



## Technical Evaluation of the Next Generation NPAC/SMS Proposals

Report on Findings

### Abstract

Ericsson Inc./Telcordia Technologies, Inc. d/b/a iconectiv's proposal and oral presentation were ambiguous as to whether the company was bidding a US-specific NPAC system developed from scratch or if it was proposing to [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] Smith & Associates' IT experts evaluated iconectiv's proposal and related documentation under each scenario. In the best case, offering an evolved solution based on an existing product, the proposal contains a number of serious technical flaws and unmitigated risks. Later filings make clear that iconectiv most likely will be providing a system that uses software to be developed from scratch. The risks increase exponentially when attempting to develop, test, and implement a system this large, complex, and critical, from scratch, with timeframes extending into multiple years. No Milestones for development and testing were included in the iconectiv proposal, the associated risks were not identified nor mitigated, and a completely unrealistic amount of time was allotted to perform the necessary work. A more realistic schedule would add [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] to iconectiv's implementation timeline. The Plans, as described in the iconectiv proposal and further explained at the orals, render the proposal technically not viable under either a build "from scratch" system or evolved system scenario.

January 28, 2015

Report on Findings

January 28, 2015

## Table of Contents

Executive Summary	3
Description of the Work Effort	6
Methodology and Approach	6
Findings	
<b>1. Proposal Technical Assessment—iconectiv New ‘Build’ Solution</b>	<b>11</b>
<b>2. Proposal Technical Analysis—iconectiv’s Product ‘Buy’ Solution</b>	<b>16</b>
<b>3. Proposal Technical Assessment—Neustar/Assessment of Key Discriminators</b>	<b>27</b>
Conclusions	32
Appendix A: Smith & Associates Credentials	35

## Report on Findings

January 28, 2015

# Executive Summary

The Federal Communications Commission (“FCC”) is currently evaluating the North American Numbering Council’s (NANC) recommendation for Ericsson, Inc./Telcordia Technologies Inc., d/b/a iconectiv to serve as the next Local Number Portability Administrator (LNPA). Smith & Associates (S&A) was retained to provide subject matter expertise to evaluate the technical proposals submitted and assess the technical implications of the recommendation for a change of the prime vendor. As outlined in Appendix A, Smith & Associates has particular expertise and experience in the area of telecommunications and Information Technology (IT), and is uniquely qualified to perform such a technical assessment.

For reasons discussed below, iconectiv’s proposal is not clear with respect to whether it intends to offer (a) an entirely new system using software developed from scratch or (b) a solution that is evolved from a system that currently is in production and deployed outside the United States. As we might say in the IT industry, it was not clear to us after reading iconectiv’s proposal whether it intends to “build” a new NPAC system or if it is offering the FCC to “buy” a modified version of its current package. More recent statements by iconectiv strongly indicate that it is pursuing the riskier “from scratch” build approach. However, in order to be complete and give iconectiv the benefit of any doubt, S&A performed the following technical assessments covering both the “build” and “buy” possibilities:

### 1. Proposal Technical Assessment—iconectiv New ‘Build’ Solution

How does an iconectiv NPAC solution to be developed from scratch, and underlying technologies, compare to what is in production today? To what extent do new technologies play a role in the iconectiv proposed system? How well-defined is the iconectiv transition strategy and how comprehensive is the Transition Plan for this approach? What, if any, additional technical issues might arise in a transition to a newly developed NPAC system that were not addressed in iconectiv’s proposal?

### 2. Proposal Technical Assessment—iconectiv Product ‘Buy’ Solution

How does an iconectiv **[BEGIN HIGHLY CONFIDENTIAL INFORMATION]** [REDACTED] **[END HIGHLY CONFIDENTIAL INFORMATION]** solution, and underlying technologies, compare to what is in production today? What is its life expectancy? How well-defined is the iconectiv transition strategy for this approach, and how comprehensive and realistic is the Transition Plan?

### 3. Proposal Technical Assessment—Neustar/Assessment of Key Discriminators

What is the current status of the NPAC system, *i.e.*, applications, operations, and infrastructure, in production today and supported by Neustar? What is its estimated life expectancy? An important aspect of this inquiry focused on identifying key aspects of the respective Neustar and iconectiv proposals that offered advantages over the competing approach (these are referred to as “discriminators”). Although S&A identified several areas where the Neustar proposal/system offered advantages over the iconectiv proposal, there were no technical areas in which iconectiv offered an advantage.

## Report on Findings

January 28, 2015

The S&A team formulated a methodology to address the requirements of the assignment, reviewed copious documents submitted relating to the bid, and documented detailed findings.

The overarching conclusions reached are the following:

- The iconectiv proposal is extremely technically deficient, well below any Industry Standard Best Practice, with respect to implementing a greenfield “from scratch” development approach, as it does not address the design, development, testing, or implementation efforts for providing an NPAC system based on that approach.
- No NPAC functionality or operational performance could have been compared prior to the NANC recommendation because a new NPAC system from iconectiv was not available for evaluation, nor did the Transition Plan include any details that would normally be included to evaluate a new software development effort and the resulting potential solution.
- If, notwithstanding iconectiv’s later clarifications about using a “from scratch” approach to software development, iconectiv instead plans to [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] its proposal contains a number of major technical flaws in the proposed transition, including:

[BEGIN HIGHLY CONFIDENTIAL INFORMATION]

[REDACTED]

[END HIGHLY CONFIDENTIAL INFORMATION]

- The implementation timeline proposed is at least [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] regardless of whether the proposed system will be developed from scratch or if [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION]

## Report on Findings

January 28, 2015

Consequently, no matter whether iconectiv actually intends to use a “build” or “buy” approach, the NANC conclusion that the NPAC systems proposed were relatively equivalent based on the technical criteria, which carried [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] of the evaluation weight, in our opinion is not valid. On the contrary, in both cases, iconectiv’s proposal is seriously deficient and unrealistic in multiple technical aspects. It is technically not viable due to the absence of any plans for design, development, testing, or implementation of a system developed from scratch OR for the modification needed to incorporate US requirements, and for the issues inherent in the Transition Plan, regardless of approach.

Finally, we were unable to find any documentation in the record demonstrating that a detailed technical assessment like the one we performed had been performed prior to the formulation of the award recommendation. Nowhere are the risks we identified noted in any way, much less thoroughly analyzed, along with documented rationale as to why the level of risk associated with them was deemed to be acceptable.

## Report on Findings

January 28, 2015

# Description of the Work Effort

S&A was retained to provide independent subject matter expertise to evaluate the technical proposals submitted, and assess the technical implications of the NANC recommendation for a change in the prime vendor to operate as the LNPA in each of the seven former Regional Bell Operating Company (RBOC) areas in the US.

As outlined in Appendix A: "Smith & Associates Credentials," Smith & Associates has particular expertise and experience in the area of telecommunications and Information Technology (IT), and is uniquely qualified to perform such an assessment. In addition, neither Smith & Associates nor any of its individual members have had prior business relationships with Neustar or any other connections with Neustar that would raise questions concerning its objectivity to the assessments described in this report.

