

February 20, 2018

The Honorable Ajit Pai  
Chairman  
Federal Communications Commission  
445 12<sup>th</sup> Street, SW  
Washington, DC 20554

Re: WC Dockets No. 09-109, 07-149, and CC Docket No. 95-116

Dear Chairman Pai:

I am writing on behalf of Telcordia Technologies, Inc., dba iconectiv (“iconectiv”) to provide an update in response to your letter of February 2, 2018, regarding contingency rollback for the Local Number Portability Administrator (“LNPA”) transition. As your staff requested, iconectiv participated for the past week in meetings hosted by the Transition Oversight Manager (“TOM”) that included the North American Portability Management, LLC, Neustar and iconectiv to determine whether there was a set of mutually-agreeable tests that could be added to further validate the industry-led rollback process, consistent with maintaining the current schedule. (This was, as you know, preceded by a long series of discussions.) Unfortunately, Neustar has not yet agreed to reactivate its NPAC database in an affected region if rollback would be necessary, and the parties have not been able to converge on a testing plan that does not subject the service providers to unduly burdensome testing and that would hold to the current schedule for LNPA cutovers. This letter provides information as to existing and additional testing steps that iconectiv believes could be taken, as well as additional information to assist you and the Bureaus as they evaluate the situation further.

The industry-led rollback process as proposed by the TOM and NAPM is fundamentally very straightforward. For Neustar, it requires them to, reactivate their NPAC database for the affected region(s) (which, in the case of the Southeast Region cutover on April 8, will be while they are operating NPAC databases for six other regions), allow service providers to reconnect to their NPAC, and process the ports submitted by the service providers. Once its database is turned back on and service provider connectivity reestablished, Neustar would be processing ports as submitted, just as it would be doing in those regions that had not been cutover. For service providers, they must keep a log of their post-cutover ports that were sent to iconectiv (which iconectiv will supplement by providing its own log to each service provider), take account of certain exceptions, prioritize those ports for resubmission, and resubmit them to the Neustar NPAC.

In order to try to bridge the gaps in the discussions, iconectiv proposed that it would operationally support additional voluntary testing of contingency rollback that would allow service providers to simulate a cutover and rollback process by transmitting ports, simulating a rollback to Neustar resubmitting the port transactions, and comparing the results to verify consistency. This is voluntary so that a service provider does not have to undertake this testing of a back-up contingency process if it believes that such testing is not necessary or is more

burdensome than beneficial to ensuring continued porting. This additional voluntary test is structured to run entirely on the iconectiv test bed, so that the tests can be run efficiently and without requiring synchronization of the iconectiv and Neustar test beds, a process that would be complex and time consuming, and is not necessary to test that service providers can resubmit ports under the industry-led process.

This additional test supplements the tests that are already planned or available for voluntary service provider testing:

- All users that will be directly connected to the iconectiv NPAC have been encouraged to test their ability to switch between connections to the Neustar NPAC and connections to the iconectiv NPAC. This is a necessary part of the regional cutover process to the iconectiv NPAC, and would also be necessary should a user need to revert back to the Neustar NPAC.
- iconectiv has already provided a set of example transaction log reports for service providers to download and test, along with a “Resubmission Aid” that tells them how to use the report as part of an industry-led rollback to supplement the service provider’s own logs.
- Service providers (or service bureaus) that are connected to both the iconectiv and Neustar test beds can utilize those test beds to test their own ability to execute the sequence of submitting ports on the iconectiv test bed, logging them, prioritizing them according to the priorities suggested in the Resubmission Aid, and then resubmitting the transactions to the Neustar test bed. This allows service providers (or service bureaus) to verify that their own internal processes are prepared to handle their resubmission tasks.

