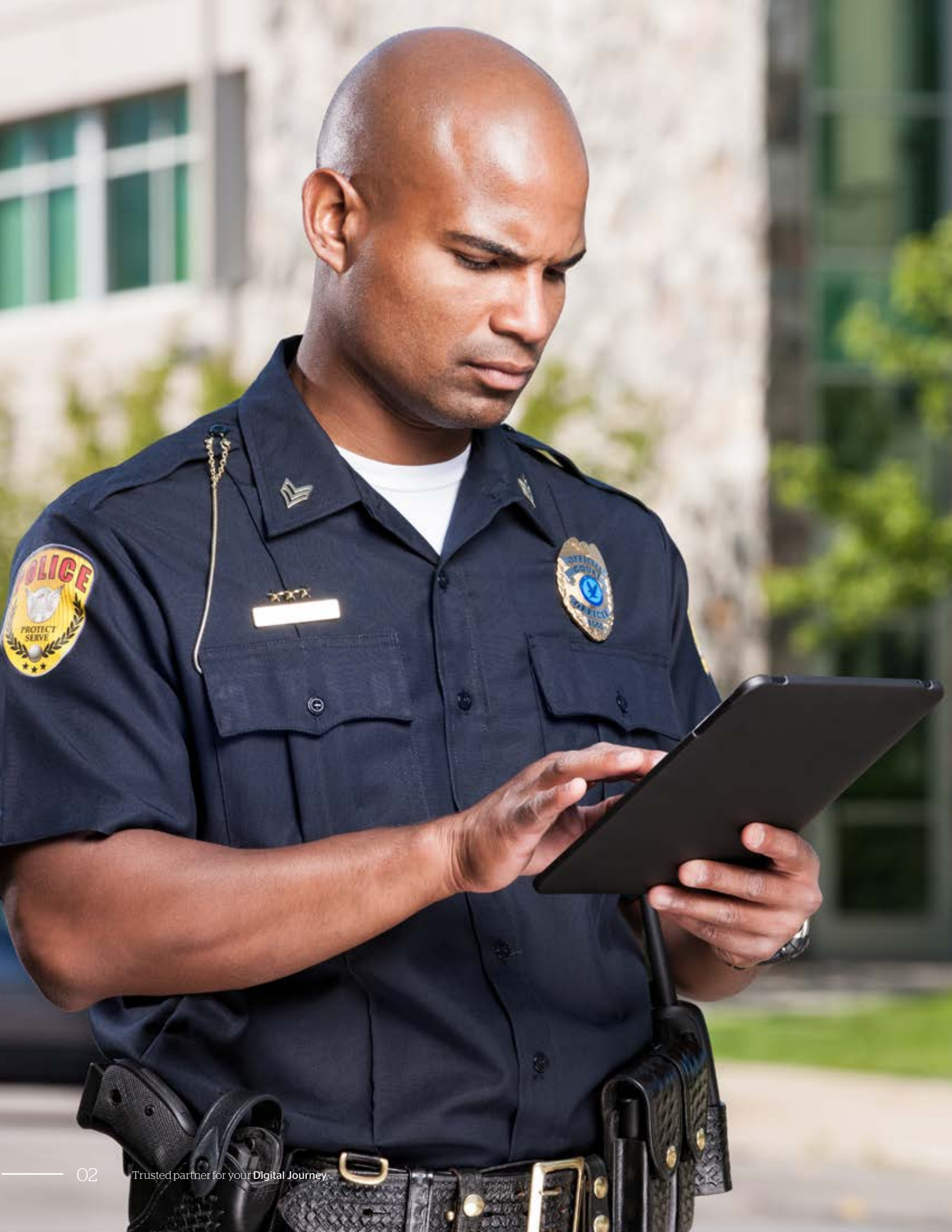# Connected Cities
Safety and Security with NG9-1-1

How Atos 9-1-1 ecosystems deliver greater levels of interagency response across a converged communications environment.

Atos

Trusted partner for your **Digital Journey**

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Interagency Collaboration
Becomes a Unified Reality

Here's the objective: Get your first responders into, and out of, potentially life-threatening emergency situations quickly, effectively and—above all—safely.

Here's the problem: An obsolete analog emergency response infrastructure that's ill-suited to the demands of a highly digital, socially engaged public, well versed in communicating across different channels.