### Methodology and Approach

In formulating this report, the S&A team carefully studied the following documents:

- Publicly available information on NPAC, LNPA, and related topics
- All procurement documents (*e.g.*, RFP, TRD, FRS)
- Current NPAC system in production today—all aspects
- Proposals (except for materials redacted for national security reasons) submitted by both Neustar and iconectiv and all associated documents
- Presentations by both companies before the FoNPAC in Aug. 2013
- Transcripts of Q & A for both companies before the FoNPAC in Aug. 2013
- June 16, 2014 Neustar Ex Parte filing
- July 17, 2014 Neustar Ex Parte filing
- July 25, 2014 Neustar Comments
- July 25, 2014 iconectiv Comments
- July 28, 2014 Comment Summary
- Aug 8, 2014 CTIA/UST Telecom Reply Comments
- Aug 22, 2014 iconectiv Reply Comments
- Aug 22, 2014 Neustar Reply Comments
- Sep 26, 2014 Neustar Sur-Reply
- Oct 17, 2014 Neustar Ex Parte filing
- Oct 27, 2014 iconectiv Ex Parte filing

Studies commissioned by both sides (iconectiv and Neustar) have resulted in a body of information on technical issues relating to the development and implementation of large, critical IT systems. These studies included:

- Historic transition costs and risks (Deloitte Consulting and Dr. Eric Berger from Georgetown University);
- Large IT project historic success rates (The Standish Group);
- The impact of an LNPA change on wireless carriers (Recon Analytics);

## Report on Findings

January 28, 2015

- The impact of an LNPA change on various US security organizations (The Chertoff Group);
- The complexity of the processing involved in local number portability, and the Neustar history of keeping up with the changes (The Yankee Group); and
- Well-researched opinions on a number of legal and procurement issues by numerous law firms.

The S&A team did not replicate, nor are we commenting on, any of that work.

As previously noted, the iconectiv proposal and oral presentation were ambiguous as to whether the company was bidding a US-specific NPAC system developed from scratch, *i.e.*, a system 'build' project as referred to in the industry, or if it was proposing to [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED]

[REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] *i.e.*, a product 'buy' project. Because of the ambiguity, the S&A team decided to evaluate iconectiv's proposal and related documentation under each scenario even though later iconectiv filings specified the proposed solution is a system 'build' project. Accordingly, our work focused on the following technical assessments:

### 1. Proposal Technical Assessment—iconectiv New 'Build' Solution

How does an iconectiv NPAC solution to be developed from scratch, and underlying technologies, compare to what is in production today? To what extent do new technologies play a role in the iconectiv proposed system? How well-defined is the iconectiv transition strategy and how comprehensive is the Transition Plan for this approach? What, if any, additional technical issues might arise in a transition to a newly developed NPAC system that were not addressed in iconectiv's proposal?

### 2. Proposal Technical Assessment—iconectiv Product 'Buy' Solution

How does an iconectiv [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] solution, and underlying technologies, compare to what is in production today? What is its life expectancy? How well-defined is the iconectiv transition strategy for this approach, and how comprehensive and realistic is the Transition Plan?

### 3. Proposal Technical Assessment—Neustar/Assessment of Key Discriminators

What is the current status of the NPAC system, *i.e.*, applications, operations, and infrastructure, in production today and supported by Neustar? What is its estimated life expectancy? Part of this examination involved identification of key discriminators that exist as between Neustar and iconectiv proposals.

The premise behind establishing the answers to these questions was to determine the technical implications of an award to a new LNPA vendor and NPAC system. The S&A team assessed the technical implications based on: (a) the capabilities of the system that will be provided to replace the existing NPAC, and (b) the reasonableness of the effort defined to transition all users of the existing system to the "next-generation NPAC/SMS in all Regions."

## Report on Findings

January 28, 2015

Each “proposed” solution was evaluated as to the technical capabilities proposed in the following categories:

Current/Proposed System Assessment  
New Technology Assessment  
Transition Plan  
Miscellaneous Technical Issues

The detailed technical questions that needed to be answered applied to all three “proposed” NPAC solutions. The following questions were used as guidelines to produce the baseline assessment in each category:

### Current/Proposed System Assessment

#### Technology

- a. Will/does the application(s) proposed accurately and adequately support the functionality required by the major parties involved (as defined in the Functional Requirements Specification and other related documents identified in the RFP)? To what extent?
- b. Do the application technologies proposed allow for new functionality to be provided in a timely manner?
- c. Does the proposed infrastructure adequately support the technical infrastructure (as defined in the Technical Requirement Document and other related documents identified in the RFP)?
- d. Can the mandated performance specifications be met?
- e. Are the data center high availability and disaster recovery capabilities proposed at today’s industry standards?
- f. Are the data center(s) using or have plans to move to today’s private cloud architectures?
- g. Are the database technologies currently being used or planned for appropriate to response times to support the application requirements?
- h. Are the telecommunication and networking technologies currently being used or planned for at today’s industry standards?
- i. Are the test systems answering end user needs and requests?

#### Processes

- j. Do the proposed operational flows meet the RFP requirements *based on what has been proposed?* To what extent?
- k. Can reporting requirements being met? To what extent?
- l. Can billing requirements be met? To what extent?
- m. Can audit requirements be met? To what extent?
- n. Can business continuity requirements be met? Are there any shortcomings?
- o. Can benchmarking requirements be met? To what extent?
- p. Can testing requirements be met?
- q. Can user support and training requirements be met? To what extent?
- r. Can security requirements be met? To what extent?
- s. Are all major operations activities (Operations Centers, Help Desk, run books, Tier level support, monitoring activities, change management, outage activities and protocols, etc.) proposed at industry-standard best practice levels?

## Report on Findings

January 28, 2015

### People

- t. Are the IT leaders and teams proposed qualified for their individual roles?
- u. Will the IT organizational structure proposed be able to be responsive to the business and at the same time operationally strong?
- v. Have IT expenditures been benchmarked against similar types of IT organizations within the past 3 or 4 years to ensure cost-effectiveness of the IT operations?

### Data

- w. What are the statistics on data errors on the system proposed? Are they within industry standards?
- x. How much time is spent on manual data cleansing/clean up on the system proposed?
- y. Are there plans in place to offer Service Providers Data as a Service, BI as a Service, BI Reporting Services?

In short, are the people, processes, data, and technologies in place or proposed to be in place as would be expected in an industry standard best practices IT operation today?

From a Neustar perspective: The company has been operating as the US and Canadian LNPA for 17 years. Has the company, the IT group, and the system(s) kept up with available technology, methods, and practices, or has it stagnated and the system is at end of life?

From an iconectiv perspective: If bidding **[BEGIN HIGHLY CONFIDENTIAL INFORMATION]** **[END HIGHLY CONFIDENTIAL INFORMATION]** does the iconectiv proposal demonstrate that the company, the IT group, and its system(s) have kept up with available technology, methods, and practices, or has it stagnated and the system is at end of life? If proposing a system developed from scratch, does the proposal clearly demonstrate that the company and the IT personnel bid have the capability to build a system of this size, scope, complexity, and performance? Do the Plans submitted have enough detail on its development and testing processes, procedures, and methodologies to provide the level of confidence needed by an industry practitioner to certify that the Plans have a high chance of providing the solution required within the timeframe committed?

The detailed technical assessment made by our expert IT practitioners have documented answers to these questions.

