

From reactive to proactive: Transforming public safety with safe cities technologies

White paper

Executive summary

While today's city leaders have many responsibilities, public safety consistently ranks among the top issues.¹ Indeed, as worldwide consulting firm McKinsey & Company points out, responding effectively to matters of life, death and trauma is the most fundamental function of city government.² From burglaries, accidents and homicides to terrorist attacks, fires and hurricanes, city agencies are expected to quickly and decisively respond to—or, better yet, prevent—a wide range of incidents.

Many cities, however, are struggling to deliver on this mission. As populations rise and threat scenarios increase, they're finding that the traditional siloed operational models and infrastructure systems are no longer up to the task. Agencies need to communicate and collaborate more efficiently and effectively, and take advantage of the many digital tools now available.

That's why forward-thinking city leaders are investing in smart public safety technologies, such as predictive policing, real-time crime mapping and gunshot detection. McKinsey & Company found that deploying a range of smart public safety technologies could help to reduce fatalities by 8% to 10% and lower crime incidents by 30% to 40%.³

To help more cities adopt smart public safety technology, Verizon has created a portfolio of integrated solutions that run on a secure public safety network. Delivered as hosted and managed services across a unified platform, they reduce the need for IT involvement and hardware investments, and work together to improve situational awareness, decision making and safety.

"The goal of any safe city program," says PricewaterhouseCoopers (PwC), "is to provide officers and first responders with a shared security presence and an enhanced awareness."³

Public safety ranks high in preferences and priorities.

Safety and security are a major priority in any city, for elected officials and public responder agencies, as well as for residents and visitors. Feeling safe and secure in a community is critical for quality of life, which is why safety is among the primary metrics in virtually every "Best Places to Live" survey. In fact, for many seniors, it's the number-one metric⁴ when it comes to choosing a place to retire.

There's good reason for that. As the Institute for Local Government found, residents' perception of safety impacts health and well-being by influencing their level of engagement in physical and social activities.⁵ Residents who don't feel safe in their communities are less likely to be involved, increasing their risk of isolation, obesity, diabetes and high blood pressure.⁵

Crime can also impact the local economy. Gun violence, in particular, has been found to significantly reduce the growth of new retail and service businesses and impact home values.⁶ Further, higher levels of neighborhood gun violence can be associated with fewer retail and service establishments and fewer new jobs.⁶ Higher levels of gun violence are also associated with lower home values, credit scores and homeownership rates.⁶

It's not surprising that crime prevention and emergency response is growing increasingly difficult as urban populations surge. And while public safety is typically one of the largest expenses for city governments, crime-fighting costs keep rising. And budgets aren't necessarily growing apace.

"Cities big and small are contending with a tall order: Do more with less, help more people, expand more programs, but do it with less money, and less support from the federal government," said Brooks Rainwater, the executive director of the National League of Cities Center for City Solutions.⁷

The advent of safe city technologies

To manage the complexities of public safety—and other pressing urban challenges, such as transportation and parking management, energy, traffic, citizen engagement, the digital divide and sustainability—city leaders are increasingly embracing smart city technologies.

Most agencies and systems that serve communities operate independently, making it difficult to get the big picture—of crime, traffic congestion, street light outages or a host of other issues. Such organizational and technical silos complicate efforts to improve processes and services, and impede interagency coordination and collaboration.

Smart city technologies utilize advanced networking, cloud, security and device management tools, helping to eliminate information silos and enable rapid interagency communication and collaboration, so city agencies can deliver more efficient and sustainable services.

Safe cities, a subset of smart cities, use a similar toolset to advance the way public safety intelligence is gathered and processed. They are typically municipal-level deployments of sensors and surveillance systems that specifically serve to enhance civilian security and safety. Homeland Security Research Corporation⁸ defines safe city technologies as “a system that enhances public security by constructing networked sensors across cities to optimize safety-related response, from detection to reaction.”

A typical safe city architecture might include a surveillance system (IP cameras and video analytics); network connectivity; a data center (cloud or local); mobile devices and a command center.

The ROI of safe cities

But can technology really help cities become safer, more livable and more sustainable?

In a word, yes.

