Before the Federal Communications Commission

In re
INQUIRY CONCERNING
911 ACCESS, ROUTING, AND LOCATION
IN ENTERPRISE COMMUNICATIONS SYSTEMS

ON NOTICE OF INQUIRY

COMMENTS OF THE
NATIONAL EMERGENCY NUMBER ASSOCIATION

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NATIONAL EMERGENCY NUMBER ASSOCIATION

The National Emergency Number Association ("NENA") respectfully submits the following comments in response to the *Notice of Inquiry* adopted by the Commission on September 26th, 2017.

COMMENTS

For more than two decades, the emergency communication capabilities of "Enterprise Communications Systems" ("ECS") have lagged dangerously behind the state-of-the art. Customers who call 9-1-1 from traditional landlines and cellular telephones generally expect – rightly – that their calls will be completed, that they will be routed to the jurisdictionally-appropriate Public Safety Answering Point ("PSAP"), and that the telecommunicator who answers will have access to timely and accurate location information for the call. For millions of office and factory workers, dormi-

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tory residents and hotel guests, and, increasingly, unsuspecting mobile device users, however, these basic guarantees are not reliably available. Today's market for originating services is fundamentally different from the one that existed when the Commission first addressed ECS in the context of Multi-Line Telephone Systems ("MLTS"), and it is high time that the Commission took steps to create a comprehensive regulatory regime that places all originating services providers on an equal footing while providing all consumers with a uniform set of 9-1-1 service expectations. Our comments provide a roadmap to that regime.

I.   The market for ECS has evolved significantly.

When the Commission first addressed E9-1-1 requirements for MLTS,[1] the Public-Switched Telephone Network ("PSTN") was still in its prime: Enterprises relied principally on heavy-iron on-premise analog or time-division-multiplexed "Private Branch Exchange" hardware *or* similar "centrex" services provided by telephone company switches. Voice over Internet Protocol ("VoIP") was still largely an experimental technology being explored by researchers and bleeding-edge early adopters.[2] Most importantly, however, the public safety infrastructure undergirding 9-1-1 access, routing, and location was still engineered to handle exclusively legacy technologies.

Today, the overwhelming majority of voice communications are carried using VoIP for at least part of their journey from originating station to terminating station. Likewise, nearly 100% of the ECS market is based on VoIP technology, with only a few legacy applications remaining in-service. Carrier networks are now architected using VoIP

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[1] Notice of Proposed Rulemaking: *In re Revision of the Commission's rules to ensure compatibility with enhanced 911 emergency calling systems*, CC Docket No. 94-102 (Nov. 2, 1994) (*available at*: www.gpo.gov/fdsys/pkg/FR-1994-11-02/html/94-27134.htm).

[2] Internet voicemail apps came to prominence in 1996, and interconnected VoIP first began commercial service in 1998. https://bebusinessed.com/history/voip-history/.

as a core technology, with the Session Initiation Protocol ("SIP") dominating the setup and teardown of voice traffic for LTE-based mobile networks and IMS-based transport networks. At the same time, the public safety infrastructure has evolved significantly: Today's 9-1-1 systems handle not only voice traffic originated from legacy TDM networks, but from circuit-switched and packet-switched mobile networks, infrastructure-based VoIP systems, and wholly-disaggregated Originating Service Providers ("OSPs"). Moreover, they now handle SMS text, on an interim basis, using a variety of architectures. Soon, they will also handle both interim- and next-generation-native Real-Time Text ("RTT"). This evolution has followed a complex but deliberate path with many intermediate steps. At each step, public safety systems have become more open, more interconnected, and more capable, while public safety operations have adapted to ever-more-complex challenges presented by changing technologies. And yet, as the capabilities and underlying technologies used by Access Network Providers ("ANPs") and OSPs have evolved, and as the capabilities of public safety systems have evolved, the regulatory regime for E9-1-1 services has remained largely unchanged, fragmented, and anchored in the legacy world.

