Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Inquiry Concerning 911 Access, Routing, and Location in Enterprise Communications Systems	)	PS Docket 17-239
	)	

NOTICE OF INQUIRY

Adopted: September 26, 2017 **Released: September 26, 2017**

Comment Date: November 15, 2017
Reply Comment Date: December 15, 2017

By the Commission: Chairman Pai and Commissioners Clyburn, Carr, and Rosenworcel issuing separate statements.

TABLE OF CONTENTS

I. INTRODUCTION

1. When Americans face a life-threatening emergency, they rely on the ability to call 911 to obtain emergency assistance. Consumers expect that a 911 call made from anywhere in the country will be routed to the appropriate 911 call center or Public Safety Answering Point (PSAP), that location and callback information will be transmitted to the PSAP, and that the location information provided will be accurate and precise enough to ensure prompt dispatch of emergency personnel to the caller's location.

2. Consumers have access to these capabilities when they make wireline calls to 911, and the Commission has adopted Enhanced 911 (E911) rules for wireless and interconnected Voice over

Internet Protocol (VoIP) providers to promote the development of the same 911 capabilities on those platforms.[1] However, enterprise-based communications systems that serve environments such as office buildings, campuses, and hotels may not provide consumers with the same access to E911 services as wireline, wireless, and VoIP systems. For instance, we are aware of reports that some of these systems in operation today may not support direct 911 dialing, may not have the capability to route calls to the appropriate PSAP relative to the caller's location, or may not provide accurate information regarding the caller's location. Historically, enterprise-based services – which we refer to collectively as Enterprise Communications Systems or ECS – have been provided by legacy Multi-Line Telephone Systems (MLTS), but many enterprises are increasingly relying on Internet Protocol (IP)-based systems, including cloud-based services, to support their communications needs.[2] In this Notice of Inquiry (NOI), we examine the provision of 911 by ECS, including the capabilities of ECS to support direct 911 access, routing, and automatic location.

3. We seek to identify the reasons that the 911 capabilities of ECS appear to have lagged behind those of wireless, wireline, and interconnected VoIP, including the possibility that the costs of providing ECS E911 have contributed to this lag.[3] The NOI seeks comment on consumers' expectations regarding their ability to access 911 when calling from an ECS. Finally, we seek to identify potential ways, including standards, service and implementation best practices, and regulatory action if needed, to ensure that ECS supports direct 911 access, routing, and location and keeps pace with technological developments and consumer expectations.

II. BACKGROUND

A. History of Legacy and IP-Based Enterprise Communications Systems (ECS)

4. For many years, ECS have been widely deployed to serve large enterprises, such as businesses, hotels, educational institutions, and semi-public venues (*e.g.*, courtesy phones in airports). These systems were developed to support multiple users at individual telephone stations[4] across a single enterprise, while allowing service providers to manage the system and bill the enterprise customer as a single entity. The earliest ECS were private branch exchanges (PBXs) or Centrex systems that used circuit-switched time-division multiplexing (TDM) technology to support voice communications among

[1] Enhanced 911 service (E911) expands basic 911 service by not only delivering 911 calls to the appropriate PSAP, but also providing the call taker with the caller's call back number, referred to as Automatic Numbering Information (ANI), and automatically generated location information – a capability referred to as Automatic Location Identification (ALI). *See Framework for Next Generation 911 Deployment*, Notice of Inquiry, 25 FCC Rcd 17869, 17875, para. 13 (2010) (*NG 911 Deployment NOI*).

[2] While the Commission has previously used "MLTS" to refer to various types of multi-line systems, this term has historically denoted systems that use circuit-switched telephone technology to support enterprise voice communications. We believe continued use of the term MLTS may not capture the full array of existing and emerging IP-based enterprise systems, including cloud-based systems, that support voice (and possibly multimedia) communications. Therefore, in this NOI, we use "ECS" to refer to the full range of networked communications systems that serve enterprises, including circuit-switched and IP-based enterprise systems. Where it is necessary to distinguish varieties of ECS based on underlying technology, we use the term "legacy ECS" rather than MLTS to refer to circuit-switched ECS, and "IP-based ECS" to refer to enterprise systems that use IP-based technology, including cloud-based technology.

[3] The required E911 capabilities of wireline, wireless, and interconnected VoIP networks are summarized in Appendix A below.

[4] A telephone "station" is a telephone handset or similar customer premises equipment (CPE) intended for an individual user. Each ECS station is typically assigned a unique extension or telephone number that the ECS recognizes for directing internal traffic and inbound calls. However, outbound external calls may not have a unique identifier and therefore may be unable to transmit complete 911 information. *See Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Systems*, Report and Order and Second Further Notice of Proposed Rulemaking, 18 FCC Rcd 25340, 25366 n.207 (2003) (*E911 Scope Order*).

internal users and to connect users to the public switched telephone network (PSTN).[5] However, as communications networks have evolved from TDM to IP technology, many enterprise customers have migrated from legacy PBX and Centrex systems to IP-based ECS platforms, *e.g.*, "hybrid" PBXs and enterprise-based VoIP systems, which use VoIP to support internal communications and connect ECS users externally via IP for outbound calls (including 911 calls).[6]

5. As IP-based applications migrate to the cloud, the variety of ECS configurations is expanding to include virtual and cloud-based platforms that can serve not only individual buildings or campuses, but also decentralized and distributed groups of users (*e.g.*, corporate "virtual call centers" that connect geographically dispersed personnel to support customer service or sales activities). Many ECS end users can connect remotely to IP-based ECS from any location with IP connectivity. Thus, ECS can support increasingly diverse types of applications, including automatic call distribution for call centers; residential services in apartment buildings; shared tenant services in shopping malls; multi-location applications such as connecting schools within a school district to the administrative headquarters or telework; and voice communications for small businesses. In addition, while legacy ECS only carried voice calls, IP-based ECS is capable of supporting media beyond voice, such as message-based text or video.

6. Throughout the United States, thousands of large and small enterprises rely on ECS networks, ranging in size and complexity, serving anywhere from a handful to thousands of users.[7] While ECS comes in a wide variety of configurations, in general the principal participants that play a role in the provision of 911 in ECS are enterprise owners, ECS operators, and ECS equipment and service vendors. The enterprise owner is the purchaser of the ECS, and may be a building owner/manager, a business, or a non-profit or public institution. The ECS operator is the entity that operates and maintains the ECS, which may be the enterprise owner itself or may be a separate company that provides hosted ECS services to the enterprise owner under contract. The ECS equipment or service vendor is the entity that provides the ECS hardware or software. The vendor may be an equipment manufacturer or systems integrator that installs the system, or it may also act as the ECS operator.

7. Because ECS have evolved as private systems designed for efficient internal communication within the enterprises that use them, they have not been consistently designed to deliver E911 services in the same manner as wireline, wireless, or interconnected VoIP networks. For example, making external outbound calls from an ECS may require dialing a prefix in front of the telephone number being called, which impedes direct dialing of the digits "9-1-1" for an emergency call. When a caller places a 911 call from an ECS station, the PSAP may not receive a complete call-back number for that station, preventing the PSAP from re-establishing a connection with the caller if the initial call is cut off. The ECS also may not retain or communicate information regarding the location of the caller's

[5] Traditional PBXs were premises-based private exchange facilities typically owned and operated by the enterprise customer, and connected to the PSTN by a dedicated trunk line. Centrex was offered by many incumbent local exchange carriers (ILECs) to business customers as a hosted private exchange service with the facilities housed at the ILEC central office switch. *See* California Public Utilities Commission, Communications Division, MLTS E9-1-1 Workshop Report in Rulemaking 10-04-011 to Improve Public Safety by Determining Methods for Implementing Enhanced 9-1-1 Services for Business Customers and for Multi-line Telephone System Users at 16 (2010), http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Utilities_and_Industries/Communications_-_Telecommunications_and_Broadband/Final_MLTS_E9-1-1_Workshop_Report.pdf. (*Cal. PUC MLTS Report*).

[6] In the case of IP-based ECS, connection with the PSTN for inbound and outbound calls is typically provided via an interconnected VoIP service provider or an ILEC or competitive local exchange carrier (CLEC) affiliate. *See id*.

[7] There are over 1.2 million firms in the U.S. with more than 10 employees, a large percentage of which are likely to employ some kind of ECS to support their communications needs. *See* Small Business Administration, Statistics of U.S. Businesses, U.S. static data (2014 data), https://www.sba.gov/advocacy/firm-size-data (last visited Sept. 1, 2017).

individual ECS station, impeding the PSAP's ability to locate the caller for dispatch purposes. In some cases, the location identified in the ECS 911 call may be the enterprise owner's corporate headquarters or billing address, which may result in the call being routed to a PSAP in a different city or state from the caller's actual location.[8] In some cases, the ECS 911 call may not be accompanied by any location information at all, in which case the call is typically routed to a third-party call center rather than a PSAP.[9]

B. Previous Commission Proceedings Related to E911 Service for ECS

8. Although the Commission has previously examined the provision of 911 by ECS, it has not adopted E911 requirements for either legacy or IP-based ECS. Instead, the Commission has deferred to state and local authorities to devise the 911 obligations of ECS operators and service providers.

