

# The 411 on Next-Gen 911 Upgrades

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Upgrading the nation's 911 systems to function in today's wireless- and IP-driven world has become an essential undertaking for America's communities.

But the success of Next-Gen 911 upgrades also depends on state and local government leaders making crucial investment decisions about their underlying networks—to ensure they can handle not only the deluge of data, but also the security challenges that come with moving from analog to digital systems.

In this special report, we highlight recent reports that reflect how state and local government leaders are looking at these issues—and offer some recommendations for meeting these challenges.

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Photo: Getty Images

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# Make your ‘Next-Gen 911’ investments go further

## Three reasons why public officials should evaluate their future network demands before rolling out ‘Next-Gen 911’ upgrades.

By Michael Zody

As state, municipal and public safety officials continue to invest in more modern and unified 911 systems, their efforts raise important considerations that ironically mirror the circumstances that led to the creation of 911 in the first place.

The development of the underlying infrastructure to support a national 911 system was arguably one of the great achievements in the 20th century. The challenge then and now is how to bridge the vast patchwork of communication systems so that when an emergency strikes, people can reach the right first responders immediately.

What’s changed since then, among other things, is how completely Americans now rely on mobile phones – and perhaps as importantly, how they use them. An entire generation has grown up using text and multimedia apps as their primary way of communicating.

This presents fundamental challenges for public safety officials and call specialists at roughly 5,750 public safety answering points (PSAPs), because they have to rely on aging systems to respond to an *estimated* 240 million 911 calls annually.

The roll out of “Next-Gen 911” technologies – designed to make historically analog communications systems more digitally interoperable – is certainly a step in the right direction.

So is the fact that nearly all 3,135 U.S. counties reportedly have at least some ability to capture wireless data, which is important, since more than 80% of calls in most areas now come from wireless devices, according to recent *statistics*.

### Looking beyond Next-Gen 911

While federal grants to modernize 911 systems have begun flowing to state and local governments, many municipalities and counties are struggling with a deeper challenge. That’s the need to make essential upgrades to their underlying network infrastructure to handle the deluge of videos, pictures and data expected to pour into 911 PSAPs.

And that’s just part of a larger issue. The continuing push to create smart cities – and integrate internet-connected sensor systems – is putting new strains on government and public safety networks. Municipal fire, police and EMS services will need to contend with a wider range of data streaming from sensors and surveillance cameras everywhere to guide their dispatch and response teams.

But perhaps of greatest concern: The integration of all of these systems – and the hodge-podge nature of the networks they rely upon – introduces exponentially greater security risks that many state and municipal officials often

haven’t fully taken into account in planning their Next-Gen 911 upgrades.

State and local IT officials – including those highlighted in this special report – are having to confront a host of new security issues with the convergence of systems that not long ago, stood independent from one another and largely beyond the reach of hackers.

### Transitioning to digital

That’s why, from our vantage as a global network provider – that works everyday with federal, state and local governments – we believe it’s critical for public officials to pause and take a comprehensive assessment of their long-term network needs. Here are just three reasons why:

#### Every network is different.

Few county or municipal networking systems look alike. Geography, population growth, funding constraints and a host of other factors not only determine how a given community’s network systems have evolved, but also what upgrade approaches make the most sense going forward. Layering Next-Gen 911 solutions on top of pre-existing technologies may promise short-term gains, but also result in long-term pains.

#### Preparing for digital threats.

Our responsibility in protecting much of the globe’s internet infrastructure gives us a unique window into how bad actors keep evolving their craft in exploiting IP-enabled networks. (Our *Black Lotus Labs*, just as an example, ingests more than 139 billion NetFlow sessions a day allowing us to look for threats and alert customers to potential compromises.) Planning a Next-Gen 911 upgrade without more comprehensive networking security strategy may play well publicly but could also backfire with the next ransomware attack.

#### Real opportunities to reduce costs.

Spending time to map out a longer term networking strategy can also save millions in capital costs. We saw that first hand in *Pima County, Arizona*, which is saving \$30,000 a month in operating costs by moving to a managed services approach for its 911 service. The project also resulted in a better-performing IP network.

### Planning for future-ready networks

One approach we recommend for state and municipal leaders is to take advantage of a free “Solution Transformation Methodology” CenturyLink makes available to public officials. It gives them a framework to consider:

- What are you trying to accomplish?
- How far along are you in your transition?
- What do you want the end-state or outcomes to look like for your community or region?
- What near-term and long-term network capabilities will you require to achieve those outcomes?

The answers to those and other questions offer a smarter, more assured approach not only when the time comes to uplift your current 911 system, but also in ensuring your community or region has a secure and reliable core IP network to support all the other services that are important for public safety.

