ATIS-0100070

Network Reliability Steering Committee
2019-2020 Operational Report

As a leading technology and solutions development organization, the Alliance for Telecommunications Industry Solutions (ATIS) brings together the top global ICT companies to advance the industry's most pressing business priorities. ATIS' nearly 200 member companies are currently working to address the All-IP transition, network functions virtualization, big data analytics, cloud services, device solutions, emergency services, M2M, cyber security, network evolution, quality of service, billing support, operations, and much more. These priorities follow a fast-track development lifecycle — from design and innovation through standards, specifications, requirements, business use cases, software toolkits, open source solutions, and interoperability testing.

ATIS is accredited by the American National Standards Institute (ANSI). The organization is the North American Organizational Partner for the 3rd Generation Partnership Project (3GPP), a founding Partner of the oneM2M global initiative, a member of and major U.S. contributor to the International Telecommunication Union (ITU), as well as a member of the Inter-American Telecommunication Commission (CITEL). For more information, visit www.atis.org.

ATIS-0100070, *Network Reliability Steering Committee (NRSC) 2019-2020 Operational Report*

Is an ATIS Standard developed by the **ATIS Network Reliability Steering Committee (NRSC)**.

Published by

Alliance for Telecommunications Industry Solutions
1200 G Street, NW, Suite 500
Washington, DC 20005

ATIS-0100070

Network Reliability Steering Committee 2019-2020 Operational Report

April 2021

DATE: April 2021

TO: Stakeholders of the Nation's Public Communications Networks

Service disruptions, although infrequent, remind us how dependent we are on the communications networks. During these events, communication providers demonstrated how seriously they take their responsibility to provide reliable services for consumers and businesses, expending significant efforts to mitigate outages and quickly restore service. Once service is restored, equal efforts are expended to analyze the disruption, identify areas for improvement, and implement those improvements. The owners and operators of these networks, along with the equipment vendors they partner with, are firmly committed to building and maintaining reliable and resilient networks. This commitment has been demonstrated again and again – on a day-to-day basis, and in the face of natural and manmade disasters.

The Network Reliability Steering Committee (NRSC) remains committed to this effort by analyzing outage and reliability trends and recommending actions that can help prevent outages or reduce their impact. Its members work together to ensure that communication systems continue to remain secure and reliable. These efforts ultimately benefit consumers, business, the industry, and the nation as a whole.

This report provides a snapshot of the issues addressed by the NRSC over the last two years (2019-2020). As you will see, the efforts of the NRSC, guided by input from member company subject matter experts as well as the Federal Communications Commission (FCC), are primarily directed toward ensuring that meaningful data is being collected and analyzed to better understand the cause and mitigation of outages. Ultimately, the NRSC utilizes this information to develop industry guidance that directly impacts and improves the nation's networks. These efforts build upon previous NRSC work and form a strong foundation for ensuring that communication networks continue to be reliable and resilient. This foundation is especially useful in light of ongoing changes to the communications network, including the significant growth of wireless networks and the evolution to an all-Internet Protocol (IP) network. The nation depends on these networks to provide emergency communications, enable commerce, and support individual communications. As these changes to the network occur, the NRSC remains committed to, and will continue working toward, maintaining network reliability and resiliency.

CAROLYN BROWN
Lumen
NRSC CO-CHAIR

ANDIS KALNINS
Verizon
NRSC CO-CHAIR

Table of Contents

Executive Summary

About the NRSC

The Alliance for Telecommunications Industry Solutions' (ATIS) NRSC addresses network reliability improvement opportunities of service providers and vendors, in a noncompetitive environment, and allows participants to develop standards, technical requirements, technical reports, bulletins, Best Practices, and reports on the health of the nation's communications networks. The NRSC also coordinates industry improvements in network reliability through outage analysis. The mission statement[1] of the NRSC is:

> ***The NRSC strives to improve network reliability by providing timely consensus-based technical and operational expert guidance to all segments of the public communications industry.***

As a trusted expert, the NRSC addresses network reliability improvement opportunities in an open, noncompetitive environment. The NRSC advises the communications industry through developing and issuing standards, technical requirements, technical reports, bulletins, Best Practices, and annual reports.

The NRSC accomplishes this through:

- identifying potential network reliability issues through an opportunity evaluation process,
- establishing subcommittees that address network reliability issues, and conducting special studies that may lead to industry recommendations and/or the development of Best Practices,
- developing industry feedback, both formal and informal, to the FCC on network reliability,
- providing industry feedback to the FCC on the Network Outage Reporting System (NORS) and the Disaster Information Reporting System (DIRS) and providing an opportunity for the public to be informed on network outages and ongoing efforts to resolve network reliability concerns.

This Operational Report covers the period of 2019 through 2020. A brief history of the NRSC is provided in the *Introduction* of this report (page 1).

Changing Regulatory Environment & Changing Industry

The last two Operational Reports (2015-2016 and 2017-2018) cited an increased focus on issues related to network reliability and resiliency and to the obligation of industry to report communications outages. This focused attention has, if anything, increased over the last two years, with numerous regulatory measures being enacted and industry responding to various high-profile service interruptions. Continuity of emergency services, cybersecurity, and the move to an all-IP network have received the bulk of attention, although reliability of legacy networks remains a critical piece of the equation.

Extension of Outage Reporting to Voice over IP (VoIP)

In 2012, the FCC extended its outage reporting rules to interconnected VoIP service providers, noting that consumers are increasingly using interconnected VoIP services in lieu of traditional telephone service. The interconnected VoIP rules are based on the existing legacy network reporting rules, and in 2014, the FCC indicated they were planning on revising those rules, possibly in 2015, to more accurately reflect the realities of an all-IP network.[2] The NRSC has continued its work with other standards setting organizations to provide insight into the best ways of monitoring and reporting VoIP service interruptions, leading to the NRSC's publication of a white paper, ATIS-0100069, *Voice over Internet Protocol (VoIP) Availability*[3], in October 2020.

Network Reliability and Resiliency

On May 25, 2016, the FCC proposed new reporting rules and thresholds aimed at improving the resiliency of mobile wireless networks by simplifying the methodology required to calculate reportable events. These rules went into effect in May of 2018 and have drastically increased the number of outages reported to the FCC. Looking at the

---

[1] This mission statement can be found on NRSC's webpage at < https://www.atis.org/committees-forums/nrsc/nrsc-mission/ >

[2] The FCC adopted the *Amendments to Part 4 of the Commission's Rules Concerning Disruptions to Communications NPRM*, (DA No. 15-710) (Dkt No 15-80), on March 30, 2015.

[3] This white paper can be found on NRSC's public workspace at
< https://access.atis.org/apps/group_public/workgroup.php?wg_abbrev=nrsc >

increase one might conclude that reliability and resiliency have decreased; however, that would not reflect the true nature of the outages. The NRSC is committed to partnering with the industry and the FCC to look at reliability and resiliency through the lenses of outage reporting.