Here's the solution: An intelligent 9-1-1 system that, according to the National 9-1-1 Program, creates a "faster, more flexible, resilient, and scalable system that allows 9-1-1 to keep up with communication technology used by the public" based on IP voice communications.*

In short, Next Generation 9-1-1, or NG9-1-1.

This, of course, oversimplifies the move to NG9-1-1 that's been occupying the minds and the budgets of state and local officials since the FCC first developed the US 9-1-1 system (also adopted by Canada) in 1968.

But whatever the changes being mandated in networks and devices in the field, the protection of citizens and the safety of emergency services personnel remain paramount.

And while access to a new world of data is the driving force in this shift to an IP emergency ecosystem, one constant remains: voice communication is king. As we embark on this migration to integrated, enterprise communication systems that harness the power of data, the ability of citizens and emergency responders to engage in a live discussion remains the single most important capability of your NG9-1-1 solution.

With these truisms in mind, this paper takes a look at a complex and wide-ranging program. It seeks to bring clarity to the issues and offers a potential way forward for officials tasked with NG9-1-1 delivery.

What's the big deal about Big Data?

Today we live in a world of mobility and large data plans, communicating in many ways beyond voice. NG9-1-1 will usher in an entirely new means of not only requesting emergency services, but—through the use of smartphones and social media—also providing first responders with critical data related to given emergency situations.

Because today's PSAPs rely upon antiquated "static" data that resides in many disparate systems and product silos, Big Data is a critical component for modernizing any 9-1-1 operation. For instance, instead of police officers submitting a query and waiting for multiple reports to produce key information such as the criminal history of a suspect, NG9-1-1 data models and relevant incident history for the relevant geographic sector can be provided to the call taker, narrowing the field of suspects and improving officer safety even before the police arrive on the scene.

NG9-1-1 from 10,000 Feet

We operate today in a world where the line between security and safety has blurred, and the operational dynamic has changed.

The events of 9/11 forced first responders globally to adapt in new ways: to push communications through traditional barriers, to more fully exchange information and data, and to bridge gaps to become more technologically adept at securing the safety of our most critical asset—our citizens. And while these actions better identified emerging threats, they also spawned more intelligent criminals perpetrating new methods of crime. These changes affect how law enforcement, fire departments and EMS services protect us and ensure our safety when we make that call for help.

Traditional 9-1-1 service needed to become more proactive, intelligent and geographically non-restrictive. It needed to focus on voice communications as the primary path, yet bolster the response process through the collaborative use of "big data."

This is a compelling evolution, no doubt about it: to revamp public safety, enable public safety answering points (PSAPs) to receive and manage multiple data sets, and empower first responders with new technology. Public safety agencies now expect calls to be delivered via text message, terminals to be video-enabled, and officers on the scene to have as much data and situational awareness as the command center.

Data-Driven PSAP Operations

For decades, many of the world's governments, from national to municipal, have addressed their safety and security challenges through control room and/or command center models. It's a path we now follow as part of the NG9-1-1 agenda. Indeed, it's the only way to effectively adapt to, and leverage, Big Data.

The aim, then, is to harness control room solutions across disparate boundaries to enable the deployment of communication solutions offering local control and autonomy, while also interoperating beyond jurisdictional boundaries. But there's a challenge. To date, the control room model has been defined rather loosely, depending on locale and audience. The core criteria, however, remain the same: unified command and control for public safety.

Let's consider this example: a 9-1-1 call arrives from an address with hazardous materials, reporting a fire. Social media is abuzz with reports of people with serious breathing difficulties four blocks away. Area hospitals are inundated with arriving patients, yet have no knowledge of the nearby fire. With a data-driven PSAP, all of the details above become part of an integrated, intelligent emergency response system, using a single enterprise platform for disparate data set presentation and management.

This unified solution approach requires silos to be broken down, collaboration to occur, new technologies to emerge, and cloud solutions to take hold. In many places, Atos is building control center solutions, the backbones of which require emergency services IP networks (ESInets) and the build-out of the National Public Safety Broadband Network (NPSBN), known as FirstNet.

These networks are the engines, and NG9-1-1 is the application and service portfolio filling the network pipes with information and new command and control capabilities for our first responders and public safety professionals.