9. In 2003, the Commission released the *E911 Scope Order,* which clarified the technologies and services that would be required to be capable of transmitting E911 information to PSAPs.[10] The Commission found that Congress had granted it broad authority to address public safety concerns in wire and radio communications, including with respect to services that offer substantially similar wireline and wireless alternatives.[11] The Commission also concluded that ECS users expected to have access to E911 service as would any other caller.[12] However, the Commission declined to adopt E911 rules for ECS at that time, instead concluding that (1) states were in the best position to establish what steps to take to promote E911 availability, and (2) the local nature of 911 implementation supported giving states broad discretion to adopt E911 rules for ECS.[13] The Commission noted that commenters had supported NENA's original Model Legislation from 2000,[14] and found that NENA's proposal offered a flexible approach to addressing ECS implementation of E911, allowed states to adopt rules based on local conditions, and reflected their particular needs.[15] Accordingly, the Commission strongly encouraged states that had not adopted ECS E911 legislation to do so, urging consideration of NENA's Model Legislation as a valuable template for state-level rules.[16] The Commission noted that if states did not fill these gaps in implementation or inhibited the development of E911-compatible ECS, it might reconsider its decision not to implement nationwide rules.[17] Further, the Commission stated that it expected states to act expeditiously on adopting 911 requirements for ECS and committed to releasing a Public Notice one year from adoption of the *E911 Scope Order* to examine their progress.[18]

---

[8] *See* Joseph D'Eramo, Multi-Location Organizations Using VoIP Can Create a 911 Emergency (Sept. 27, 2016), https://patch.com/massachusetts/plymouth/multi-location-organizations-using-voip-can-create-911-emergency.

[9] Many ECS operators rely on third party providers to support 911 call routing. These third-party providers use remote call centers to provide "back-up" 911 service in the event that local routing of the 911 call cannot be completed. In such instances, an ECS 911 call is routed to a remote call center where a call-taker typically attempts to determine the caller's location through direct questioning of the caller. The call center operator then uses a database maintained by the call center to determine the appropriate PSAP to receive the transferred call. *See* Mark Fletcher, 911 Call Misrouted by 2,500 Miles (July 21, 2016), https://www.networkworld.com/article/3097611/data-center/911-call-misrouted-by-2500-miles.html.

[10] *E911 Scope Order*, 18 FCC Rcd at 25341, para. 1.

[11] *Id*. at 25345-47, paras. 13-17.

[12] *Id*. at 25362, para. 51.

[13] *Id*. at 25363, para. 53.

[14] *Id*. at 25365, para. 58.

[15] *Id*. at 25365, para. 59.

[16] *Id*. at 25363, para. 53.

[17] *Id*.

[18] *Id*. at 25361-62, para. 50.

10. The Commission declined in the *E911 Scope Order* to revise its Part 64 (Miscellaneous Common Carrier Rules) and Part 68 (Connection of Terminal Equipment to the Telephone Network) rules. With respect to Part 64, the Commission found that where a state requires ECS E911 implementation, section 64.3001 of the rules would require all telecommunications carriers to transmit all 911 calls to the appropriate PSAP, including the location information provided by the ECS operator. As a result, the Commission found that no amendment to Part 64 was warranted.[19] With respect to Part 68, the Commission found that uniform national standards through Part 68 amendments would not achieve actual interworking between devices and networks and that states were in a better position to establish specific technical solutions and requirements.[20]

11. In 2004 the Commission issued a Public Notice seeking comment on progress made by the states in implementing E911 solutions for ECS, in particular by states that already had promulgated regulations to address this issue.[21] The Commission also sought comment on pending proposals to address this issue and whether they were based on NENA's model legislation proposal.[22] In addition, the Commission sought comment on the extent to which carriers and others offer E911 solutions for ECS.[23]

12. NENA updated its proposed model ECS legislation for states in 2011,[24] and more recently has proposed federal model ECS legislation.[25] As revised, the Model Legislation would require operators of ECS serving residential buildings to ensure that the telecommunications system is connected to the public switched network so that calls to 911 result in "one distinctive Automatic Number Identification (ANI) and Automatic Location Identification (ALI) for each living unit."[26] It further would mandate that operators of business ECS above certain size thresholds deliver 911 calls with location information providing at a minimum the building and floor location of the caller, or an ability to direct the public safety response through the establishment of a private answering point.[27] The Model Legislation also states that the location information associated with 911 calls from ECS should be "specific enough to provide a reasonable opportunity for the emergency response team to quickly locate a caller anywhere within [that location]."[28] With respect to direct dialing of 911 from ECS, the Model Legislation notes that many ECS require a caller to dial a prefix (usually the number 9) before dialing any outgoing call, and it

[19] *Id.* at 25365, para. 60.

[20] *Id.* at 25365, para. 61.

[21] *Commission Seeks Comment About Status of State Actions to Achieve Effective Deployment of E911 Capabilities for Multi-Line Telephone Systems (MLTSs)*, Public Notice, 19 FCC Rcd 23801 (WCB 2004) (*2004 ECS Public Notice*).

[22] *Id.* at 23802.

[23] *Id.* at 23803.

[24] The modifications reflect, *inter alia*, changes in IP technology and the use of building code fire zones to help set emergency response locations. *See* NENA, Technical Requirements Document on Model Legislation, 9-1-1 for Multi-Line Telephone Systems, NENA 06-750, Version 3 at 7 (2011), https://c.ymcdn.com/sites/www.nena.org/resource/resmgr/Standards/NENA_06-750_v3_Model_Legisla.pdf (Model Legislation).

[25] *See* NENA, MLTS Model Legislation (2015), http://c.ymcdn.com/sites/www.nena.org/resource/collection/C3D071C2-FACD-41CB-A09C-354888272EF8/MLTS_2015.pdf.

[26] Model Legislation at 15.

[27] *Id*. at 16-17.

[28] *Id*. at 13 (definition of Emergency Response Location (ERL)).

provides that ECS administrators must "take all reasonable efforts to assure that potential 9-1-1 callers are aware of the proper procedures for calling for emergency assistance."[29]

13. In 2012, Congress enacted the Next Generation 911 Advancement Act of 2012, which directed the Commission to issue a public notice seeking comment on (1) the feasibility of requiring ECS manufacturers to include one or more mechanisms to provide a sufficiently precise indication of a 911 caller's location, while avoiding the imposition of undue burdens on ECS manufacturers, providers, and operators; and (2) NENA's model E911 legislation for ECS.[30] As directed by Congress, the Commission issued a public notice in 2012 seeking comment on the ability of ECS to provide improved location capabilities, including any associated costs and technical issues.[31] It also sought comment on NENA's model legislation, including NENA's recommendation that the Commission incorporate ECS E911 requirements into certain of its rules and that it take the lead in encouraging industry to develop standards for ECS E911 service.[32]

C. Review of Relevant Legislation

1. State ECS Legislation

14. The Commission noted in the *E911 Scope Order* that states have broad powers to adopt requirements regarding E911, including using their police powers to place requirements on ECS operators.[33] As of 2016, 24 states had enacted, or had pending, legislation generally requiring enterprises over a certain size or purchasing a new PBX-based ECS system to implement and activate E911 capabilities in the system.[34] Individual state laws vary as to specific E911 requirements and the entities they apply to (*e.g.*, enterprise owners, ECS operators and vendors), but many states have adopted direct 911 dialing requirements (Kari's Law)[35] and location accuracy requirements.[36] Much of the recent focus of state legislation has been on ensuring ECS delivery of more precise location information.[37]

15. In addition to those states that already have passed some form of legislation or regulations regarding the responsibility of enterprise owners and ECS operators to enable consumers to reach 911, the Commission is aware of several other states that are considering ways to address 911 access issues related to ECS. For example, Maine is considering amending its current ECS-related rules to require that any public or private entity that installs or operates an ECS ensures that it is connected to

[29] *Id*. at 19.

[30] *See* Next Generation 911 Advancement Act at § 6504(b), 126 Stat. 242.

[31] *Public Safety and Homeland Security Bureau Seeks Comment on Multi-Line Telephone Systems Pursuant to Next Generation 911 Advancement Act of 2012,* Public Notice, 27 FCC Rcd 5329, 5330-31 (PSHSB 2012) (*2012 ECS Public Notice*).

