

**Federal Communications Commission (FCC)**  
**North American Numbering Council (NANC)**

**Nationwide Number Portability Working Group**  
**(NNP WG)**

**Telnyx's Minority Report on IPLRN Implementation**

## Introduction

Telnyx would first like to thank the Federal Communications Commission (“FCC” or “the Commission”) as well as the North American Numbering Committee (“NANC”) for the opportunity to discuss Nationwide Number Portability solutions and implementation methods with the industry. In addition, Telnyx would also like to thank all NNP Working Group (“NNP WG”) members for their fruitful discussions and contributions to the June 2020 NNP Report (“the report”).

On December 16, 2019, Chairperson McKee shared the NNP WG scope of work with the goal of “bring[ing] us closer to realizing the promise of NNP.”<sup>1</sup> As mentioned in the report, the Commission and subsequently the NANC, tasked the NNP WG with:

- Analyzing the effects of the IPLRN solution including interconnection, carrier expenses, consumer expectations, and tariffs
- Recommending a path forward to implement the IPLRN solution including necessary steps and using commercial solutions as a substitute for IPLRN
- Providing any modifications to the IPLRN solution
- Addressing the objections and concerns found in the Minority Report.

Generally, we believe, the report provides further guidance on the implementation of IPLRN; however, every victory within the report was matched with comments on how difficult NNP implementation via IPLRN would be for legacy providers lacking IP connectivity. The following minority report addresses some of these concerns and provides a forward-looking picture of the industry with IPLRN and complimentary commercial solutions.

## Summary of the IPLRN Solution

As discussed in the previous reports,<sup>2</sup> the IPLRN solution provides subscribers the capability of porting their telephone numbers outside of their current LATA via IP routing by establishing a non-geographic area code from which NNP-enabled service providers can create IPLRNs. The non-geographic NPA would notify originating service providers that the call must be sent via an IP-capable switch to the terminating party. It was also decided that all call query (ACQ), would be optimal in order to recognize an NNP call properly, complete a TN to URI translation, and egress the call to an IP network as early in the call flow as possible.

Per NNP WG discussions, IPLRN is an origination mechanism for providers to implement and offer NNP to their subscribers. Therefore no substantial changes to current routing, rating, and porting mechanisms are required. To ensure ubiquitous service for NNP subscribers, all service providers must have the capability to terminate calls destined for IPLRNs, which contain a unique NPA used to inform the originating network that the call must be taken off the TDM network and moved to the IP network for

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<sup>1</sup> Chairperson Jennifer K. McKee’s Charge Letter to the NNP WG, December 16, 2019.

<sup>2</sup> NANC NNP WG Final Report, *Report on Findings Related to ATIS Models on Nationwide Number Portability*, June 2018. NANC NNP WG Technical Subcommittee Final Report, *Additional Findings Report on Nationwide Number Portability*, May 8, 2019.

routing. This requirement provides originating carriers two options to terminate calls to an IPLRN: either leverage a service provider's own IP infrastructure or enter a commercial partnership with a third-party provider able to provide TDM-IP gateway services ("TDM-IP GW"). TDM-IP gateway services, available in all 50 jurisdictions, are the basis for the commercial agreements section of the NNP WG's initial report (and again referenced in this report erroneously under the Heading Commercial Agreements as a Substitute).

However, unlike the Commercial Agreements section which continues to perpetuate a system of TDM interconnection (i.e., requiring the provisioning of new T-1 circuits), IPLRN provides a clear means to achieve IP interconnection -- by creating a mechanism to route traffic on the PSTN without having to maintain backward compatibility with the TDM network. Using IPLRNs, commercial partners can solve the IP routing gap for TDM-based providers without requiring hosting of the NNP telephone number along with TDM points of interconnect in all rate centers across the country. Thus commercial agreements in the IPLRN model are complementary and not necessarily a substitute.

