

**Before the
Federal Communications Commission
Washington, DC 20554**

In the Matter of)	
)	
Technology Transitions Policy Task force)	GN Docket No. 13-5
Seeks Comment on Potential Trials)	
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)	

**COMMENTS OF THE ALLIANCE FOR
TELECOMMUNICATIONS INDUSTRY SOLUTIONS**

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SUMMARY

ATIS has significant work aimed at facilitating the deployment of new services and networks. ATIS urges the Commission to encourage trial participants to be familiar with and utilize existing industry technical and operational standards. Compliance with voluntary industry standards will help promote interconnection and interoperability with existing networks and services, and ensure that consumers' expectations are satisfied. Knowledge of existing standards is also necessary to allow the identification of any gaps that may exist in the standards ecosystem. Moreover, it is important that the Commission make the results of the trials available to the industry to aid in the refinement and/or development of industry standards.

ATIS has a robust set of work programs that are relevant to the proposed trials. This work addresses more than basic interconnection issues and ensures that key network functions are retained as new functions and services are deployed. Among the key work programs within ATIS are those focused on:

- Ensuring the seamless and reliable transition from legacy to next generation technologies, including VoIP;
- The on-going transition to NG9-1-1 and the provision of emergency access and priority processing for local and long distance telephone calls on IP networks;
- Facilitating support for operator services in an IP environment;
- The continued resiliency and robustness of network interconnections; and
- Numbering systems and the assignment of numbering resources.

Regarding the numbering issues related to the proposed trials, it is important to recognize that some existing TDM networks and functions will continue to operate until the migration to IP is complete. Thus, any new databases or modifications to existing databases should accommodate the need for a dual mode telephone routing environment until such time that every telephone number can route successfully in an all-IP environment. Standards development groups, such as ATIS, must be made aware of any changes considered for the trials, and these groups should be able to collaborate in the development of trial criteria to ensure alignment with current industry standards.

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**COMMENTS OF THE ALLIANCE FOR
TELECOMMUNICATIONS INDUSTRY SOLUTIONS**

The Alliance for Telecommunications Industry Solutions (ATIS) submits these comments in response to the Commission’s May 24, 2013, *Public Notice* seeking comment on possible trials relating to the on-going transitions from copper to fiber, wireline to wireless, and time-division multiplexing (TDM) to Internet Protocol (IP) technologies. Among the issues on which input is sought is how to structure trials to help identify the need and scope for technical or industry standards for the exchange of voice traffic in IP formats, particularly in the areas such as signaling, media format, non-voice media, fault location, fail-over, and Quality of Service (QoS) measurements.¹ As a leading developer of technical and operational standards for the communications industry and the North American Organizational Partner in the 3rd Generation Partnership Project (3GPP), ATIS has developed a significant number of standards related to the transition of wireline and wireless networks to new and evolving technologies. This work includes voice over IP (VoIP) interconnection and next generation 9-1-1 (NG9-1-1) emergency communications, QoS, and North American Numbering Plan (NANP) numbering. ATIS urges

¹ *Public Notice* at p. 5.

the Commission to encourage trial participants to be familiar with and utilize existing industry technical and operational standards to ensure seamless interconnection and interoperability with existing networks and services. ATIS also urges the Commission to ensure that results of the trials are available to the industry to aid in the refinement and/or development of industry standards.

I. BACKGROUND

ATIS is a global standards development and technical planning organization that leads, develops, and promotes worldwide technical and operational standards for information, entertainment, and communications technologies. ATIS' diverse membership includes key stakeholders from the Information Communications and Technology (ICT) industry – wireless and wireline service providers, equipment manufacturers, broadband providers, software developers, consumer electronics companies, public safety agencies, digital rights management companies, and internet service providers. Nearly 600 industry subject matter experts work collaboratively in ATIS' open industry committees and incubator solutions programs. Technical, operational, and business priorities are also examined by ATIS through its Technology and Operations (TOPS) Council, a group established by the ATIS Board of Directors to identify and address the ICT ecosystem's needs through focused, expedited efforts.