[32] *Id*. at 5332.

[33] *See E911 Scope Order*, 18 FCC Rcd at 25363-64, paras. 54, 56.

[34] 911 ETC, Current 911 MLTS Legislation, http://www.911etc.com/legislation (last visited August 21, 2017); 9-1-1 Enable, State-by-State E911 Legislation Summary at 14 (2012), http://files.meetup.com/3299882/State-E911-Legislation-Summary.pdf (*9-1-1 Enable Report*).

[35] A number of states adopted state laws requiring direct 911 dialing from ECS, commonly referred to as "Kari's Law," following the 2013 murder of Kari Dunn, whose 9-year old daughter unsuccessfully attempted to dial 911 from a hotel phone that required dialing a "9" before dialing 911.

[36] *See, e.g.*, National Conference of State Legislatures, State 911 Legislation Tracking Database, http://www.ncsl.org/research/telecommunications-and-information-technology/state-9-1-1-legislation-tracking-database.aspx (last visited August 21, 2017); *9-1-1 Enable Report* at 14; Voice Report, E911: The MLTS Problem Gets More Complicated with New Legislation and New Technology (Dec. 3, 2010), http://www.thevoicereport.com/2010-12-03/E911-MLTS.

[37] *See* Appendix B (noting that some state ECS requirements relate to improved location information).

the PSTN in such a way that 911 can be dialed without requiring any prefixes.[38] The New York State Assembly is considering a bill that would require public buildings with ECS to configure their system hardware so that any call placed to 911 is connected directly to a PSAP.[39] Other states are considering similar actions.[40] A table summarizing existing and pending state legislation requirements is attached as Appendix B.

2. Kari's Law

16. In addition to state actions, both chambers of the U.S. Congress have recently passed versions of Kari's Law that amend the Communications Act of 1934 to require ECS to have a configuration that permits users to directly initiate a call to 911 without dialing any additional digit, code, prefix, or post-fix.[41] The draft legislation also requires that ECS must be configured to notify the operator's designated central point of contact when someone initiates a call to 911 using the system. House and Senate versions of the Kari's Law Act of 2017 are currently with the House Energy and Commerce Committee for reconciliation.

III. DISCUSSION

A. State of the ECS Industry

17. As noted above, the ECS marketplace encompasses many types of legacy and IP-based systems and involves equipment manufacturers, service providers, and third party platform operators.[42] We seek comment and data on all aspects of the current state of the ECS marketplace, including the number and type of ECS equipment and service vendors; the number and type of subscribers to ECS and their usage of the service; the effect of broadband availability on ECS; the current E911 capabilities of ECS; standards that govern how ECS are offered, configured, and tested; and the effect of typical business arrangements on ECS 911 provisioning. We request that commenters include data and statistics in their submissions, as appropriate, as well as information on any trends and developments impacting ECS not otherwise covered by the questions posed here.

18. *ECS Operators and Vendors*. ECS operators and vendors offer an array of equipment and service types. In order to understand the scale of systems currently in place and the scope of potential provision of E911 by ECS, we seek information on the number and types of ECS operators and ECS equipment and service vendors, the types of ECS offered, including non-IP, IP, and hybrid systems, non-hosted and hosted arrangements, and the E911 capabilities each provides. What are the E911 capabilities of ECS desk stations and other premises equipment, including hard phones, soft-phones, and wireless devices? What types of calling features and media types beyond voice do ECS vendors offer that could support multimedia 911 communications? To what extent are the ECS in use today IP-based rather than circuit-based? How rapidly is the industry migrating from premises-based to cloud-based service offerings? To what extent are ECS operated by enterprise owners versus hosted by third-party service

[38] *See* An Act to Ensure Direct Dialing of 911 from Multiline Telephone Systems, LD 825, 128th Legis. (Maine 2017).

[39] *See* Proposed Legislation to Add Section 717-a, Direct Dialing to Public Service Answering Points, State Assembly Bill A608, 2017-18 Regular Session (New York 2017).

[40] *See, e.g.,* https://docs.legis.wisconsin.gov/2013/related/proposals/ab98.pdf 2013 Assembly Bill 98 (Wis. 2013-14) (Wisconsin ECS owners/operators must supply ALI and ANI to PSAPs); S.B. 72, 2010 Gen. Sess. (Utah 2010) (proposing, *inter alia,* that Utah ECS be capable of accessing 911 directly, without use of prefix).

[41] On January 23, 2017, the U.S. House of Representatives unanimously passed Kari's Law Act of 2017. *See* Kari's Law Act of 2017, H.R. 582, 115th Cong. (2017). The U.S. Senate passed a similar bill on August 3, 2017. *See* Kari's Law Act of 2017, S. 123, 115th Cong. (2017).

[42] *See supra* para. 5.

providers? We also seek comment on requirements for the manufacture, importation, sale, installation, configuration, and maintenance of ECS equipment.

19. *Subscribers, Total Connections, and Usage*. To help the Commission understand the extent to which consumers might rely on ECS for calls to 911, we seek information on the type and number of subscribers, businesses, enterprises, and other entities employing legacy and IP-based ECS, including whether such subscribers are using premises-based or cloud-based systems. We also seek information on the total number of individual telephone numbers associated with ECS, as well as data on the percentage of 911 traffic originating from ECS. The 2016 National 911 Progress Report issued by the National Highway Traffic Safety Administration (NHTSA) contains data from 11 states on the total number of incoming 911 calls from ECS.[43] Are there additional data on the number and frequency of ECS-originated 911 calls? Do PSAPs track ECS calls separately from wireline, wireless and VoIP 911 calls? How frequently do ECS 911 calls get routed to a non-local PSAP or a backup center? How many entities operate ECS where service footprints may extend across city, county, or state lines and/or service multiple locations or campuses, potentially making information collection more challenging? Are there data on the number and consequences of failed 911 calls from ECS? Are there data about 911 calls placed from settings frequented by more transient occupants, such as hotels, airports, or educational institutions?

20. *Broadband Access, Teleworking, and Smart Buildings*. Does the availability of broadband service affect the deployment and reliability of IP-based ECS? What impact, if any, do smart buildings with distributed antenna systems (DAS), advanced Ethernet switches, and ubiquitous Wi-Fi coverage have on the provision of IP-based ECS E911 service? What is the impact on E911 connectivity of teleworking arrangements in which an employee working at home uses ECS equipment or services provided by his or her employer? Will an increase in broadband access likely lead to an increase in the deployment of ECS?

21. *E911 Capabilities of ECS*. We seek comment on the existing E911 capabilities of the various ECS available today. To what degree do ECS enable and support direct access to 911, routing to the correct PSAP, and the provision of accurate location information about the end user? How frequently and under what circumstances are 911 calls originating from an ECS dropped, misrouted, or delayed because location information was not provided to properly route the call? During hurricanes and other natural disasters, do ECS services face technical challenges different from those faced by other systems trying to reach 911?

22. How precise should location information be when a caller uses ECS to attempt to reach 911? In the case of an office building or multi-unit dwelling, should ECS provide the precise location of the office or apartment from which the ECS call was made? How frequently is location information provided with ECS 911 calls insufficient to ensure that emergency services will be dispatched to the actual location of the call? In what ways, if any, are the E911 capabilities and limitations of IP-based systems or cloud-based systems different from those of legacy circuit-based systems? Are newly-deployed systems typically using extensions or direct-dial (10-digit) phone numbers? How do VoIP-based ECS differ in terms of technology from carrier or over-the-top (OTT) interconnected voice services? Are there any technical barriers that would need to be addressed to enable ECS to provide E911 service, or more reliable or accurate E911 service, to all end users?

[43] *See* National Highway Traffic Safety Administration (NHTSA), 2016 National 911 Progress Report at 23 (2016), https://www.911.gov/pdf/National-911-Program-2016-ProfileDatabaseProgressReport-120516.pdf. For the 11 states that reported data, the total number of incoming 911 calls from ECS was 1,549,199. Comparison of data from the 2015 National 911 Progress Report shows that in California, the number of incoming calls from ECS increased from 563,178 to 674,719. *See id*; National Highway Traffic Safety Administration (NHTSA), 2015 National 911 Progress Report at 19 (2016), https://www.911.gov/pdf/National-911-Program-2015-ProfileDatabaseProgressReport-021716.pdf.

23. We also seek comment on the role of onsite emergency or security personnel in ECS configurations. To what extent are ECS configured so that 911 calls are routed solely to an answering point within the enterprise, such as a campus police station or facility guard desk? To what extent are ECS configured to route calls to an external emergency answering point but also to notify an onsite emergency contact? What are the advantages and disadvantages of these configurations, and what safeguards or best practices should be followed with them?