The mapping that is generally used for routing is the LERG, which provides a mapping between NPA-NXX and SS7 points codes (via CLLIs). This same mechanism of NPA-NXX to SS7 point codes can be used in the most rudimentary way (via a single NPA) to ensure that all traffic (local or long distance) is routed to an SS7 enabled switch that can provide TDM-IP translation, a TDM-IP GW service. This same TDM-IP GW can also be responsible for signing calls via SHAKEN-STIR.

Incumbents continue to claim but have been unable to substantiate that this sort of routing would require investment and upgrades of their TDM networks. Yet, service providers routinely update both legacy switches with newly assigned numbering codes and thousand-blocks, as well as facilitate new NPA overlays<sup>3</sup> to assist with numbering resource exhaust. Updating legacy switches with a single NPA to signify the need to egress the call to their contracted 3rd party IP gateway partner should not be significantly challenging. This involves ensuring that every time an NPA is added, that both a local and long-distance SS7 point code is mapped to this 3rd party provider under a commercial agreement.

*Figure 1* portrays an originating carrier who is unable to leverage internal IP infrastructure to complete a call destined for an NNP subscriber. The originating service provider receives a call from their subscriber, a dip (ACQ) to the NPAC determines this call is destined to a number with an IPLRN and must egress the call to an IP enabled network - their contracted 3rd party provider. The originating service provider programmed their switch to send calls with an IPLRN, signified by the unique non-geographic NPA, directly to this contracted provider.

Next, the 3rd party provider dips a local NPAC copy to obtain the remaining TN record for the IP URI routing information. Or alternatively can simply look in the LERG for the IP routing data assigned to this IPLRN. In either case, the call is then converted from TDM to IP and is sent to the terminating provider.

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<sup>3</sup> According to the NANPA website, 12 overlays are either in progress or have been completed since 2018 in Alabama, California, Florida, Illinois, Ohio, Oklahoma, Pennsylvania, South Carolina, Texas, and Virginia.

Figure 1: TDM Originated Call Using a 3rd Party IP Gateway Provider

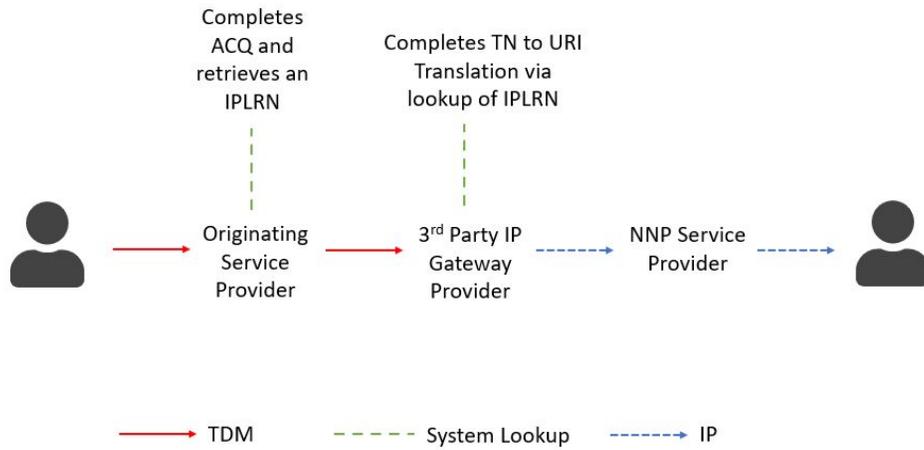


Figure 2 portrays a TDM subscriber originating a IPLRN destined call on an IP-enabled network. Similar to Figure 1, the originating service provider completes a local NPAC dip (ACQ) and determines the call is destined to a number with an IPLRN. Since this particular service provider has IP capabilities within their network, they retrieve the IP URI routing data either in the NPAC or the LERG, and the call is sent to the terminating provider via the service providers' peering agreement.