* Source: http://www.911.gov/911-issues/standards.html

A Continually Evolving System

The Case for Control Room Evolution

Unfortunately, our public safety system is not currently structured around a centralized control room model as defined by the rest of the world. While we certainly need the same operational capabilities and intelligent policing (and response) tools that control rooms provide, our national response system consists of thousands of independent local, state and federal agencies. Many local centers operate without the tools to collaborate based on need and incident, and it's hard to see how multiple levels of government—each with their own protocols, policies and autonomous needs—can integrate into a single operational environment.

This is not a criticism of a disparate voice infrastructure that has served us and our emergency services for almost 50 years. Rather, it is an acknowledgment that the network simply wasn't built for today's demands.

PSAPs operate today within the limits of specific silo-oriented systems: from a 9-1-1 call-taking system, to a computer-aided dispatch (CAD) system, to a land mobile radio (LMR) console, to various third-party data systems. Staff must look to multiple sources and use multiple products just to do their job. With a single platform using an enterprise service bus (ESB) model, data fusion can be done and applications customized to the center's workflow and operations. These tools help to not only manage the data available but also reduce operational complexity, minimize transfer and dispatch times, reduce obsolete system maintenance costs, and provide a shared data domain that optimizes user capabilities by function/skill/role.

As we can see, a change is needed. Indeed, it's mandated. Entities must operate collaboratively and seamlessly to provide safety to governments and their citizens.

When a call for help is made to 9-1-1, or when a catastrophic event such as a natural disaster, act of terror or riot occurs, responding agencies need the best information and tools to protect and serve. Such collaboration comes in many forms and through various media, but all leverage Big Data, and all evolve toward a control room model that works for, and seamlessly between, different levels of government. And it must be delivered over a universal protocol that all agencies recognize and use every day: IP.

With a single platform enabling multimedia collaboration, for instance, response personnel can securely communicate via a private domain regardless of location or device. In a hostage situation, police on the scene can analyze pertinent data and images in real time, gaining a deeper knowledge of the location and the hostage taker. Should there be a need to coordinate with, for example, the FBI or a specialized response unit, they can be securely added to the incident response collaboration platform, creating a virtual command center independent of physical locations.

Converged Communications
The Framework

So where are we on the journey? Well, it's just begun.

Many 9-1-1 entities have built, are building or will soon build an ESInet to connect PSAPs and other public safety agencies within a region. These will network to other ESInets and originating service providers within a region or state. This is a positive progression, but challenges remain, not the least of which is knowing who to trust to lead the migration into and through the entire NG9-1-1 ecosystem.

Similarly, there are key questions that need to be answered, including:

• What steps can be taken today to ensure that these IP networks will meet the requirements for i3 core services (such as emergency call routing function and emergency services routing proxy)? If an agency buys a 9-1-1 call handling system or chooses to just "upgrade" with a current vendor, it is putting itself at risk of buying obsolete or equipment with limited functionality. To be i3-ready,

9-1-1 stakeholders must not make repeat purchases, but rather invest in a platform that will migrate them to a converged ecosystem.

• What major design considerations should be taken into account? A carrier-grade, multimedia communications controller must be capable of delivering any type of "call" as a 9-1-1 priority call. Native VoIP architecture is critical; attempting to repurpose a product to serve an NG9-1-1 domain is simply bad judgment.

• What are some of the limitations and advantages of the various technologies? Legacy solutions were designed only for specific silo operations. They were not designed for native multimedia communications and are functionally designed for one domain: either they serve a PSAP and one specific operation within the PSAP, or they are a small part of the ESInet. They also cannot scale to replace a telephone central office.

• What can network designers do to assure maximum availability in a disaster? In the Atos model, network resiliency and survivabily are ensured through use of logically and physically diverse network assets. Through the use of a mixed asset/managed IP network model, layer 3 network diversity and routing is assured so that if one physical core is rendered inoperable, call routing and delivery is seamlessly achieved through use of non-affected assets. This is a key driver in transforming physically limited networks of today into redundant, distributed and disaster-proof communication ecosystems.

Transformation Through Innovation with Atos

Rather than provide public safety customers with more of the same, Atos has specifically aligned its core competencies to fit the exact needs of the market. We have the industry's only VoIP switch capable of replacing the aged telephone exchange central office switches, one of the single biggest gaps in the 9-1-1 industry today.