### New Technology Assessment

A second set of questions was developed to understand how well (or how poorly) the systems proposed have incorporated—or are able to incorporate—relevant new technologies. The original title of the process concerned ensuring that Next Generation technologies would be included so that the number portability system could not only grow to meet projected needs, but could also address unforeseen future business needs. A powerful, flexible, extensible technical infrastructure in this area could be used to help US wired, wireless, and Internet companies grow and expand, as well as be ready to support new products and services as they evolve.

## Report on Findings

January 28, 2015

There were a finite number of categories of technology that needed to be addressed in terms of what is a necessary and appropriate infrastructure for the NPAC/SMS systems. These categories primarily include:

- Various application-specific development technologies and potential infrastructures
- Data center server (hardware) architectures (virtual and physical server farms in use or planned for)
- Database technologies
- Networking technologies
- Telecommunications architectures and systems, including Call Center/IVR systems
- Middleware technologies (Is an enterprise service bus architecture appropriate to an NPAC/SMS next-gen system or not? Same with identity management capabilities, enterprise notification systems and technologies, certain web capabilities, etc.)
- Mobile technologies (for either internal or external use)

The individuals from S&A working on this effort have, as recently as this past year, implemented leading-edge capabilities in each of these areas in the airline industry. Comparison of what may be of value to the NPAC/SMS architecture was not difficult. The majority of time was spent on the application components that are unique to LNP systems.

In addition to determining if new technologies were proposed by either vendor, the S&A team also assessed if the *current system architectures* could incorporate the new technologies if a need for them arises in the future.

### Transition Plan

After assessing the proposed technologies inherent in or proposed for the application and infrastructure layers, current and future, the S&A team's assessment concentrated on the reasonableness, realism, and thoughtfulness behind the strategy of iconectiv's Transition Plan. A graceful and successful transition from one infrastructure system to another is challenging when it is happening within a company between experienced team members who have worked together for long time. A graceful and successful transition of a telecommunications infrastructure system that is US-wide and between competing companies has massive odds stacked against its success. A comprehensive, insightful, detailed strategy and plan is required to pull it off.

The S&A team knows that the plan's fine details will come later. However, S&A could evaluate the transition strategy proposed, the logic behind it, as well as the completeness of the Milestones, steps, and activities listed, and the reasonableness of the timetable at the level that would be expected to be provided in a proposal such as this.

The iconectiv transition plan proposed was reviewed to determine if a majority of the categories typically covered in a replacement system transition of this size and scope were present, and if the risks and timing were adequately and appropriately incorporated.

### Miscellaneous Technical Issues

Finally, the team looked for any additional technical issues that might arise—either in terms of missing components that we would expect to be included, or items that are included or discussed that we would question technically.

## Report on Findings

January 28, 2015

# Findings

## 1. Proposal Technical Assessment—iconectiv New ‘Build’ Solution

How does an iconectiv’s NPAC solution to be developed from scratch, and underlying technologies, compare to what is in production today? To what extent do new technologies play a role in the iconectiv proposed system? How well-defined is the iconectiv transition strategy and how comprehensive is the Transition Plan for this approach? What, if any, additional technical issues might arise in a transition to a newly developed NPAC system that were not addressed in iconectiv’s proposal?

iconectiv’s filing dated Aug. 22, 2014 clarified that iconectiv is proposing a completely ‘new product’ and not simply a [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] offering. The Harris, Wiltshire & Grannis LLP filing No. 95-116 to the FCC dated Aug. 22, 2014, states:

Page 10: “Telcordia is not re-using foreign code. Telcordia is creating entirely new code for the U.S. Number Portability Administration Center/Service Management System (NPAC/SMS) that underlies the LNPA operation. Telcordia is not contracting for its NPAC/SMS code development from non-U.S. sources.”

Page 127: “Telcordia is not re-using code from foreign implementations. The code for the NPAC is being developed from scratch in America.”

Page 127-28: “In the press, Neustar has suggested that Telcordia is reusing code from number-portability systems in foreign countries. This is entirely false. Telcordia is creating entirely new code for the U.S. NPAC, developed in America. Telcordia is not re-using code from foreign implementations, nor is it contracting its code development from non-U.S. sources.”

Page 128: “The application is being developed new *from scratch* using the existing industry requirements (*e.g.* FRS, IIS, and XIS).”

Accordingly, S&A analyzed the iconectiv proposal based on these representations. However, for reasons discussed above and in the following section, S&A also evaluated the iconectiv offering as an “evolved” solution, which we believe a more plausible and less risky technical approach. S&A did not evaluate national security risks associated with a system that is not built entirely in the United States. These risks were part of the record supporting the new build solution

### Current/Proposed System Assessment

Assuming that all technology references in the iconectiv proposal and oral transcripts refer to the infrastructure that would be used to build a new NPAC system from scratch, then the new system, if/when completed, would be

## Report on Findings

January 28, 2015

deployed using technologies very similar to the Neustar NPAC system. For example, the proposal stated that [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED]

[REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION]

To build and deploy a system comparable to the current Neustar system—developing all software from scratch—would take approximately 2 ½ to 3 years (see Transition Plan below for details), assuming that expertly detailed plans, developed by a highly skilled IT and NPAC-expert team, in conjunction with tightly involved Service Providers who dedicate resources to making their own internal changes as necessary and to multi-regional user testing, are rigorously followed. And everything goes right . . . the first time. **Since there were no Milestones or activities included in the proposal that gave any insight—or even mentioned this effort, we have no way of assessing the probability of its success within any reasonable timeframe.** During the orals the iconectiv representatives specifically discussed the [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] for the design of the system. Getting the design right is important, but it is not code, and is only a fraction of the effort.

### New Technology Assessment

Given what S&A understands the FCC to be looking for—namely a next generation system—the team examined the extent to which each offeror’s proposal contained or would be able to incorporate new technologies.

If we assume that all of the technologies described in the iconectiv proposal and during the orals were to be applied to the development of a new NPAC system, then the S&A team has identified a few new technologies that could be incorporated into the NPAC architecture that iconectiv did not propose in the materials available to us. For example, use of Oracle’s Exadata appliance would enable an NPAC system to handle substantially higher volumes of transactions—something that may be needed in the future if all TNs are included in the system—at speeds which would be required. The most current versions of XML, or the use of Java, could make portions of the system easier and less time consuming to modify. Use of private cloud and virtualization hardware technologies could be deployed to ensure high availability of the application and handle new, heavier processing volumes and requirements. Incorporation of web services could allow for asynchronous transactions and lead to far richer functionality offered at a fraction of the cost and time to deliver. In the future, depending on how TNs may be used, Identity Management software capabilities may be of value.

We assume that although the system is not yet built, that iconectiv intends to build to the technologies that were identified in its proposal. So no new technologies would be included in the original build. That said, that should not preclude the incorporation of any of these technologies in the future after the initial system is completed.

## Report on Findings

January 28, 2015

### Transition Plan

Assuming that iconectiv is proposing a new system and had planned to do so from the outset, it is technically inconceivable that iconectiv's proposed Transition Plan [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED]

[END HIGHLY CONFIDENTIAL INFORMATION]

Given that the proposal is for 'a new product' 'developed from scratch,' the sufficiency of the Transition Plan—the sufficiency of the entire iconectiv proposal—must be assessed in relation to other system development efforts of similar size, scope, and complexity.