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*Learn more about how CenturyLink can help with your Next-Gen 911 and network planning.*



# As 911 Goes Digital, Security and Training Pose Major Challenges

Written by [Colin Wood](#)

Photo: Operations center for NYC Emergency Management in the Brooklyn, New York  
Reuters / Brendan McDermid

## GOVERNMENT COMPUTER SYSTEMS

are frequently updated as a matter of course, but a sanguine nationwide effort to shift the country's aging 911 systems onto a digital platform belies a moral dilemma around risk that could touch the lives of everyone who might one day call for help in an emergency.

Counties across the United States are gradually trading in analog systems that run on copper wire for platforms that will allow 911 operators to receive photos, video and other digital media, while automatically collecting critical intelligence like caller location – new capabilities that are expected to shave seconds off response times and ultimately save lives.

A readiness to adopt next-generation 911 is reflected in a steady stream of announcements from local governments touting unprecedented capabilities and budding talks in Congress to fund a national rollout that could cost more

than \$12 billion. But along with the advantages of a more advanced digital network will also come new security risks that today's outdated analog systems have had the accidental good fortune to be insulated from.

The lack of connectivity in decades-old computer systems is both the reason they're considered outdated and the primary reason they don't get hacked. It's the same reason the federal government and many states have delayed migrating mainframes used for critical functions – like health care and public works – onto more modern platforms. Being outdated can be a tremendous security asset.

But this security in antiquity will soon fade. The implicit question facing governments updating these systems is whether the new capabilities they are enabling will save more lives than will be threatened when a next-generation 911 system is inevitably hacked and taken offline.

John Zanni, chief executive of the Arizona-based IT security company Acronis SCS, said systems used for public safety purposes today are compromised infrequently, but that when they are, it usually happens in smaller jurisdictions. One exception was Baltimore, which last year saw a "limited breach" to its computer-aided dispatch system. But even in that attack, operators were able to continue taking phone calls, jotting notes with pen and paper.

As 911 call centers begin handling different types of data and sharing it across jurisdictions, though, Zanni said these uncommon occurrences will become frequent.

"All of that means integration across networks, which means you need to think even more deeply about how you secure those systems," Zanni said. "The more

elaborate those systems become, the more they become the targets for bad actors."

## Doors 'wide open'

Ransomware attacks against public networks seem to arrive on a near-weekly basis, preventing administrators and the public from accessing their data and services. At a minimum, it's an expensive annoyance, and at worst a dangerous disruption of critical services. Technology officials leading the 911 upgrades say they're doing their best to ensure the necessary security precautions have been taken before emergency services finally go digital, but they're still worried.

"The doors are going to be wide open," said Wisconsin Chief Information Officer David Cagigal. "These organizations are going to have to ramp up in an area they're very unfamiliar with."

Emergency call centers have decades of training to catch up on, Cagigal said. While state and local government agencies still struggle to absorb now-familiar security truisms about software updates, email-based phishing attempts and adhering to standardized frameworks, Cagigal said he worries that public-safety officials are even less prepared.

"They don't have the skills and talents," he said. "They don't have a chief information security officer or an IT director to assist them if there is an issue. Next-generation 911 is necessary and very promising, but we must prepare for the eventuality that they'll be susceptible to everything that's facing us today. They're going to be attacked."

"The doors are going to be wide open. These organizations are going to have to ramp up in an area they're very unfamiliar with."

David Cagigal  
Wisconsin CIO

## Leading ahead

Despite those concerns, officials like North Carolina CIO Eric Boyette, believe upgrading is the right move.

“We would not be doing our part as leaders to not move forward with it,” said Boyette, who also leads North Carolina’s 911 board.

North Carolina is a leader among states on next-generation 911. It launched a first-of-its-kind Network Monitoring and Assistance Center in Raleigh last month, a central hub for assisting its 127 PSAPs, 16 of which are now equipped for the next-generation switch. Boyette said he expects all 127 centers to be ready by July 2021.

He admitted there will be new security risks – that’s one of the reasons the monitoring center was built. The state is also relying on its vendors for additional support. Best of all, Boyette said, is that the modern platform is designed such that if one PSAP fails, others can pick up the slack.

“If we have an issue with a PSAP that’s down, we have back-up ways that we can reroute traffic and the end user never knows that they’re on a secondary versus a primary,” he said. “We have the same capability now with the copper, but you have a lot of [telecommunications companies] you have to work with to make sure the traffic is routed all the way through.”