As well, Atos does not prescribe to customers what their network or even their hardware infrastructure should consist of; we continue the Atos tradition of serving as a transformation partner, and help our customers identify the best network assets and redundancy design using what exists, rather than reselling what is already there. The industry has

called for reduced total cost of ownership by leveraging existing investments with Atos integrating and managing them. This is the Atos model in all client engagements.

From the Public to the Responders

A Single Platform for Collaboration and Coordination

The way we communicate has changed dramatically; in fact, it's hard to remember when making a "phone call" was our default communication method. Now, asynchronous communication—social media messaging, SMS, video, email—drives most of our actions, and its modes and methods are not supported by legacy infrastructure designed for a hardware era.

Where once we dialed 9-1-1, we now expect to "call" for help with a text message or through an application. We want to enhance our safety and security by offering information to public safety agencies. When we call for help, valuable

data is available via the right architecture and technologies, enabling first responders to serve us more quickly, effectively and collaboratively, increasing the odds of success for all parties.

Early adopters of digital 9-1-1 are sharing their lessons learned and advancements to set the benchmarks. Atos helped Summa 112—one of Europe's largest emergency coordination centers, serving 7.1 million people with an integrated voice and dispatch platform—modernize, streamline and greatly expand its capabilities, providing an excellent example of what's possible with today's technology.

IP makes it all possible. Through this protocol, national communication systems have been built, financial systems secured, social media revolutions enabled, information superhighways constructed, and global economies managed. It has ushered in the age of software, applications, cloud services and social media, changing how we communicate and, conversely, the products that support this application-driven world we live in.

OpenScape and NG9-1-1

The Atos OpenScape NG9-1-1 solution portfolio is putting state and local governments in the driver's seat, providing the ability to connect municipalities, enable interoperable communications between agencies, deliver command and control environments, and improve operations. Moreover, it can deliver all this while reducing overall costs to 9-1-1 authorities.

With Atos and the OpenScape NG9-1-1 platform, migrating to NG9-1-1 is not restricted to a specific starting point or product set; Atos manages the process as an ongoing journey, with one investment serving the entire transformation.

Whether starting with NG Core Services (NGCS)in the network, or placing a hosted

call-handling solution in service, the OpenScape engine powers the entire ecosystem with one platform for your communication infrastructure.

Atos NG9-1-1 Extends Functionality and Productivity While Lowering TCO

Creating an NG9-1-1-Powered Smart City Ecosystem

What is a "smart city"? We have all heard various iterations and slogans used (safe, smart, connected, converged, etc.) describing the "city of tomorrow," yet how many of these "blueprints" actually show us how to build this ecosystem? While there are many views about what defines a true "safe city," the Atos blueprint that makes "smart" synonymous with "safe" has been well defined. A national initiative is actively under way to create this ecosystem: NG9-1-1.

Rather than reinvent the wheel, Atos has defined a repeatable, scalable and sustainable framework that leverages NG9-1-1 for an even greater good. This framework relies on key pillars that, just like a safe/connected/smart city, provide the foundation for NG9-1-1, namely:

- Network management

- Applications and software services

- Cyber security

- Managed infrastructure

Collectively, these pillars reduce the cost of excessive and underused network assets, and help transition clients to a managed broadband domain with a reduced operating cost. Additionally, this broadband IP network domain enables a redundant, diverse network and integrated communications platform that is secured against cyber threats, affording PSAP operations a workflow management customization capability required for managing disparate data sets.

With these pillars in place, regions can define a virtually unlimited path for their respective future-state ecosystems, as a "smart" region is one that is connected, networked and secured. Whether the connection is initiated by a human or a traffic camera, communication grids power our world today; the same networked infrastructure models we are laying in place for ESInets via NG9-1-1 services can (and should) serve a greater good within the any region. NG9-1-1 and smart cities have the same stakeholders, address the same infrastructure elements, and serve the public; the Atos NGSmart model embraces these synergies and deploys shared architecture, which achieves a greater good.