9-1-1

On September 11, 2017, the FCC held a 9-1-1 roundtable with the carriers, industry, and public safety. The aim of this roundtable was to discuss outage notifications to public safety and public safety notifications to the public, including reaching out to persons with disabilities. As a result of this roundtable, NRSC formed the Situational Awareness for 9-1-1 Outages Task Force to investigate standardizing a best practice for how to notify public safety during a 9-1-1 outage event. Unlike other NRSC Task Forces, this one was open to the public, which afforded the NRSC the ability to partner with Public Safety Answering Points (PSAPs), public safety, the Association of Public-Safety Communications Officials (APCO), the National Association of State 911 Administrators (NASNA), and the National Emergency Number Association (NENA). While the Task Force was sunset in October 2019, NRSC continues to work with PSAPs and public safety entities to standardize PSAP outage notifications. In October 2020, NRSC provided to the FCC a proposal for an industry safe harbor when using a proposed national PSAP outage contact database.

Cybersecurity

With the transition to an all-IP network, cybersecurity has taken on added significance and the FCC has increased its attention to this topic. During the FCC's Communications Security, Reliability, and Interoperability Council (CSRIC IV) and its Technological Advisory Council (TAC), the FCC chartered a CSRIC Working Group (WG4) to determine how best to ensure implementation of cybersecurity measures. That Working Group delivered a 300+ page Final Report, and the FCC immediately issued a Public Notice about this report, seeking comments on how well the Final Report met the goal and what other measures could be taken to ensure cybersecurity.

While the industry and the underlying network technologies may be evolving, the role of the NRSC remains constant. The NRSC provides expert industry guidance regarding communications reliability issues to ensure that U.S. communications networks remain highly reliable and robust, even during their constant evolution.

Highlights

During the 2019 to 2020 timeframe, the NRSC convened six Task Forces and investigations, and reviewed and provided comments for high profile regulatory filings. Along with these initiatives, the NRSC also had four standing Subcommittees. The covered topics included:

Special Studies/Task Forces

- NRSC Emergency Preparedness and Response Checklist Task Force (formerly the Hurricane Checklist Task Force)
- Situational Awareness for 9-1-1 Outages Task Force (Public Task Force)
- Determining Best Counts for NG 9-1-1 Outage Reporting (NRSC Issue 0043)
- FCC Request NRSC to Further Investigate TSP Rule Change (NRSC Issue 0044)
- Impact of Rule Changes to Wireless Reporting (NRSC Issue 0046)
- Investigate Recommendations for PSAP Contact Database (NRSC 0047)

Subcommittees

- Best Practices Subcommittee
- IP Reliability Subcommittee
- Outage Reporting Advisory Subcommittee
- Regulatory Subcommittee

NRSC Initiatives, Studies, and Filings

- Completed and Ongoing Initiatives:
    - Updates to Best Practices Tutorial and Guidance for CSRIC VI and VII
    - Review and Updates to Best Practices Website
    - FCC Implementation of Cause Code Consistency Task Force Recommendation
    - Completion of the Work of the NRSC Emergency Preparedness and Response Checklist Task Force

- Completion of the Work of the Situational Awareness for 9-1-1 Outages Task Force
- Submission of Information to the Government Accountability Office (GAO)
- Review and Updates to *NRSC Pandemic Checklist*
- Review and Updates to *NRSC Emergency Preparedness and Response Checklist*
- Guidance on DIRS Activations

- Filings[4]
  - *Letter to the FCC to provide additional input regarding third-party efforts to develop a national Public Safety Answering Point (PSAP) contact database, PS Docket 11-60*, December 7, 2020
  - *Reply Comments by NRSC on FCC NOI on 911 Fee Diversion, PS Docket No. 20-291, 09-14*, December 2, 2020
  - *Letter to provide additional input regarding third-party efforts to develop a national Public Safety Answering Point (PSAP) contact database*, October 29, 2020
  - *Reply Comments by NRSC on FCC NPRM on Review of Rules and Requirements for Priority Services, National Security Emergency Preparedness Telecommunications Service Priority System; NTIA Petition for Rulemaking to Revise the Rules for Wireless Priority Service, NTIA Petition for Rulemaking to Revise the Rules for the Telecommunications Service Priority System*, October 19, 2020
  - *Comments by NRSC on FCC Public Notice proposing changes to the FCC's Network Outage Reporting System (NORS) and 911 Reliability Certification System*, July 20, 2020
  - *Comments by NRSC on Amendments to Part 4 of the Commission's Rules, PS Docket No. 15-80*, April 30, 2020
  - *Comments by NRSC on the California Governor's Office of Emergency Services Notice of Modifications to Text of Proposed Regulations*, April 1, 2020
  - *Letter to the FCC on the ATIS NRSC Standard Operating Procedures for Updating PSAP Outage Contact Information Improving 911 Reliability, PS Docket No. 13-75*, December 13, 2019
  - *Reply Comments by NRSC on the Development of Operational, Technical, and Spectrum Requirements for Meeting Federal State and Local Public Safety Agency Communications Requirements Through the Year 2010, WT Docket No. 96-86*, September 16, 2019
  - *Ex Parte on behalf of NRSC on Improvements to the Wireless Network Resiliency Framework, PS Docket No. 11-60*, June 27, 2019
  - *Letter to the FCC on NRSC Recommendations for NORS 3.0 Manual and System*, May 13, 2019
  - *Comments by NRSC on Reliability and Continuity of Communications Networks, Including Broadband Technologies Effects on Broadband Communications Networks of Damage of Failure of Network Equipment or Severe Overload, PS Docket No. 11-60*, April 29, 2019
  - *Ex Parte - PS Docket No. 15-80; ET Docket No. 04-35; PS Docket No. 11-60*, February 14, 2019
  - *Comments by NRSC on the Reliability and Continuity of Communications Networks, Including Broadband Technologies Effects on Broadband Communications Networks of Damage of Failure of Network Equipment or Severe Overload, PS Docket No. 11-60*, February 8, 2019

Publications

- NRSC Bulletins/Reports:
  - ATIS-0100067, *Network Reliability Steering Committee 2017-2018 Operational Report*

- ATIS Standards:
  - ATIS-0100012.2019, *Standard Outage Classification*
  - ATIS-0100019, *NRSC Emergency Preparedness and Response Checklist*
  - ATIS-0100068(2019-11), *Standard Operating Procedures (SOP) for Updating Public Safety Answering Point (PSAP) Outage Contact Information*
  - ATIS-0100069, *Voice over Internet Protocol (VoIP) Availability*

[4] Filings can be found on ATIS' Legal and Public Policy webpage at < https://www.atis.org/01_legal/public-policy/ >

1 Introduction

1.1 History of the NRSC

Several Catastrophic Outage Events

From 1988 through the early 1990s, the United States communications industry experienced several network outages that impacted a large number of subscribers. Beginning with the "Great Hinsdale Fire" of 1988, through several Signaling Transfer Point (STP) outages in 1991, the nation increased its focus on the reliability of its public networks.

The Network Reliability Council is Established

In November 1991, the Network Reliability Council (NRC) was established by the FCC to bring together telecommunications industry leaders and telecommunications experts from academic and consumer organizations to explore and recommend measures to enhance network reliability.[5]

The FCC Mandates Outage Reporting

In April 1992, the FCC required the reporting of outages by exchange and interexchange service providers. For an event to be reportable, it had to last 30 minutes or more and potentially affect at least 50,000 customers.[6] The industry-led National Communications System (NCS) afterward recommended that the reporting criteria be lowered to 30,000 customers. Another NRC recommendation was to report all outages affecting 9-1-1 emergency call centers, major airports, nuclear power plants, major military installations and key government facilities. Carriers began reporting outage events using the lowered threshold criteria in June 1992. Because of the sensitive nature of some of the outage events (e.g., military installations), in May 1993, the NCS accepted the task of reporting such outages to the FCC. In August 1994, FCC outage reporting regulations were revised.[7] Most of the changes had already been accounted for by industry in their voluntary reporting of events that began in June 1992. Other major changes included the reporting of fire-related incidents potentially affecting 1,000 or more lines, and the requirement that final reports include root cause analysis and a review of how Best Practices could have prevented or mitigated the impact of such events.

