concept can even be extended to serve as a consumer's identity in cyberspace. There are many companies—including but not limited to the same over-the-top Internet and social media providers currently acting as partners to Service Providers today—vying to be the consumer's primary provider of identity in cyberspace. These companies recognize the need for subscribers to aggregate personal information for mobile and IP-based transactions related to health care, finance, home security, and others, in such a way that is reliable and fully safe. The US government has even organized an effort called National Strategy for Trusted Identities in Cyberspace (http://www.nist.gov/nstic/) to evaluate this specific issue, and ensure that consumers have appropriate options as the technology environment evolves. The communications industry has an opportunity to proactively secure telephone numbers as a preferred subscriber identity for this very purpose—building upon their reputation as providers of high-performing, trustworthy, and reliable services.

For additional details regarding Neustar's proposed approach for NPAC/SMS digital certificates, delegated authority, and identity management, see attached white paper "Telephone Numbers as Secure Universal Identifiers."

The concept of the NPAC/SMS providing an authoritative identity service in a changing market is further exemplified in two ongoing Industry discussions—SMS over fixed-line telephone numbers and stolen handset registries.

SMS Interoperability for Fixed-line Providers

In recent years, non-wireless SPs and their partners have developed mechanisms to send and receive text messages, similar to the manner of wireless operators. This has allowed for a variety of new services and applications to be delivered, including SMS to the set-top-box, SMS to tablet clients, and integration with social media. However, it has also introduced a greater potential for fraudulent or abusive messaging to wireless customers.

Operators in the wireless and fixed-line communities, in cooperation with the CTIA, have in recent months been working to establish authoritative protocols for SMS interoperability for new entrants, particularly non-wireless providers with "over-the-top" resellers. The challenge has been to create a mechanism for transparent and authoritative whitelisting for telephone numbers that are eligible for SMS origination and delivery—with an aim toward maximizing the potential of interoperability between consumers, while minimizing the potential for spamming and spoofing in what is now a relatively clean ecosystem.

Neustar has recommended that non-wireless Service Providers use the SMSURI and/or MMSURI field in the NPAC/SMS to enable transparent, effective and efficient routing. Because the Industry already uses the NPAC/SMS for message routing for wireless numbers (by using a combination of SPID and service type), it is logical to include a designation within NPAC/SMS to identify non-wireless numbers that should be enabled for SMS.

With this protocol adopted, messaging aggregators and wireless providers will rely on a combination of SPID and SMSURI/MMSURI to derive a route for SMS/MMS. This approach will provide a consistent, transparent, and most importantly trusted mechanism to enable fixed-line carriers to offer messaging services in a manner that is transparent and secure, and that allows for prompt reaction on behalf of Industry in the event of identified spamming. The solution also helps to aligns messaging services portability with voice portability. The SMSURI/MMSURI fields are configurable to the provisioner of SMS service, allowing for flexibility with respect to the identity of the underlying user. Finally, all information relevant to service routing can be stored in an Industry-approved registry with equal, consistent access and appropriate oversight.

For additional details regarding Neustar's proposal to use the NPAC/SMS SMSURI for whitelisting, see attached white paper "SMS Message Routing - Landline Numbers."

Equipment Identity/Stolen Handset Registries

Given its ubiquitous connectivity across the Service Provider landscape, NPAC/SMS is the ideal location to store and distribute device identity and service information to serve the interests of the broader Industry. In particular, with the support of the FCC, the wireless community is moving towards a common platform to share information in a common Equipment Identity Register (EIR), to address fraud associated with stolen handsets. Individual carriers are currently moving forward with internal solutions, and the GSMA has begun offering a file transfer mechanism to support the exchange of information between carriers. However, no single platform exists today for U.S. carriers to not only publish this information quickly and efficiently, but also provision the information about stolen devices directly into their networks in the same manner as LNP data is provisioned today, using an LSMS-like infrastructure already in place feeding Service Provider networks. A nationwide platform to address stolen handsets can reduce fraudulent activity by reducing the value of stolen devices, and save Service Providers significant expense in opportunity cost and customer support.

For additional details regarding Neustar's proposal to offer an Equipment Identity Register as part of the NPAC/SMS, see attached white paper "Equipment Identifier Registry (EIR) Solution."