The major deficiencies of the iconectiv proposed Transition Plan include, but are not limited to:

- **Failure to Allow for Sufficient Time.** Assuming that everything goes exactly according to a plan (and no plan has been provided), the industry 'rule of thumb' is that 1/3 of the total schedule is required for development (up to and including system integration testing), 1/3 for user and performance testing, and 1/3 for implementation. iconectiv documents have stated repeatedly that the system will require a minimum of [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] and preferably [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] for user and performance testing. That means that implementation of an NPAC built from scratch will require [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION]
- **Lack of a True Risk Profile.** In addition to these specific shortcomings, a number of the risks mentioned in iconectiv's proposal were not even identified let alone properly mitigated. With a [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] this might have been a manageable issue. But a greenfield deployment makes it critical to have an understanding of the true system development and deployment risks, and have a solid risk management plan.

### Miscellaneous Technical Issues

With this in mind, we began to identify additional deficiencies in iconectiv's proposal:

- **No Proven Capability to Meet the Performance SLAs.** [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] Regardless of whether [BEGIN HIGHLY CONFIDENTIAL INFORMATION]

Report on Findings

January 28, 2015

**INFORMATION]** [REDACTED] **[END HIGHLY CONFIDENTIAL INFORMATION]** that system is not being proposed. With no code and no production system to base a prototype on, the proposal is technically deficient in this very critical area.

- **Lack of Detail on Recruiting.** **[BEGIN HIGHLY CONFIDENTIAL INFORMATION]** [REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED] **[END HIGHLY CONFIDENTIAL INFORMATION]** particularly given that iconectiv is offering a “from scratch” solution, which requires an even broader skill set.
- **Concerns that Arose During iconectiv’s Technical Q & A.** There were a number of exchanges that took place during the Q & A session that led our team to begin to question the detailed understanding on the part of iconectiv of some key technical concepts that were proposed. One exchange, in particular, reflects iconectiv’s lack of technical understanding in a critical area: (Q & A transcript, pages 133-136) **[BEGIN HIGHLY CONFIDENTIAL INFORMATION]**

[REDACTED]

**[END HIGHLY CONFIDENTIAL INFORMATION]** The discussion continues for a few pages, then begins again: **[BEGIN HIGHLY CONFIDENTIAL INFORMATION]**

[REDACTED]

## Report on Findings

January 28, 2015

[REDACTED]

[REDACTED]

[REDACTED] [END  
HIGHLY CONFIDENTIAL INFORMATION] We believe it is significant that iconectiv's Chief Solution Architect responsible for the service delivery of the NPAC solution (Q & A transcript, page 8) appears not to understand the difference, or at a minimum cannot describe iconectiv's bid accurately. The interesting thing about this exchange is that [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] the Working Group did not pursue it.

This is only one example of a Working Group member identifying a technical inconsistency in an iconectiv response and simply letting the issue go.

In summary, a proposal for a system that is to be built from scratch that contains no mention of who, what, when, where, or how it will be designed, developed, tested, or implemented is not a viable proposal and should be eliminated from any further consideration. It is easy for a company to say 'yes' that it will deliver a system that meets all of the requirements. However, proof that it can do so is what is required in a development-specific proposal. That proof typically is shown by providing detailed project plans for the build of the system and all of its core components; descriptions of the processes, tools, methods, and procedures that will be deployed; committed resumes of the individuals who will be responsible for and working on the efforts; detailed timelines showing milestones when major portions of the system will be provided for demonstration and user testing. **Not only were none of these very standard system build items included, the entire effort wasn't even mentioned.** [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION]

The above approach poses high risk of failure and is not a viable alternative, much less a technical equivalent approach to the continuation of Neustar's currently deployed system. In fact, it is more accurate to say that there is no actual system that is being proposed, and no credible technical evidence from the proposal that it will or can be built.

Report on Findings

January 28, 2015

2. Proposal Technical Analysis—iconectiv’s Product ‘Buy’ Solution

How does an iconectiv [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] solution, and underlying technologies, compare to what is in production today? What is its life expectancy? How well-defined is the iconectiv transition strategy for this approach, and how comprehensive and realistic is the Transition Plan?

iconectiv’s proposal is more plausible if read as [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED]

[REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION]

The proof that iconectiv was experienced at implementing and running an NPAC system, and potentially capable of doing so in the US, was based on the fact that it [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION]

Other aspects of iconectiv’s proposal are consistent with a ‘buy’ product offering including:

- Throughout the iconectiv Technical Requirements Document (TRD) Section 12.1, when discussing its NPAC/SMS Solution it used the present tense [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] e.g., ‘is,’ ‘includes,’ ‘provides,’ ‘supports,’ ‘contains’ ‘maintains,’ ‘uses,’ ‘generates,’ ‘implements,’ ‘monitors,’ ‘connects,’ ‘handles,’ etc.
- Throughout the iconectiv TRD Section 12.1, when it discussed [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] it consistently used the phrase ‘will provide.’ (subsection 7.7, “will provide an IVR system”; subsection 7.8, “will provide and Enhanced Law Enforcement Platform service”; subsection 7.11, “will provide an intermodal ported number identification service”; subsection 7.12, “will also provide the information needed” relating to a public website.)

[BEGIN HIGHLY CONFIDENTIAL INFORMATION]

[REDACTED]

[REDACTED]



## Report on Findings

January 28, 2015

**CONFIDENTIAL INFORMATION]** notwithstanding its assertion that it would build the system software “from scratch.”

### Current/Proposed System Assessment

After reading the iconectiv proposal and related materials, we answered the same questions that we had developed for evaluation of both proposals.

As previously noted, iconectiv’s proposal can be read as proposing **[BEGIN HIGHLY CONFIDENTIAL INFORMATION]**

[REDACTED]

**[END HIGHLY CONFIDENTIAL INFORMATION]**

Upon study of the iconectiv proposal we were comfortable assuming that **[BEGIN HIGHLY CONFIDENTIAL INFORMATION]** [REDACTED] **[END HIGHLY CONFIDENTIAL INFORMATION]** is at Industry Standard level. We saw no evidence that more advanced technologies are incorporated, just today’s standard technologies.

Based on iconectiv’s proposal, the technology components upon which both systems are built or are proposed to be built appear similar. The differences arise when assessing the application level capabilities and support of the application requirements:

**[BEGIN HIGHLY CONFIDENTIAL INFORMATION]**

- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]

**[END HIGHLY CONFIDENTIAL INFORMATION]**

[NOTE: Technical system comparisons between Neustar’s NPAC and iconectiv’s **[BEGIN HIGHLY CONFIDENTIAL INFORMATION]** [REDACTED] **[END HIGHLY CONFIDENTIAL INFORMATION]** were based on the level of description in each proposal that provided answers to the S&A Technology, Processes,

## Report on Findings

January 28, 2015

People, and Data questions outlined in the Description of Work Effort of this report. The S&A team did have direct access to the Neustar NPAC system and team after reading all Neustar-related materials, so our answers to those questions were verified. The S&A did not have direct access to the [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] so our answers are inferred after reading all iconectiv-related materials, but not verified.]