24. We also seek information on alternative 911 call handling and fallback mechanisms in use or available for ECS. In particular, we seek comment on the reliance by ECS on remote call centers that receive and process 911 calls when the call does not include sufficient location information to route the call automatically to the nearest PSAP. In those circumstances, ECS 911 calls may be transferred to a remote call center located in a different state or even outside the United States.[44] Call takers at these centers attempt to identify the physical location of the caller by asking the caller questions about his or her location. Once the call center has enough information, it attempts to route the call to the appropriate PSAP. We seek comment on how many remote call centers provide these 911 fallback services. What is the volume of 911 calls received by such call centers from ECS, and how does this volume compare to calls received from non-ECS networks?

25. We also seek comment on the practices that apply at these call centers for processing 911 calls, obtaining information about the caller's location, and re-routing such calls. Are there best practices or standards that apply to these functions? Are there differences in the processing of 911 calls between remote call centers located in the U.S. and call centers located outside the U.S.? What data is available to remote call centers to assist in identifying the caller's location? What percentage of calls received by remote call centers require an oral conversation with the caller to determine the caller's location? Once location information has been obtained, what procedures and policies do remote call centers follow to identify the appropriate PSAP to receive the call? Do remote call centers maintain their own PSAP routing databases or do they rely on routing data provides by others? Are there other fallback mechanisms besides remote call centers that can be used to redirect ECS 911 calls that lack routing information? For example, if IP-based or cloud-based 911 services suffer an outage, can ECS emergency calls be redirected to legacy telephone lines at each business location and processed as basic 911 calls?

26. Some cloud-based VoIP providers appear to support 911 for enterprise customers.[45] Do these cloud-based VoIP providers provide location information for individual stations in the ECS and, if not, are they capable of doing so? If they provide location information, is it based on registration of the location, either by the enterprise owner or the end user? Do any of these (or other) cloud-based VoIP providers provide ECS end user location information automatically without relying on registration? Is it technically feasible to do so and, if so, how? Are there mechanisms that can enable ECS automatically to

[44] For example, Northern911 operates a call center in Canada that receives 911 calls from VoIP providers from throughout North America that cannot be routed directly to a PSAP. When Northern911 receives the call, the call-taker attempts to obtain location information from the provider or, if necessary, directly from the caller. Once Northern911 verifies the physical location of the caller, it transfers the call to the appropriate PSAP. *See* Northern911, VoIP Services, http://www.northern911.com/911-services/voip-911services/ (last visited Sept. 22, 2017). Similarly, West Corporation operates an Emergency Call Response Center (ECRC) that offers VoIP emergency routing services for "unprovisioned and failover 9-1-1 calls." West notes that dispatchers at the ECRC orally confirm the caller's location and transfer the call to the appropriate PSAP. *See* West Corporation, Emergency Routing Service Data Sheet, http://safety.west.com/safety-services/enterprise/ERS.pdf (last visited Sept. 22, 2017). *See also* Mark Fletcher, 911 Call Misrouted by 2,500 Miles (July 21, 2016), https://www.networkworld.com/article/3097611/data-center/911-call-misrouted-by-2500-miles.html (discussing the role of emergency call response centers).

[45] *See, e.g.*, Top 10 Best Business VoIP, Top Cloud Phone Systems for VoIP of 2017, http://www.top10bestvoipproviders.com/cloud-phone-system (last visited Sept. 1, 2017); RingCentral, RingCentral Emergency Services, https://www.ringcentral.com/legal/emergency-services.html (last visited Sept. 1, 2017).

generate, update, and authenticate location information for end user locations? For example, could ECS leverage in-building location information from existing or future databases such as the National Emergency Address Database (NEAD)?[46]

27. We also seek comment on the capability of ECS to provide accessible emergency communications. To what extent do ECS currently support 911 communication for people who are deaf, hard of hearing, deaf-blind, or have a speech disability? What is the potential for future ECS to support accessible communications media, such as real-time text (RTT)?[47]

28. *Standards*. We also seek comment on current accepted industry standards for ECS E911 delivery. The NENA Model Legislation suggests that standards work is needed, particularly for small ECS.[48] We seek comment on this observation as it pertains to both legacy and IP-based ECS. Are there other areas where industry standards are still in development or areas where standards development has not been initiated? How do ECS standards or their practical implementation differ from those used for VoIP systems? We also seek comment on the technological solutions current ECS use to support E911 calling, including signaling architecture and protocols designed to produce an automatic display of caller information and location at the PSAP. Are there industry standards governing interconnection between ECS operators and telecommunications or broadband service providers? Are there standard tests or other procedures that ECS vendors use to ensure equipment and services are providing E911 to PSAPs prior to initiation of service? We also seek information on any testing procedures ECS operators use to test 911 connectivity when they add new telephone numbers to existing services. Finally, we seek comment on any related standards that might affect the provision of E911. For example, what role, if any, do state or local fire codes play in annual testing of ECS?

29. *Business Arrangements*. The Commission also seeks comments that will provide insight into the typical commercial arrangements for provision of ECS and their impact on the ability of ECS to provide reliable E911 access. Are there specific business or contractual relationships that make it harder or easier for ECS to provide E911 service? What are the typical responsibilities of ECS operators vis-a-vis carriers, enterprise owners, and end users (e.g., employees or consumers)? Are there gaps in accountability or liability issues that impede the provision of E911 service? Have cost considerations led to an increase in ECS over time? What cost savings are realized by ECS? How do ECS costs in states with E911 regulations or commonly used best practices compare to costs in other states?

30. *Next Generation 911 (NG911) Capabilities of ECS*. We also seek comment on the impact of the IP-based NG911 transition on ECS.[49] Will ECS 911 communications be affected as PSAPs transition from legacy 911 to NG911 operations and, if so, how? Do current legacy or IP-based ECS have the capability to deliver 911 traffic, and associated call-back and location information, to ESInets or NG911-enabled PSAPs? If not, what transitional steps are needed for ECS to develop that capability, and what is the cost of those transitional steps?

[46] The NEAD is a national database being developed by the major wireless carriers that will use media access control (MAC) addresses and Bluetooth Public Device Addresses (BT-PDA) of fixed indoor access points to determine the specific indoor location of wireless 911 callers. *See infra* para. 31.

[47] *See Transition from TTY to Real-Time Text Technology et al.*, Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd 13568 (2016).

[48] *See* Model Legislation at 18.

[49] *See NG 911 Deployment NOI*, 25 FCC Rcd at 17877, para. 18 (noting that NG911 relies on IP-based architecture rather than the PSTN-based architecture of legacy 911 to provide an expanded array of emergency communications services and functionality, including the ability to process emergency calls that include non-voice (multimedia) messages and the ability to acquire and integrate additional data useful to call routing and handling).

31. *Indoor Location Accuracy*. In 2015, the Commission revised 911 location accuracy requirements for wireless providers to improve location of wireless 911 calls from indoor locations.[50] In connection with this, the national wireless carriers have committed to designing and building the NEAD, a national database of media access control (MAC) addresses and Bluetooth Public Device Addresses (BT-PDA) of fixed indoor access points (e.g., Wi-Fi and Bluetooth) that will be used to determine the specific indoor location of wireless 911 callers.[51] We seek comment on whether MAC addresses associated with ECS could be entered in the NEAD and used to help improve indoor 911 location accuracy for ECS. What, if any, impediments exist to using the NEAD for improved location accuracy for ECS?

B. Costs and Benefits of Supporting E911

32. We seek information on the costs of provisioning ECS to support E911 access, routing, and location. Who bears these costs and how are they apportioned in the marketplace? How do the costs differ for legacy systems as opposed to IP-based systems, as well as for hosted as opposed to non-hosted systems? Are the costs greater in non-urban areas and, if so, why and to what extent? Is the magnitude of costs likely to impact enterprise owners' decisions to use ECS as a cost-saving substitute for multiple unique lines? How will the transition to NG911 affect the costs of provisioning ECS to support E911? NENA has noted that ECS operators have an economic incentive to comply with E911 requirements as part of their risk management considerations.[52] We ask commenters to provide specific examples of such incentives. For example, do liability insurers provide incentives for enterprise owners that implement E911 capabilities? We also ask commenters to demonstrate the effectiveness of this incentive by comparing E911 access, routing, and location in states that have legislation and/or regulations mandating some form of E911 service by ECS to those states that do not. In the states that have E911 legislation and/or regulations for ECS, is there any evidence that the cost of complying with the legislation has had a substantial adverse effect on the purchase and deployment of new ECS?