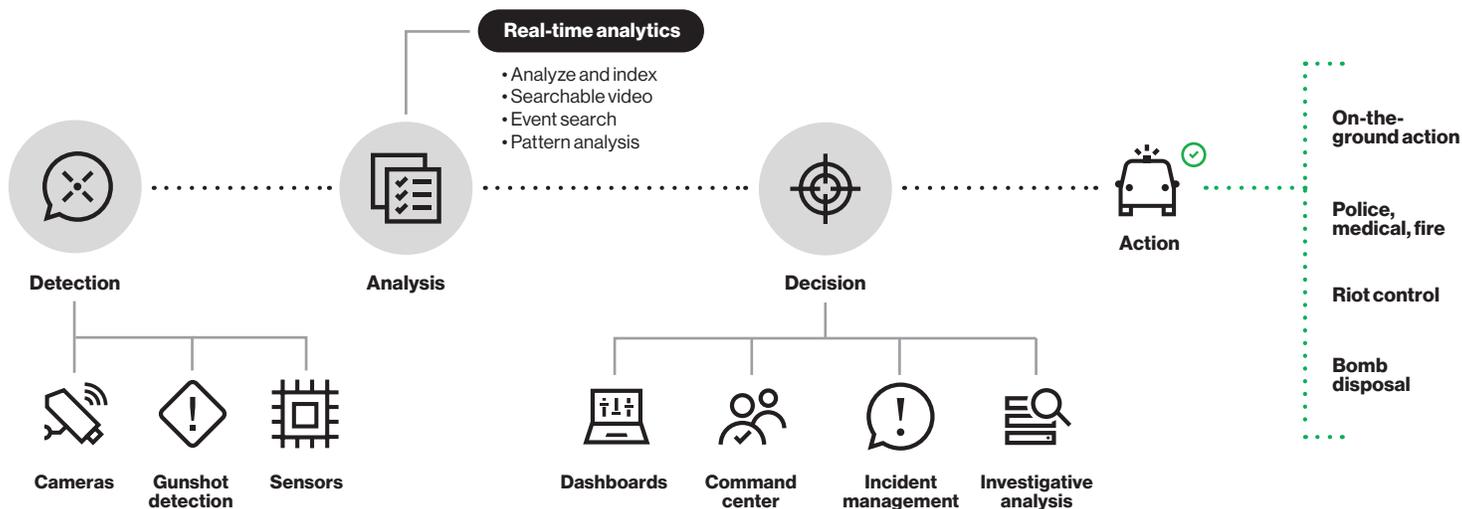
A 2018 Forbes Insights/Intel survey⁹ of 211 senior leaders found concrete gains across the board from smart city technologies. When asked which technologies have created a return on investment (ROI), respondents cited public safety (81%), waste management (68%) and energy/smart grids (65%).

Additionally, New York, once known as the murder capital of the United States, now ranks as the safest major city in the country, thanks in part to predictive modeling that identifies key crime hot spots. The NYC fire department similarly uses data analytics to target the areas most likely to need building safety inspections.¹⁰

McKinsey & Company reports that cities that deploy a range of smart city applications to their maximum effect could reduce fatalities from homicide, road traffic and fires by 8% to 10%. In a city with the population and crime profile of Rio de Janeiro, which has a population of approximately 7.44 million (over a million fewer than New York City), that could mean up to 300 lives saved each year. Predictive policing, real-time crime mapping and gunshot detection could lower incidents of assault, robbery and burglary by 30% to 40%.²

Positive results like these are attracting the attention of public safety leaders across the country. According to Forbes, one-third of all U.S. cities either use or are considering predictive or data-driven policing.⁹

A safe city workflow, as described by PwC:³



Financial and functional challenges to data-driven public safety

While the merits of data-driven public safety are increasingly evident, financial and functional issues have been preventing its broader adoption.

For example, video surveillance is becoming increasingly costly and complex. Each new IP video camera requires a broadband connection and data storage services, as well as the personnel and services necessary to manage infrastructure.

Similarly, public safety agencies are facing a torrent of data that is both complex and costly to manage.

The ability to rapidly ingest, analyze and deliver information systems is the backbone of data-driven public safety. Data gathered from 911 call systems, video surveillance, license plate detection and other systems can help agencies find perpetrators and victims, track suspects, uncover patterns, and better manage planned and unplanned events.

And while many departments have individual solutions to gather this information, too often they're not integrated and require time-consuming manual collection to build a holistic picture. Most agencies have limited IT staff or budget to integrate siloed systems, or to efficiently manage manual data collection, integration and analysis. Many also lack the data hygiene tools needed to ensure that information is viable, current and actionable, as too much data can be as problematic as no data. There is also the burden of responding to Freedom of Information Act (FOIA) requests, which can require time-intensive searches and heavy redaction on photos and video.

Once data is scrubbed, it must then be sorted, curated, indexed and delivered quickly, efficiently and reliably to only the people who need it, when and where they need it, and on the device that they are currently using. All of which requires additional infrastructure and personnel.

These, and other financial and functional challenges, have thus far impeded the widespread implementation of safe city technology.

Integrated solutions for improved situational awareness and response

To help public safety agencies overcome those challenges, Verizon has created a portfolio of integrated solutions that connect agencies and their communities through a secure public safety network and application portfolio across a unified platform.