In summary, the major challenges for [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] [BEGIN RESTRICTED ACCESS CRITICAL INFRASTRUCTURE INFORMATION] [REDACTED] [END RESTRICTED ACCESS CRITICAL INFRASTRUCTURE INFORMATION] [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] to ensure that the operation is as solid as Neustar's is today.

In addition, [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] about 1/3 of the daily transaction volumes that Neustar's system currently handles (Q & A transcript, pages 148-154). Consequently, substantial performance improvements and testing would be required—[BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION]

Since no such modification or testing effort was proposed, the S&A team concluded this could mean one of two things: either no modification for US requirements or volumes would be included, or such modifications would be completed, tested and implemented either prior to or immediately after contract signing. Since iconectiv said yes to all of the functional and performance specifications in the RFP, we assumed, in order to make the proposal at all legitimate, that all modifications would be completed and tested prior to contract signing. It is highly unlikely this had already occurred at the time that the NANC made its recommendation.

### New Technology Assessment

The S&A team has identified a few new technologies that could be incorporated into the NPAC architecture that iconectiv did not propose, based on the documents available to the S&A team. See discussion of potential new technologies at page 12 (discussion of Oracle Exadata, more current versions of XML, private cloud/virtualization).

Based on the documentation available to us, we assume that the [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] architecture does not

<sup>2</sup> This figure was included in Neustar's original proposal, which was the basis of S&A's review. Neustar currently has [BEGIN RESTRICTED ACCESS CRITICAL INFRASTRUCTURE INFORMATION] [REDACTED] [END RESTRICTED ACCESS CRITICAL INFRASTRUCTURE INFORMATION]

## Report on Findings

January 28, 2015

preclude the incorporation of any of these technologies. iconectiv's proposal states that [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED]

[END HIGHLY CONFIDENTIAL INFORMATION]

Regardless of the extent to which the system proposed by either company is deploying capabilities such as these today, both systems appear to have the ability to be upgraded or enhanced to deploy new technologies and take advantage of new capabilities. However, as discussed below, implementing new technologies would be more challenging if attempted in parallel with other modifications to iconectiv's system.

### Transition Plan

Any IT expert who has hands-on experience successfully implementing large infrastructure systems [BEGIN RESTRICTED ACCESS CRITICAL INFRASTRUCTURE INFORMATION] [REDACTED] [END RESTRICTED ACCESS CRITICAL INFRASTRUCTURE INFORMATION] would say of iconectiv's proposed Transition Plan that it contains only the most rudimentary level of detail [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION]. Assuming that iconectiv in fact will implement an evolved version of a system that was already in production, the major steps in a transition of a system of this size were at least captured (except for the time and effort to [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION]).

That said, even with an evolved solution, there are major technical deficiencies with the iconectiv Transition Plan itself. While these deficiencies can be fixed and mitigated, the expertise and knowledge of individuals involved in putting together and proposing these strategies is called into question.

Key technical Transition Plan issues include:

- **Lack of Recognition of Risk due to Modifications.** In iconectiv's proposal (Section 12.3, subsection 4.7 pages 33-39) [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] This lack of recognition of the modification efforts, even if previously done and tested, means that there is no 'placeholder' or mitigation plan for application problems and issues should something go wrong.
- **Lack of detailed strategy around cutover.** iconectiv proposed [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED]

Report on Findings

January 28, 2015

[REDACTED]  
[REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION]

[BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

[REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION]  
[REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION]

- [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED]  
[REDACTED] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] iconectiv's proposed Transition strategy [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] is not a reasonable approach. Reasons to support such a conclusion, clarifications about missing steps, and recommendations about how to make the overall plan workable, follow:

- *First,* [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED]  
[REDACTED]  
[REDACTED]

[REDACTED]  
[REDACTED]

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

Report on Findings

January 28, 2015

■ [REDACTED]

**[END HIGHLY CONFIDENTIAL INFORMATION]**

As IT experts we would expect that at least a full quarter of operation be experienced, with no Priority 1 or Priority 2 errors reported, with all Service Providers in the region participating, before cutting over another region. We would expect that within an individual quarter, the majority of the functional and performance scenarios would be experienced. (NANC members would know if 90 days is adequate.)

- *Second*, each region also should be cutover **[BEGIN HIGHLY CONFIDENTIAL INFORMATION]** [REDACTED]  
[REDACTED] **[END HIGHLY CONFIDENTIAL INFORMATION]** And since this is a real-time system, we predict that data may be corrupted and/or lost and may not be able to be recovered.

Settling in a single region at a time using code identical to the initial region cutover, and ensuring that the Service Providers in the new region operate flawlessly for at least 30 days, is the only way to know for sure that the transactions, and all of the various Service Providers and users involved in the region, are operating at a reasonable level before moving to the next region.

- *Third*, **[BEGIN HIGHLY CONFIDENTIAL INFORMATION]** [REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

[REDACTED]  
[REDACTED] **[END HIGHLY CONFIDENTIAL INFORMATION]**

- *Fourth*, **[BEGIN HIGHLY CONFIDENTIAL INFORMATION]** [REDACTED]  
[REDACTED]  
[REDACTED]

[REDACTED]  
[REDACTED]

## Report on Findings

January 28, 2015

[REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION]

Our suggested implementation strategy, which is in line with industry best practices and uses capabilities assumed but not stated in the iconectiv proposal, would require 9 months to 1 year.

Such a transition strategy will provide a technically safer path for cutover to a new NPAC system, should transition to a new NPAC be the final FCC decision.

Assuming that a strategy such as this is adopted, another year has been added to the transition schedule.

- **Incomplete Contingency Planning for Migration.** Very high level statements about a contingency plan are made throughout the Migration Plan document Section 12.1. [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] Not having a well thought out fail back strategy could easily result in many hours, if not days, of transactional data lost. This is a very important and unmitigated risk.

- [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] The iconectiv transition contingency strategy itself also was questioned by the S&A team. The iconectiv Proposal [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED]

[REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION]

- **Ill-Defined Data Migration and Cutover Strategies.** The iconectiv descriptions of migration, testing, and data migration are intertwined and confusing at best. Section 12.3 (2.3.4), also Q & A transcript,(pages 200—204) The plan [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED]

Report on Findings

January 28, 2015

[END HIGHLY CONFIDENTIAL INFORMATION] [BEGIN RESTRICTED ACCESS CRITICAL INFRASTRUCTURE INFORMATION] [REDACTED]

[REDACTED] [END RESTRICTED ACCESS CRITICAL INFRASTRUCTURE INFORMATION] In addition, [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED]

[REDACTED]

[REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] The technical realities of testing new software (system testing, integration testing, user testing, load testing, performance testing, etc.) have not been addressed.

- Data conversion and testing strategy needs to be better defined. Problematic examples include:

The plan for data 'migration' [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED]

[REDACTED]

[REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] These technologies and their use in this program must be described in detail since Neustar data files are on the originating end of the transaction. In addition, time and effort must be allocated for both companies to develop and test such a process.

[BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED]

[REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION]

[REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] These issues need to be stated more clearly and in greater detail.