While many of ATIS' work programs are aimed at facilitating the seamless deployment of new services and networks, the committees below have work programs that are particularly relevant to the trials envisioned in the *Public Notice*:

- Emergency Services Interconnection Forum (ESIF): The ATIS ESIF serves as the primary forum for the telecommunications industry, public safety organizations, and other stakeholders to identify and resolve recognized technical and operational interconnection issues related to the delivery of E9-1-1 services. ESIF works closely with the Association of Public Safety Communications Officials (APCO) and the

National Emergency Number Association (NENA), which manages the technical evolution of the 9-1-1 system and emergency communications process.

- Industry Numbering Committee (INC): The ATIS INC addresses and resolves industry-wide issues associated with planning, administration, allocation, assignment, and use of the NANP numbering resources within the NANP area. INC guidelines and recommendations are used by the North American Numbering Plan Administration (NANPA) and the Number Pool Administration (PA) in the management of numbering resources, as well as the Canadian Radio-Television and Telecommunications Commission (CRTC) in the management of numbering resources.
- Next Generation Interconnection Interoperability Forum (NGIIF): The ATIS NGIIF addresses next generation network interconnection and interoperability issues associated with emerging technologies and develops operational procedures that involve architecture, disaster preparedness, installation, maintenance, management, reliability, routing, security, and testing between network operators.
- Network Performance, Reliability and Quality of Service Committee (PRQC): The ATIS PRQC develops and recommends standards, requirements, and technical reports related to the performance, reliability, and associated security aspects of communications networks, as well as the processing of voice, audio, data, image, and video signals, and their multimedia integration. PRQC also develops and recommends positions on, and fosters consistency with, standards and related subjects under consideration in other North American and international standards bodies.
- Packet Technologies and Systems Committee (PTSC): The ATIS PTSC develops and recommends standards and technical reports related to services, architectures, and signaling. The PTSC also coordinates and develops standards and technical reports relevant to telecommunications networks in the U.S., reviews and prepares contributions on such matters for submission to U.S. delegations to the ITU, or to other standards organizations. The PTSC PSTN Transition Subcommittee addresses the PSTN to IP transition by: (1) analyzing the impact of emerging technologies and services on the evolution of interconnection models and developing implementation use cases; (2) identifying service requirements, protocols, and architecture definitions; (3) examining circuit-switched services to be offered in both circuit-switched/packet-switched hybrid and in packet-switched only environments; and (4) developing protocols and procedures for circuit-switched to packet-switched interworking. The PTSC IP Interconnection Subcommittee leads and coordinates with other committees where appropriate to define standard protocol procedures and profiles for the Network-Network Interface (NNI), Application-Network Interface (ANI), Server-Network Interface (SNI), User-Network Interface (UNI) and other reference points, and to define interconnection guidelines and interoperability test suites.
- Wireless Telecommunications and Systems Committee (WTSC): The ATIS WTSC coordinates and develops standards and technical reports primarily relevant to wireless/mobile telecommunications networks in the U.S. and reviews and prepares contributions on such matters for submission to the appropriate U.S. preparatory body for consideration as ITU contributions or for submission to other domestic and regional standards organizations.

II. INPUT TO THE *PUBLIC NOTICE*

As noted above, the Commission in its *Public Notice* seeks comment regarding how to structure the proposed trials to help identify whether industry standards or standard profiles are needed.² ATIS strongly believes that, in order to identify any gaps in the standards ecosystem, the trial participants must be familiar with existing industry standards. In order to provide input on the need for new standards, there must be an understanding of the significant work that has been accomplished and is underway by the ICT community. As explained below, numerous ATIS industry-supported standards and technical reports address important issues related to the transition from legacy systems to new and emerging wireline and wireless networks. These standards go beyond basic interconnection to ensure that key network functions are retained as new functions and services are deployed. ATIS recommends that the Commission urge trial participants to consider the industry technical and operational standards referenced below when constructing their trials.³ ATIS believes that compliance with voluntary industry standards will help promote seamless interconnection and interoperability with existing networks and services, and ensure that consumers' expectations are satisfied.