The NRC Recommends the Formation of the NRSC

In its 1993 *Report to the Nation*, the NRC[8] recommended the formation of the NRSC, under the auspices of the ATIS, for the purpose of monitoring network reliability on an ongoing basis. As defined at that time, the NRSC's mission was to "analyze the industry's reporting of network outages to identify trends, distribute the results of its findings to industry, and where applicable, refer matters to appropriate industry forums for further resolution, in order to help ensure a continued high level of network reliability."[9]

The FCC Makes Changes in Outage Reporting

In 2005, FCC regulations regarding outage reporting were put in force.[10] These mandates can be summarized as having three major aspects: (a) expansion regarding who was required to report; (b) new reporting thresholds, timeframes, and concepts; and (c) limited access to the outage data due to confidential protection under the Freedom of Information Act (FOIA). Regarding the reporting expansion, in addition to wireline providers, the new requirements included wireless, satellite, paging, and cable telephony service providers. Changes in the thresholds and concepts include events that affect 900,000 user-minutes and events impacting DS3 facilities. Because of these

---

[5] Daugherty, H.T., Klein, W. J., "U.S. Network Reliability Issues and Major Outage Performance," *Proceedings: IEEE Symposium on Computers and Communications, 1995,* June 27-29, 1995, pp.114, 119.

[6] *FCC Report and Order, CC Docket No. 91-273*, Federal Communications Commission, Washington, D.C., adopted February 13, 1992, released February 27, 1992.

[7] *FCC Second Report and Order, CC Docket No. 91-273*, Federal Communications Commission, Washington, D.C., adopted July 14, 1994, released August 1, 1994.

[8] Since the subsequent re-charters under the name "Network Reliability and Interoperability Council (NRIC)", this first Council is sometimes referred to as "NRC-1".

[9] *Network Reliability: A Report to the Nation*, Network Reliability Council, June 1993. Section I, p. 6.

[10] *Report and Order and Further Notice of Proposed Rulemaking*, ET Docket No. 04-35, adopted August 4, 2004, released August 19, 2004; E*rrata*, ET Docket No. 04–35, released September 3, 2004.

criteria, the overall number of reportable events substantially increased. In 2012, the FCC expanded the outage reporting criteria and thresholds to include VoIP services.

In July of 2016, the FCC published a Report and Order[11] updating several of the Part 4, Disruption to Communications, rules with some significant changes. The changes: better defined required reporting at airports; shortened the threshold for reporting Simplex conditions from 120 hours to 96 hours; increased the minimal reportable transport outage from DS3 to OC3; defined the methodology for determining Wireless Potential Users; implemented required reporting for Partial PSAP Outage Reporting; and applied Telecommunications Service Priority (TSP) as the way of defining Special Offices and Facilities.

Disaster Response

In the summer of 2017, the United States and its territories experienced a number of hurricanes that shattered not only communication networks, but also people's lives. Hurricane Maria, in particular, devastated the island of Puerto Rico in a manner that had not been seen since Hurricane Mitch of 1998. In the aftermath of Hurricane Maria, the Information and Communications Technology (ICT) industry came together in a powerful way to enable recovery from this traumatic event. Carriers aided each other in procuring and providing generators, security teams, food, water, and the necessities to survive while restoring communications infrastructure. Parts of the island were without power and critical infrastructure for months, and the FCC activation of DIRS lasted 182 days, the longest in the history of DIRS. Additionally, in 2020, NRSC provided the GAO with industry feedback on wireless network resiliency in the aftermath of Hurricane Maria.

Under the threat of COVID-19 and with the World Health Organization (WHO) declaration of a global pandemic, NRSC's previous work on ATIS-0100018, *NRSC Pandemic Checklist*, as well as ATIS-0100019, *NRSC Emergency Preparedness and Response Checklist*, served as critical models in the telecommunications industry's response to this global crisis, given the increased demand for socially distanced telework, telemedicine, online learning and more.

The NRSC briefed the FCC's Broadband Deployment Advisory Council (BDAC), and the Disaster Response & Recovery Working Group (DRRWG) on industry response to the COVID-19 crisis. Following this presentation, NRSC elected to review these Checklists and update documentation based on lessons learned during the response to the pandemic.

1.2 Factors Affecting Network Reliability

The NRSC has historically recognized that identifying and understanding the underlying causes of outage trends are important parts of learning from past experiences and preparing for future challenges as networks evolve. When evaluating negative or positive trends that affect network reliability, having standard analytical methodologies and trending schemas has proven to be a solid link to the past, while providing a bridge into the future. The NRSC works to identify the direct and root cause(s) associated with particular trends, evaluates these against existing Best Practices, and develops new Best Practices or recommends modifications to existing Best Practices when appropriate. Additionally, the NRSC will recommend the development of new (or modification of existing) cause code categories, review other completed studies, review internal company outage data, determine contributing factors, and review associated federal and state regulations.

2 Health of the Nation's Public Networks

The members of the NRSC have a historic and unique perspective on network reliability. Nowhere else in the world have subject matter experts from competing companies gathered regularly for the purpose of analyzing network outage data, developing consensus determinations about the data analyzed, and offering expert guidance on actionable countermeasures to improve network reliability. Through this collaboration, high reliability for the nation's public networks is promoted, expert guidance is offered, and an ongoing accurate view of the health of networks is provided at a national level. The NRSC continues to believe that the reliability of the nation's public network is the best in the world.

[11] FCC 16-63, *Amendments to Part 4 of the Commission's Rules Concerning Disruptions to Communications, PS Docket No. 15-80, ET Docket No. 04-35, PS Docket No. 11-82, Report and Order, Further Notice of Proposed Rulemaking, and Order on Reconsideration,* available at < https://apps.fcc.gov/edocs_public/ >

2.1 Introduction to Special Studies/Task Forces

The NRSC had six active special study teams and Task Forces during 2019 and 2020. The purpose of these special studies was to bring industry experts' attention to network reliability issues or concerns, to determine the underlying causes behind national trends, to determine the most effective Best Practices or other means for preventing and ameliorating the impact of such events, and to provide industry level guidance regarding the issue or concern. The keys to the success of these teams are open dialogue, meaningful information sharing, and collaboration among the industry participants on potentially sensitive issues. To protect the interests of participating companies and their sensitive and critical infrastructure data, a Non-Disclosure Agreement (NDA) between the NRSC member companies is in place.

These studies represent the thousands of hours that NRSC members have contributed to the painstaking scrutiny, documenting, and publishing of publicly available findings and results. These efforts are instrumental in providing expert industry guidance and ensuring high network reliability in the United States.

2.1.1 FCC Implementation of Cause Code Consistency Task Force Recommendations

The majority of this work activity was completed in 2016, as reported in ATIS-0100065, *Network Reliability Steering Committee 2015-2016 Operational Report*. In early 2017, the Task Force provided recommendations to the FCC and the industry. These recommendations included revised definitions of root cause and direct cause, updated definitions for all cause codes, and a guide to using each of the codes. The FCC implemented the NRSC's recommendations in 2019. For further detail on the work of this Task Force, please see the 2015-2016 Operational Report.