- Conversion of history files [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED]

[REDACTED]

[REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] Since history files will need to be kept, and the Neustar application would be out of synch with the active code with iconectiv's first release, it is unrealistic to assume that a previous vendor would continue to be responsible for historic files. Neustar has history records dating back to 1996. A history record conversion effort [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION]

- [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] not included in the proposal. One final piece was missing from the iconectiv Transition Plan Milestones of Key Events (iconectiv's proposal RFP Section 12.3, pages 24-25). The S&A team felt the need to consider the time and level of effort that would most likely be required to [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED]

[REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] When we went to compare our estimates with those included in the iconectiv Transition Plan, we discovered that [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED]

[REDACTED]

[REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION]

[REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION]

## Report on Findings

January 28, 2015

We noted that [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED]  
[REDACTED]  
[REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION]

Even if [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED]  
[REDACTED]  
[REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] To the Service Providers, the internal workings of the system itself would be invisible—iconectiv committed to [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED]  
[REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] It wasn't the best solution to test the modifications required to ensure that US-specific business requirements were met in our opinion, but if the test plans were detailed enough and covered every functional and performance requirement included in the RFP (comprising thousands of pages), the process could, potentially, work.

Our concern is that, for this evaluation, NANC and the FCC would have to take iconectiv at their word that these modifications and testing are underway and are being performed successfully. Our team found it difficult to understand how a recommendation for a vendor can be made concerning a system of this size and scope without having any assurance on record that the modifications will be made as per the requirements, or even any way to evaluate whether the company, the processes, and the individuals involved are in place and capable of ensuring success in this area.

### Miscellaneous Technical Issues

The effort to stand up the new system has a potential to detract from efforts to insert new or improved technologies throughout that time, or even to address new functionality, since recreating the current functionality still needs to be incorporated in the time schedule. [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED]  
[REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] New functionality may have to be put on the back burner until [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] is at parity to where NPAC is today.

In summary, although iconectiv's approach presented issues, some major, that need to be addressed, its proposal was technically plausible when read as [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED]  
[REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] However, even with this approach as opposed to a "from scratch" software development effort, major technical deficiencies have been noted in our assessment of the current technology being proposed and in the iconectiv Transition Plan.

## Report on Findings

January 28, 2015

At a minimum, each of these technical deficiencies should be addressed, with written commitments made, and the iconectiv proposal reassessed in its entirety after such a submittal.

## Report on Findings

January 28, 2015

### 3. Proposal Technical Assessment—Neustar/Assessment of Key Discriminators

#### Current/Proposed System Assessment

The Smith & Associates team studied the Neustar proposal in detail, examining the current status of the NPAC system, i.e., applications, operations, and infrastructure, in production today and supported by Neustar, and the estimated life expectancy. Part of this examination involved identification of key discriminators that exist between Neustar and iconectiv proposals.

Answers to the questions that had been developed (see questions a–y above at pp. 8–9) were documented based on the proposal and related materials. However, in order to draw concrete conclusions about the current NPAC system, we asked to see it in operation and talk with the teams that support it. Neustar gave us the permissions and access that we requested. We met with 27 of the NPAC team members. The NPAC team members were requested to come prepared to talk about: (a) their individual background and history with the NPAC system; (b) the details of the portion of the system for which they are responsible; and (c) their team’s plan for future development/enhancements. The answers to the questions that we had documented based on the Neustar proposal were used as the guideline for information that needed to be verified throughout the week by the appropriate Neustar employees and/or via system demonstrations. We also toured their headquarters facilities and the primary data center. By the end of the week the S&A team felt that we had certified the answers we had assembled from the Neustar proposal to the questions. The S&A team provided our detailed assessment of the current NPAC/SMS system in a separate document provided to Neustar. This report summarizes those findings relevant to a comparison of the system proposed by iconectiv.

As stated in previous sections of this report, there is ambiguity about the intended mechanism of delivery in iconectiv’s proposal, a package implementation or a development from scratch effort. Since comparison of Neustar’s operational system to a system that does not yet exist would be difficult, for the purposes of our comparison documented in this section we assumed [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] This provides tangible comparison targets and a more favorable assertion about the iconectiv offering. That said, many of the discriminators are generic between companies and apply to both iconectiv’s ‘build from scratch’ and evolved from an existing, deployed software product scenarios.

The key discriminators between Neustar’s and iconective’s respective proposals are as follows:

- Organization, Expertise, Training

There is a great advantage to having Number Portability-experienced people. The Neustar team is in place. iconectiv’s proposal and Q & A responses talked about [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] whereas Neustar provided committed team resumes.

- Change Management

The Neustar proposal provided very strong Change Control, Change Management, and Risk Management Processes (Section 1.1.6., Exhibit 1.1-6, Exhibit 1.1-7, Section 1.3, Exhibit 1.3-2, Exhibit 1.3-4, Exhibit 1.3-5),



## Report on Findings

January 28, 2015

iconectiv's proposal made no reference to a data warehouse. It did mention [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED]

[REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION]

- Application Software

In addition to ensuring that [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION]

the iconectiv Technical Requirements Document (TRD, Section 12) states that: it will provide an intermodal ported number identification service (page 36, 7.11), and it will provide a public website (page 36, 7.12). These components are currently available in Neustar's NPAC system [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED]

[REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION]

- Application Testing Tools

The fact that [BEGIN RESTRICTED ACCESS CRITICAL INFRASTRUCTURE INFORMATION] [REDACTED] [END RESTRICTED ACCESS CRITICAL INFRASTRUCTURE INFORMATION]

[REDACTED] [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED]

[REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION]

- Test Cases

[BEGIN RESTRICTED ACCESS CRITICAL INFRASTRUCTURE INFORMATION] [REDACTED] [END RESTRICTED ACCESS CRITICAL INFRASTRUCTURE INFORMATION]

This level of automated testing of any system is exceptional, and results in practically flawless deployments of new releases. (Section 1.3.1 pages 1.3-5 through 1.3-11) iconectiv committed to automated testing in its proposal but does not specify how many test conditions [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION]

- IVR

The iconectiv Technical Requirements Document (TRD, Section 12) states that: it will provide an IVR system (page 34, 7.7); it will provide an Enhanced Law Enforcement Platform (page 34, 7.8). These components are currently available in Neustar's NPAC system and appear not currently to be available in [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] No information was provided as to how or when these capabilities would be available in the iconectiv proposal.

- Monitoring Tools

iconectiv bid some [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED]

## Report on Findings

January 28, 2015

[REDACTED]

[END HIGHLY CONFIDENTIAL INFORMATION]

Our independent IT assessment of the Neustar proposal and first-hand review of the people, processes, technology, and governance of the current NPAC system shows it to be using state-of-the-art technologies, deployed at or above current Industry Standard Best Practices in all categories that were not mandated by requirements. The system is highly stable and performant today, and is flexible and capable of handling future requirements.

The iconectiv solution, in contrast, affords no advantages over the Neustar solution. In several areas, there are noted “discriminators” reflecting Neustar’s superiority. There was no technical area where the iconectiv system, as described in its proposal, was found to offer an advantage.

### New Technology Assessment

In terms of new technologies and the current NPAC/SMS system, there are some new technologies that could be incorporated into the current NPAC architecture that Neustar is not using nor has it proposed. See discussion at page 12 (discussion of Oracle Exadata, more current versions of XML, private cloud/virtualization).