33. We seek comment on whether improving access to E911 in an ECS environment can improve the speed at which emergency personnel and services can reach the caller, with a resulting improvement in the health and safety of the caller, and the magnitude of this presumed benefit. How common are failed 911 calls from ECS? Are there data on the speed of emergency response for states with and without legislation or regulation requiring E911 access in ECS? Given the state of ECS technology, how much of a speed increase can we reasonably expect in the future? Are there other benefits that have accrued or could accrue in those places where E911 access is available in ECS? Are there any ECS environments, e.g., very small facilities, that would not benefit from additional E911 information?

34. *Consumer Expectations*. Consumer expectations are very important in emergency situations. We seek comment, on what expectations consumers may have when calling 911 from an ECS station. Given that the emergency number 911 is one of the most ubiquitous fixtures in the American public safety landscape, do consumers expect that 911 calls from an ECS will be quickly routed to the correct PSAP and that help will be promptly dispatched to the caller's location? Are consumers aware of different steps in calling 911 (depending on environment), the difference in type and depth of information callers may have to give to the 911 call taker, and other unique requirements that may apply in an ECS environment?

---

[50] *See Wireless E911 Location Accuracy Requirements*, Fourth Report and Order, 30 FCC Rcd 1259 (2015) (*Indoor Location Fourth Report and Order*) and rules at 47 CFR § 20.18(i) *et seq*. The four national wireless carriers are AT&T, Sprint, T-Mobile, and Verizon. *See Indoor Location Fourth Report and Order*, 30 FCC Rcd at 1260, para. 5.

[51] *See Indoor Location Fourth Report and Order*, 30 FCC Rcd at 1279-87, paras. 54-73.

[52] *See* Model Legislation at 22.

35. In many instances, consumers in office buildings, campus, hotel and other enterprise environments have access to their personal wireless phones as well as to ECS facilities. In such circumstances, what impact, if any, does the availability of wireless phones have on consumer decisions whether to use ECS or wireless to make a 911 call? Are consumers aware that there may be differences in how an ECS 911 call is treated when compared to a wireless 911 call? Are consumers more likely to use wireless phones to call 911 in hotel or business environments due to uncertainty regarding the ability to access 911 from ECS facilities in those environments? We seek comment on the extent to which consumers might know that within an ECS environment, the ability to dial 911 directly, and have that call received by a PSAP, is not universal. We also are interested in consumer expectations for 911 location accuracy in the context of an ECS environment. For example, when calling 911 via ECS from a multistory building, what, if any, information do callers expect the PSAP to receive identifying the floor and room in which the call originated? Are there unique issues that persons with disabilities may encounter when calling from an ECS environment?

C. Updating the Record on Options

36. In the *E911 Scope Order*, the Commission expressed concern that the lack of effective implementation of ECS E911 could create an unacceptable gap in the emergency call system and have a deleterious effect on public safety.[53] Nevertheless, the Commission concluded that state and local governments were better positioned to devise rules to ensure effective E911 deployment over multi-line telephone systems in their jurisdictions.[54] The Commission stated that it might reconsider its decision not to implement national ECS rules if states failed to fill existing gaps in E911 implementation.[55]

37. We seek to update the record on the extent to which the states have passed statutes or implemented rules that require ECS operators to provide E911. As the Commission sought in its 2004 *Public Notice* on this subject, we specifically ask commenters to identify and discuss relevant state activity by: (1) citing particular statutes or regulations, or proposed statutes or regulations; (2) identifying any corresponding state web page or other materials where these activities are presented or discussed; (3) identifying the date any final legislative or regulatory action became effective or is expected to become effective; (4) discussing any requirements placed on carriers, ECS equipment manufacturers, enterprise owners, ECS operators, or any other persons; and (5) discussing how the statute and/or regulation is enforced.[56] How has model legislation such as NENA's proposal influenced the states' approaches to this issue? Have any states passed statutes or implemented rules that have served to inhibit the development or deployment of E911 for ECS? Are there differences between the states' approaches to E911 implementation that have created challenges for enterprise owners, ECS operators, or any other parties that have taken steps to implement ECS E911 nationwide? If so, describe those challenges and the actions that enterprise owners, ECS operators, or others are taking to address them.

38. Does it continue to be the case, as the Commission found in the *E911 Scope Order*,[57] that the unique needs and circumstances of residential and business ECS users are suited to state-level action? Have there been developments in technology, operations, industry standards, or public expectation that cause commenters to conclude that the public would find greater benefit in federal rules that facilitate the effective and uniform deployment of E911? How have the statutes or regulations in question been tailored to address special circumstances within each state's jurisdiction? How important is it for the E911 capabilities of ECS to be uniform on a nationwide basis? Is such uniformity important for all aspects of E911 (access, routing, and location)? Is there a particular state that should serve as a guide to

[53] *E911 Scope Order*, 18 FCC Rcd at 25361, para. 50.

[54] *Id.*

[55] *Id.* at 25363, para. 53.

[56] *See 2004 ECS Public Notice*, 19 FCC Rcd at 23803.

[57] *E911 Scope Order*, 18 FCC Rcd at 25364, para. 55.

possible federal regulation? On the other hand, has the variety of state regulation proven that this should remain a state issue?

39. We also seek comment on any action that we should consider to encourage voluntary implementation of E911 for ECS. What roles, if any, should voluntary best practices or voluntary technical or operational standards play in supporting access to E911 for ECS users? To what extent do best practices and voluntary standards exist today? If best practices or voluntary standards exist, to what extent are they adhered to by ECS manufacturers and operators? Have these existing practices or standards proven effective? Have any states acted to establish voluntary best practices or technical or operational standards that support access to E911 for ECS users? If so, have such best practices and standards proven effective?

40. Should additional voluntary best practices or voluntary technical or operational standards be established to support access to E911 for ECS? By which entities, and via what processes, should such best practices or standards be established, and who should monitor their implementation? What role, if any, should the Commission play in the creation of such standards or practices?[58] What specific issues should standards resolve?

41. What goals should best practices or standards aim to accomplish? Are there any incentives that the Commission or other government agencies could provide to encourage the implementation of E911 over ECS? Are there any differences in the motivations of ECS owners, ECS vendors, and ECS operators that the Commission should consider when exploring ways to encourage the implementation of E911 over ECS? Are there any technical or regulatory barriers to implementation of E911 for ECS? If so, what action, if any, could the Commission or other government agencies take to address them?

42. We seek comment on whether we should continue to refrain from adopting rules requiring ECS implementation of E911. Do significant gaps currently exist in the 911 system due to failures to effectively implement E911 for ECS? Can these gaps be observed in any states that have previously addressed this issue by statute or regulation? What harms to life and property have arisen from any such gaps in the 911 system? To what extent have enterprise owners and/or ECS operators voluntarily implemented E911, despite the lack of a state or local mandate? Are such implementations more common in some settings, e.g., college campuses or hotels, than in others? Commenters should specify how such owners or ECS operators implemented E911, the experience of PSAPs in receiving E911 calls from these systems, the strengths and shortfalls of these implementations, and whether these implementations are achievable by all ECS providers nationwide. In its Model Legislation, NENA advises that unless state regulators mandate 911 system upgrades for ECS, uniform 911 support, especially in non-urban areas, could take a long time.[59] How rapidly are ECS acquiring E911 capability in states that have not adopted legislation? Have urban areas implemented ECS E911 capability more rapidly than non-urban areas? If so, what has given rise to this difference?

43. If significant gaps in the 911 system caused by ECS remain unaddressed, what actions should the Commission consider to close these gaps? In the *E911 Scope Order*, the Commission found that it had jurisdiction to adopt 911 rules "for both wire and radio communications" and cited, *inter alia*, the Wireless Communications and Public Safety Act of 1999.[60] The Commission declined, however, to address the question whether it had authority to adopt E911 requirements for ECS operators or equipment

[58] *See* Model Legislation at 19.

[59] *Id*. at 23.

[60] *See E911 Scope* Order, 18 FCC Rcd at 25346, para. 13 (citing Wireless Communications and Public Safety Act of 1999, Pub. L. No. 106-81, 113 Stat. 1286, codified at 47 U.S.C. §§ 222, 251(e)).

manufacturers.[61] We seek comment on any statutory provisions that grant the Commission authority to adopt rules that would apply to enterprise owners, ECS operators (including hosted service providers), and ECS vendors or equipment manufacturers.[62] If the Commission has such authority, we seek comment on whether it should consider proposing rules to address existing shortfalls and, if so, what those rules should require. Should the Commission consider updating or streamlining any existing rules to better support implementation of E911 for ECS? For example, are the Commission's existing 911 rules for interconnected VoIP providers,[63] commercial mobile services,[64] and telecommunications carriers suited,[65] in whole or in part, to be applied to IP-based, cloud-based, and legacy ECS systems? If not, what updates could be made to those rules for them to be effective in an ECS environment? Alternatively, should the Commission consider developing a new regulatory classification and corresponding set of 911 rules for ECS?