With next-generation 911, information such as caller location is stored in the cloud, rather than on-site, so the platform is expected to be far more resilient than contemporary systems. Having basic caller information is important so operators can indicate the correct location when they answer calls, Boyette said. During Hurricane Florence in 2018,

operators on analog systems taking calls routed from other jurisdictions didn’t know where their calls were coming from and how they answered the phone sometimes confused callers, who then hung up.

Despite being an advocate for the technology, Boyette isn’t oblivious to the threats 911 will soon face. Next-generation 911 is one of hundreds of technology projects he’s helped launch during nearly 25 years with the state. He knows that increased complexity means increased risk.

“I didn’t say it was easy,” he said.

## ‘Seconds matter’

One group that’s always looking for additional support for next-generation 911 is the National Emergency Number Association. Its CEO, Brian Fontes, has been a strong advocate for modernizing systems and attracting new funding for a platform he’s been trying to promote for more than a decade. But he agreed that educating and training PSAP operators will likely prove to be one of the greatest threats to 911.

“They’re comfortable with the way things are, the way they’ve been operating for 50 years,” Fontes said. “I hate this expression but I hear people say, ‘I don’t have to worry about it because I’m retiring in three years.’ It’s a challenge.”

Like others, Fontes said the challenge is worth facing. Cloud-based technology will make it easier to isolate cyberattacks, he said, and the general benefits of next-generation 911, like reduced response times and enhanced situational awareness, are too great to pass up.

“At the end of the day, seconds matter,” Ohio CIO Ervan Rodgers said.



“There is a great amount of excitement, especially with the funding. I’d say the lion’s share majority are excited about this moving forward.”

Ervan Rodgers  
Ohio CIO

Rodgers recently hosted a statewide 911 symposium marking \$4.3 million in new federal funding for his state’s 911 upgrades. Ohio was one of 34 states and territories to receive a chunk of \$109 million in new funding – a pittance compared to the \$12 billion needed nationally – but Rodgers said the event conveyed a positive reception to the new technology.

“There is a great amount of excitement, especially with the funding,” Rodgers said. “I’d say the lion’s share majority are excited about this moving forward.”

The self-selected individuals attending a symposium for 911 may be more likely to have enthusiasm for next-generation 911 than the population at large, however. The challenge of educating thousands of PSAP administrators and operators not only on what the technology is, but how to securely use it, remains.

In Paulding County, Ohio, a region of 19,000 residents tucked away in the northwest corner of the state, Matt McDougall, the county’s deputy sheriff who also serves as the regional PSAP coordinator, said he’s heard there’s a big push for next-generation 911, but that he doesn’t know much more than the fact that it would allow his operators to handle new types of media.

But is he security-conscious?

“Sure,” McDougall said. “We try to be ready with those firewalls.”

Is he ready for next-generation 911?

“The state hasn’t even come out with what next-generation 911 is, really,” he said. “I just don’t know how we’re going to handle all that.”

*This article was originally published on StateScoop.com and edited to fit in this reprint. North Carolina CIO Eric Boyette has since stepped down to head the state’s Department of Transportation.*

*Photo: Getty Images*



# Next-Generation 911 Promises ‘Explosive’ Challenges, State CIO says

**Wisconsin CIO David Cagigal says the introduction of digital networks into 911 call centers is presenting public safety officials with unfamiliar technologies.**

Written by [StateScoop staff](#)

Photo: Getty Images

**WISCONSIN CHIEF INFORMATION OFFICER** David Cagigal says his top priority, after securing his state’s election systems, is ensuring public safety officials are fully prepared to respond to emergencies.

Thousands of primary and secondary public safety answering points, or PSAPs, more commonly known as 911 call centers, are upgrading their systems to next-generation 911 around the country. Wisconsin’s PSAPs are among them, as public safety and technology officials transition their old analog systems used to handle emergency calls onto digital systems capable of sending and receiving videos, photos and other media.

All this is expected to cut response times and equip first responders with additional intelligence as they head to the scene.

States are at varying levels of maturity in their upgrades, but none has yet gone live in providing next-generation 911 capabilities to the public.

“We’re at the beginning of evaluating our ESInet, our emergency services internet provider, our digital provider,” Cagigal says in a video interview with StateScoop.

“We’re searching for them, hoping to be able to line ourselves up with a vendor that can protect that environment. As you connect to a digital network, you become hackable, so to speak, and you have to build in appropriate firewalls.”

These types of technologies are outside the wheelhouse of most of those working in public safety, and that has Cagigal concerned.

“These are two things that the historical PSAPs have not had to deal with,” Cagigal says. “So now they’re learning about a digital network, they’re learning about firewalls, they’re learning about protecting their environments.”