A review of the Neustar architecture showed that any or all of these technologies could be incorporated into the current system if/when required. The Neustar technical team has continually evolved the system in the past, incorporating the latest applicable technologies to ensure that it remains in a condition that is, at a minimum, state-of-the-art. Neustar has specific annual upgrade schedules which it follows for all of its components: hardware, operating system software, application software, networks, etc. We find no reason to doubt that this practice will continue in the future.

In summary, there is no technical reason for the current NPAC not to go forward, as the systems and services are highly technically capable of responding to current and future (5-7 years) number portability requirements.

### Transition Plan

Neustar NPAC is a continuation of service, and, consequently, did not require a Transition Plan.

### Miscellaneous Technical Issues

The S&A team found no additional technical issues relating to the Neustar proposal. The system is currently in service and operating at levels exceeding current SLA requirements and meeting most, if not all, of the new and more stringent SLA requirement to be delivered on by the Next Generation NPAC. Many of the requested enhancements are in progress via evolutionary changes, while the balance of them are proposed to be implemented in the same way that enhancements and new functionality have been introduced during the past decade of flawless operations (all SLAs met or exceeded during that time). In essence the requested enhancements will be introduced

## Report on Findings

January 28, 2015

under the umbrella of a very well documented and proven Change Control / Management process that will result in no service disruptions as demonstrated by the past performance record.



## Report on Findings

January 28, 2015

### INFORMATION]

In terms of a technical comparison, whether iconectiv is adopting a “from scratch” approach or a less ambitious evolved approach, its proposal is deficient in that it fails to meaningfully address the necessary development, testing, or implementation efforts needed to produce a system using *either* approach. The following summarizes our conclusions re: the proposal components and commitments most critically impacted by iconectiv’s “from scratch” approach:

- iconectiv Transition and Implementation Plan, including its Project Plan, Staffing Plans, Risk Assessment, Change Control, Quality Assurance, and Contingency Plans needed to account for the full effort of design, development, testing, and cutover of a greenfield (newly developed) system and they do not.
- The timeline to be considered following industry best practices now results in an overall transition period of 2 ½ to 3 years (9 months to 1 year for development; 9 months to 1 year for system and performance testing; 9 month to 1 year for cutover of all 7 regions.) This timeline assumes that there is an expert team in place, detailed plans have been produced, and everything goes right . . . the first time.
- No new technologies were proposed that would, or even could, substantially reduce development time, automate testing, etc. Consequently, minimal new functionality can be added throughout the elongated transition time, or the development time for the new system will continue to extend even beyond the 2 ½ to 3 years.
- It is reasonable to estimate an additional year for a new system to settle in and become as solid and performant as Neustar’s NPAC system is today. The realistic implementation timeline is now close to 4 of the 5 years of the base contract.
- As iconectiv and the Working Group discussed during the Aug. 6, 2013 Q & A, [BEGIN CONFIDENTIAL INFORMATION] [REDACTED] [END CONFIDENTIAL INFORMATION] (Q & A pages 192—193). Transitioning to a [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] carries a set of quantifiable risks. Transitioning to a newly developed system increases the risk exponentially. These risks have not been recognized, nor have mitigation strategies and plans been developed and proposed.

Provided that this is a greenfield development, the iconectiv proposal is seriously technically deficient since it does not incorporate any Industry Standard Best Practice components relating to new software being developed from scratch.

Assuming that iconectiv’s plan is actually to [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] then a comparison of the two systems can be performed. Neustar’s NPAC/SMS and [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION]

## Report on Findings

January 28, 2015

[REDACTED]

[END HIGHLY CONFIDENTIAL INFORMATION]

The iconectiv proposal did not include any plans, time, or staffing to modify and test the [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] system in order to mitigate these deficiencies. Consequently we were unable to provide any assessment as to whether any of these very key requirements would, or even could, be adequately and accurately incorporated into the [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [REDACTED] [END HIGHLY CONFIDENTIAL INFORMATION] system. Lastly, the proposed transition plan misses a number of critical tasks, and remains silent about the expected changes to systems and operating processes that will need to be performed by Service Providers and the incumbent LNPA.

No new or futuristic technologies were included in either companies' proposals, related documents, or follow-on presentations or filings. However, of the two offerors, Neustar is in a better position than iconectiv to implement new technologies by building on the current NPAC system because a newly developed iconectiv system will require years to just recreate what is currently available. During the time needed by iconectiv to recreate this baseline functionality, introduction of new technologies would be expected, from a technology perspective, to make a development effort even riskier.

Major transition issues and miscellaneous technical issues have been identified in our assessment of the iconectiv proposal in both the 'build' and the 'buy' scenarios. No documentation or personnel staffing commitments were included in the proposal that gave us any comfort that these major issues could, or even would, be addressed.

The two proposals clearly do not represent technically equivalent systems for consideration. There is no evidence on record to support a conclusion of technical equivalency and therefore it is our inference that the NANC recommendation was a price only selection, and represents exponentially higher, long-term technical risk.

The Neustar NPAC/SMS system is built on state-of-the-art technologies, is in production today, and is well-positioned to grow into new technologies as they become commercially available and are needed to fulfill functional or performance requirements. The Neustar NPAC system is substantially more advanced in its support of the NANC requirements today, and will be more responsive and less disruptive to the short-term and longer-term needs and activities of the Service Providers and the public.

## Report on Findings

January 28, 2015

# Appendix A: Smith & Associates Credentials

Smith & Associates is an expert information technology (IT) consulting firm that specializes in providing support to organizations facing a critical IT challenge. That challenge could be a business disruption such as a merger or divestiture, a major IT development or implementation effort that has gone bad, an IT department not meeting business expectations, a change in business direction that requires “fresh technical eyes” from outside the company, etc. The company’s approach addresses People, Process, Data, and Technology.

The Smith & Associates value proposition:

- Each associate is a former CIO or CTO for brand name companies, and has been responsible for the successful turnarounds and first-time completion of major IT projects throughout the world. Our profiles demonstrate that we have held executive-level IT leadership positions at major corporations such as McKesson, Monsanto, Verizon, Xerox, KeySpan Energy, WestJet, CitiBank, Nortel, Sithe Energy, CSX, and Bristol-Myers Squibb. We have also led Venture Capital startups and have worked in Private Equity.
- Because each associate has 25+ years of experience, we are able to provide an accurate assessment of IT situations quickly, as well as detail options and potential solutions.
- Our associates are “hands-on” technologists and leaders. We do the work ourselves.
- We are independent of vendor bias.

Smith & Associates offers expert services in four key areas:

### IT Crisis Management

Expert support to organizations experiencing major system outages, security breaches, significant project delays, large cost overruns, strategic IT rightsizing, a critical migration to a new technology. We identify and fix the current problem, and help to ensure that future crises are averted.

### IT Crisis Prevention Support

Expert support to companies about to undertake a strategic IT planning effort, a major data or code development project, a key system implementation, a vital operations or infrastructure improvement project, a future technology planning effort, an IT cost and/or performance assessment, a major IT controls review. Our associates are experts at improving corporate benefits from IT while lowering IT costs, and ensuring successful system outcomes the first time.