II. ECS are now the unifying model for *all* telephony and 9-1-1 services.

Currently, public safety agencies nation-wide are deploying "Next Generation 9-1-1." Though its character defies reduction to a soundbite, NG9-1-1 is, technologically, defined by the "Detailed Functional and Interface Specification for the NENA i3 Solution" or, colloquially, the "i3 Standard." i3 represents the culmination of several generations of standards development work that enabled ECS to access 9-1-1 systems in much the same way that legacy wireline systems do, regardless of the specific architecture adopted by each ECS OSP. For example, early "Private Switch ALI" standards enabled TDM-based MLTS to pro-

vide the same E9-1-1 functionality offered to ordinary wire-line subscribers,[3] while the *i2* standard served much the same purpose for interconnected (and willing non-interconnected) VoIP providers.[4] Beginning in the early 2000s, NENA's standards developers envisioned a future in which these advanced IP-based architectures would become the norm, rather than the exception. As a result, the i3 Standard is strongly oriented toward technologies that originated in the ECS realm. Individual "calls," whether voice, message-based text, real-time text, video, or otherwise, are set-up and torn-down using the Session Initiation Protocol, routed using Location to Service Translation ("LoST") protocol, transmitted using Real-Time Protocol and Message Session Relay Protocol, and located using the Hypertext-Enabled Location Discovery ("HELD") protocol.[5] Critically, however, many ECS (and ECS-derived originating services) currently do not offer their users the benefits of these core ECS technologies when those users call 9-1-1.

A. *Many consumers use limited-capability ECS, often unknowingly.*

Due to the ubiquity of ECS technologies in seemingly-distinct contexts, many millions of consumers actually use ECS on a daily basis without knowing it. For example, while the user of an office's on-premise MLTS or cloud-hosted PBX service may know that that their desk phone is an ECS, users of "Wi-Fi Calling" services may *not* realize that their cellular telephone is frequently acting as an ECS when in areas of limited macro-cellular coverage. In both cases, however, 9-1-1 service is limited by the location-de-

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[3] NENA: The 9-1-1 Association, *Private Switch (PS) E9-1-1 Database Standard*, 2002 (rev'd 2004).

[4] NENA: The 9-1-1 Association, *Interim VoIP Architecture (i2)*, 2005 (rev'd 2010).

[5] NENA: The 9-1-1 Association, *Detailed Functional and Interface Specification for the NENA i3 Solution*, 2011 (rev'd 2016).

termination and routing capabilities of the service. Similarly, tablet-based users of both interconnected and non-interconnected voice origination services may not realize that their ability to reach 9-1-1 depends on the often-disparate implementations of ECS features in differing OSPs' applications. Technologically, a carrier-integrated over-the-top VoIP app is indistinguishable from a third-party VoIP app, except for the charging functions that are inherent to ANPs who are also OSPs. Likewise, from a user perspective there is not (and should not be) a distinction: Both applications allow the user to make a call.

B. *Consumers reasonably expect* all *ECS and ECS-like services to fully access 9-1-1.*

Because consumers have no ready means to distinguish the character and behavior of differing ECS or ECS-like originating services, it is critical that all such services function in a manner consistent with basic consumer expectations for 9-1-1. These include the ability to make a 9-1-1 call directly, without additional digits or steps, automatic location identification and location-based routing to a jurisdictionally-appropriate PSAP, and call-back capability if a call is interrupted for any reason.

Direct access remains a significant area of concern, since neither the federal government nor a majority of states have yet established consistent requirements in this area. However, increased attention to this issue, brought about by public advocacy on the part of individual Commissioners, interested members of the public, and dedicated public safety professionals *has* led to a recent up-tick in the number of states with at least *some* legislation addressing the problem. That legislation varies significantly, however, in its scope and application from state to state, and represents a barrier to the deployment of uniform 9-1-1 capabilities for all ECS, the market for which is, after all, global.