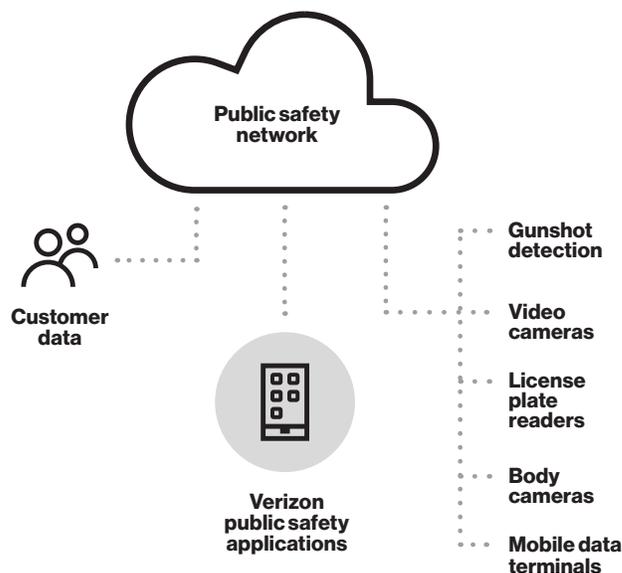
Offered as hosted and managed services, Verizon public safety solutions eliminate the need for hardware investments and IT support, making the technologies more accessible and convenient.

Solutions include:

- Real Time Response System
- Intelligent Video
- Gunshot Detection
- Wireless Priority Service
- Mobile Broadband Priority
- Preemption
- Responder Private Core
- Private Network Traffic Management
- Evidence Management (2019 launch)
- Intelligent Video 2 (2019 launch)

Verizon public safety technologies work together to provide public safety agencies with enhanced situational awareness through the integration and analysis of data in near real time. Agencies can also leverage historical crime data, license plate recognition, gang information and other data sources to proactively determine the likelihood of a crime or other event occurring.

Information is delivered over a secure private network that prioritizes public safety communications, enabling responders and others to react more quickly, efficiently and deliberately, with improved operational intelligence.



And as more cities tap into the power of Verizon 5G, public safety agencies will gain access to high-speed, low-latency connectivity that will enhance the functionality of all public safety and Smart Communities technologies—particularly those utilizing video and data analytics.

With the multitude of safe city solutions to choose from, it's hard to know which one to implement first. An excellent way to start—and a way that most smart cities are deploying—is via Intelligent Lighting, where aging streetlights have been upgraded to LED-based luminaires and smart controls, both of which can help cities save millions of dollars in energy and maintenance costs while gaining increased control and access to actionable data.¹¹ The nature of an intelligent lighting system lends itself perfectly to additional sensors that are necessary for safe city solutions like gunshot detection, intelligent video and intersection safety analytics.

Following are some examples of how Verizon public safety technologies could provide invaluable data, network access and intelligence in various scenarios.

Active shooter use case

Consider an active shooter situation. With a gunshot detection service, the software-as-a-service (SaaS) solution sends an alert within 60 seconds of detection to dispatch centers and officers, and maps the location of the shot(s) within 25 meters. Street-level views provide officers with increased tactical awareness of the area. Additional data, from surveillance cameras, 911 calls, records management systems (RMSes), computer-aided dispatch (CAD), license plate recognition, information from the public and more, can all be accessed through the Real Time Response System interface, and reviewed, annotated and shared with first responders.

Verizon Mobile Broadband Priority helps provide network priority for communication traffic, while Verizon Private Network Traffic Management helps responders quickly and securely access information to increase situational awareness, such as street and building maps, live video feeds, and known offenders via automated database searches.

The rapid alerts and integrated system help improve the response time, enabling authorities to more quickly aid victims, identify witnesses, and locate key evidence to identify and prosecute suspects.

Natural disaster use case

In the event of a natural disaster, Verizon public safety technologies can help responders across multiple agencies communicate, coordinate and stay informed.

Integrated field asset-tracking software enables the near real-time tracking of responders and equipment in the field, while surveillance video can provide insights into current road conditions, making it easier to plan a safe evacuation or rescue routes. All of this information is provided in a single view to quickly assess the situation and respond accordingly.



Improved decision-making with the Real Time Response System

The potential of smart technology

Safe city technologies have the potential to make cities across the United States safer and more livable—for both the public and first responders. These technologies can also make public safety operations more efficient and cost-effective, through better management of everyday operations, special events and crisis response.

And at a time when state and local agencies are being expected to do more with less, safe city solutions can help cities get more value from existing infrastructure systems, while expanding the capacity and lifespan of those systems.

