NextGen 911 is NowGen 911 in NC

Information Communications Technology Innovations

North Carolina

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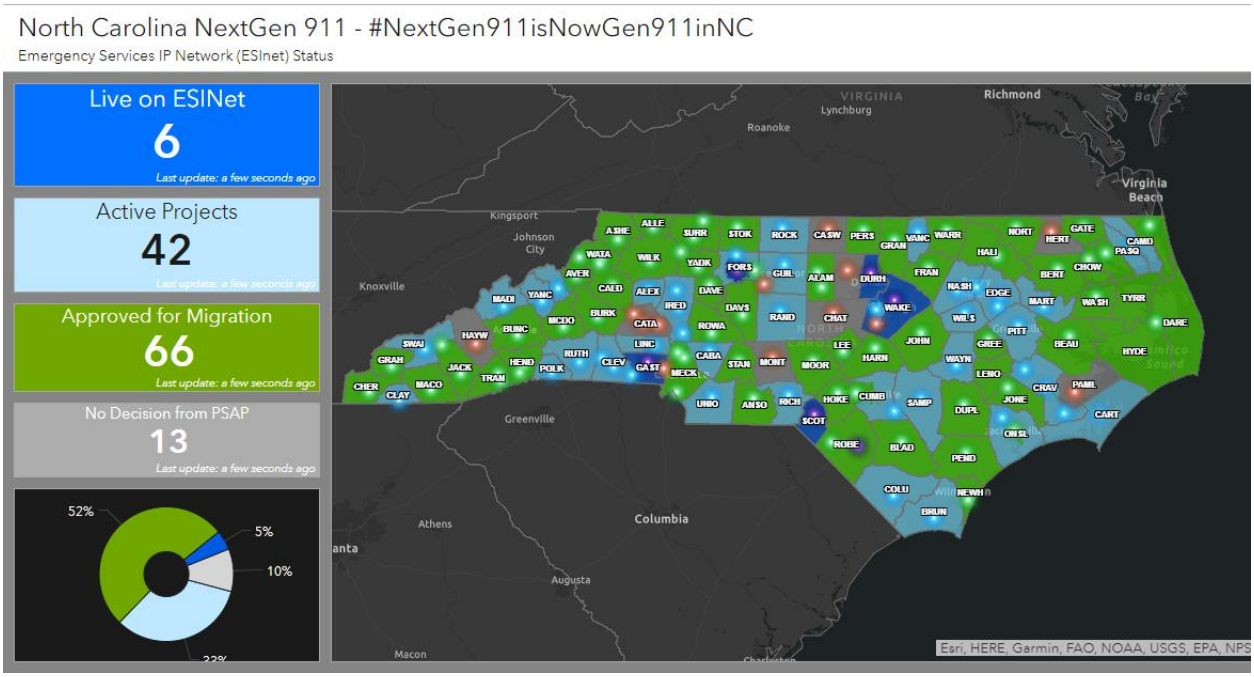