IV. PROCEDURAL MATTERS

A. Ex Parte Rules

44. This proceeding shall be treated as a "permit-but-disclose" proceeding in accordance with the Commission's *ex parte* rules.[66] Persons making *ex parte* presentations must file a copy of any written presentation or a memorandum summarizing any oral presentation within two business days after the presentation (unless a different deadline applicable to the Sunshine period applies). Persons making oral *ex parte* presentations are reminded that memoranda summarizing the presentation must (1) list all persons attending or otherwise participating in the meeting at which the *ex parte* presentation was made, and (2) summarize all data presented and arguments made during the presentation. If the presentation consisted in whole or in part of the presentation of data or arguments already reflected in the presenter's written comments, memoranda or other filings in the proceeding, the presenter may provide citations to such data or arguments in his or her prior comments, memoranda, or other filings (specifying the relevant page and/or paragraph numbers where such data or arguments can be found) in lieu of summarizing them in the memorandum. Documents shown or given to Commission staff during *ex parte* meetings are deemed to be written *ex parte* presentations and must be filed consistent with Rule 1.1206(b). In proceedings governed by Rule 1.49(f) or for which the Commission has made available a method of electronic filing, written *ex parte* presentations and memoranda summarizing oral *ex parte* presentations, and all attachments thereto, must be filed through the electronic comment filing system available for that proceeding, and must be filed in their native format (*e.g.*, .doc, .xml, .ppt, searchable .pdf). Participants in this proceeding should familiarize themselves with the Commission's *ex parte* rules.

---

[61] *Id*. at 25367, para. 63; *see also id*. at n.216 (declining to address whether the Commission has jurisdiction over ECS operators).

[62] For example, the Twenty-First Century Communications and Video Accessibility Act of 2010 provides that the Commission has authority to promulgate regulations implementing the recommendations of the Emergency Access Advisory Committee (EAAC). *See* Twenty-First Century Communications and Video Accessibility Act of 2010, Pub. L. No. 111-260, 124 Stat. 2751, 2764, § 106(g) (2010) (codified at 47 U.S.C. 615c(g)). The EAAC has recommended that the FCC base its regulations for 911 accessibility on the assumption that users can only effectively call 911 using the same devices, solutions, features, or programs that they use daily for communication where there is a reasonable expectation that emergency communications will be supported. Emergency Access Advisory Committee, Emergency Access Advisory Committee (EAAC) Report and Recommendations at 33 (Recommendation T4.1, "Familiarity") (2011), https://apps.fcc.gov/edocs_public/attachmatch/DOC-312161A1.pdf.

[63] 47 CFR §§ 9.1 *et seq.*

[64] 47 CFR §§ 20.18 *et seq.*

[65] 47 CFR §§ 64.3001 *et seq.*

[66] 47 CFR §§ 1.1200 *et seq.*

B. Comment Filing Procedures

45. Pursuant to Sections 1.415, 1.419 and 1.430 of the Commission's rules, 47 CFR §§ 1.415, 1.419, 1.430, interested parties may file comments and reply comments on or before the dates indicated on the first page of this document. Comments may be filed using the Commission's Electronic Comment Filing System (ECFS). *See Electronic Filing of Documents in Rulemaking Proceedings*, 63 FR 24121 (1998).

- Electronic Filers: Comments may be filed electronically using the Internet by accessing the ECFS: https://www.fcc.gov/ecfs/.

- Paper Filers: Parties who choose to file by paper must file an original and one copy of each filing. If more than one docket or rulemaking number appears in the caption of this proceeding, filers must submit two additional copies for each additional docket or rulemaking number.

  Filings can be sent by hand or messenger delivery, by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail. All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission.

  - All hand-delivered or messenger-delivered paper filings for the Commission's Secretary must be delivered to FCC Headquarters at 445 12th St., SW, Room TW-A325, Washington, DC 20554. The filing hours are 8:00 a.m. to 7:00 p.m. All hand deliveries must be held together with rubber bands or fasteners. Any envelopes and boxes must be disposed of before entering the building.

  - Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9050 Junction Drive, Annapolis Junction, MD 20701.

  - U.S. Postal Service first-class, Express, and Priority mail must be addressed to 445 12th Street, SW, Washington DC 20554.

- People with Disabilities: To request materials in accessible formats for people with disabilities (braille, large print, electronic files, audio format), send an e-mail to fcc504@fcc.gov or call the Consumer & Governmental Affairs Bureau at 202-418-0530 (voice), 202-418-0432 (tty).

- Availability of documents: Comments, reply comments, and *ex parte* submissions will be publicly available online via ECFS.[67] These documents will also be available for public inspection during regular business hours in the FCC Reference Information Center, which is located in Room CY-A257 at FCC Headquarters, 445 12th Street, SW, Washington, DC 20554. The Reference Information Center is open to the public Monday through Thursday from 8:00am to 4:30pm and Friday from 8:00am to 11:30am.

C. Contact Person

46. For further information about this proceeding, please contact Timothy May, FCC Public Safety and Homeland Security Bureau, Room 7-A727, 445 12th Street, S.W., Washington, D.C. 20554, (202) 418-1463, Timothy.May@fcc.gov.

[67] Documents will generally be available electronically in ASCII, Microsoft Word, and/or Adobe Acrobat.

V. ORDERING CLAUSE

47. Accordingly, IT IS ORDERED that, pursuant to the authority contained in Sections 1, 4(i), 4(j), 4(o), 251(e), and 403 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 151, 154(i), 154(j), 154(o), 251(e), and 403, this Notice of Inquiry **IS ADOPTED.**

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch
Secretary

APPENDIX A

Required E911 Capabilities of Wireline, Wireless, and Interconnected VoIP Services

1. As additional background for our consideration of the provision of E911 by ECS, we provide below an overview of how 911 calls over wireline, wireless, and interconnected VoIP networks are handled, and summarize the Commission's E911 rules for each of these networks.

2. *Wireline E911 Service*. Wireline E911 service is generally provided by incumbent local exchange carriers (LECs) serving their local PSAP jurisdictions.[1] The Commission's 911 rules require wireline carriers to deliver all 911 calls to the appropriate PSAP, to a designated statewide default answering point, or to an appropriate local emergency authority.[2] Wireline carriers accomplish this by use of selective routers to receive 911 calls from LEC central offices over dedicated trunks. When a wireline 911 call is delivered to a selective router, a query is sent to a selective routing database (SRDB) maintained by the LEC to determine which PSAP serves the caller's geographic area. The selective router then forwards the call, along with the caller's phone number (i.e., Automatic Numbering Identification, or ANI) to the PSAP that serves the caller's area. The PSAP in turn submits the caller's ANI to an Automatic Location Identification database (ALI database), which communicates the caller's physical address to the PSAP. This address information is typically highly reliable because it has previously been verified by comparison to the Master Street Address Guide (MSAG) for the jurisdiction.[3]

3. *Wireless E911 Service*. The mobility of wireless handsets means that routing wireless 911 calls and providing accurate location information poses challenges for wireless providers not faced by wireline providers. To address the challenge of location identification for wireless 911 calls, the Commission implemented wireless E911 requirements in two phases. Pursuant to the Phase I rules, wireless carriers are required to provide the PSAP with a call back number for the wireless handset placing the 911 call and report the location of the cell site or base station that received the call.[4] Under the Phase II rules, wireless carriers must provide ALI consisting of the caller's approximate longitude and latitude coordinates to PSAPs that have the capability to receive Phase II information.[5] In 2015, the Commission adopted rules to increase the accuracy of ALI for both indoor and outdoor wireless 911 calls by requiring wireless carriers to provide (1) latitude and longitude coordinates ("x/y" location) within 50 meters, or (2) dispatchable location, for increasing percentages of wireless 911 calls within stated timeframes.[6] The rules also set timeframes for wireless carriers to include vertical (z-axis) location information as part of ALI.[7]

---

[1] *See NG 911 Deployment NOI*, 25 FCC Rcd at 17875, para. 14.

[2] 47 CFR § 64.3001.

[3] *NG 911 Deployment NOI*, 25 FCC Rcd at 17875, para. 14.

[4] *Id*. at 17876, para. 15. *See also* 47 CFR § 20.18(d).

[5] *See* 47 CFR § 20.18(e). According to NENA, in 2017 99 percent of PSAPs nationwide, serving 98 percent of the U.S. population, have some Phase II capability. *See* National Emergency Number Association, 9-1-1 Statistics (2017), http://www.nena.org/?page=911Statistics. NENA notes that in order for any carrier to provide Phase II service, the county or PSAP must be capable of receiving the service. According to NENA, in most cases where the county or PSAP is Phase II-capable, all carriers serving the county or PSAP have implemented Phase II, but in some instances one or more carriers may be in the process of completing the implementation. *Id*.