A. VoIP Interconnection

ATIS has a robust set of work programs aimed at ensuring the seamless and reliable transition from legacy to next generation technologies, including VoIP. ATIS PTSC, for example, has published a number of standards in support of transitioning from circuit-switched to packet-switched (i.e., IP) technologies. Among these are standards focused on the interconnection of VoIP networks, including *IP Network-to-Network Interface (NNI) Standard*

² *Public Notice* at p. 5.

³ ATIS' standards and technical reports, including those referenced in these comments, are publically available from the ATIS Document Center at: <http://www.atis.org/docstore/default.aspx>. While fees are charged to recover the costs of some documents, other documents, such as the industry standards developed by INC, are made available free of charge.

for VoIP (ATIS-1000009). This standard addresses the IP NNI for VoIP between carriers, as well as the need for a standard interface as telecommunications networks migrate the NNI from TDM circuit-switched to IP systems. It supports VoIP by defining: (1) interconnection architecture; (2) Session Initiation Protocol (SIP) call/session control signaling; (3) signaling and media transport; (4) QoS; (5) association between call control and media control; and (6) mandatory SIP uniform resource identifiers (URI) to be supported. Other VoIP interconnection standards developed by PTSC include:

- *Session Border Controller Functions and Requirements* (ATIS-1000026.2008(R2013)), which define the Session Border Controller (SBC) functions and requirements that reside within a service provider's network, including operation, administration, maintenance, and provisioning (OAM&P) requirements.
- *Technical Parameters for IP Network to Network Interconnection Release 1.0* (ATIS-1000038), which specify the "Interconnection Technical Parameters" that need to be collected and eventually exchanged between two service providers so that they can successfully interconnect IP-based facilities and VoIP services at an NNI.
- *Testing Configuration for IP Network to Network Interconnection Release 1.0* (ATIS-1000039), which specifies the service under test configurations that shall be utilized in order to verify the settings (to support ingress and egress processing) of the network border elements for interoperability of a service between providers.
- *Protocol Suite Profile for IP Network to Network Interconnection Release 1.0* (ATIS-1000040), which identifies a set of protocols and specifies their profile so that signaling, media, and network related parameters can be uniformly and consistently (as identified by the test scenarios defined in ATIS-1000041) utilized across the interconnection interface.
- *Test Suites for IP Network to Network Interconnection Release 1.0* (ATIS-1000041), which specifies a set of call test scenarios involving SIP and other signaling messages which for various situations may be required to provide an expected reaction to an event or a sequence of events appropriate to the previously-signaled message. This "expected reaction" is based upon the protocol profile established in the messages that flow across the NNI.
- *IP Device (SIP UA) to Network Interface Standard* (ATIS-1000028.2008(R2013)), which supports SIP-based interconnection for VoIP between a carrier and the user. The SIP UNI specified in this document is applicable to individual SIP phones as well as to SIP private branch exchanges.

ATIS PTSC is also working to enhance the NNI to support multimedia services, and 3GPP/GSM Association specifications.

ATIS PTSC has also developed a standard that facilitates interconnection between IP-based networks and those based on Signaling System 7 (SS7) circuit-switched technology. *Signaling System 7 (SS7) and Internet Protocol (IP) Transport Networks Signaling Interworking and Compatibility* (ATIS-1000047) addresses the fact that control mechanisms and procedures of traditional PSTN SS7 differ from the signaling/control mechanisms associated with IP technology. The standard identifies the need for lower-layer protocol transport network interworking and interoperability to support the end-to-end upper layer protocol communications and applications protocol services. It provides guidelines and requirements for traditional lower-layer SS7 transport protocols and IP-based transport network interworking and interoperability, and for the interconnection nodes that will provide this interworking and interoperability, as well as guidelines and requirements for gateway support of the relevant lower-layer SS7 and IP protocols.