EXECUTIVE SUMMARY

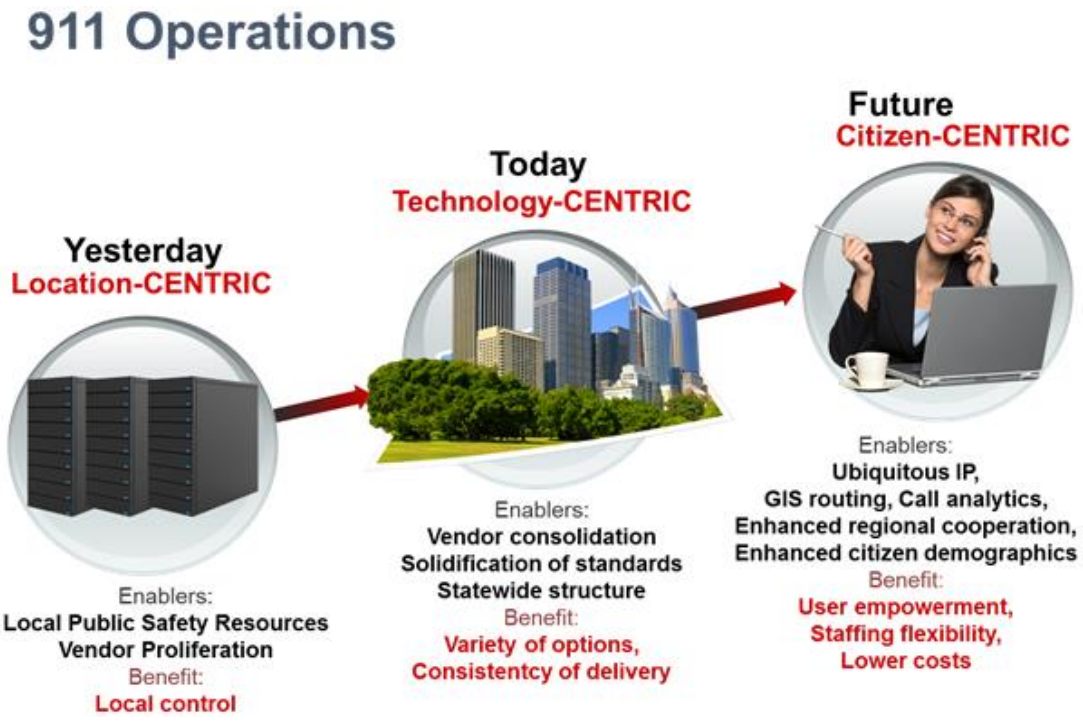
In an emergency, people need immediate access to 911 services. **Over 7.3 million 911 calls were made in North Carolina in 2018, and 75 percent of those were wireless calls.** Though the percentage of emergency communications made via wireless, VoIP, text or instant message continues to grow, legacy 911 systems are not natively capable of managing these types of communication. We must move to a NextGen 911 (NG911) technology, as the existing technology is facing obsolescence with decreasing system service provider support after 2021.

All emergency services across the country are grappling with the need to update technology. North Carolina's 911 Board chose to take a hosted, managed service approach to the migration.

North Carolina was the first in the country to take a hosted, managed service approach to updating its emergency network.

After researching all the options to accomplish this major improvement the 911 Board chose to contract with AT&T for a hosted, managed service approach. On November 13, 2018, Durham County became the first PSAP in North Carolina and the nation to transition to a cloud-hosted ESInet and Hosted Call Handling solution which allows them to receive text messaging, instant messaging and VoIP calls.

The new Hosted Call Handling solution will increase the accuracy geo-location of cell calls and the ability to handle text messages, the high-speed connections enable every center to serve as a backup for any other center in the state in the event of a natural disaster or an overload of emergency calls (which was put to use as Hurricane Florence pounded our coast in September 2018). There are 6 Hosted Call Handling solutions fully functional and implemented on the new ESInet. There are 71 in process and 67 more PSAPs that have decided to migrate to the new hosted environment with the managed service contract from AT&T. **Currently the 911 Board has a 90% acceptance rate among eligible PSAPs.** The Board anticipates full participation, with all PSAPs live by December 2021.



CONCEPT

Why are we changing 911 operations?

Citizens and businesses are increasingly depending on new communications technologies and devices, such as VoIP, instant messaging, text messaging, SMS, and email. At the same time, they are abandoning landline phone service for wireless phone service only. In the deaf and hard-of-hearing community many have given up use of TTY/TDD machines in favor of text messaging. Citizens today expect to communicate with 911 using smart phones and smart devices, including texting and sending photos and videos. To support these trends, the North Carolina 911 Board (the Board) and the state's Public Safety Answering Points (PSAPs) are migrating to a platform that enables new and emerging communications services and devices to access 911.

What do we want out of 911?

Citizens want immediate access to 911 services in the case of an emergency. Communications technologies have changed, and we now rely heavily on texts, instant messages, and VoIP services. However, legacy 911 service is not natively capable of managing these types of communications.