Figure 2: TDM Originated Call on an IP enabled network

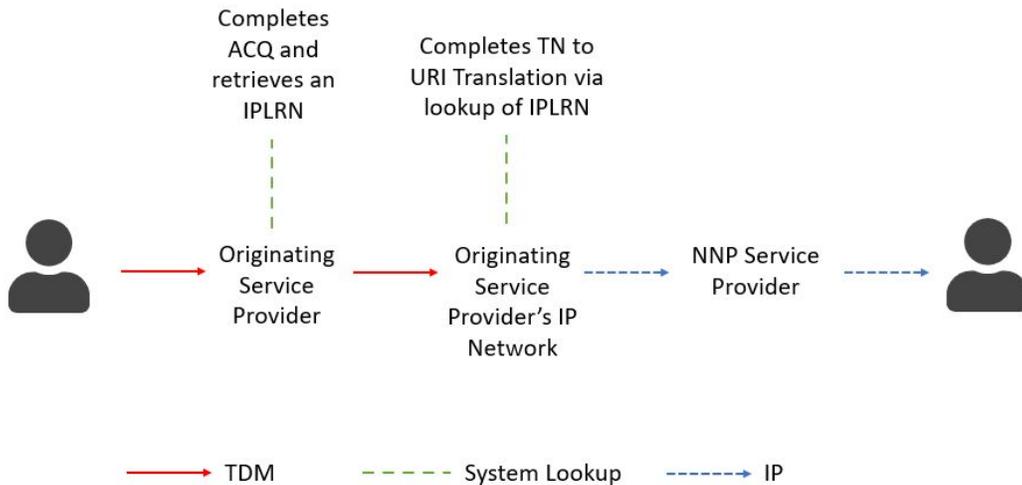


Figure 3 portrays an all IP call flow between peered partners. Similarly to Figure 2, the originating provider performs both the ACQ to confirm the number is routing on an IPLRN and then uses the TN URI data to terminate the call to the proper peered partner.

Figure 3: IP Originated Call destined to a Peered Service Provider

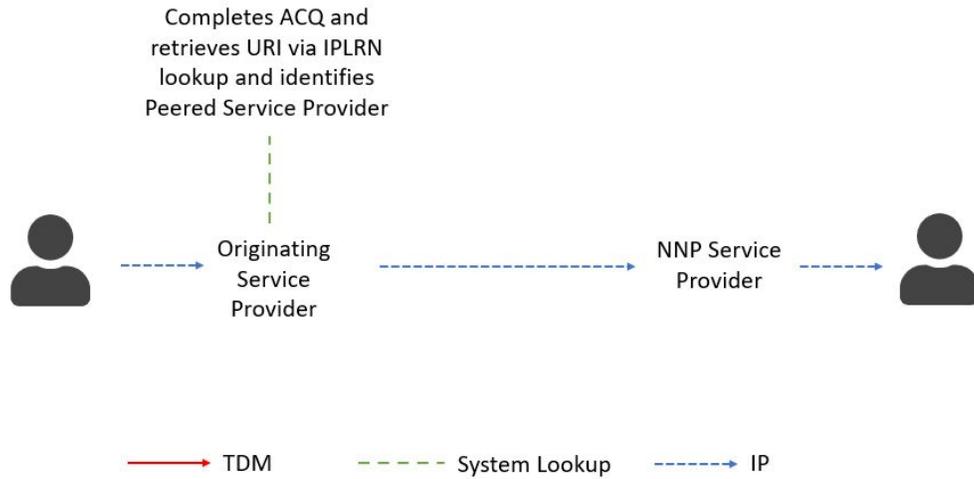
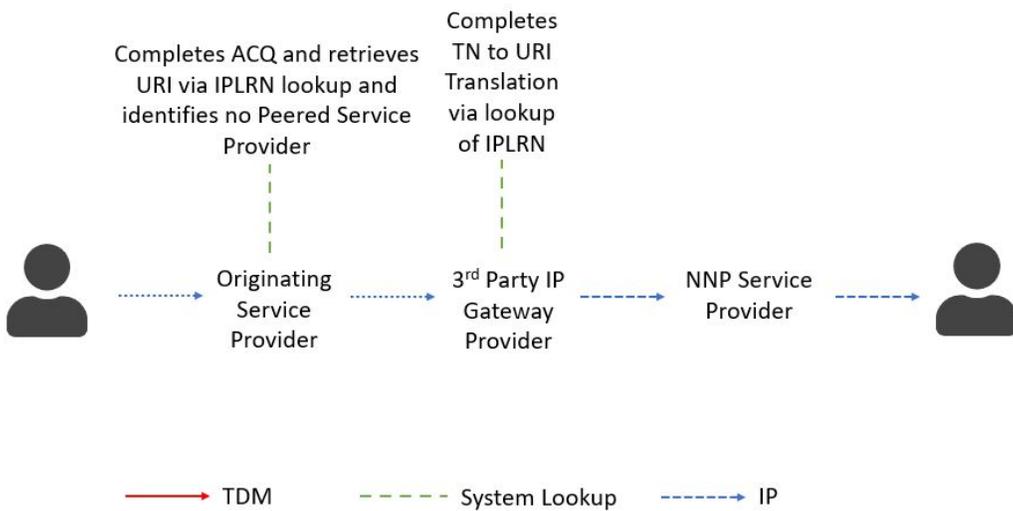