[6] *See Indoor Location Fourth Report and Order*; *see also* 47 CFR § 20.18(i) et seq. "Dispatchable location" is "a location delivered to the PSAP by the CMRS provider with a 911 call that consists of the street address of the calling party, plus additional information such as suite, apartment or similar information necessary to adequately identify the location of the calling party. The street address of the calling party must be validated and, to the extent possible, corroborated against other location information prior to delivery of dispatchable location information by the CMRS

(continued….)

4. *Interconnected VoIP E911 Service*. Since 2005, the Commission has required interconnected VoIP providers to transmit all 911 calls to the appropriate PSAP, and to provide PSAPs with the caller's call back and location information.[8] To enable the routing and location of VoIP 911 calls, interconnected VoIP providers require their subscribers to provide a registered location, which is typically a street address that is either entered manually or derived from the subscriber's billing record.[9] When a VoIP subscriber makes a 911 call, the VoIP provider uses the subscriber's registered location to query a database that determines which PSAP should receive the call from that location, and then delivers the call to the LEC whose selective router serves that PSAP. The VoIP provider also delivers the subscriber's call-back number and registered location information to the PSAP.

(Continued from previous page)
provider to the PSAP." 47 CFR § 20.18(i)(1)(i); *see also Indoor Location Fourth Report and Order*, 30 FCC Rcd at 1273-74, paras. 43-44.

[7] 47 CFR § 20.18(i)(2)(ii).

[8] 47 CFR § 9.5(b). *See IP-Enabled Services; E911 Requirements for IP-Enabled Service Providers*, First Report and Order and Notice of Proposed Rulemaking, 20 FCC Rcd 10245, 10269-70, para. 42 (2005), *aff'd sub nom. Nuvio Corp. v. FCC*, 473 F.3d 302 (D.C. Cir. 2006). The Commission's rules define interconnected VoIP service as a service that (1) enables real-time, two-way voice communications; (2) requires a broadband connection from the user's location; (3) requires Internet protocol-compatible customer premises equipment (CPE); and (4) permits users generally to receive calls that originate on the public switched telephone network and to terminate calls to the public switched telephone network. 47 CFR § 9.3.

[9] *See* 47 CFR § 9.5(d)(1)-(2).

APPENDIX B

Existing State E911 ECS Requirements

State	Citation	Description of Existing State Rules
AK	AS 29.35.134. Multi-Line Telephone Systems.	A municipality may require ECS operators to provide enhanced 911 service.
AR	Ark. Code Ann. § 12-10-303 (1997)	ECS operators must deliver to the PSAP the phone number and street address of any telephone used to place a 911 call.
CO	Sec. 1. 29-11-100.5, Colorado Revised Statutes	ECS operators shall provide written information to their end-users describing the proper method of dialing 911, when dialing an additional digit prefix is required. ECS operators that do not give the ANI, the ALI, or both shall disclose this in writing to their end-users and instruct them to provide their telephone number and exact location when calling 911.
CT	CT Stat. § 28-25b	A private company, corporation or institution may provide private 911 service to its users, provided it has adequate resources, the approval of the Office of State-Wide Emergency Telecommunications and the municipality in which it is located, and a qualified private safety answering point.
FL	Section 365.175, Florida Statutes 2009 365.175	All PBX systems installed after January 1, 2004 must be able to provide station-level ALI data to the PSAP.
IL	50 ILCS 750/15.5 *et seq.*	Private residential switch service providers must identify the telephone number, extension number, and the physical location of a 911 caller to the PSAP. Private business switch service providers must provide ANI and ALI data for each 911 call, and must not require the dialing of an additional digit prefix (systems installed after July 1, 2015).
KY	65.752 Requirements for enhanced 911 emergency service	Residential private switch telephone service providers located in E911 capable areas must provide ANI and ALI data for each 911 call, and must provide ALI that includes the street address, plus an apartment number or floor, if applicable.
LA	RS 33:9110	PBX systems installed after January 1, 2005, must be capable of providing station-level ALI data to the PSAP.
ME	25 MRSA §2934	Residential ECS providers must deliver a distinct ANI and ALI for each living unit to the PSAP. Business ECS providers must deliver ANI and ALI to the PSAP; specific ALI data requirements are outlined. Also includes requirements for hotels/motels, exemptions and guidelines to establish a private emergency answering point.
MD	H.B. 1080	ECS operators must not require the dialing of any additional digits to access 911 as of December 31, 2017.
MA	560 CMR 4.00 et seq.	All new or substantially renovated ECS must route emergency calls to the appropriate PSAP and provide an ANI and ALI for every 911 call. The level of detail required for ALI data and exemptions are outlined as well.

State	Citation	Description of Existing State Rules
MI	MCL 484.901 et seq.	Providers of private switch equipment or services for businesses are required to ensure their system provides ANI and ALI for all 911 calls, no later than December 31, 2019.
MN	MN 403.15	Operators of ECS purchased after December 31, 2004 must ensure that their system provides ANI and ALI for each 911 call. Residential ECS should provide one distinctive ANI and one distinctive ALI per residential unit. Location identification requirements for businesses are outlined. Also includes requirements for hotels/motels, schools, exemptions and guidelines to establish a private emergency answering point.
MS	MS SEC. 19-5-359	Service providers must provide callers with access to the appropriate PSAP. Anyone operating a shared tenant service is required to provide the ANI and ALI for each 911 call made from any extension.
NH	RSA 106:H-8	Telephone and VoIP service providers, as well as hotels, motels, hospitals, universities and potentially others, must deliver the 911 call with the ANI to the appropriate PSAP
OK	S.B. 112	Business owners or operators using VoIP service must allow a 911 call on the system to directly access 911 without an additional code, digit, prefix, postfix, or trunk-access code, and must provide a notification to a central location when someone on their network dials 911. Effective January 1, 2017.
PA	35 PCS 5302 et seq.	Shared residential ECS operators must deliver 911 calls to the PSAP with one distinctive ANI and ALI for each living unit. Business ECS operators must deliver the 911 call with an ANI and ALI detailed to the building and floor location of the caller, or must establish a private emergency answering point.
TX	TX Health and Safety Code, Ch. 771a	ECS operators who serve residential users and facilities must provide the same level of 911 service as received by other residential users in the same regional plan area, including ANI. Business owners or operators using VoIP service must allow a 911 call on the system to directly access 911 without an additional code, digit, prefix, postfix, or trunk-access code, and must provide a notification to a central location when someone on their network dials 911. Tarrant County, Texas, requires that ECS providers offering residential or commercial service to non-affiliated businesses must provide the level of 911 service as required under the appropriate regional plan. Businesses must provide the PSAP with ANI and ALI data for each 911 call.
UT	Utah Code Secs. 53-10-601 et seq.	Requires certain multi-line telephone systems to provide certain information to a public safety answering point; requires a multi-line telephone system to be capable of accessing 911 services directly.
VT	30 V.S.A. § 7057	Privately-owned telephone system operators must provide ANI signaling and station-level ALI data to the PSAP.

State	Citation	Description of Existing State Rules
VA	VA Code § 56-484.14	ECS providers must ensure that an emergency call placed from any telephone is delivered to the PSAP with ANI and ALI, or an alternative method of providing call location information.
WA	RCW 80.36.560, RCW 80.36.555	Residential service providers must ensure that an emergency call placed from any caller is delivered to the PSAP along with a unique ALI for their unit. Business service providers must ensure that an emergency call placed from any caller is delivered to the PSAP along with a unique ALI for their telephone.

STATEMENT OF
CHAIRMAN AJIT PAI

Re: *Inquiry Concerning 911 Access, Routing, and Location in Enterprise Communications Systems,* PS Docket No. 17-239

When Americans call 911, they need to reach emergency personnel. And when those numbers are dialed, first responders need to receive accurate location and callback information.

Simple propositions each. But for many 911 callers located in hotels, on college campuses, or in corporate complexes, these expectations aren't being met. To reach emergency personnel, a caller sometimes has to dial an access code or other numbers before actually dialing 9-1-1. And if he or she reaches emergency personnel, the 911 call center may not get the location or callback information required to find the person in need.

That's why this *Notice of Inquiry* is important. We will examine why it can be difficult to just dial 9-1-1 when calling from an enterprise-based communications systems, or ECS. These systems typically serve environments such as office buildings, campuses, and hotels. And we also will take a comprehensive look at what can be done to ensure that accurate location and callback information is sent to emergency personnel. In an emergency, it shouldn't matter whether you're calling from your house, an outdoor park, or an office building. You should be able to reach first responders quickly, and those first responders should be given the information they need to assist you.