PSAPs want to be more accessible to the public, resolve emergencies faster, and as a result resolve more of them. If calls are received, managed, and dispatched faster, PSAPs can serve more people and ultimately save more lives.

The Board wants to ensure that the best possible emergency services are provided across the state, including new features, functionalities, and applications that address a changing technical landscape and meet the needs of North Carolinians. The Board is responsible for ensuring that these services are provided and managed efficiently and cost-effectively, and the Board wants to lower ongoing operating costs while also improving service delivery.

Current 911 landscape

The existing 911 framework is a wireline network comprised of fixed locations and fixed addresses, based on circuit-switched network technology that dates to the 1970s. Within that framework, **each 911 call center or PSAP is responsible for planning and designing its own 911 system.** PSAPs typically enter

into individual agreements or contracts with their 911 System Service Provider (SSP), which provides the 911 network, database, and network monitoring and maintenance. The PSAPs also enter into a separate lease/purchase agreement with the SSP for the call-taking equipment. Some of these PSAP systems are approaching the end of their useful life, while some are using legacy telecommunications technology to deliver 911 calls but have been modified and retrofitted to allow additional data with additional systems to deliver wireless/cellular voice and VoIP 911 to the PSAP.

The mobility of today's callers and the variety of devices can quickly overwhelm the complex arrangements cobbled together to manage these technologies. **We must move to a NextGen 911 (NG911) technology, as the existing technology is reaching obsolescence and will face decreasing SSP support after 2021.**

What is NG911?

NextGen 911 refers to the complete ability to transmit, receive, process, transfer, dispatch, use, and store both voice and data (in the form of pictures, videos, text messages, and incident information) associated with a 911 call or request for emergency assistance. NG911 will enable a more efficient use of 911 resources by enabling the transfer of 911 calls between geographically dispersed PSAPs, increased sharing of data and resources to improve emergency response, and improved coordination and partnerships within the 911 community.

E911-NG911 Comparison		
	Today's E911	**NG911**
Networks	Complex Analog Trunking and Data Network to meet IP	Managed Private Emergency Services IP Network (ESInet)
Routing	Class 5 Switch for Selective Routing, limited forwarding of calls	IP Routers, call forwarding more dynamic and flexible
Accepted Media	Voice Calls Only	Integrated Voice, Text, and Video
Integration	Complex Interfaces	Standard IP Interfaces
Data	20 Character Data Limit	Broad Data Bandwidth
Location/Call Routing	Complex translations based on tabular data (MSAG); Location fix occurs at back end of call	Geo-Location/Routing, Location fix more precise and happens at front end of call

The North Carolina General Assembly recognized the need to modernize and improve 911 operations in the state over a decade ago. In 2007, the General Assembly passed legislation to provide funding for improved 911 service. That legislation was translated into a working blueprint for the migration to a NextGen 911 (NG911) platform with the State 911 Plan in 2010, which is updated annually. In addition, the General Assembly approved a set-aside of ten percent of the Board's annual budget to fund the transition to NG911.

Our approach

North Carolina was the first in the country to take a hosted, managed service approach to updating its emergency network.

The transition to NG911 is an enormous undertaking and can be achieved in a variety of ways. In 2016, the Board issued an RFP for building and transitioning to a NG911 system. Many of the bidders required large amounts of money up front to build a new network, which would be connected and managed at the individual PSAP level, as in the current model. Based on the bid responses and the Board's knowledge of the FirstNet implementation, the Board chose to contract with AT&T for a hosted, managed service approach to NG911 delivery.

The managed service provider retains responsibility for the functionality of the IT service and equipment. The customer benefits from predictable pricing and the ability to focus on core business concerns rather than IT management. NC's PSAPs thus obtain a more robust 911 network with fewer direct IT responsibilities.

The seven-year, approximately $100 million contract was signed in August 2017, for the implementation of a statewide Emergency Services IP Network (ESInet) and a Hosted Call Processing system.