An aspect of IP interconnection is circuit-switched (ISUP) to IP (SIP) interworking, which addresses interoperability between the two domains and PSTN Transition. In June 2004, ATIS published *Interworking between Session Initiation Protocol (SIP) and Bearer Independent Call Control or ISDN User Part* (ATIS-1000679.2004), which was later revised in 2009, and is currently being updated. ATIS-1000679 defines the signaling and interworking between the ISDN User Part (ISUP) protocols and SIP in order to support services that can be commonly supported by ISUP and SIP-based network domains.

In addition to developing standards and technical reports, ATIS also has been involved in interoperability testing to validate the next generation NNI designed to provide a direct, IP-only connection between carriers. An NNI interoperability test event (NNI IOT) was conducted in January 2013 based in part on interface specifications and test plans developed by the ATIS

PTSC.⁴ The NNI IOT verified the North American Emergency Telecommunications Service (ETS) configurations of the NNI in the U.S. Government's Office of Emergency Communications (OEC) laboratory, operated by Applied Communication Sciences in Basking Ridge, New Jersey.

The NNI IOT tested interconnections between service providers using a number of scenarios, including scenarios in which both interconnected service providers were compliant with industry standards and other scenarios in which only one of the providers was compliant. The goal of this testing was to verify the validity and completeness of ATIS' profile and test suite in support of the NNI specifications, especially as they pertain to ETS, in support of making NGN as resistant to failures, attacks, and congestion as the legacy Public Switched Telephone Network (PSTN). The event demonstrated that the ETS requirements based on ATIS specifications for providing end-to-end ETS communications services utilizing an IMS infrastructure across the NNI were mature and interoperable.

B. Emergency Services, Priority Services and NG9-1-1

ATIS is also producing key industry standards related to the on-going transition to NG9-1-1 and the provision of emergency access and priority processing for local and long distance telephone calls on IP networks. This work is being progressed in a number of ATIS forums, but particularly in the ATIS ESIF, NGIIF, PRQC, PTSC and WTSC.

ESIF has developed, and is in the process of developing, a number of standards related to NG9-1-1, including key work on transitional architectures involving the interconnection of legacy and next generation components. This includes work that applies the common IP

⁴ The tests were based on *IP Network-to-Network Interface (NNI) Standard for VoIP* (ATIS-1000009), with the ETS aspects from *Emergency Telecommunications Service (ETS) Profile and Tests for IP Network-to-Network Interconnection* (ATIS-1000053).

Multimedia Subsystem (IMS) technology used by service providers to emergency services networks. *Applying 3GPP Common IMS to NG911 Networks* (ATIS-0500023) addresses the assumptions, requirements, and use cases associated with applying IMS architecture concepts to a next generation emergency services network. Stage two and three of this work is currently underway as joint ESIF/PTSC/WTSC projects. This work will: (1) address the architecture, protocol, and procedures to support the interconnection of IMS-based next generation emergency services networks with legacy and IP-based originating networks, and legacy and NG PSAPs; (2) define a standard interface between an IP originating network and a next generation emergency services network; and (3) compare the SIP profiles associated with the interface between an IP originating network and an IP-based emergency services network as defined in the standards developed by ATIS, 3GPP (IMS Release 10), and the NENA i3 specifications.

ESIF is also working to identify and adapt, as necessary, 3GPP common IMS emergency procedures for applicability in North America to support emergency communications that originate from an IMS subscriber and are delivered to an Emergency Services IP Network (ESInet) or to a legacy Selective Router. This work is expected to be completed and published in the near future.

Emergency telecommunications services work that has been completed or is being progressed within ATIS committees includes:

- *ETS Packet Priority for IP NNI Interfaces - Use of Existing DiffServ Per Hop Behaviors* (ATIS-1000011), which provides guidelines for the application of existing Differentiated Services (DiffServ) Per Hop Behaviors (PHB) and their associated DiffServ Code Points (DSCP) when ETS VoIP packets are transported in the media stream at NNI.
- *ETS Packet Priority for IP NNI Interfaces – Requirements for a Separate Expedited Forwarding Mechanism* (ATIS-1000020), which provide the requirements for a separate expedited forwarding mechanism that can recognize a class of traffic for preferential treatment via a unique DiffServ Code Point (DSCP). This class of traffic included ETS

VoIP calls/ sessions with the requirement of a pre-determined quantity of reserved bandwidth for ETS service.