Figure 4 portrays an IP call flow between non-peered partners. In this scenario, the originating carrier dips NPAC for the IPLRN, but discovers in the TN to URI translation, that they do not have a peering agreement with the terminating carrier. They instead pass the call to a 3rd party provider, who is peered with that provider and can terminate the call appropriately. Interconnected VoIP providers are already required to have this 3rd party connectivity, which we will explore herein.

Figure 4: IP Originated Call destined to a Non-Peered Service Provider



## **Mirroring Order 15-70 Order Requirements**

The IPLRN solution removes the need for a dedicated network of Non-Geographic Gateways (“NGGWs”) found in the Non-Geographic LRN (“NGLRN”) solution. Instead, it allows legacy service providers to partner with 3rd party IP gateway providers to commercially facilitate the TDM to IP conversion and complete calls on IP networks.

As the Commission is aware, interconnected VoIP providers licensed under the Commission’s Order 15-70 (“the Order”) are currently obligated to facilitate backward compatibility to the PSTN through commercial means. The Order states,

“Therefore, we permit an interconnected VoIP provider that has obtained Commission authorization to request numbers directly to demonstrate proof of facilities readiness by (1) providing a combination of an agreement between the interconnected VoIP provider and its carrier partner and an interconnection agreement between that carrier and the relevant local exchange carrier (LEC), or (2) proof that the interconnected VoIP provider obtains interconnection with the PSTN pursuant to a tariffed offering or a commercial arrangement (such as a TDM-to-IP or a VoIP interconnection agreement) that provides access to the PSTN.”<sup>4</sup>

We believe this same mechanism of leveraging 3rd party TDM-IP Gateway Providers to convert and terminate traffic to an IP network would work for the implementation of IPLRN. Service providers with a lack of IP in their network today can enter into commercial agreements with one of the three companies currently able to provide PSTN homing tandem services today to interconnected VoIP providers. These commercial agreements include a fixed per-minute fee for all inbound traffic, and a similar per-minute billing structure could be used for IP termination services from legacy originating providers. By making this fee commercially negotiated, access charge compensation discussions are moot as IP traffic is not tariffed. Given IPLRN can be implemented and deployed via commercial agreements, Telnyx urges the Commission to order that NNP follow the implementation timeline of the Order.

Telnyx strongly urges the Commission to limit the facilitation of NNP via commercial agreements to only apply when carriers commercially interconnect with 3rd party TDM-IP Gateway Providers. Past references to commercial agreements alone should not be considered as an alternative to IPLRN as they require the establishment of POIs in each LATA and therefore perpetuate the legacy network and further delay the already multi-decade technology transition. For instance, Telnyx is interconnecting with various carriers via commercial agreements and has been asked to provide forecasts in order for our future interconnected partner to purchase additional T-1s to support our traffic. Without a serious commitment from the Commission to provide a means to force the IP transition, primarily through IPLRN, companies will continue to preserve the legacy network, and the Commission and NANC will be having similar technology transition discussions far into the future.