1.5.3 NPAC/SMS and the Value of Information: The ElementOne Analytics Platform

Today's number administrators and network engineers need access to the right information at the right moment, in order to maximize the effectiveness of their operation. Neustar's suite of analytics solutions gives Service Providers the power to make better decisions based on the data housed in the NPAC/SMS, for the essential purposes of network planning, telephone number resource allocation and assignment, and subscriber management.

The NPAC/SMS as administered by Neustar is already a source of invaluable reporting and analysis for NPAC/SMS users. The NPAC/SMS contains nearly half of the NANP's 1.5B telephone numbers allocated to Service Providers, and an even greater percentage of numbers in active service. It contains an authoritative picture of the movement of telephone numbers—and thus subscribers and devices—in and out of carrier inventories. More broadly, the NPAC/SMS also contains information that can illuminate the distribution and comparative density of telephone numbers across geographies and network facilities, along with the pace and trending of subscriber loss and acquisition. In total, over 12 billion data elements related to networks, subscribers, and telephone numbers are stored in the NPAC/SMS, all of which Service Providers have access to today for the purposes of routing, rating, billing, and network maintenance.

Over the last several years, Neustar has partnered with its customers to make NPAC/SMS data more accessible to users throughout a Service Provider's operations. To this end, we have developed the Port Power Search (Port PS) service, beginning with a free online service allowing authorized users to query individual or groups of telephone numbers and receive a consolidated ownership and routing disposition from all Industry numbering registries databases. Since its inception in 2006, Port PS has processed over 1.5 billion Service Provider queries, across over 14,000 Industry users - all at no charge. Recognizing the need for more , Neustar has since enhanced the Port PS platform with an online reporting tool known as Query Manager. The service offers a set of canned reports accessible to all users, and also offers the option of creating custom queries of a single virtual data model, that

includes all four Industry numbering registries (NANPA, PA, LERG, and NPAC/SMS). For the next contract term, and subject to review by the LNPA Working Group, functionality currently available in Port PS and Query Manager will be made available at no charge to all NPAC/SMS Users, as part of the NPAC/SMS User Agreement and accessible through the new NPAC/SMS Portal.

Beyond the incorporation of services with which the Industry is familiar through Port PS, Neustar also proposes to include, free of charge, access to our proprietary and market-leading analytics engine as a means to derive meaning and value from the NPAC/SMS's enormous datastore: the ElementOne Analytics Platform.[1]

The ElementOne Analytics Platform (EAP)

Neustar's ElementOne (E1) is a robust, scalable, and secure cloud-based Geographic Information System (GIS) platform that provides rich data and cutting edge analytics to help clients make better business decisions. ElementOne leverages Security-Related Information, spatial and Java EE technologies to provide a feature rich, secure and highly scalable application to end users. Validating its best-of-breed attributes, in 2011 the EAP won the highly coveted Security-Related Information, out of a field of leading domestic and international entries in the GIS Industry.

The key technical differentiators for EAP include:

- An Industry-leading cloud based geo-spatial query engine
- Sophisticated enterprise reporting, panels and dashboards
- Comprehensive and flexible area creation and manipulation functions (geography aggregations, non-overlapping component trade areas, configurable thresholds)
- Multiple topology views for accurate and granular geography relationships
- Improved base data precision with rate center, LATA, and ZIP+4 level data
- Cached tile maps for high performance, scalability and portability

[1] Although the implementation of a new NPAC feature relying on Neustar's proprietary ElementOne Analytics Platform technology as described in this Section 1.5 will be subject to the SOW Allowance process set forth in Section 3 of this Proposal, Neustar will, if selected as the LNPA, and as further accommodation to the Industry, exclude from the SOW Allowance calculation the cost of licensing the technology to users; provided, however, such underlying technology is not subject to any limitations or restrictions other than in conjunction with the provision of NPAC/SMS Services, the code to the underlying technology is not subject any escrow or additional licensing requirement, and the technology is not subject to any transition services obligation.