### **Factors Affecting the Likelihood of Contingency Rollback.**

As the Commission evaluates this situation, it is important to recognize that the probability of needing to invoke contingency rollback is vanishingly small. There are three major types of failures that could lead to a catastrophic failure—data corruption during data migration, hardware failure, and software failure. Each of these risks has been substantially mitigated in iconectiv’s NPAC’s design and comprehensive test plan:

- Data corruption during data migration—iconectiv has developed and tested tools to test the migrated data to ascertain whether it has been corrupted. It has conducted substantial data migration practice runs in coordination with and cooperation from Neustar, which include running these tools to determine whether the data has been corrupted in the extraction process run by Neustar to create the data files, or in the migration process. While these practice runs and tools cannot eliminate the possibility that an undetected corruption could occur and go undetected, they significantly reduce the likelihood of such an occurrence. Because the data is extracted and migrated from Neustar to iconectiv in several files over a two week period prior to cutover, any data corruption issues are likely to be discovered before or during the maintenance window. Thus, a major corruption of

the migrated data—which is the only type of corruption that could cause catastrophic failure necessitating a rollback—is extremely unlikely to go undetected and unmitigated during the migration process.

- Hardware failure—iconectiv has constructed redundant data centers, with redundant, highly available hardware within each data center, and it has successfully tested its ability to failover from one data center to the other. It also has installed redundant trunks between each data center. There is no single point of failure. iconectiv’s NPAC hardware architecture substantially eliminates the potential for a crippling hardware failure, as both pieces of the same hardware within both data centers would have to fail (essentially, four simultaneous hardware failures).
- Software failure—iconectiv has conducted extensive tests, both internal and with service providers, of the functionality and interfaces of its NPAC. At this time, all carrier gateway systems for both sending and receiving ports have been tested and certified. Testing of the Low Tech Interface used by over 50% of service providers has been ongoing since July 2017 with no issues. 25% of service providers use the Helpdesk staff to port numbers for them and are very low volume users. iconectiv has completed all mandatory testing pursuant to the industry’s standard, defined test cases, and carriers are now carrying out ad hoc and round-robin testing. This testing has been successful to date, and no unremedied situations remain. iconectiv has conducted performance stress testing, confirming its ability to handle volumes of transactions significantly in excess of specified levels. The acceptance test plans were all reviewed and accepted by NAPM, as well as reviewed by FCC staff.

In addition, even if some unknown problem were to emerge, that problem would need to be so significant as to essentially halt iconectiv’s ability to continue processing ports. Even a significant degradation in the pace of port processing would not be the type of catastrophic failure that would necessitate rollback, as opposed to being fixed in place (with the potential for contractual penalties). All of this makes the likelihood of the need for contingency rollback vanishingly small.

### **Factors Affecting “Data Corruption” in Rollback**

With respect to concerns raised about “data corruption” in a rollback situation, it is important to have a clear understanding of how the NPAC interacts with carrier routing databases and what contingency rollback actually accomplishes. As you are aware, the NPAC is not in the call set up and routing path, and is not itself interrogated during call set-up.<sup>1</sup> Rather, the NPAC maintains a database of only those telephone numbers that no longer should be terminated to the network location (e.g. switch) associated with that number’s Central Office Code (i.e., NPA\_NXX). Thus the NPAC is an exception database that does not contain all phone

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<sup>1</sup> Contrary to some public assertions, the NPAC is also not involved in routing 911 calls. Those calls are routed by the carriers receiving those calls to the selective routers serving PSAPs via dedicated 911 connections.

numbers. The NPAC associates each such telephone number in its database with the location (e.g. switch) to which it is to be sent, which is identified by a Location Routing Number (or LRN). When numbers are ported, the NPAC broadcasts to service providers the fact that traffic to that number now should be routed to a new network location, specified by its LRN. Service providers update their routing tables accordingly, which are the only routing tables used for call set-up. In addition, the NPAC does not broadcast out its whole database, it only broadcasts changes made. This is significant because when the iconectiv NPAC begins to process port requests, only changes to the NPAC database will be sent to the Service Providers, not the entire database, minimizing the impact of even a low probability data corruption issue.