Of course, we are not laboring alone in these fields. Each House of Congress has unanimously passed a version of the Kari's Law Act of 2017. This legislation would help ensure direct access to 911. I hope Congress can quickly resolve these bills and send final text to the President.

This is yet another step in our ongoing efforts to ensure that when the next emergency strikes—whether it's a hurricane that affects legions or a heart attack that affects a loved one—Americans can use an effective, reliable, and easy-to-use 911 system to get the help they need.

Thank you to the staff who worked on this item. From the Public Safety and Homeland Security Bureau: Brenda Boykin, Michael Connelly, Lisa Fowlkes, David Furth, Lauren Kravetz, Tim May, Roberto Mussenden, Erika Olsen, Austin Randazzo, Emily Talaga, and Michael Wilhelm. From the Consumer and Governmental Affairs Bureau: Suzanne Singleton. From the Wireline Competition Bureau: Kirk Burgee and Cathy Zima. From the Office of General Counsel: Deborah Broderson, David Horowitz, and Bill Richardson. And from the Office of Strategic Planning and Policy Analysis: Chuck Needy and Henning Schulzrinne.

STATEMENT OF
COMMISSIONER MIGNON L. CLYBURN

Re: *Inquiry Concerning 911 Access, Routing, and Location in Enterprise Communications Systems,* PS Docket No. 17-239

A frantic call to 911 is one we never hope to make, but in an emergency, we count on that number to be our link to police, fire, or EMS. When dialing 911 from your hotel, school, or office building, the expectation is that the call will connect just as it would from your home phone or mobile device, and that the dispatcher will know exactly where you are calling from. Unfortunately, that has not always been a reality, as we saw from the tragic death of Kari Hunt which ultimately led to the passage of "Kari's Law."

As we continue to witness the utter devastation and loss of lives resulting from Hurricanes Harvey, Irma, and Maria, we are reminded that we must do all we can to enable effective emergency services. So, today, we consider an item which examines the provision of 911 services in enterprise communications systems or ECS. ECS provides phone service within large businesses, including the office building we are in right now. And since ECS is expanding to include virtual and cloud-based platforms, it is all the more reason why it is time to explore challenges that ECS may face when accessing 911.

In this NOI, we invite input on the capabilities of ECS to directly call 911 and provide automatic location information. Notably, we seek comment on ways to ensure that these systems will keep pace with technological developments and enable the 911 service that consumers expect and deserve.

I was pleased that my colleagues supported my requests to seek comment on two issues. First, whether, during hurricanes and other natural disasters, ECS services face technical challenges different from other services in the provision of access to 911. And second, how precise should ECS location information be when a caller dials 911. For example, in the case of an office building, is it sufficient to identity the floor a call was made from, or should the system be able identify the actual office from which the call was made?

This item should help enhance the provision of emergency communication services to the public and I am pleased to support it. My thanks to the Public Safety and Homeland Security Bureau for presenting us with this important item.

STATEMENT OF
COMMISSIONER BRENDAN CARR

Re: *Inquiry Concerning 911 Access, Routing, and Location in Enterprise Communications Systems,* PS Docket No. 17-239

In 2012, Congress and the public safety community identified a long-standing problem with 911. As the item before us explains, when consumers dial 911 from an office building, hotel, school, or other large enterprise, the telephone system in use in those facilities may not pass along accurate location or call-back information. That can—and has—led to tragic circumstances in which public safety officials have been unable to locate a caller or have sent first responders to the wrong location, wasting the critical minutes that often make the difference in an emergency.

Congress therefore directed the Commission to seek comment on the feasibility of requiring these systems to provide accurate location information. FCC staff did so by issuing a Public Notice over five years ago. But the Commission itself did not take any formal action. In the intervening years, the problem has not been solved. In 2014, for instance, when a Utah man suffered a heart attack at an auto parts store, the telephone system identified the call as coming from the company's corporate headquarters. Paramedics rushed to the wrong location. Those close to the man say that the resulting delay in reaching him contributed to his death.

So I think the Commission has an obligation to take action. And I agree with Commissioner Clyburn that the recent hurricanes only underscore the importance of this issue. So I am grateful that we are now launching this proceeding, which will examine potential solutions to this problem.

I also want to thank my colleagues for agreeing to expand this inquiry to cover a related issue. As the item now notes, when a 911 call lacks the location information necessary to route it automatically to the local 911 center, it is transferred to what is known as a fallback, or remote, call center. These call centers can be located in a different state or even outside the country. Operators at these centers then attempt the very analog task of identifying the location of the caller by asking questions about his or her location, what city they think they are located in, or what they can see. Once the call center has enough information, if it is able to get that information, it attempts to route the call to the appropriate PSAP. I think it is important that we shed light on this particular process as part of today's inquiry, ask about the best practices that are in place, and determine how frequently this issue arises. I am glad that my colleagues agreed to do so. This item has my support.

STATEMENT OF
COMMISSIONER JESSICA ROSENWORCEL

Re: *Inquiry Concerning 911 Access, Routing, and Location in Enterprise Communications Systems,* PS Docket No. 17-239

It was nearly fifty years ago when the first 911 call was made. It took place in Haleyville, Alabama. Haleyville is a city tucked away in the northwest corner of the state. No one would mistake it for a major metropolis. Today it has a little over 4000 residents and perhaps the most noteworthy thing about it is that it is the only place in Winston County that allows the sale of alcohol. So if you visit, you can get a drink.

But Haleyville has a place in the history books. Because it got our nation's emergency number system started. And a week after it did—on the other side of the country—Nome, Alaska announced that they too had implemented 911 service. Then by the end of the last century, 93 percent of the population was covered by some form of 911 service. Congress made a nod to the local work that brought this about when just before the turn of the millennium it pronounced 911 the national emergency number in the Wireless Communications and Public Safety Act.

Today there are roughly 240 million calls a year that are made to 911. More than 70 percent of them now come from wireless phones. That's certainly not what anyone was imagining five decades ago in Haleyville. But over time we have navigated changes in the way we reach out in crisis—and brought new technologies into the 911 fold. As a result, wireless, Voice over Internet Protocol, and texting have been incorporated into emergency response. Now, with this Notice of Inquiry, we seek to bring enterprise systems into the fold. These systems are often used in office buildings, college campuses, and hotels. Many of them do not support direct dialing for 911 and many more lack the capability to provide location information–and the consequences have been tragic. The Chairman deserves credit for making this a priority.

But let's be clear, we can't stop here. Because limiting our efforts to enterprise systems is thinking small. We need a big commitment; we need to remake our 911 systems for the digital age; we need to provide leadership for next generation 911.

Next generation 911 will link call centers to Internet Protocol networks that will support voice, text, data, and video communications. For those who call in an emergency, it will mean the opportunity to offer real-time video from an accident. It will mean the ability to provide first responders with instantaneous pictures of a fleeing suspect or emergency incident. For those who take calls in an emergency, all of this data can expedite and inform public safety efforts, dramatically improving emergency response.

To get there is not easy. But it's worth it—and there are three big things this agency needs to address.

First, we need a common definition of next generation 911. We need to ensure that when we talk about next generation 911 in one jurisdiction it means the same thing in another jurisdiction. That is not the case today. So we need to have this agency lend its voice and support nationally-accredited standards that promote interoperability between call centers.

Second, we need to end fee diversion. In recent years, as many as 8 states have diverted funding from the line-item for 911 on consumer bills—to pay for services other than 911. We know this is happening because the agency collects this data pursuant to the Net 911 Improvement Act. This is fraud. It has to stop.

Third, we need new ideas for funding. Transitioning to a new set of standards comes at a cost. The good news is that last week the Department of Commerce finally sought comment on proposed rules for a next generation 911 grant program using $110 million in funds from the Commission's recent spectrum auctions. The bad news is that while these funds will help, they will not reach every community in this country. We need many more ideas about how to fund the building and recurring costs of a modern emergency number system. I've offered one today: revenue raised from the auction of nationwide toll free numbers should be used to support our nationwide emergency number.

Over the past several years I have visited more than two dozen public safety answering points—from Alaska to Arkansas, Vermont to Virginia, and Colorado to California. Last month I visited with the public safety personnel at the 911 center who answered the call during the recent Congressional baseball shooting. Last week I visited with individuals who answered the call when a plane hit the Pentagon sixteen years ago on one of our darkest days. These operators are everyday heroes. They keep us safe. They save lives. But by and large they are working with communications infrastructure that has not kept pace with new technology. That's because too much of our nation's emergency number system relies on technology that has more in common with Haleyville history than the new networks of the digital age. It's time to fix that. Today's inquiry regarding enterprise systems is a start—but we need to do much, much more.