2.1.2 NRSC Emergency Preparedness and Response Checklist Task Force

Background

In late 2016, the NRSC identified that ATIS-0100019, *NRSC Hurricane Checklist*, needed updates. After determining that the document was last published in October 2006, NRSC established the Hurricane Checklist Task Force, which was later named the Emergency Preparedness and Response Checklist Task Force.

Team Activity

The Emergency Preparedness and Response Checklist Task Force met consistently throughout 2017 and 2018. As a result of the Task Force, the Checklist was reformatted to cross reference applicable Best Practices. Where appropriate, the Checklist was streamlined. Throughout the process, the FCC demonstrated interest and appreciation for this work effort.

Conclusion

In March 2019, the NRSC published ATIS-0100019, *Emergency Preparedness and Response Checklist*. A subsequent press release was issued to the industry. As of publication of this Operational Report, several new Best Practices, were proposed as a result of the Checklist and were given CSRIC approval. Following the completion of this work, this task force was sunset in May 2019.

2.1.3 Situational Awareness for 9-1-1 Outages Task Force (Public Task Force)

Background

During the 4Q2016 NRSC face-to-face meeting, participants discussed concerns from both public safety and service providers regarding the current requirements for PSAP notifications. During early 2017, NRSC began meeting on the topic. By June of 2017, NRSC had invited participants from NENA and APCO to join regular meetings on ways to improve PSAP notifications.

On September 11, 2017, the FCC's Public Safety and Homeland Security Bureau (PSHSB) hosted a workshop to discuss best practices for improving situational awareness during 9-1-1 outages.[12] In particular, the PSHSB examined how to strengthen PSAP 9-1-1 service outage notifications and how to best communicate with consumers about alternative methods of accessing emergency services during 9-1-1 outages.[13] The workshop participants included state and local 9-1-1 administrators, 9-1-1 call center directors, industry technology and policy experts, public safety advocacy organizations, and disability access representatives. Following this workshop, the NRSC continued in its leadership role and formalized ongoing work with the creation of the Situational Awareness for 9-1-1 Outages Task Force (NSA-TF), comprised of NRSC Members, as well as Public Safety Representatives to make recommendations to the Commission, as a response to discussions at the workshop. With the support of the FCC, the NSA-TF made recommendations to:

- Standardize PSAP Outage Notification Data Elements;
- Standardize Process for annual collection of PSAP data, and specifically PSAP Notification data;
- Standardize and document the data collection process for PSAP databases.

Team Activity

In June 2018, the NRSC published a report and associated PSAP Notification Template, ATIS-0100066, *Technical Report on Service Providers: Outage Reporting Structure and Potential Types of 9-1-1 Outages.* In November 2019, the NRSC published a second technical report, ATIS-0100068, *Standard Operating Procedures (SOP) for Updating Public Safety Answering Point (PSAP) Outage Contact Information.*

Conclusion/Ongoing Work

In October 2019, following the publication of ATIS-0100068, the NSA-TF agreed that the Task Force had completed its work. Following the closure of the Task Force, NRSC members began discussions on recommended rule changes.

2.1.4 Determining Best Counts for NG 9-1-1 Outage Reporting

Background

During the 3Q2019 NRSC face-to-face meeting, participants noted that the transition from Enhanced 9-1-1 (E 9-1-1) to Next Generation 9-1-1 (NG 9-1-1) would present challenges for 9-1-1 outage reporting. Under legacy networks in an i2 environment, outage reporting was based on a count of telephone numbers (TN Count) potentially affected utilizing the Automated Location Identification (ALI) system to quantify where an outage may affect customers. This method of using the TN count from the ALI database becomes untenable for the following reason. The ALI database already does not reflect an increasing number of wireless and VoIP customers, but more importantly i3 NG 9-1-1 uses geospatial location data and no longer has the TN Count of wireline TNs in the ALI system as a basis for estimating the number of potentially affected customers.

Team Activity

In August 2019, NRSC confirmed a desire to investigate this Issue, in advance of further NG 9-1-1 implementation, and related regulations. Participants investigated other potential information sources for outage impacts. Upon review, it was determined that Originating Service Providers (OSPs) could continue to use existing metrics, such as subscriber counts or call attempts, in their outage reporting for NG 9-1-1. However, a new metric for outage reporting was needed for 9-1-1 System Service Providers (SSPs), such as U.S. Census data or failed call attempt data. Participants compared U.S. Census data to TN Counts from the ALI database and found that the U.S. Census data consistently overstated the potential impact, but there was not a proportional correlation between these figures. This lack of correlation, combined with the complexity of determining call attempts when made on other networks,

---

[12] The workshop fulfilled the PSHSB's previously stated intention to convene stakeholders at a workshop to discuss recommended practices for improving situational awareness during 9-1-1 outages. See PSHSB, March 8, 2017 AT&T VoLTE 911 Outage Report and Recommendations, PS Docket No. 17-68, 15, para. 33 (2017), https://apps.fcc.gov/edocs_public/attachmatch/DOC-344941A1.pdf. The Commission defines an "outage" as "a significant degradation in the ability of an end user to establish and maintain a channel of communications as a result of failure or degradation in the performance of a communications provider's network." 47 CFR § 4.5(a). A "911 outage" is one that "potentially affects a 911 special facility." 47 CFR § 4.5(e).

[13] *See* PSHSB, *Announcing Workshop on Improving Situational Awareness During 911 Outages*, Public Notice, DA 17-719 (PSHSB 2017), https://apps.fcc.gov/edocs_public/attachmatch/DA-17-719A1.pdf.

left NRSC with the recommendation that 9-1-1 SSPs use U.S. Census data to represent the relative potential impact of certain 9-1-1 outages where 900,000 user minutes is the threshold.

In August 2020, participants met with members of the Emergency Services Interconnection Forum Leadership and Advisory Group (ESIF AG) to review the use of U.S. Census data as a relative representation of potential outage impact. Both NRSC and ESIF participants agreed that U.S. Census data presented the best alternative to ALI data in the i3 environment.

Conclusion/Ongoing Work

This investigation presented its findings to the FCC in January 2021. NRSC has recommended the use of U.S. Census data in NG 9-1-1 outage reporting for SSPs. This data represents a best effort on the part of carriers and provides a relative representation of the potential outage impacts. U.S. Census data is widely available, can be filtered by localities, and is updated on an annual basis. The recommendation would also include E 9-1-1 and i2 NG 9-1-1, so there are no reporting disparities between legacy E 9-1-1 and NG 9-1-1 systems. This is due to possible overreporting of outages with U.S. Census data always being a higher number per geographic area and thus resulting in lower thresholds.

2.1.5 FCC Request NRSC to Further Investigate TSP Rule Change

Background

In October 2019, the FCC approached NRSC leadership to further review recent changes to TSP 1 and 2 outage reporting criteria. The FCC stated that after the 2016 Outage Reporting Order (effective December 22, 2018) outage reports for Special Offices and Facilities had skyrocketed. This increase in reports has reduced the effectiveness of the data contained within.

Team Activity

In October 2019, NRSC convened a group to further investigate TSP outage reporting. This group collected NRSC member data and examined possible solutions, including reporting thresholds based on outage duration, circuit bandwidth, and circuit quantity. This group also reviewed the possibility of eliminating sympathy reports but found that would result in reduced visibility for outages occurring across multiple networks.