The parallel effort of creating a centralized NG911 Network Monitoring and Assistance Center (NMAC) (which is a combined NOC and SOC) in conjunction with the NG911 migration will provide a valuable safety net to the PSAP community in its role as a PSAP-only support center. The NMAC will be joined with the extensive resources of the Department of Information Technology Raleigh-based network operations center, which will foster the ability to share network and cyber security intelligence. The NMAC staff will have extensive PSAP operational experience in addition to network management skills to provide comprehensive services to the PSAP while ensuring effective oversight of AT&T's service delivery.

Each PSAP is responsible for planning and designing its own 911 system. As a result, a PSAP's use of the managed service contract is voluntary.

The Board approached the task of communicating the benefits of the NG911 program by taking the message of the benefits of NG911 directly to the PSAPs. Board staff completed two rounds of regional PSAP meetings that have provided a venue for in-depth discussions of the technical, operational, and financial benefits of the NG911 program. In addition, Board staff have organized and participated in regional "tech talks" with several PSAP groups who have regional operational alliances. The tech talks were frank and informative for both staff and the PSAP community.

On November 13, 2018, Durham County became the first PSAP in the nation to transition to a cloud-hosted ESInet and Hosted Call Handling solution, to be followed by 40 additional PSAP sites in 2019.

SIGNIFICANCE AND IMPACT

Over 7.3 million 911 calls were made in North Carolina in 2018. In September 2018, over 75 percent of 911 calls in North Carolina were from wireless devices, slightly less than 18 percent were from landline telephones, and about 7 percent were from VoIP phones. The 911 system that was designed and built exclusively for landline service now transports only a quarter of the state's 911 calls. Additional 911 call statistics show that the state's 911 telecommunicators had the precise location of only 25 percent of their 911 callers and only an estimate of the location for 75 percent of their callers. Three quarters of the 911 callers in North Carolina had their calls routed based not on their location, but rather on the location of the tower that received the 911 call. **Every PSAP in the state is transitioning to NG911 technology.**

The ESINet system allows all 117 primary 911 centers statewide to connect through internet protocol-based routing services, allowing the call centers to seamlessly communicate with one another. In addition to improved geo-location of cell calls and the ability to handle text messages, high-speed connections enable every center to serve as a backup for any other center in the state in the event of a natural disaster or an overload of emergency calls (which was put to use as Hurricane Florence pounded our coast in September 2018).