Alignment of voice and data modernization programs at city/regional/state levels with the architectural blueprint already in place via NG9-1-1 has the ability to revolutionize the way public services are connected. Connecting disparate assets, entities, endpoints and systems is part and parcel of NG9-1-1, accounting for the need to integrate machine-to-machine (M2M) interfaces and nontraditional communicative paths, including new realities where connected cameras can themselves "call" 9-1-1.

Atos and and NGSmart provide the blueprint for your region's IT transformation by leveraging existing investments, sharing infrastructure, reducing cost and improving public service.

The NGSmart NG9-1-1 Model

While integrated PSAP workflow domains are critical to delivering public safety services, deploying the right infrastructure for tomorrow is paramount to successful NG9-1-1 transformation.

Voice and Collaboration Suites That Extend Functionality and Productivity

The most critical aspect of an NG9-1-1 migration is establishing the NGCS aggregation and routing hub, what Atos calls "the core." This core serves as the nucleus of the new IP network domain, serving as the mission-critical switching and routing engine of the ESInet. This core powers the scalable, diverse, mixed-asset ESInet infrastructure deployed and managed by Atos—a SIP-based enterprise voice solution serving as the integrated engine for NG9-1-1 delivery.

OpenScape sits at the heart of public safety communications by facilitating secure interoperability across the ESInet domain and among agencies for improved situational awareness and enhanced response tools. This leads to a more informed response and, ultimately, improved public perception and confidence.

While public safety organizations may seem to have an immediate need to replace a communications infrastructure that has reached the end of its life, it may make sense to choose a voice and collaboration suite that extends functionality and productivity, rather than a full system "rip-and-replace." Migrating with Atos makes your transition to NG9-1-1 safe and secure. It's a resilient, robust solution designed to work with any of your existing infrastructure investments, so it can integrate seamlessly and cost-effectively into your existing environment. You can use our OpenScape VoIP switch as the foundational platform where you can converge all your different inputs (network communications types) to give you an integrated call flow. It also means that over time, you can reduce complexity to make management of your system much easier, quicker and cheaper—a total cost of ownership benefit for multiple agencies to leverage.

Why Atos for Infrastructure Modernization

Atos provides public safety agencies with more than just an NG9-1-1 solution; we will be a strategic technology partner who will lead your IT transformation for years to come. We have put together a team of industry leaders to provide solutions that will be the benchmark for public safety infrastructure modernization across the country. We will lead our clients beyond current limitations and reliance on legacy network infrastructure into a managed ESInet domain, and will do so with the same complex infrastructure modernization expertise we bring to all client transformation programs.

To provide the best support to our clients, we apply governance that encompasses all aspects of our strategic direction, service offerings, technical integration, engagement model, relationship innovation and market position. Our ability to execute is rooted in our core focus in the IT services market and our years of practical experience in managing complex infrastructures, most recently seen around the world during the Rio 2016 Olympic Games, where all IT services and security were managed by Atos.

Reduce Complexity for Seamless Response

Incident Management: PSAP Solutions by Atos

OpenScape is at the heart of creating NGSmart cities, regions and interconnected state governments—converged communications over layered, logical, secure infrastructure domains. Atos' communications and collaboration division (Unify) has built a media-rich service with voice at its heart, which can also handle all the data public safety organization needs. Designed for carrier-grade voice communications in single, multi-site or cloud deployment models, this dynamic software solution can benefit call management operations of all sizes and volumes. Whether originating as a voice, text or video call, a variety of data feeds, from traditional to multimedia emergency calls (from video to text message), can be processed by PSAP personnel into a unified response.

Public safety agencies need a solution that can route various types of emergency and contact to the most appropriate and skilled agent within the control center. That's where OpenScape First Response provides the ability to receive and accept voice, video, text and social into a call routing network to quickly and simply allocate the most appropriate contact to the right agent. Routing emergency contact to the most appropriate agent automatically through better use of contact blending, queuing and proficiency weighting helps speed up first response and prevent the loss of lives.

Atos' NG9-1-1 PSAP solution, OpenScape First Response, is designed to seamlessly integrate into PSAPs. Working with existing technologies, such as computer-aided dispatch and geographic information systems, it brings together all applications in a control center, leveraging Big Data sources to drive first-response activities. Public safety agencies need an enterprise communications backbone to accept multiple contacts, including text, video (wearable body cameras or surveillance) and voice.