In July 2020, NRSC approached the FCC with a plan to reduce reports by implementing a four-hour reporting threshold in place of the current 30-minute threshold. It was noted that this reporting threshold would reduce reports by approximately 40% and withdrawals by approximately 60%. Additionally, large OC3 circuits would still be reportable under the 667-minute threshold, ensuring continued visibility for large scale outages.

Conclusion

This investigation is awaiting FCC response as of December 2020.

2.1.6 Impact of Rule Changes to Wireless Reporting

Background

In October 2019, the FCC approached NRSC leadership to review 2018 rule changes to wireless outage reporting. Since the rule change took effect, wireless outage reporting has increased by 175%. The NRSC studied and analyzed this statistically significant increase to determine the cause and identify potential measures to mitigate this increase.

Team Activity

The NRSC collected data from participating wireless providers and determined that the increase in reporting was due to the rule change, rather than a change in wireless network reliability. To mitigate the increase in reports, a recommended de minimis for outage reporting was suggested. It examined possible reporting thresholds based on the number of cell sites impacted, outage duration, and a combination of these factors, similar to the FCC's own Potential User Minutes Affected (PUMA) measurement.

To avoid community isolation, and maintain higher visibility on outages impacting rural areas, NRSC has suggested a dual de minimis which would differentiate between higher reporting thresholds for Metropolitan Service Areas (MSAs) and lower reporting thresholds for Rural Service Areas (RSAs). The suggested de minimis is five cell sites for RSAs and 15 cell sites for MSAs.

Conclusion/Ongoing Work

This investigation presented its recommendations to the FCC in January 2021. NRSC has recommended the implementation of a dual de minimis of five cell sites for RSAs and 15 cell sites for MSAs.

2.1.7 Investigate Recommendations for PSAP Contact Database

Background

Following the work of the NRSC Situational Awareness for 9-1-1 Outages Task Force (NSA-TF) to develop ATIS-0100066 and ATIS-0100068, a business need was identified for developing a PSAP contact database. In December 2019, NRSC determined that a national PSAP contact database for outage notification purposes could consolidate the existing PSAP data collection work being done by individual carriers and be a resource to member companies should a company desire to use such a tool.

Team Activity

In February 2020, at the request of James Wiley (FCC), NRSC created an educational presentation to educate PSAPs on the Outage Notification Requirements followed by carriers as established by the FCC. In April 2020, NRSC reached out to Harriet Rennie-Brown, Executive Director of NASNA, to review the draft presentation and to establish a workshop with the State 911 Administrators. NASNA members representing several State 911 Authorities throughout the U.S. volunteered for a test-run of the educational program and was launched in August 2020.

Additionally, in August 2020, the NRSC met with FCC staff to discuss a safe harbor or indemnification process for carriers, should they desire to use a national PSAP database. The NRSC reminded the Commission that service providers are responsible for maintaining their own internal PSAP contact databases and without indemnification for the use and accuracy of a third-party national PSAP contact database, service providers will continue to use internal systems, rather than risk action from the FCC.

Conclusion/Ongoing Work

NRSC provided input to Mr. Wiley regarding safe harbor for industry use of a third party national PSAP database in October 2020 and closed this investigation in December 2020. In December 2020, the FCC published a Public Notice seeking comment on a national 9-1-1 call center contact information database, which cited NRSC's letter. The Regulatory Subcommittee will address this notice in 2021 if necessary.

2.1.8 Submission of Information to the GAO

Background

In May 2020, the GAO requested feedback from the NRSC regarding Network Resiliency and the FCC's support of carriers in the aftermath of Hurricane Maria. Specifically, the GAO inquired:

- To what extent has FCC examined the communications failures in Puerto Rico and the U.S. Virgin Islands caused by Hurricane Maria and what lessons were learned?
- To what extent did FCC and other federal agencies face challenges addressing the communications problems?
- To what extent did FCC provide the public with meaningful information on network outages in the aftermath of Hurricane Maria?
- How much funding has FCC made available to restore communications networks in these U.S. territories and how is FCC ensuring that the funds are being used as intended?

Team Activity

The NRSC Regulatory Subcommittee opened discussion of these questions among members.

Conclusion

On May 20, 2020, NRSC Co-Chairs met with members of the GAO and discussed NRSC feedback. They also advised that GAO contact individual providers servicing Puerto Rico and the US Virgin Islands for further details on Hurricane Maria response. This investigation is completed as of July 2020.

2.2 Subcommittees

2.2.1 Best Practices Subcommittee

Background

The Best Practices Subcommittee, which is a standing NRSC Subcommittee, is charged with improving the quality of Best Practices and updating and/or expanding them as appropriate. The Subcommittee operates from the premise that Best Practices are voluntary, are *not* standards, *and implementation of any Best Practices should not be mandated*. Best Practices provide guidance, based on assembled industry expertise and experience, to improve network security, reliability, and resiliency. The applicability and possible implementation of any Best Practice by an organization is best determined by someone with expertise in both the topic of the Best Practice and the particulars of the organization itself.

Team Activity

During the past two years, the Best Practices Subcommittee has reviewed the work of the Communications Security, Reliability and Interoperability Council (CSRIC VI and VII) to prepare the Best Practices to be integrated into the Best Practices online databases. In particular, the Best Practices Subcommittee closely collaborated with CSRIC VI Working Group 1 representatives to edit to align best practices additions/consolidations and updates for Public Safety. The best practice recommendations work was presented to the FCC to verify alignment with expectations during different phases of development.

The Best Practice tutorial, created by this Subcommittee, was published to the ATIS Best Practices Website, as were additional Best Practices resulting from the work of CSRIC VI.

ATIS manages one of the two Best Practices web sites[14], with the FCC maintaining the other site[15]. The Subcommittee monitors these websites and suggests enhancements as appropriate to improve their usefulness.

This subcommittee was also consulted by the Broadband Deployment Advisory Committee (BDAC) Disaster Response and Recovery Working Group, with a request for industry feedback on the response to COVID-19 as well as any recommendations from the pandemic response. Due to the Best Practices Subcommittee's work on the *Pandemic Checklist* (ATIS-0100018) and *Emergency Preparedness & Response Checklist* (ATIS-0100019). This Subcommittee provided information about these documents, as well as other work items on August 20, 2020.

In August 2020, it was further determined that this Subcommittee should review and update these checklists, noting lessons learned in industry response to the COVID-19 pandemic. The Subcommittee focused its work on the *Pandemic Checklist*, which was last revised in 2015. An updated *Pandemic Checklist* is planned for publication in early 2021.

Additionally, in December 2020, NRSC proposed a framework for incorporating non-CSRIC generated edits to Best Practices into the industry Best Practice database. It was suggested that NRSC could aggregate proposed changes to Best Practices and present these edits to CSRIC once per charter for review and approval.

Conclusion

The fact that an FCC Advisory Committee (i.e., CSRIC) continues to regularly advance new and revised Best Practices along with frequent reference in both industry and government documents demonstrates the value that this collection of industry knowledge holds, and the influence that Best Practices have on improving network security, reliability, and resiliency. Their value is derived both from the collective industry knowledge that created them, and the voluntary nature of their implementation. This allows users to benefit from their guidance while maintaining their flexibility to be applied appropriately as determined by experts. The Best Practice Subcommittee will continue to work with the FCC and CSRIC to ensure consistency and usability of this valuable resource.