Benefits of NG911 technology

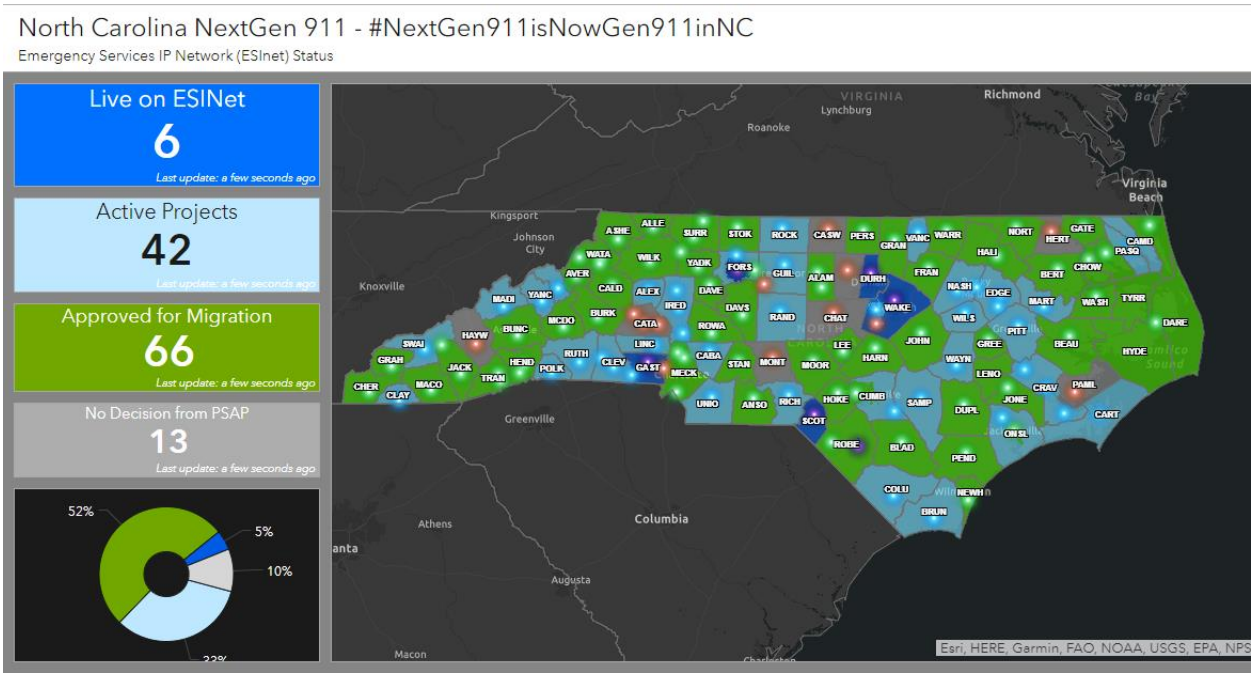
- Reduces call set-up time from 10-12 seconds to 0.5 seconds – consistent across all participating PSAPs
- Removes single points of failure through geo-redundant call processing with redundant and diverse networking
- Modernizes PSAP call delivery by replacing legacy CAMA circuits with IP so that voice or text calls are delivered over the same private MPLS VPN connections
- Automatically detects and recovers from PSAP CPE call failures – ESInet can represent an active 911 call to a PSAP without losing the originating call leg
- Routes calls using geographic information or tabular addresses so that PSAPs can define routing rules for 911 calls/text by drawing geographical boundaries on a map (requires GIS/Call Handling equipment compatible with ESInet)
- Provides robust and flexible policy-based call delivery functions so that PSAPs can automatically failover and overflow calls based conditional call processing rules (e.g., call volume) for voice or text calls (legacy PSAP failover requires manual intervention that takes time)
- Establishes an IP network foundation for future advanced capabilities that support receiving critical incident awareness info e.g., video transmitting to first responders, providing secure access to public safety apps via Netbond

Benefits of the contract vehicle

The AT&T agreement provides NG911 services through a managed services contract. The managed service structure enables North Carolina to achieve high levels of service reliability with rapid implementation without large capital expenditures for hardware, software, and professional services. Using the managed service approach, North Carolina was able to go from signing the contract to turning up the first site in 15 months, whereas a state-built network would require two to three years to provision and an up-front investment of millions of dollars just to get the first site up and running.

Benefit Category	Benefit Description
Cost	• No up-front capital expenditures • Hardware, software, and professional services are all part of contract • Maintenance costs rolled into contract • Vendor doesn't get paid until a PSAP is fully functional • Payments based on service delivery, not individual PSAP cutover • Flat rate and overall cost for service
Central management and oversight	• All GIS data for routing housed on servers in state data centers • Call routing can be managed/monitored centrally • Future hosted computer aided dispatch (CAD) allows the 911 Board to standardize a CAD application to PSAPs, or integration infrastructure for multiple CAD packages.
Mobility and reliability	• PSAPs can failover/overflow calls to any other PSAP in the state • First contract to formally establish redundant routing for every PSAP as a requirement
Security	• Closed network: nobody can connect to the internet through this network • Cybersecurity assessments of PSAPs happen before migration to ESInet • Network Operations Center and Security Operations Center housed in central Network Managing and Assistance Center at DIT
Adoption	• Incentivizes PSAP participation because Board pays network costs and the contract permits onsite or hosted CPE (PSAP's choice) with costs set by the contract

Six PSAPs are already fully functional on the new ESInet, and another 42 are in the process of converting. Sixty-six more have agreed to participate. Only thirteen of the 127 PSAPs have not yet made a decision. **This is a 90 percent acceptance rate among eligible PSAPs.** The Board anticipates full participation, with all PSAPs live by December 2021.



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