Likewise, precise location determination remains elusive: Many enterprises still believe that location determination facilities are expensive, despite vast reductions in cost over the preceding decade and a widespread public

safety consensus that "good enough" location precision is acceptable until more-precise and lower-cost NG9-1-1 capabilities become common.[6] With limited location capabilities come limited routing capabilities: For today's distributed enterprises, where one ECS may serve large campuses scattered across multiple states or even continents, the inability to locate a calling station to the correct campus and building can prove deadly. The confluence of these conditions means that, for many ECS users, 9-1-1 calls are frequently routed to either a default 9-1-1 center, a third-party routing center like Northern911, or, worse, to no 9-1-1 center at all.[7]

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[6] For example, NENA's 2015 Model Legislation for MLTS would require only *one* "Emergency Response Location" per 40,000 ft^2 on a single level. This can represent an enormous savings for enterprises that might otherwise have believed they were required to provide station-level location data. NENA: The 9-1-1 Association, *MLTS Model Legislation*, (2015) (*available at*: http://c.ymcdn.com/sites/www.nena.org/resource/collection/c3d071c2-facd-41cb-a09c-354888272ef8/MLTS_2015.pdf?hhSearchTerms=%22MLTS%22)

[7] In the latter case, NENA is aware that some organizations have routinely intercepted 9-1-1 calls to prevent them from reaching a PSAP. While such practices have, on rare occasions, been rooted in a genuine and reasonable belief that an enterprise's own response capabilities are superior to those accessible via the local PSAP, they have more often been implemented in a crass and heartlessly-misguided effort to protect an enterprise's reputation or bottom line. NENA abhors such practices, and has consistently advocated *against* the use of ECS to divert 9-1-1 calls to unsafe alternative endpoints. We note here that this practice is *not* the same as "on-site notification," which can play an important role in speeding-up access to public safety services for large campuses, hotels, office buildings, and industrial facilities. *E.g., id* at 5 & 7.

Because each of these failures breaches the significant public trust that consumers reasonably place in 9-1-1 service, NENA is convinced that the Commission should take steps to prevent such breaches of the public trust in future.

III. The Commission should harmonize 9-1-1 obligations for all similarly-situated providers.

In order to reach the full potential of NG9-1-1, NENA encourages the Commission to begin looking at ECS and related technologies in a comprehensive fashion. For example, the i3 Standard specifies a unified location-determination and routing mechanism for *all* 9-1-1 calls, regardless of the type of system they originate on. For traditional ECS, in particular, these mechanisms represent a sea change in both the complexity and cost of providing precise location for individual stations. Yet the Commission's rules still treat wireline access networks differently from mobile networks, and leave non-carrier-integrated originating services with few choices for either location determination or location-based routing. In order to accelerate the transition to NG9-1-1 and level the playing field for both ANP-integrated OSPs and independent OSPs, NENA recommends that the Commission begin the process of clarifying which 9-1-1 service obligations belong to each class of entity. For example, the requirement to provide a Location Identification Server ("LIS") is central to the ability of an ECS to determine the location of non-fixed ECS subscriber units. Whether a LIS uses a device's onboard location-determination equipment, an enterprise location service, or the National Emergency Address Database, it must be available to attached ECS to enable location discovery and routing. The Commission could specify that this obligation lies with the Access Network Provider, regardless of network technology or medium. Likewise, the Commission could specify that the obligation to establish 9-1-1 sessions and provide transport security (authentication and encryption) lies with the Originating Service Provider, whether that is the ANP or not. These and other questions require

answers, and soon. Moreover, they require *harmonized* answers so that our converging carrier networks, originating services, and 9-1-1 systems can interconnect and interoperate securely, consistently, and without undue competitive advantages or disadvantages.

CONCLUSION

The Commission should adopt a *Notice of Proposed Rulemaking* to unify and harmonize 9-1-1 requirements for *all* Access Network Providers and Commission-regulated Originating Service Providers.

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