---

[14] The ATIS Best Practices website is available at < https://bp.atis.org >

[15] The FCC Best Practices website is available at < https://opendata.fcc.gov/Public-Safety/CSRIC-Best-Practices/qb45-rw2t/data >

2.2.2 IP Reliability Subcommittee

Background

As the Public Switched Telephone Network (PSTN) and wireless networks transition to all-IP communications, many aspects of the way networks are managed must also change, presenting new challenges. One such challenge is how outages are measured and reported in IP networks, and how faults that cause outages can be identified for reporting and restoration activity.

In the PSTN, discrete voice switches and voice lines and trunks of deterministic voice call capacity makes the determination of the number of lines impacted by any given fault (e.g., a switch port card failure, or TDM trunk failure) fairly straightforward. In contrast, IP networks are converged service networks where voice traffic typically represents a small proportion of the aggregate traffic through any given link or switch, and the throughput per voice connection varies significantly and continuously over time. In addition, IP congestion control mechanisms, depending on how the network is engineered, may not fully mitigate voice impacts. The question arises regarding how to achieve the level of visibility and control needed to accurately measure IP networks availability.

The IP Reliability Subcommittee was formed at the request of ATIS NRSC member companies and the FCC. The Subcommittee's mission was to define what IP network availability and/or outage reporting metrics can be consistently reported across the industry.

Key areas being explored:

- Determine when an IP network event creates a VoIP outage[16]
- Resolve whether an impact can be quantified when an outage is detected
- Establish what level of granularity customer impact can be depicted

Team Activity

The IP Reliability Subcommittee developed a generic network topology diagram of an IP network. The team then ran simulated call flows for on-net, off-net, and emergency 9-1-1 call types. This analysis validated that the access (e.g., last miles / local loop) section of the network remained relatively unchanged. The major changes in IP network occur north of the access network in the local metro and core networks. Local metro and national backbones are transitioning to cloud architectures.

The IP Reliability Subcommittee has leveraged work from the ATIS Technology and Operations (TOPS) Council PSTN Transition Functional Group Assessment and Recommendations (January 2013)[17]. ATIS NRSC members have been able to work from a high-level functional block diagram detailing new hardware and software components of an advanced IMS network. Where these components reside either in the core or Regional Data Center (RDC) will depend widely on individual company deployment strategies and business drivers. Operation, Administration, Maintenance & Provisioning (OAM&P) components were added to denote the need in an IP environment for both Element Management Systems (EMS) and Service Assurance (SA) tool suites to monitor end-to-end call completion activity.

The IP Reliability Subcommittee partnered with the TOPS Council Leveraging Network Intelligent (LNI) Focus Group, adding a use case for outage alerting, avoidance, and reporting. This use case articulated the need to monitor, identify triggers, and take action on mission critical outage events in an IP network. The concept of using other network intelligent data points was discussed, identifying gaps in current standards.

The IP Reliability Subcommittee also partnered with the ATIS Emergency Services Interconnection Forum (ESIF) Next Generation Emergency Services Subcommittee (NGES) to further define break points in Next Generation Emergency Service architecture. NGES will look at both legacy and NG platforms along with hybrid states as the network transition to all IP.

---

[16] Consideration of this issue does not indicate a consensus that VoIP-related outage reporting should be considered or required.

[17] *PSTN Transition Focus Group Assessment and Recommendations*, January 2013, available at
< https://www.atis.org/01_resources/whitepapers/#pstn >

Additionally, the IP Reliability Subcommittee worked extensively with the 3GPP, an international standards body, to review end-to-end network availability metrics to gauge the health of these critical IP networks. The IP Reliability Subcommittee's contribution S5-176523, *The Percentage of Non-Registered Users Metric,* received 3GPP endorsement in 2017. Member companies modeled and designed such metrics sharing the perceived benefits.

Monitoring a rise in the number of UE(s) not registered on the network was a focus of this joint effort. Using Service Assurance Tool statistics provides aggregation points in the network that can identify issues quicker. The need for these metrics is two-fold—it is critical for all service providers to have insight into their networks when an event has occurred impacting network availability, service, and/or customers, and it can help service providers prioritize fix activity on core alarms that are truly impacting user ability to utilize vital services.

The IP Reliability Subcommittee's work culminated in the publication of ATIS-0100069, *Voice over Internet Protocol (VoIP) Availability*[18], which built upon work by the TOPS Council, 3GPP, and the IP Reliability Subcommittee. This white paper describes key measures of IP-based network reliability.

Conclusion

Following the publication of ATIS-0100069, it was determined that the IP Reliability Subcommittee's work was complete. NRSC agreed to sunset this subcommittee in December 2020.

2.2.3 Regulatory Subcommittee

Background

The ATIS NRSC Regulatory Subcommittee addresses and responds to network reliability, resiliency, and outage reporting related regulatory activity. To accomplish this work, the Subcommittee monitors, reviews, and responds to various local, state, and federal regulatory activities. Where appropriate, the NRSC develops and files comments. Refer to the *NRSC Initiatives, Studies, and Filings* section of this report for a list of these filings.

Team Activity

Following the implementation of the FCC filing of the Amendments and New Rules to Part 4 of the Commission's Rules Concerning Disruptions to Communications NPRM, the NRSC Regulatory Subcommittee reviewed, discussed, and commented on the impacts of these rule changes. Data was collected and presented to the industry. The Subcommittee also monitored and kept membership appraised of significant regulatory activity from state legislatures and commissions.

The Regulatory Subcommittee met consistently to establish and refine the issues for the NRSC membership and provide a forum for members to contribute to the comments on each of the Rulemaking procedures that were provided on behalf of ATIS NRSC. The comments provided to the FCC are available on the ATIS and FCC websites.

The Regulatory Subcommittee took on NRSC Issue 41, *Provide Feedback on Proposed DIRS Changes*, to provide feedback to the FCC in light of a proposed update of the DIRS system and platform in 2019. The Subcommittee provided suggestions on various aspects of DIRS reporting and process. The NRSC filed "NRSC feedback to the FCC Regarding 2019 DIRS Changes" with the FCC in December 2018.

In wake of the various storms in the 2017 and 2018 seasons, and due to the increased activity of the States in legislation around originating call outage reporting, the Regulatory Subcommittee proposed and started work on NRSC Issue 42, *Investigating Diverse Requests for Outage and Emergency Data from Multiple Agencies*. This investigation resulted in the creation of two reference documents, *ATIS NRSC Position Paper on State Regulatory Reporting Requirements and Requests for Date (2020-02)*, and *State Outage Reporting Spreadsheet (2020-02)*, both of which were made available as reference documents to NRSC participants in February 2020.

NRSC feedback on 2020 Hurricane Season DIRS Activations

The NRSC Regulatory Subcommittee provided feedback to the FCC on DIRS activations during the 2020 hurricane season in October 2020. In particular, NRSC highlighted DIRS activation for Hurricane Sally as consistent with normative DIRS practices (timely activation allowed providers to prepare for activation, narrowly defined scope of activation). NRSC also suggested creating case studies for exemplar DIRS and DIRS-Lite activations to ensure future continuity and alignment between industry and the FCC.