Baltimore County Sets Benchmark for NG9-1-1

In one of the earliest examples of NG9-1-1 migration and infrastructure enhancement, we provided the Baltimore County PSAP with the integrated framework needed to convert its legacy infrastructure onto a SIP-based platform, implementing our solutions to establish its NG9-1-1 framework and readiness well ahead of the curve. Going forward, we are working with the county to leverage its existing investment and bring its internal call management operations to an integrated application layer, empowering its PSAP with the most advanced communications management solution in the US. This will set the benchmark for the rest of the state of Maryland to follow as it migrates to NG9-1-1.

OpenScape First Response provides an intuitive, converged desktop that provides enhanced situational awareness. It leverages video and data to allow first responders to share live footage with the PSAP, or with other colleagues en route. This provides a much more accurate picture of an emergency situation, speeding up incident response times by using a multitude of potential data sources for incident command.

From receiving and processing multimedia emergency calls, to using location-based services to pinpoint the exact location of a caller, to establishing real-time visual assessment using available surveillance cameras, OpenScape First Response solution is the foundation for improved public protection and safety.

Transformation with Atos
The Future Is Now

As we saw with Atos customer Summa 112 in Spain, when call takers are armed with a full and current appreciation of the situation and the right support, first responders can be immediately directed to the situation, and its impact can be assessed in real time. Live, reliable, visual communication between those on the ground, at command and in other agencies reduces the likelihood of mistakes, increases the immediate impact of first responders, and delivers a more efficient overall response.

Furthermore, our solutions allow public safety agencies to capture actionable intelligence from members of the public during emerging situations, and use that intelligence to inform and guide responders and affected parties safely and collaboratively. For example, Atos' Big Data

tools can capture actionable intelligence from the public during emerging situations, via such sources as Twitter and Facebook, video, SMS and email streams. This can then be used to safely collaborate with, inform and guide responders and affected parties. This not only warns citizens in the immediate vicinity of an emergency and enables direct communication with those involved; it also informs non-affected civilians to stay away from the affected area until the situation has passed.

From network traffic management to PSAP call handling and incident management, the OpenScape NG9-1-1 portfolio helps first responders perform to their best, regardless of the communication kit used. Not only will public safety personnel be able to more seamlessly communicate with each other, but first responders will

also be able to process incoming on-scene video to the PSAP and responders in the field using the OpenScape platform. The result is end-to-end communication control. Whether it's a fire or medical emergency, and whatever device the member of the public has, first responders can view the scene, prepare to deal with it, and even advise the citizen on how they can assist.

Why Atos for Public Safety

While our expertise is proven across the public sector in the US and abroad, Atos recognizes that 9-1-1 is a highly specialized segment of the market, one that requires a unique set of core competencies and subject matter expertise. Our dual task is to ensure that customer objectives are understood and met, and that Atos'

transformational pillars are focused in the appropriate areas of expertise. To achieve this, we have collaborated with industry partners over the last year to refine and optimize the most reliable and scalable NG9-1-1 solution that the industry has to offer. Through our team of experts, Atos will manage your entire transformation as

the single turnkey provider, overseeing all facets of the deployment and delivering a fully managed service into and through your NG9-1-1 infrastructure modernization process

About Atos

Atos SE (Societas Europaea) is a leader in digital services with pro forma annual revenue of circa € 12 billion and circa 100,000 employees in 72 countries. Serving a global client base, the Group provides Consulting & Systems Integration services, Managed Services & BPO, Cloud operations, Big Data & Cyber-security solutions, as well as transactional services through Worldline, the European leader in the payments and transactional services industry. With its deep technology expertise and industry knowledge, the Group works with clients across different business sectors: Defense, Financial Services, Health, Manufacturing, Media, Utilities, Public sector, Retail, Telecommunications, and Transportation.

Atos is focused on business technology that powers progress and helps organizations to create their firm of the future. The Group is the Worldwide Information Technology Partner for the Olympic & Paralympic Games and is listed on the Euronext Paris market. Atos operates under the brands Atos, Atos Consulting, Atos Worldgrid, Bull, Canopy, Unify and Worldline.

For more information on our Public Safety offering and the solutions Atos provides, please visit us at:
atos.net/ng911
ascent.atos.net

Let's start a discussion together