It is important to recognize that contingency rollback starts with Neustar's pre-cutover database. Contingency rollback, whether accomplished through industry resubmission of transactions or by database-to-database transfer, updates the pre-cutover Neustar NPAC database only with transactions that iconectiv processed while it was operating its NPAC prior to the catastrophic failure that necessitated the rollback. If iconectiv never began processing ports, or attempted to process but never successfully processed any ports, there would be no need for any rollback process to update Neustar's database.<sup>2</sup> Neustar could simply reactivate its pre-existing copy of its pre-cutover database, and begin processing ports.

If, however, iconectiv successfully processed any port, then Neustar's pre-cutover database no longer matches the industry's view of the current state of porting. In this case, Neustar's pre-cutover database must be updated (either through database-to-database transfer or industry resubmission) to reflect the ports that iconectiv had successfully processed. In the case of the industry-led resubmission, the service providers would then update the Neustar pre-cutover database using their internal resubmission process.

Even if iconectiv's database were to be completely corrupted, that corruption would not affect Neustar's pre-cutover database. Neustar's pre-cutover database still only needs to be updated for the transactions that iconectiv successfully processed.

As such, contingency rollback fundamentally calls for Neustar to restart the database in the affected region (which in the case of the Southeast Region, means that it restarts that region while it continues to operate the databases for the six other regions), to receive updates for the transactions successfully processed by iconectiv, and then process the unprocessed and new ports.

### **Further Discussion of Recurring Questions.**

A number of issues have recurred with respect to contingency rollback, which we summarize below along with our views on each:

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<sup>2</sup> This situation is equivalent to a "fallback" scenario in which service providers aborted a cutover and reverted to Neustar before iconectiv began processing any ports.

- Is automated database-to-database rollback necessarily better than rollback through industry resubmission of ports?

iconectiv view: An automated database-to-database rollback is not necessarily better in all cases than a rollback through industry resubmission of ports. An automated rollback between databases can be more convenient, in that carriers do not have to go through a resubmission process for those ports that can be updated through the automated process. However, an automated process may not be able to be used for all ports successfully processed by iconectiv. For example, if iconectiv's database were truly corrupted, then an automated process might not be usable. In that case, industry resubmission of ports would still be needed. Industry resubmission is a backstop method for updating the Neustar database that must be in place for any contingency rollback, with or without an automated database-to-database process in addition. Database-to-database updates also add the potential for transmitting corruption from iconectiv's database to the Neustar rollback database, which is not present with industry resubmission.

- How many transactions would be involved in a contingency rollback?

iconectiv view: If contingency rollback is limited to the first day, the number of ports that would be involved is likely only a few thousand. Each carrier that ported on that day would be a fraction of that. It is important to understand that competitive ports (i.e, those that occur when a consumer switches carriers) are only a small fraction (less than 20%) of total transactions that the NPAC customarily handles. Moreover, the first day on which iconectiv will be processing ports is a Sunday, when porting volumes within the first 4 hours are less than 20% of average daily porting volumes that occur Monday through Saturday and less than 30% of average daily volumes within the first 12 hours. Not only are competitive porting volumes the lowest on a Sunday, porting is primarily only from the major wireless carriers. Most other NPAC transactions are network rearrangement transactions that do not need to be scheduled for that cutover Sunday. In addition, pooling transactions also would not be scheduled to occur on that Sunday. The Resubmission Aid provides guidance to carriers on prioritizing the resubmission of ports in the case of a rollback.

- Do a large number of service providers, including at least the larger GUI users, need to be required to test?

iconectiv view: No, because this is a low probability contingency, service providers or service bureaus can be permitted the discretion to test their readiness to participate in rollback. GUI users usually port in low volumes and many do not port on Sundays.