[18] Available at < https://www.atis.org/01_resources/whitepapers/#pstn >

NRSC comments on California Office of Emergency Services (Cal OES) Community Isolation Regulations

In comments filed March 2020, NRSC opposed the adoption of a ZIP Code-based outage reporting threshold, citing implementation issues. Service providers generally do not have reporting systems in place based on ZIP Code and it was suggested that Cal OES align its definition of community isolation with advanced IP network architecture. NRSC also suggested that providers not be required to notify end users prior to "scheduled maintenance," noting that it is not always feasible for service providers to know which users will be impacted.

NRSC suggestions to FCC regarding rulemaking dockets and Public Notices

Through the NRSC and the Regulatory Subcommittee, several clarifications of the FCC rule changes were discussed, brought to the FCC staff, and provided to membership and the industry through the Public Meeting reviews.

NRSC comments and ex parte on the Wireless Network Resiliency Framework

In comments filed April 2019, NRSC suggested that proposed changes to roaming policies were unnecessary, citing the increased need for flexibility by wireless companies transitioning to 4G and 5G technology, as well as effective mutual aid and roaming agreements already in place between carriers. NRSC affirmed that decisions regarding disaster preparation were best left to service providers who have knowledge of their network conditions and resources available. Further resources available, such as the ATIS NRSC *Emergency Preparedness and Response Checklist* and industry Best Practices, were noted in opposition of new metrics for disaster response and restoration.

In June 2019, NRSC filed a further ex parte in this matter, expressing its appreciation for the Framework and other Best Practices, which have promoted resiliency across the industry. While acknowledging that the 2017 and 2018 hurricane seasons were devastating, NRSC agreed with other commenters' opposition to incorporating additional roaming requirements and metrics into the Framework. With the exception of issues raised by the deaf and hard of hearing community, which NRSC acknowledged deserved additional consideration, NRSC was opposed to additional regulation in this matter. NRSC acknowledged its own work on both the *Emergency Preparedness and Response Checklist*, and the development of standards for a PSAP contact database to support continued voluntary and flexible cooperation among wireless carriers in this matter.

NRSC comments on FCC Second Further Notice of Proposed Rulemaking (FNPRM) on Sharing of NORS and DIRS Information with State Agencies

In April 2020, NRSC filed comments in response to this FNPRM, supporting FCC efforts to push for the restoration of communications services for public safety or lifesaving purposes. However, NRSC opposed the sharing of sensitive NORS and DIRS data with state agencies. NRSC sought clarification on "need to know" and "public safety purposes". NRSC also highlighted the importance of restricting access to data and ensuring its confidential treatment.

NRSC comments on FCC Public Notice on Modifications to NORS and 911 Certification

NRSC supported notifications to PSAPs regarding relevant 911 outages, and certain modifications to certification forms in comments filed in July 2020. With regard to suggested additions to notification and initial NORS reports, NRSC opposed listing of special facilities impacted by the outage, noting that the FCC special facilities directory is not aligned with service providers' individual notification processes. NRSC also opposed the diversity measures field unless it was relevant to the outage and had concerns with sharing this sensitive information with the states.

NRSC comments on FCC NPRM Modernizing Service Priority Rules

In October 2020, NRSC filed comments in response to this NPRM, which closely resembled previous NRSC comments in response to a 2019 NTIA Petition regarding the reporting of performance data and service providers' obligations concerning the Commission's TSP Program. While NRSC supported the FCC's suggestion of a "light-touch" governance structure for TSPs. Additionally, NRSC opposed the use of "promptly" and "all resources" necessary to define service providers' provisioning and restoration obligations. It was noted that these terms lack the specificity necessary to provide meaningful clarity to providers.

NRSC reply comments on FCC Notice of Inquiry (NOI) on 911 Fee Diversion

In December 2020, NRSC filed reply comments which supported the FCC's desire to deter 911 fee diversion. However, NRSC opposed involving service providers by turning them into "fee diversion cops". NRSC disagreed that this issue could be addressed as a truth-in-billing issue, suggesting it is instead a fiscal policy issue. NRSC supported Congressional legislation to deter or eliminate 911 fee diversion but opposed conditioning access to some FCC programs on the basis of fee diversion.

Conclusion

The Regulatory Subcommittee provides a platform to address and respond to network reliability, resiliency, and outage reporting related regulatory activity. The Subcommittee monitors, reviews, and responds to various local, state, and federal regulatory activities. Where appropriate, the NRSC has developed and filed these comments.

2.2.4 Outage Reporting Advisory Subcommittee (ORAS)

Background

The NRSC established the Outage Reporting Advisory Subcommittee (ORAS) to review issues associated with reporting communication service disruptions pursuant to Part 4 of the FCC's rules. The ORAS was formed as a standing subcommittee that utilizes the experience and expertise of its members to improve the value, accuracy, and consistency of outage data submitted to the FCC, and since its establishment has expanded its role to address disaster information provided to the FCC on a voluntary basis. The ORAS works with the FCC to maintain a mutual understanding of the needs and expectations regarding submitted information, identifies process and system improvement opportunities, and develops appropriate recommendations, from the users' perspective, regarding enhancement of system interfaces, processes, and documentation.

Team Activity

Intra-Company Outage Reporting Consistency (Issue 0045)

This Issue was raised with the NRSC by John Healy (FCC) in October 2019 as an issue with discrepancies across companies reporting OC3 outages. After much discussion within NRSC, clarification was sought from the FCC. Clarification was provided that there was an inconsistency on methodology/procedure for reporting outages within a single company.

In May 2020, following clarification from the FCC that this issue related to inconsistent reporting within different segments of a single company, the NRSC drafted a Best Practice, which was submitted to CSRIC for review. The proposed Best Practice states "Network Operators and Service Providers should ensure intra-company consistency for NORS and DIRS outage reporting."

As of November 2020, NRSC was awaiting feedback from CSRIC and the FCC regarding this Best Practice. In December 2020, NRSC proposed a framework for non-CSRIC generated edits to Best Practices via NRSC. This proposed framework was submitted for possible inclusion in the upcoming CSRIC VIII charter.

Update ATIS-0100021, *Analysis of FCC-Reportable Service Data Version 2* (Issue 0048)

ATIS-0100021, *Analysis of FCC-Reportable Service Outage Data Version 2*, was published by the NRSC in 2013, with the intention of documenting the techniques utilized by the FCC in its quarterly outage reports. In January 2020, it was noted that this document did not reflect current FCC reporting regulations. Additionally, the document utilized outdated DS3 measures, which have been replaced by larger OC3 measures in the years since this document's initial publication.

Starting in January 2020, NRSC ORAS undertook a complete review of ATIS-0100021 to ensure the report accurately portrays FCC statistical analysis. In consultation with Jay Bennett (FCC) and FCC staff, NRSC ORAS revised the document to accurately reflect current methods used to develop the FCC's quarterly outage reports.

This work is ongoing as of December 2020. An updated revision of this document is planned for publication in 2021.

NORS and DIRS Information Sharing Training for State Agencies Accessing Data

In March 2020, the FCC published a Second FNPRM regarding sharing NORS and DIRS data with state agencies for public safety purposes. In comments filed in April 2020, NRSC supported proposals to share data for public safety purposes but requested that the FCC require states to certify to and receive training on the need to appropriately manage their accounts, as well as revoking access should individuals or agencies fail to meet basic criteria to keep this data secure.

This work remains ongoing as of December 2020. Once the FCC has finalized its rulemaking for NORS and DIRS data sharing with state agencies, NRSC ORAS will complete this training.