Information Services Available to all NPAC/SMS Users

The E1 architecture provides a structured approach to assembling critical information, visualization and trending. In addition to offering automated, up-to-the-minute assessments of Service Provider inventories for the purposes of utilization forecasts and registry synchronizations, the E1 reporting and analytics package will offer, to all Users of the NPAC/SMS:

Geographic Visualization—E1 offers the use of clickable "heat maps", which allows Service Provider users to navigate a clickable hierarchy of inventory or activity down to the Region, State, LATA, central office switch, and Rate Center level. The NPAC/SMS E1 instance will offer users a near real-time view into porting and pooling data, to quickly identify areas:

- Which have the highest inventory density relative to the surrounding areas and facilities
- Which have experienced higher levels of porting or pooling over configurable time periods
- Which are approaching inventory exhaust, necessitating requests for replenishment

Histograms and trending reports—While the heat maps described above excel at delivering a "snapshot view" based on geographical segmentation, the histogram function (also available as part of E1) allows for an even greater flexibility in organizing telephone number inventory according to configurable rules set by the Service Provider. In addition, E1's access to historical NPAC/SMS data allows the user to create trending reports that show, over time, the pace of Service Provider activity with regard to the NPAC/SMS—competitive porting, pool block activation and donation, and network management. E1 can break this information down according to any attributes available to the analytics engine, including trading partner, customer type, service characteristics, or routing attributes (LRNs, URIs, etc.) As a mechanism to refine and streamline operations like provisioning and network management, the E1 analytics platform can be a valuable decision-making tool.

As part of the implementation of the NPAC/SMS Portal (described in Proposal Section 1.1), Neustar will request participation from the LNPA Working Group to discuss the specific configuration of the E1 platform for NPAC/SMS Users. Service Providers will only be able to run queries and perform analysis on their own NPAC/SMS data, and as a beginning, will only have access to data already stored in the NPAC/SMS. As the Industry evolves to TN 3.0, and Service Providers recognize a need to analyze the existing dataset against other, proprietary information in their own systems, the E1 platform can evolve to provide exponentially more value to Service Providers.

Future Considerations

NPAC/SMS data is used subject to strict permitted use constraints. Pending review by the NAPM, LLC, Neustar is prepared to continue improving the information services and analytics that we can provide to Service Providers, both inside and outside the NPAC/SMS Administrator contract. NPAC/SMS data reflects the distribution and movement of telephone numbers nationwide—combined with other data sources, it can unlock material insights into networks, communities, and economies—with value not only to Service Providers, but also regulators and other public interest groups. For example:

- Neustar could combine aggregated and anonymized portability data with demographic and economic data, to identify correlations between telecom service and various types of population shifts

- Anonymized and Aggregated NPAC/SMS data can also provide insights into commercial data sources, to investigate correlations between telecom usage and other market trends in real estate, consumption, and job growth.

We look forward to continuing the discussion with the NAPM LLC on the value of NPAC/SMS-based information services in the next term.

Conclusion

Over the past 15 years Neustar has developed and demonstrated expertise in managing a complex, highly available service to support Number Portability. This service is hosted on state of the art platforms, which have been refined over time based on years of unique operational experience. Neustar has continuously invested in the NPAC/SMS's reliability and availability, utilizing best of class commercial hardware, storage and software products. We have also repeatedly partnered with the Industry to invest in and refine our operational and business processes, all to accommodate consistently rising volumes and expanded services.

The telecommunications Industry will witness unprecedented change over the next decade, fueled by migration to IP networks, proliferation of devices, increased mobility, and further personalization of consumer services. These drivers underpin the importance and strategic relevance of NPAC/SMS innovation, building upon the unique characteristics that make the NPAC/SMS the Industry's most comprehensive and high-performing number management registry. Extending Neustar's partnership ensures that our current exceptional performance will be maintained, and further that the Industry will be able to focus on meeting the requirements of the future. Table 1.5-1 describes the various innovations and investments proposed by Neustar in the next term.