In addition to handling new media types, next-generation 911 promises greater accuracy in locating 911 callers, including indoors, which is hoped to further cut response time.

But, first, states and counties will have to navigate various technology challenges.

“The storage medium is going to be an explosive situation for them because now they have to take a picture, text

or video, whatever the consumer offers up for evidence of their situation, it has to be retained,” Cagigal says.

“There are significant storage management challenges, [geographic information systems] challenges, firewall security challenges and [protecting] a digital network.”

Looking more broadly, Cagigal has his eye on a variety of pressing projects.

“For the State of Wisconsin, our top priorities are really focused on one priority: cybersecurity. If we can’t get past that one, we’ve got some difficulties.”

But tied to that are concerns around elections and the extent to which security issues have the ability to place “a measure of doubt on our democracy and our voting process,” he said.

“I see my role being able to bring multiple constituents, multiple providers together to optimize a relationship that we can essentially protect our data centers from the personally identifiable information, our most critical asset, to be able to protect our citizens’ livelihood and be able to protect the democracy through our election process.”



“There are significant storage management challenges, GIS challenges, firewall security challenges and [protecting] a digital network.”

David Cagigal  
Wisconsin CIO

This article was originally published on [StateScoop.com](#).



# Next-Generation 911 Gets \$109 Million Boost

**Funding authorized in 2012 is now being dispensed to 34 states and territories. But a full nationwide upgrade could require more than \$12 billion.**

Written by [Colin Wood](#)

Photo: Getty Images

**THE COMMERCE DEPARTMENT IDENTIFIED** its release of more than \$109 million in new federal grants to states upgrading their 911 systems as one of the department's milestone accomplishments in 2019. The \$109 million will be divided up among 34 states and tribal territories.

According to the National Telecommunications and Information Administration, the grants will help call centers upgrade their technologies as they transition their aging analog systems toward digital platforms that can handle photos, video and location data during emergencies. The funding will also offset the training costs needed to prepare emergency call-takers for the influx of new information they'll be managing, NTIA officials said.

"These 911 grant awards are a significant step toward a faster, more resilient emergency system," Commerce Secretary Wilbur Ross said in a press release.

The funding, which was mandated by the American Taxpayer Relief Act of 2012 (the same law that created FirstNet, the public-safety communications network), is a tiny fraction, however, of the estimated \$12.7 billion that it will cost to launch next-generation 911 nationwide, notes one public safety observer.

The size of the grants range from \$11 million for California down to \$680,000 for Maine. But Brian Fontes, CEO of the National Emergency Number Association, a group that advocates for 911, didn't use the word "significant" when asked to describe the funding. Instead, he emphasized that it is coming seven years after Congress first authorized it.

"It's not about moving the nation completely into the next-generation 911 environment," Fontes said.

## More funding will be needed

Fontes said this funding will be helpful, but will more likely be put toward iteratively upgrading systems here and there. Bigger changes will require bigger funding.

A federal report published last October estimated that a nationwide roll-out of next-generation 911 will cost between \$9.5 billion and \$12.7 billion and take at least a decade to complete. NENA's Brandon Abley told StateScoop that resources for various public safety jurisdictions vary widely, as do their efforts to modernize 911 systems.

In August of 2019, California announced plans to advance its next-generation 911 efforts, tapping into \$175 million in funding collected from phone surcharges. But others working in emergency management, particularly in rural areas, have told

StateScoop they're concerned that they'll bear the brunt of the technological and social challenges expected to accompany the change.

However, Abley said people don't tend to need much convincing that 911 is worth the investment.

"I think it's easy to support capital funding for next-generation 911 nationwide because our 911 networks across the country are aging," he said. "They really, really need modernization badly."

## Aging 911 infrastructure

Dan Henry, NENA's government affairs director, told StateScoop that it's hard to estimate the average age of the country's 911 infrastructure, though many regions have had the same systems in place for about 20 years. He likened old copper-wire communications systems to naval warships, many-decades old and constantly being patched, repaired and having newer components bolted on. And this new funding, originally made available in the late summer of 2019, won't be nearly enough for a nationwide overhaul, he said.

"It's not like they're throwing a big switch to next-generation 911," Henry said.

The House of Representatives is considering legislation that would provide \$12 billion for a broader upgrade to next-generation 911, though Henry said he's worried it could get overshadowed by other matters.

"Our biggest threat for this legislation, and for a lot of our legislation, is that there's another hot-button issue that sucks the air out of the room," he said.

**"I think it's easy to support capital funding for next-generation 911 nationwide because our 911 networks across the country are aging,"**

Brandon Abley  
NENA

*This article was originally published on StateScoop.com.*



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