3 Conclusion

Throughout the 2019 to 2020 timeframe, the NRSC has been active in researching and providing guidance on many network reliability issues and responding to various FCC issues and concerns regarding network events. It continues to work closely with the FCC to improve outage reporting procedures, refine Best Practices, and provide a forum for collaborative industry and government work efforts. The continued efforts of NRSC member companies have directly and positively impacted the resiliency and reliability of the nation's networks, which ultimately benefits all users.

For the Common Good

The NRSC clearly demonstrates the spirit of service in the communications industry. Companies that are fierce competitors in the marketplace collaborate via the NRSC, to advance network reliability for the benefit of all users. Working together for the common good is the finest product of the NRSC.

Future Plans

While the NRSC continues its focus on the network reliability and resiliency of today's networks, it does so with an eye on the future. Considerable effort has been expended in defining a generic model of what an all-IP network will look like, and the industry's knowledge of today's networks will be imperative in addressing reliability and outage reporting issues associated with an all-IP network. The NRSC's unique model of industry cooperation, along with its perspective of future networks, based on current expertise, will serve the nation well during the coming technological evolution. The NRSC continues to welcome input on topics to be addressed in the future and looks forward to the participation of both existing and new communications provider.

4 Participation

Participating NRSC Member Companies (2019-2020)

Alcatel-Lucent
AQSACOM
AT&T
Bandwidth
Charter Communications (Formerly Time Warner Cable)
CISA Emergency Communications Division (Formerly Office of Emergency Communications)
Comcast
Comtech (Formerly TCS)
Cox Communications
CSI Telecommunications
Eltek
Ericsson
FairPoint Communications
Intrado (Formerly West Safety Services)
JMA Wireless
Lumen (Formerly CenturyLink)
Mobi
Nokia
Perspecta Labs, Inc. (Formerly Vencore Labs)
Somos
TDS Telecom
Telnyx
T-Mobile (and previously Sprint)
Verizon

NRSC Subcommittee Participants[19]

Outage Reporting Advisory Subcommittee (2019-2020)

Co-Chair: Becky Wormsley, T-Mobile
Co-Chair: Christopher Desmond, Verizon Wireless

Berardi, Robert	AT&T
Canaday, Rick	AT&T
Chapa, John	AT&T
DeCuir, Jason	AT&T
Desiato, Robert	AT&T
DeVito, Victor	AT&T
Lawrence, Erik	AT&T
Hall, Chad	Charter Communications
Nobles, Haleigh	Charter Communications
Collins, Kari	Comcast
Obasuyi, Thomson	Comcast
Lu, Ruobo	Comtech
Peay, Mark	Cox Communications
Rubio, Ed	Cox Communications
Boyd, Mary	Intrado (Formerly West Safety Services)
Brown, Carolyn	Lumen (Formerly CenturyLink)
Steven Wright	Marconi Pacific
Biholar, Ken	Nokia
Armenta, Julio	Somos
Gormley, Andy	T-Mobile
Hagerson, Eric	T-Mobile
Wormsley, Becky	T-Mobile (Formerly Sprint)
Kalnins, Andis	Verizon

[19] The following lists provide meeting participation for the 2019-2020 period. NRSC participation outside of meetings may not be captured.

Desmond, Christopher	Verizon Wireless
Oberg, Chris	Verizon Wireless

Best Practices Subcommittee (2019-2020)

Co-Chair: Robert Desiato, AT&T
Co-Chair: Thomas Smith. Comcast

Berardi, Robert	AT&T
Canaday, Rick	AT&T
DeCuir, Jason	AT&T
Desiato, Robert	AT&T
DeVito, Victor	AT&T
Lawrence, Erik	AT&T
Hall, Chad	Charter Communications
Dreas, Eric	Comcast
Obasuyi, Thomson	Comcast
Smith, Thomas	Comcast
Browning, Rodney	Cox Communications
Peay, Mark	Cox Communications
Jacobs, Kurt	JMA Wireless
Brown, Carolyn	Lumen (Formerly CenturyLink)
Gormley, Andy	T-Mobile
Hagerson, Eric	T-Mobile
Wormsley, Becky	T-Mobile (Formerly Sprint)
Kalnins, Andis	Verizon
Desmond, Christopher	Verizon Wireless
Oberg, Chris	Verizon Wireless

Regulatory Subcommittee (2019-2020)

Co-Chair: Carolyn Brown, Lumen (Formerly CenturyLink)
Co-Chair: Solape Ajayi, T-Mobile

Berardi, Robert	AT&T
Berry, Darlene	AT&T
Canaday, Rick	AT&T
DeCuir, Jason	AT&T
Desiato, Robert	AT&T
DeVito, Victor	AT&T
Lawrence, Erik	AT&T
Cummings, John	Charter Communications
Obasuyi, Thomson	Comcast
O'Donnell, Beth	Comcast
Smith, Thomas	Comcast
Ornstein, Susan	Comtech
Peay, Mark	Cox Communications
Boyd, Mary	Intrado (Formerly West Safety Services)

Brown, Carolyn	Lumen (Formerly CenturyLink)
Hartman, Stacy	Lumen (Formerly CenturyLink)
Ajayi, Solape	T-Mobile
Gormley, Andy	T-Mobile
Hagerson, Eric	T-Mobile
Putzier, Jacob	T-Mobile
Wormsley, Becky	T-Mobile (Formerly Sprint)
Dausy, Ken	Verizon
Kalnins, Andis	Verizon
Desmond, Christopher	Verizon Wireless
Oberg, Chris	Verizon Wireless

IP Reliability Subcommittee (2019-2020)

Co-Chair: Mark Peay, Cox Communications
Co-Chair: Chris Oberg, Verizon Wireless

Berry, Darlene	AT&T
Canaday, Rick	AT&T
DeCuir, Jason	AT&T
Desiato, Robert	AT&T
DeVito, Victor	AT&T
Cummings, John	Charter Communications
Dreas, Eric	Comcast
Jordan, Beau	Comcast
O'Donnell, Beth	Comcast
Breen, Tom	Comtech
Peay, Mark	Cox Communications
Boudhaouia, Jamal	Lumen (Formerly CenturyLink)
Brown, Carolyn	Lumen (Formerly CenturyLink)
Armenta, Julio	Somos
Retka, Mary	Somos
Gormley, Andy	T-Mobile
Hagerson, Eric	T-Mobile
Putzier, Jacob	T-Mobile
Solape Ajayi	T-Mobile
Wormsley, Becky	T-Mobile (Formerly Sprint)
Hutyra, Staci	Verizon
Kalnins, Andis	Verizon
Oberg, Chris	Verizon Wireless

Companies/Organizations in Attendance at the 2019-2020 Public NRSC Quarterly Meetings

24/7 Networks
Altice
APCO
AT&T
Cameron Communications
Cellcom
Cellular One
Charter Communications
Cincinnati Bell
Comcast
Comtech
Consolidated Communications
Cox Communications
Crocker Communications
Crown Castle
Department of Homeland Security
Fairpoint Communications
FCC
Intrado (Formerly West Safety Services)
JMA Wireless
Ligado Networks
Lumen (Formerly CenturyLink)
Marconi Pacific
Motorola
Nokia
Nsight
Perspecta Labs, Inc (Formerly Vencore)
Somos
Sprint
TDS Telecom
T-Mobile USA
University of Pittsburgh
US Cellular
Verizon
Windstream