Table 1.5-1. Proposed Innovations and Investments

NPAC/SMS Roadmap Item	Value to Service Providers	Next Steps	Further Proposal Reference
[redacted]			
Consolidated POIs and Network-Aware Provisioning	• Avoids need for central office / point-of-interconnect in each LATA, in favor of optimal network design unconstrained by PSTN geographic rules • Efficient roll-out of VoLTE networks based on dynamic route provisioning as subscribers move between 4G/3G coverage areas	• Policy discussion regarding LATA boundaries and TN / LRN assignment • LNPA Working Group review (long term policy review)	Neustar white papers: Enhancing the NPAC/SMS's role in dynamic addressing and routing Optimal VoIP Call Routing Using NPAC
[redacted]			
Machine-2-Machine Administration	• Accommodation for significantly increased demand for TN resources, deferred area code exhaust (estimated expense for area code overlay) • Increase value of M2M devices on Service Provider networks by maximizing interoperability options	• Enable NPAC/SMS provisioning for non-geographic numbers (5YY) • Add M2MURI attribute, M2M SV Type value to SVs and pooled blocks	Neustar white paper: M2M Number Administration, Interoperability, and Service Enablement
[redacted]			

NPAC/SMS Roadmap Item	Value to Service Providers	Next Steps	Further Proposal Reference
[redacted]			
TN Certificate Authority	• Increased security for TN-addressed messages over the internet (e.g. Caller ID, mobile finance) • Opportunities for Service Providers to differentiate in the market for mobile Internet identity services	• Definition of Certificate Authority procedures for use with NPAC/SMS Security-Ri interface	Neustar white paper: Telephone Numbers as Secure Universal Identifiers
[redacted]			
Equipment Identity/Stolen Handset Registry	• Reduced fraud due to stolen devices (13M estimated lost/stolen smartphones in 2013) • Accelerated compliance with FCC requirements • Leverages existing NPAC/SMS infrastructure and interfaces	• LNPA WG review of NPAC/SMS enhancements • Collaboration with GSMA to consolidate Service Provider option	Neustar/Tekelec joint white paper: Equipment Identity Register Solution
[redacted]			

1.6 Transition and Implementation

Why Neustar

Any transition to one or more new LNP Administrators places great financial and operational risks for Service Providers and consumers. Retaining Neustar as the U.S. LNPA eliminates:

- ALL the risks and expense of an unprecedented industry transition, estimated to cost at least $719 million for Service Providers
- Material opportunity costs for Service Providers and regulators, as resources are pulled from other strategic initiatives to focus on migrating the full set of LNPA services to a new, untested vendor
- Lengthy "shake-out" period of degraded service and periodic system unavailability - affecting consumers and driving up customer care expense
- Risk of failed calls and texts from even a small error in migrating the NPAC/SMS's 12 billion data elements
- Potential for reduced readiness in times of disaster and emergency, when first responders and regulators rely on the LNPA to restore service
- Declining consumer porting experience, blocked access to numbering resources, and delayed or impeded network management activity – all of which are effected by NPAC/SMS performance
- Compounded Service Provider expense and uneven consumer experience caused by multiple LNPAs
- Loss of consumer and SP confidence in the LNPA's understanding of and commitment to neutrality
- Reduced attention on strategic priorities (i.e. IP Interconnection) as alternate vendors focus on replicating Neustar's performance rather than the needs of the future

The Industry understands better than anyone else that there is a lot at stake when contemplating a transition to another vendor for LNP administration. As highlighted below and in Exhibit 1.6-1, delays, issues, and failures in transition will have numerous negative consequences for the Industry with potentially significant impact:

- Misrouted telephone calls and misrouted traffic for services such as SMS/MMS messages, causing increased Service Provider customer service calls and associated costs; and if long-term, customer retention problems
- Failed or slowed competitive consumer porting with reduced or slowed revenue to Service Providers and increased Service Provider customer care and resolution costs