Legacy providers have also mentioned that regulatory requirements that mandate providers continue to provide existing services offered on legacy products, such as emergency and fax, when migrating

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<sup>4</sup> Report and Order, FCC-15-70, paragraph 37, accessed June 29, 2020.

customers to IP-based solutions, are additional barriers to implementing IPLRN. Telnix, as an interconnected VoIP provider, as well as our IP competitors, provide subscribers PSTN replacement products today, including emergency (via E911) and fax (via T.38) to remain compliant and provide a competitive product.

### **Benefits of IPLRN**

The IPLRN solution gives service providers a tool to actively migrate traffic from their existing legacy infrastructure to the IP network. This can be leveraged whether a service provider uses IPLRNs to migrate TDM subscribers to IP via intra-carrier ports or to serve inter-carrier NNP subscribers. As more service providers begin to offer NNP to subscribers or migrate existing customers to IP, legacy carriers will be commercially incentivized to adopt NNP, build out internal IP networks, and participate in IP interconnection, thereby promoting industry-wide technology transition. IPLRNs can, therefore, be used by the Commission as a metric to measure the technology transition and discover methods to assist segments in the industry that continue to be slow to IP adoption.

IPLRN provides a free market solution for the IP Interconnection problem, predominantly seen in SHAKEN-STIR, by driving further competition into the industry. By implementing NNP through the use of IPLRNs, the Commission would be promoting the future-proof interconnection method described above, instead of preserving the legacy network through outdated copper circuit connectivity requirements.

We believe operators should pass a different “facilities readiness” test, compared to that required of VoIP providers described herein, that demonstrates their ability to deliver a call to a number routing on an IPLRN via their internal IP network or a contracted 3rd party’s IP network. By doing so, the Commission will also promote the adoption of SHAKEN/STIR and increase the number of authenticated calls sent over the IP network. As stated multiple times in the Call Authentication Trust Anchor and Implementation of the TRACED Act dockets,<sup>5</sup> a majority of calls reaching IP enabled providers still are delivered over TDM infrastructure.

Based on commercial and industry discussions, it seems legacy carriers are hesitant to commit time and resources to discovering an out-of-band (“OOB”) solution to SHAKEN-STIR for calls transiting legacy infrastructure and instead hope to use such time and resources to further develop their IP networks, as opposed to further preserving a dying technology. These same carriers, however, have made the argument within NNP WG discussions that the IPLRN solution is, in fact, a TDM based solution since it requires service providers to update their legacy switches with updated routing to terminate numbers to IPLRNs. Surely the Commission understands that these service providers routinely update both legacy and IP switches with newly assigned numbering codes and thousand-blocks, as well as facilitate new NPA overlays<sup>6</sup> to assist with numbering resource exhaust. Updating legacy switches to support a single additional NPA to signify the need to egress the call to their contracted 3rd party IP transit provider,

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<sup>5</sup> WC Docket No. 17-97, *Call Authentication Trust Anchor*, May 29, 2020. WC Docket No. 20-67 *Implementation of TRACED Act*, May 29, 2020.

<sup>6</sup> According to the NANPA website, 12 overlays are either in progress or have been completed since 2018 in Alabama, California, Florida, Illinois, Ohio, Oklahoma, Pennsylvania, South Carolina, Texas, and Virginia.

should not be significantly difficult and should be achievable. Legacy providers cannot make the argument go both ways: either they are migrating to IP, or they are maintaining the legacy network. Telnyx believes the implementation of IPLRN would be a more desirable alternative for the OOB problem compared to reinforcing the legacy network.

In addition, through the implementation of IPLRN, the industry would need to agree on a method to facilitate the TN to URI lookup, which can also be used in other IP related solutions such as promoting Interoperable Video Calling (“IVC”).

### **Conclusion**

The IPLRN solution provides the Commission the opportunity to accomplish multiple goals, including implementing nationwide number portability, promoting the technology transition, increasing IP interconnection availability, and reducing illegal robocalling. We encourage the Commission to continue eliciting industry comment on NNP implementation as it pertains to terminating to IPLRNs through more streamlined and cost-effective 3rd party commercial agreements.