### IT Interim Leadership Services

Expert support to IT organizations in transition and in need of an IT professional to lead it on an interim basis, or organizations requiring assistance rightsizing IT groups and/or expenditures. IT leadership services to organizations about to undertake a transformation project. We deliver a top quality interim IT team, help build a

## Report on Findings

January 28, 2015

highly functional IT 'A' Team, put extensible IT organizational structures in place, help companies avoid leadership disasters, and ensure positive buy-in by all stakeholders.

### Technology Venture Solutions

Expert support to companies considering a major merger or acquisition, or a major divestiture. Determine if IT can accept major synergies of such corporate actions in the first two years, as we have often found to be the case. Help companies learn if they can experience organic dynamic business growth using IT as an enabler. Support organizations in investigating new technology-based ventures to drive new top-line revenue growth. Our professionals help achieve successful results—first time, every time—saving organizations substantial time and money.

S&A' primary industries of expertise include: Airline, Travel, Telecommunications, Energy, Financial Services, Health Care, IT, Manufacturing, Non-profit and Government, Retail.

S&A' domain expertise includes: infrastructure and operations; system performance; package implementation; large scale system design, development and implementation; networks and communications systems; security; IT finance; IT organization—people, structures, culture—change management; and IT technology-based new products and ventures.

This information is from our website and represents what our team members have been doing since 2010. Prior to that, each associate worked inside IT organizations, ensuring that major IT projects were delivered on-time, on-budget, and in a quality manner. Consequently our expertise covers both delivering major IT efforts in a cost-effective and timely manner, as well as assessing and fixing IT problems that have already occurred.

Neustar asked Smith & Associates to provide it with an independent assessment of the technical proposals for the NPAC/SMS system, and the implications, i.e., actual benefits, challenges, risks, and costs of changing the prime LNP system administrator in today's environment. Certain members of Smith & Associates were uniquely qualified to perform such an assessment.

Smith & Associates assigned two of our associates to work on this project: Cheryl Smith and Daniel Crespo-Dubie.

**Cheryl Smith** is an information technology expert and experienced business leader. She has senior executive experience as a CIO in the airline, energy, health care, telecommunications, manufacturing, and consulting industries, and with federal agencies. She specializes in providing Interim IT leadership and crisis management support to companies that want to take their IT (people, processes, technologies) to strategic competitive levels, or for companies facing major "one-time" IT-related events. She has been responsible for the successful turnaround and completion of critical IT projects for organizations around the world. *In the case of the LNPA current situation, she has in-depth past and recent experience in assessing a critical IT situation (people, processes, data, technology), and determining the best approach to take to ensure that the company involved makes IT decisions quickly and accurately.*



Most recently, she was the EVP and Interim CIO of WestJet Airlines, the 2nd largest Canadian airline. She was responsible for transforming that company's IT applications, operations, and infrastructure into one of the most

## Report on Findings

January 28, 2015

technologically advanced in the airline industry. Real-time systems were the backbone of her application portfolio there. She also was the Interim CIO for Cendant, responsible for the design of the breakup of that corporation's IT capabilities to support four separate publicly traded companies at the time of divestiture. She knows firsthand what is involved in IT transition planning for a \$20B enterprise. She has held positions as the global CIO at McKesson Corp., the CIO for KeySpan Energy that acquired four major energy companies during her tenure, and the VP for Strategic Systems at Verizon. She was the CEO of a technology startup, utility.net, which offered Broadband over Power Line (BPL) networks for low cost, high-speed broadband for commercial sale in rural areas, and to large electric companies for SmartGrid applications.

Ms. Smith's area of expertise is successfully applying technology to critical business problems and ensuring that they provide the ROI committed. She is a key industry "go to" person when an organization is faced with a particularly challenging IT crisis or need—major corporate mergers and acquisitions (4 companies in 4 years at KeySpan) or divestitures (\$20B corporate split at Cendant); massive organic corporate growth (\$40B of new revenue in 4 years at McKesson); strategic system 'saves' (system for 1.3M employees at the NHS in the UK; a major customer billing system at Verizon).

As related specifically to the LNPA challenge, she was responsible for attestation for Bell Atlantic (now VZ) when the RBOCs were driving to get into long distance. One of her teams was responsible for ensuring that BEL passed the attestation trials (ensuring that the company could and would electronically process local change orders from external carriers as fast as BEL could do it inside the corporation) so that the company would be permitted to get into the long distant market. The company passed on its initial DOJ trial. That said she is well aware of how complex real-time telco systems are, and how many technologies and procedures are involved. She was also directly responsible for the successful implementation of a nationwide UK healthcare system that critics said couldn't/shouldn't/wouldn't get implemented. It did, and it is wildly successful today.

She is the co-founder of the CIO Institute, a certificate program for senior IT leaders that is taught at 10 major US universities and business schools, and is currently working on a leadership program for frontline IT leaders. She holds both bachelor and master degrees from the Pennsylvania State University.

**Daniel Crespo-Dubie** is a telecommunications expert. He is a senior information technology (IT) leader with a particular specialty in telecommunications. He is an expert in finding and delivering creative technical solutions that create competitive advantage. He has executive experience as a CIO and Sr. VP of Telecommunications, and has worked in the energy, health care, and telecommunications industries.



Most recently, Daniel led three different telecommunication project teams at WestJet that produced results that will continue to increase in value for the company for many years to come:

- He was responsible for leading the team that replaced an 800-line Nortel hardwired telco switch with Avaya's VoIP capabilities. When Daniel was called in the project was almost a year behind schedule. Within months, the new system was installed, and shortly after that more than 600 Call Center agents were working from home. The return on investment to WestJet for that system was about 18 months.
- He then worked with the team to replace the Zetron system—the real-time ground-to-ground and ground-

## Report on Findings

January 28, 2015

to-air communication system. He brought an entirely new view to the project, incorporating the technologies and investments that the company had made in the Avaya VoIP switch. He convinced the WestJet Airline Operations team (the airline's control tower team) as well as the pilots and ground handlers that the new technologies worked even better than the Zetron, even though their processes would change.

- Finally, the company was faced with a data center whose infrastructure had grown on a piecemeal basis as the company grew (WestJet was founded in 1997 with 3 737s; today it has 150 737s, 40 Q400s, and has announced wide bodies). In addition, a 2<sup>nd</sup> data center had recently been established but its telecommunications infrastructure was set up in the image of the primary data center (which was horrific). Daniel led a team of WestJetters and expert contractors to build a new network infrastructure in the primary data center, and failed thousands of internal data center components over to it. The conversion (which lasted a few weeks) went flawlessly. The old network was then disassembled. He then cleaned up the new data center networks, established powerful, redundant, and secure connections between data centers and WestJet's key vendors, and between both data centers and WestJet's then 86 bases around the world.

Daniel knows telecom. He has close ties to the major telco and networking vendors so he is constantly up-to-date on new technologies that are recently commercially available as well as those that are soon to come to market. He understands the power and complexity of the systems and the technologies that are involved. He is key to our understanding and documentation of currently commercially available as well as potential new technologies that are a part of this work effort as they relate to the recompute.

Full versions of their resumes and additional information about the company can also be found on the website at [www.smithandassociates.us.com](http://www.smithandassociates.us.com).