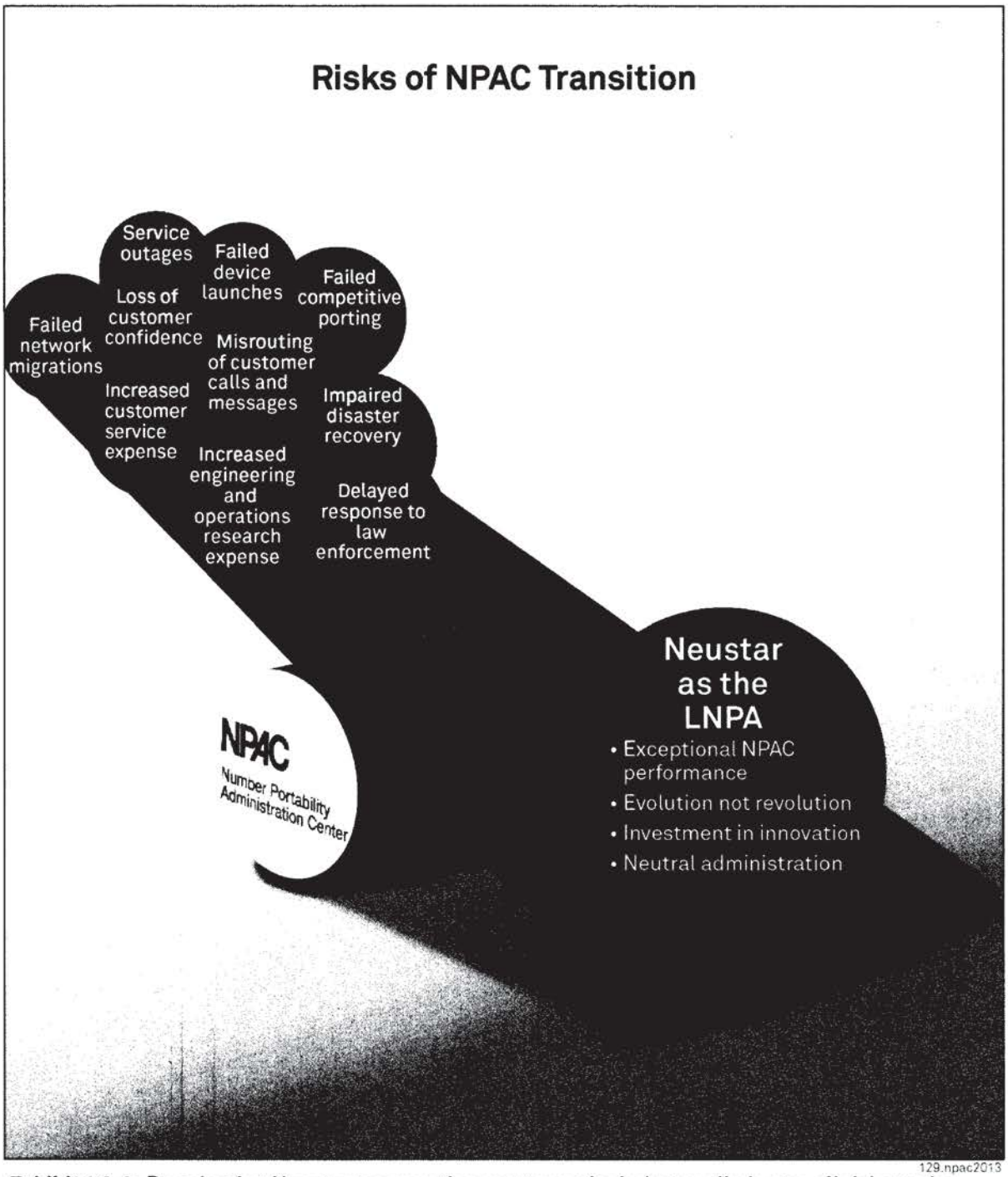

Exhibit 1.6-1: **By selecting Neustar to serve the next term, the Industry eliminates all risks to the continuing success of Number Portability in the United States.**

- Failed or slowed customer retention programs and new service/mobile device launches, again, with reduced or slowed revenue to Service Providers and further increased Service Provider customer care costs
- Failed or slowed access to telephone numbers for Service Providers
- Delayed law enforcement and public safety activity, putting citizens and property at risk
- Impaired disaster recovery efforts that use porting, pooling, or network migration as a remedy
- Failed or slowed Service Provider network migrations, potentially leading to customer service outages
- Improper calls made by automated dialers to wireless telephone numbers, causing complaints to the FCC and State PUCs

To provide another perspective for evaluators, Neustar sponsored the development of the following six studies published recently about U.S. LNP and U.S. LNP Administration:

1. *"Scale and Transactional Economies in NPAC Services,"* by Scott Masten, PhD—Professor of Business Economics and Public Policy, University of Michigan, which describes the advantages and cost savings provided to the Industry by having a single LNPA vendor nationwide.
2. *"Telephone Numbers Are Portable; Is the NPAC?,"* by the Yankee Group, which describes how LNP in the U.S. is a model for the entire world.
3. *"India's Experience with Mobile Number Portability,"* by W. Bruce Allen, PhD—Professor of Business and Public Policy, Wharton School at the University of Pennsylvania; Visiting Professor, Indian School of Business, which describes how the number portability ecosystem and infrastructure in the U.S. is vastly different and, in many ways superior to the number portability ecosystem and infrastructure in India.
4. *"Number Portability Through the Global Lens,"* by the Yankee Group, which concludes that there are vast differences between LNP ecosystems and implementations worldwide and there is no LNP ecosystem or implementation in the world that directly compares to the U.S.
5. *"The Consumer Benefits of an Efficient Mobile Number Portability System,"* by Hal J. Singer, PhD, Managing Director and Principal, Navigant Economics, which found that Americans have the fastest wireless number portability system in the world, resulting in billions of dollars in annual savings for wireless consumers. The report also found that any disruption to the number portability system's efficiency could potentially have a significant impact on wireless consumers.
6. *"Carrier and Consumer Impacts Due to a Change in Local Number Portability Administration,"* by Hal J. Singer, PhD, Managing Director and Principal, Navigant Economics, in the Attachments Section of our proposal, which discusses the risks and potential costs associated with a transition to a new LNPA vendor.

While Neustar, as the incumbent, is not required to provide a transition plan, we have included the following subsections to help the Industry evaluate a transition and a Respondent's transition and implementation plan—specifically an overview of what needs to be transitioned and evaluating plans including transition strategies.

What Needs to be Transitioned

The transition to another vendor(s) is not a trivial task; it is not only all of the work and risk involved in implementing a technical infrastructure and transitioning the NPAC/SMS software and data and migrating both to their environment but also the transition or implementation and the continued operation of all of the services previously described in Proposal Section 1.1, LNP Administration Services. In addition, the following highlight some of the additional functions the LNP Administrator must manage and/or perform:

- Industry-wide customer satisfaction surveys
- Data and physical security functions
- Gateway Evaluation Process (GEP) and audits
- Business continuity planning and execution
- LNP Neutrality Audit, conducted by a third party
- Operations benchmarking and audit (Article 14 audit), conducted by a third party
- New User Evaluation (NUE) process, performed by a third party
- LNPA reporting to Industry and FCC
- Corporate functions like human resources, contract management, and training

Further, there are certain elements that are the foundation of Neustar's success such as practical expertise, NPAC/SMS customized processes, Neustar-developed tools, etc. that will not transfer; this increases the risk to the stability of the system and quality of service delivery. The following are two examples of what can go wrong and the potential impacts.

1. **Impacts to data integrity**—There is a large amount of data to be transitioned. For example, the NPAC/SMS database—across all 7 regions—contains approximately 600 million Subscription Version (SV) records, each with about 20 fields, meaning that there are 12 billion data elements that need to be converted and/or moved from the current seven regional NPAC/SMS to the new LNPA NPAC/SMS. Even a small error rate during the conversion or movement can lead to millions of potentially service-impacting, data integrity errors. These data errors likely will propagate over time to all downstream Service Provider LSMSs. Those errors will have to be dealt with in an ongoing fashion. Those are just the SV record data fields in the NPAC/SMS. There is other data in the NPAC/SMS and there is data associated with other systems such as the Billing and Collection system that must be converted and/or moved to any new U.S. LNPA during the transition period.

2. **Impacts to LNPA's Mass Update and Mass Porting (MUMP) operations**—Neustar has an experienced team that processes incoming MUMP requests. This team catches and filters potential errors affecting millions of transactions each year. Similar to the initial Subscription Version data conversion or migration, a small error rate of fractions of a percentage can lead to millions of data errors, which then impact telephony and information services and routing. These errors will have to be resolved on an ongoing basis. If a potential LNPA vendor does not possess a thorough understanding of the various U.S. LNPA service elements, like the MUMP service, they will become quickly overwhelmed, data errors will occur, and Service Providers and consumers will be negatively impacted.