- *ETS Network Element Requirements for a NGN IMS Based Deployments* (ATIS-1000023.2008), which define network element requirements to ensure that ETS is implementable and interoperable in a multi-vendor environment for an NGN IMS-based network deployment.
- *Emergency Telecommunications Service (ETS) Profile and Tests for IP Network-to-Network Interconnection* (ATIS-1000053), which provides a profile and tests to verify the support of Emergency Telecommunications Service (ETS) on the Internet Protocol (IP) Network-to-Network Interconnection (NNI).
- *Need for Emergency Notification Best Practices* (ATIS-0300098), which will detail CMAS and other mass-notification methods in an IP environment.
- *Transition to Next Generation Network (NGN) Priority Services*, which will allow for confirmation that the replacement IP platform also is able to support NS/EP priority services (GETS, WPS and TSP).
- *Telecommunications Service Priority (TSP) Updates to ATIS-0300010* (ATIS-03000010), which address the transition of TDM-based TSP procedures for critical circuit restoration to TSP procedures that address restoration of IP resources.

C. Operator Services

ATIS also has published standards and technical reports in support of operator services in IP, including *Operator Services Architecture & Interfaces* (ATIS-1000036). This standard, developed by ATIS PTSC, describes signaling support for operator services when the application providing the services resides in the NGN. The ATIS technical report, *Support of Operator Services in an IP Environment* (ATIS-1000027), describes the traditional set of operator services and considers how corresponding services could be supported in an NGN IP environment. *NGN Operator Intercept Service* (ATIS-1000050) describes NGN signaling support for Operator Regular Intercept. The service may be invoked when an NGN caller attempts to set up a call/session to an ‘intercepted number’ where the address of the called party has changed.

D. NGN Resiliency, Quality of Service

ATIS has significant work aimed at ensuring the continued resiliency of network interconnections. While this work takes place in many ATIS committees, key work is taking place in the PRQC and NGIIF. PRQC, for instance, has work underway in the NGN reference suite of documents that focuses on IP to IP interconnection issues. *IP QoS and the development of NGN and IP/PSTN Convergence Operational Guidelines* (ATIS-0100002 and ATIS-0100524) will provide guidance pertaining to the control of QoS and metrics for network reliability in an IP environment.

NGIIF is in the process of developing a suite of NGN and auto dialer reference documents to ensure the continued reliability of communications services in an all-IP environment. Among other things, the guidelines will mitigate the impact of mass calling events in an IP environment, which can cause serious degradation of call handling capacity. Among the standards in development on this topic is *Network Management Controls for High Volume Call in (HVCI) Events when VoIP Technology is Involved*. This standard will address network management controls that are needed to handle traffic load conditions resulting from an HVCI in an IP environment. NGIIF is also working to document operational procedures for interconnections between IP carriers.

E. Numbering Trials

The Commission also seeks comment in the *Public Notice* on a possible additional trial on numbering issues and related databases, noting that it has recently authorized a limited six-month trial to provide five interconnected VoIP providers direct access to numbers.

ATIS INC recognizes that some existing TDM networks and functions will continue to operate until the migration to IP is complete. Thus, any new databases or modifications to

existing databases should accommodate the need for a dual mode (TDM and IP) telephone routing environment until such time that every telephone number can route successfully in an all-IP environment.

INC notes that any trials will need to co-exist with existing networks and telecommunications companies, which follow industry standards. Standards development groups, such as ATIS, must be made aware of any changes considered for the trials, and these groups should be able to collaborate in the development of trial criteria to ensure alignment with current industry standards. Also, given the current reliance on existing numbering databases and the potentially limited timeframe of trials, INC suggests that the existing databases be used for any such trial.⁵ The use of the existing databases will also satisfy the need to keep databases consistent and secure, and will be beneficial to trial participants because the existing databases already support other services, like real-time video and text. After any such trial(s), a determination can be made to suggest augments to existing databases or to propose new databases.