- Does industry-led rollback need to be tested at "scale"?

iconectiv view: No. NAPM offered to limit contingency rollback to the first 24 hours, which limits total possible volume. Moreover, this at most would involve a few thousand competitive ports, and the Resubmission Aid provides guidelines for prioritizing porting requests for resubmission. This means that Neustar would not be receiving all

resubmitted transactions simultaneously at the start of the resubmission process. In addition, doing a rollback simulation “at scale” would require service providers to disrupt their daily porting activities and repurpose their operations centers from daily operations to the test simulating a rollback. We believe a smaller simulation can be extrapolated to indicate the performance at full volume.

- Do the results of resubmission need to be validated between the iconectiv NPAC and Neustar NPAC post-rollback?

iconectiv view: No. As discussed above, the objective of contingency rollback is to update Neustar’s database to account for the incremental transactions that were successfully processed between when iconectiv began processing ports and when the rollback was implemented. In that situation, because the industry routing databases would already have been updated with any transactions that iconectiv actually successfully processed and broadcast, the priority need is on those transactions that were pending or that had not been broadcast to the service providers at the time the rollback was declared. Verifying that Neustar’s database matches iconectiv’s is not necessary to ensure that Neustar’s database is updated for the completed transactions and would prevent prioritizing the unfinished transactions.

- Do the resubmission results need to be 100% perfect in the first instance in order to successfully utilize the industry-led rollback process?

iconectiv view: No. The resubmission process may be iterative in some cases, so it should be anticipated that the results would not, and should not have to be, 100% perfect in the first instance. Each carrier has business-as-usual procedures for handling exceptions that may come up. These procedures can be used to resolve anomalies.

- What happens if a problem develops after the first day, if contingency rollback is limited to the first 24 hours?

iconectiv view: The remedy would be a fix-in-place solution, just as would be the case today if there were a catastrophic failure of Neustar’s NPAC. This is an even lower probability occurrence than a catastrophic failure within the first several hours because iconectiv will have been successfully processing ports through its database and promulgating them to the network for a significant period of time. As discussed above, diminished throughput, as distinct from cessation of port processing, is not a catastrophic failure that would necessitate rollback. Furthermore, industry could take steps to limit demands during the repair period, such as limiting network rearrangement transactions.

## **Final Observations**

Nothing in the discussion this week has altered either of the following fundamental takeaways from the meeting hosted by you on February 9:

- The industry-led rollback is the foundational rollback approach that would have to be in place to backstop any other rollback plan. And it is workable in the context of these transitions, particularly in light of the modest volumes of ports that would be processed on the first day following the cutover. In addition, any automated database-to-database rollback plan requires that an industry resubmission process be in place as a baseline safety net to deal with situations in which an automated rollback process would not work for some or all ports.
- The industry-led rollback is the only contingency rollback plan that can be executed while maintaining the current cutover schedule and final acceptance date. There is no intermediate automated database-to-database solution that can be developed and tested consistent with the current cutover schedule.

In iconectiv's view, the discussions are at an impasse. Further discussions are unlikely to yield a timely result consistent with the current cutover schedule and final acceptance date, in which the current LNPA will agree to resume providing this critical infrastructure in the event of a catastrophic failure in which iconectiv cannot continue to process ports and cannot restore its NPAC to functionality within a reasonable period of time. Even if there were unlimited time available for testing, the additional testing requested by Neustar beyond what iconectiv has offered would impose unreasonable burdens on service providers and/or be unworkable, as described above.

It is also important to recognize that contingency rollback is not the only issue on which cooperation of all parties is required to ensure a successful transition. There are many operational steps in the transition that remain for which good faith cooperation is a necessity.

Please contact me if you or your staff have any questions.

Sincerely,



John T. Nakahata  
*Counsel to Telcordia Technologies, Inc., dba  
iconectiv*

cc:

Matthew Berry  
Nicholas Degani  
Jay Schwarz  
Nirali Patel  
Claude Aiken  
Amy Bender  
Jamie Susskind  
Travis Litman

Kris Monteith  
Lisa Fowlkes  
Thomas Johnson  
Debra Jordan  
Michele Ellison  
Ann Stevens