Evaluating Transition Plans

There are risks inherent in any transition of services and data from one entity to another. When that transition is between two different and unrelated entities, those risks, and their likelihood of occurring, are magnified based on differences in approach, expertise, culture, and agenda notwithstanding any contractual protections. Specific to this procurement, and to further complicate matters, the transition will have to begin and end in less than 15 months—an extremely short period of time. It is important to note that when procurement for LNPA services was first contemplated, there was an allowance of approximately 30 months of transition planning and execution time. A 15-month timeline is very tight and assumes no further delays to the procurement process. Further, this tight timeline is for not only a potential new vendor but also for the industry who must organize themselves to manage the transition. Therefore, in order for the industry to make the most informed decision and assuage any concerns regarding risk, it is critical a Respondent provide a:

- **Detailed, logical, well though-out transition strategy** that outlines clearly how the Respondent's strategy meets deployment objectives with the least amount of risk and costs to Service Providers and ongoing LNPA operations

- **Comprehensive Transition and Implementation Plan** that details how the Respondent will execute on that strategy within the required timeline, with the least amount of risk and highest levels of quality

Detailed, Logical, Well Thought-out Transition Strategy

Before Respondents identify the details of their Transition and Implementation Plan, they must make a few threshold strategic decisions. For example, they must decide:

- **NPAC/SMS Application Strategy**—Will a Respondent develop and deploy their own NPAC/SMS software or will it deploy the Neustar-developed NPAC/SMS software. If a Respondent proposes to use Neustar's NPAC/SMS software, then it must quickly become an expert in all aspects of Neustar's software, which software the Respondent did not develop. This is very risky. From time to time, Neustar does hire new software engineers to maintain the NPAC/SMS software and develop upgrades, updates, and enhancements to the application. However, depending on the experience of the software developer, it generally takes them between 9 to 12 months to be sufficiently trained to begin working on lower risk areas of the NPAC/SMS application. Because there are delicate inter-relationships between the hardware, network components, operating system, Security-Related , third-party system software, and the NPAC/SMS application software, there are areas of the NPAC/SMS application software where we allow only experienced software engineers who have been working on Neustar's NPAC/SMS for several years to maintain or work on.

- **Overall approach for initial service cut-over**—Depending on this decision, Service Providers and the industry are faced with either: 1) having the prospect of two LNPA vendors operational at the same time in the same region during the transition period or 2) having to cut-over all seven regions awarded to another vendor in a single NPAC maintenance window with no real ability to roll-back.

> Unless the Industry does a high-risk flash-cut in one NPAC maintenance window of all seven NPAC regions, a transition from one LNPA vendor to another vendor will have to occur over an extended period of time, bringing with it nearly all the attendant problems and costs with having two LNPA vendors throughout the transition period.

The Industry is well aware of the direct and indirect costs to Service Providers caused by having two LNPA vendors. These well-documented, well-understood risks and costs are at a minimum those associated with the following. Neustar submits that Respondents can solve for some of the direct Service Provider transition costs; they cannot cover indirect costs and their plan should detail clearly how they would mitigate the risks:

- Service Provider efforts to connect their SOAs and LSMSs to multiple live LNPA NPAC/SMS platforms and test beds and maintain those multiple connections
- New software release deployment complications
- New carrier feature deployment complications
- Failover testing complications
- Internal Service Provider operational complexities in receiving services from two different LNPA vendors:
  - Help desk services
  - Reporting services
  - New User services
  - Tunable parameter maintenance
  - SPID migration limitations and process coordination
  - Resolution of differences among LNPA software implementations, some of which could be service-affecting
  - Data and information from multiple LNPAs into one LNPA WG Website coordination
  - Neutral change management administration
  - Development of Service Provider internal processes to accommodate differences in multiple LNPA M&Ps
  - Access, coordination, and management of Enhanced Law Enforcement Platform and Intermodal TN ID Service by multiple LNPAs
  - Negotiation, execution, and reconciliation of differences in Master Agreements with multiple LNPAs
  - Duplication of effort in changes under statements of work for modifying the NPAC platforms

If a Respondent's transition strategy is to propose a "staged transition" that takes place over time during the 15-month timeframe, that vendor needs to answer many of the questions posed by the Industry in RFP Section 14.1. These answers should be included in their submitted Transition and Implementation Plan as a part of their proposal. **If the Respondent does not answer those questions then the Respondent does not understand the requirements and complexities of transitioning and operating a complex service like U.S. LNP Administration and is not up to the task of being the new LNPA vendor.**