INC is working to support the evolution of existing processes, systems, and numbering databases for use in an all-IP environment, including an assessment of the impacts of the transition to IP on numbering resources and numbering administration. Current INC work may result in the development of recommendations regarding the future of numbering systems, including future protocols or procedures for assigning numbers in an all-IP environment. These issues would be developed based on the existing industry documents developed and managed by INC. These include:

⁵ New numbering trials conducted in conjunction with the VoIP direct access to numbering trial would be desirable and feasible, if the VoIP direct access to numbering trial was extended beyond its current six-month limit.

- *555 NXX Assignment Guidelines* (ATIS-0300048), which specify recommendations for the assignment of line numbers within the 555 NXX code.
- *9YY NXX Code Assignment Guidelines* (ATIS-0300060), which provide guidelines for the assignment of NXX codes within the 9YY Service Access Code (SAC) to carriers.
- *Central Office Code (NXX) Assignment Guidelines (COCAG)* (ATIS-0300051), which specify guidelines for the assignment of central office codes within geographic numbering plan areas.
- *Location Routing Number (LRN) Assignment Practices* (ATIS-0300065), which provide recommendations regarding the assignment of the LRNs that uniquely identify a switch or point of interconnection per LATA.
- *North American Numbering Plan Numbering Resource Utilization/Forecast Reporting (NRUF) Guidelines* (ATIS-0300068), which provide guidelines and procedures related to the submission of NRUF reports as required by the Commission.
- *NPA Code Relief Planning and Notification Guidelines* (ATIS-0300061), which provide guidance for NPA code relief planning activities, including relief planning principles, administrative responsibilities and industry notification requirements.
- *P-ANI Administration Guidelines* (ATIS-0300089), which provide recommendations regarding the administration and assignment of non-dialable pseudo Automatic Number Identification (p-ANI) numbers that are typically used for call routing and location display of callers that subscribe to a service that is mobile, nomadic, or that involves a user telephone number containing an NPA that is foreign to the serving E9-1-1 selective routing system.
- *Personal Communications Services (PCS) 5YY NXX Code Assignment Guidelines* (ATIS-0300052), which provide guidelines for the assignment of NXX codes within a 5YY NXX non-geographic SAC used for personal communications services.
- *Thousands-Block Number (NXX-X) Pooling Administration Guidelines* (ATIS-0300066), which provide information for the administration and assignment of thousands-blocks (NXX-Xs) to Local Number Portability (LNP)-capable service providers in rate centers where thousands-block number pooling has been ordered or implemented.

INC also is monitoring the VoIP numbering trial and will review current documents and procedures as necessary based on the results. INC welcomes new participants, including trial participants, as well as proposals to augment existing numbering databases or to create new numbering databases.

Finally, it should be noted that toll free service needs to be fully operational in an all-IP network. As the transition to VoIP could mean the dismantling of geographic numbering, the requirements of toll free and any other identified niches (i.e. emergency health care clinics) should be taken into consideration. New standards may need to be developed to provide toll free carriers with accurate and consistent originating location information associated with VoIP and wireless calls.⁶

⁶ See 47 C.F.R. §64.1601.

III. CONCLUSION

ATIS appreciates the opportunity to provide its input on the *Public Notice*. ATIS supports the Commission's goals of promoting investment, innovation and competition while protecting consumers and ensuring that emerging all-IP networks remain resilient. ATIS believes industry standards have well-served these goals with regard to existing and emerging networks and technologies, and urges the Commission to encourage trial participants to utilize existing industry technical and operational standards. It is imperative that industry standards be the baseline for the call processing in the trials to assure that all end users – consumers and businesses – are assured that they can continue to have access to reliable communications services. Appropriate use of existing technical and operational standards will help to promote seamless interconnection and interoperability of these emerging networks and technologies with existing networks. Finally, ATIS urges the Commission to ensure that results of the trials are available to the industry to aid in the refinement and/or development of industry standards.

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