Comprehensive Transition and Implementation Plan

The old adage "Failing to plan; planning to fail" applies to NPAC services as a whole and certainly applies to any transition of those important services and systems. This adage means more than the "mere existence" of a plan. This adage really means the "existence of a thorough, sound, and achievable" plan. If a Respondent cannot articulate a detailed and comprehensive, yet straightforward, Transition and Implementation plan, then it will have no chance of effectuating an error-free transition. A flawed transition will subject the Industry and public to all the negative consequence outlined above, some of which can cause irreparable damage and result in costs in the hundreds of millions of dollars. The Industry clearly understands this and has asked other Respondents to address the following in their submitted Transition and Implementation Plans:

- Anticipated overall transition period
- Implementation approach (e.g., tasks and milestones)
- Transition time intervals for individual functions and services
- Staff management approach (e.g., staff categories and hours per task)
- Risk management approach
- Change control approach
- Quality assurance approach
- A list of transition activities from the incumbent to the newly selected LNPA

These are minimum requirements.

In order to assist the Industry in evaluating submitted Transition and Implementation Plans, Neustar submits that any detailed, competently developed Transition and Implementation Plan should include:

- A transition strategy that mitigates as much risk to the Industry and their ability to effect porting
- An overall, logical high-level transition timeline which is realistic and achievable
- Reasonable assumptions/constraints regarding roles and responsibilities of the Industry, FCC, and incumbent
- A critical path analysis
- Sub-plans for the following that detail approach, tasks, resources, dependencies, durations, etc for each:
  - LNPA vendor neutrality
  - Database and facilities management
  - Service Provider connectivity

- Business continuity planning and execution
- Hiring/staffing/training that includes:
  - Job descriptions
  - Number of personnel already available and those that need to be hired before and during the transition
  - Associated job-related training on LNP Administration, NPAC/SMS development and operations, etc.
- Risk management/mitigation
- Communications plan to address inquiries: from the FCC, State PUCs, Service Providers, and other interested parties
- Roll-back to include detailed steps to roll-back operations if initial regional cut-over(s) fail and steps to test the initial cut-over roll-back procedures?

- Work breakdown structure that details tasks, durations, dependencies, resources to:
  - Transition all systems used for NPAC/SMS services—NPAC/SMS, Test Bed, Billing and Collection, Automated IVR, npac.com, LEAP, Intermodal Ported TN Identification, CRM (Help Desk and Trouble Ticketing)
  - Safeguard and guarantee data integrity of all current and historical data used by all NPAC/SMS service components, including identifying and addressing potential data package
  - Procure all necessary hardware and networking equipment
  - Install and provision all of the necessary hardware and networking equipment?
  - Perform testing (e.g., connectivity, Interoperability, Fail-over testing, acceptance testing)
  - Implement all LNPA operational functions identified in Proposal Section 1.1 LNP Administration Services and any additional services the Respondent is proposing to add
  - Implement the Gateway Evaluation Process and its Audits
  - Implement the NPAC/SMS Data Center Operations Audits and Benchmarks
  - Implement the New User Evaluation process
  - Implement LNPA reports to Industry and FCC
  - Implement the Mass Update and Mass Porting (MUMP) service
  - Transition and modify all NPAC User Methods and Procedures

An incomplete or abbreviated transition plan indicates a lack of understanding of the LNPA eco-system and the impacts of disruption. Prospective vendors should not rely on the industry to solve the hard problems associated with migrating the NPAC/SMS. Given the significance of the LNPA service to consumers and Service Providers, the industry should set a high bar for confidence on the transition plan when judging whether a vendor's submission is technically acceptable.

Conclusion

As depicted previously in Exhibit 1.6-1, the industry is faced with making a very important choice: retain Neustar as the LNPA vendor for the next contract term and continue receiving outstanding service with seamless upgrades and innovation without any transition risk, or select a new LNPA vendor, which by necessity, subjects Service Providers and consumers to substantially high risk in transition with numerous negative and expensive consequences. By selecting Neustar to continue to serve, the industry avoids **ALL**:

- Risk to the Industry, Service Providers, and consumers
- Service Provider costs associated with managing a transition
- Service Provider costs associated with operating in a multi-vendor environment
- Service Provider costs associated if the new vendor fails (amount dependent on type of failure)