With our Verizon public safety portfolio, the goal is to:

- Provide agencies and first responders with greater situational awareness
- Empower better collaboration and coordination inside departments and among agencies
- Make smart technology more accessible and manageable for more cities
- Reduce complexity, improve planning and optimize resource management
- Help improve quality of life and make neighborhoods safer
- Enable the shift from reactive policing/emergency management to proactive planning, readiness and response

Verizon has extensive presence in cities throughout the United States with our network and fiber infrastructures, as well as broad execution capabilities and technical expertise.

Public safety has emerged as one of the most important functions for governments around the country and around the world. At Verizon, we believe in the promise of safe city technologies to revolutionize urban policing and improve safety and well-being in communities.



Predictive policing, real-time crime mapping and gunshot detection could lower incidents of assault, robbery and burglary by 30% to 40%.²

Verizon public safety solutions

Real Time Response System

Integrates large amounts of data from multiple sources, such as computer-aided dispatch, video sensors, record management systems and third-party databases. It compiles data and provides city agencies with a consolidated, accurate and near real-time view of the city.

Intelligent Video

Provides situational awareness by leveraging advanced edge analytics and alerts to proactively identify threats. When suspicious activity is detected, an alert is immediately sent to authorized personnel to enable rapid response.

Gunshot Detection

Detects and locates gunfire in near real time, utilizing acoustic sensing and enterprise-grade software. Alerts are then broadcast to 911 dispatch centers, patrol cars and even smartphones, with the location, number of rounds fired and approximate number of shooters.

Wireless Priority Service

Gives key agency personnel top-level priority for wireless communications during a crisis, such as national security alerts and natural disasters. Designated individuals receive the ability to improve the probability of call completion during wireless network congestion in periods of national security and emergency preparedness.

Mobile Broadband Priority

Provides agencies with priority data service, so their communications take a higher priority to access the network over regular traffic when needed.

Responder Private Core

Separates public safety data communications from commercial and consumer traffic, so agencies don't have to compete for network resources.

Private Network Traffic Management

Consolidates emergency communications and enables public service agencies to control which applications get preferential access.

Preemption

Reallocates network resources to public safety users, so they can stay connected if the network is congested. Verizon leverages Preemption during peak demand and emergency situations.

Evidence Management (2019 launch)

An advanced digital evidence solution specifically designed for law enforcement. A technology platform acts as a force multiplier that allows agencies to load, store, collaborate on, analyze and distribute a broad range of digital assets (video, audio and images) to pursue criminals, expedite case resolution and effectively prosecute suspects.

Intelligent Video 2 (2019 launch)

An economical and highly scalable cloud-hosted and managed video surveillance solution with easy integration with existing surveillance deployments. A mix of edge and server-based analytics can proactively alert personnel, provide historical trending and expedite evidence retrieval with forensic search capabilities.

Gunshot detection sends an alert within 60 seconds and maps the location of the shot(s) within 25 meters.

Public safety solution spotlight: Verizon Real Time Response System

Real Time Response System is a managed decision-support system, delivered over a secure public safety network. It unifies public safety systems and integrates data from multiple independent systems—such as computer-aided dispatch, video sensors, record management systems and third-party databases—into a single, near real-time view of a city.

With an open architecture, best-in-class partner technologies from Genetec and an approach based on application programming interfaces (APIs), Real Time Response System combines advanced data analytics with leading-edge video and computer vision and runs on Verizon's advanced fiber-optic 4G LTE and—on the near horizon—5G networks.

Operations are seamlessly merged within a single interface, enhancing situational awareness, and empowering users to rapidly respond to emerging situations.

Real Time Response System comes with four core capabilities: live monitoring, a correlation engine, analytics and early warning. It allows agencies to integrate multiple data sources, including, but not limited to:

- Gunshot detection systems
- CAD
- RMSes
- Geographic information systems (GIS)
- License plate recognition
- Video management systems
- Sensors (traffic detection, alarms, cameras and more)
- Field asset tracking
- Third-party databases

Real Time Response System rapidly integrates, scrubs, sorts, curates, indexes and delivers data to a broad selection of mobile and other end devices. To minimize network bandwidth requirements, the analysis function is distributed to the most suitable device, based on physical location and use case.

The fully managed platform does not require IT support and integrates with existing technologies to help increase ROI on previous investments. It can also help keep training expenses and time to a minimum, with an intuitive, portal-based application interface.

With data sources unified into a single view, agencies can visualize crime hotspots, identify connections between crimes and contextualize incidents within larger trends. Additionally, Real Time Response System provides risk analysis, major event analysis and incident playback, and it measures the effectiveness of initiatives and campaigns.



Safe city objectives

City governments are facing unprecedented pressure to do more with less. Safe city technologies provide a new toolset to deliver more efficient and effective services, increase awareness for first responders and improve quality of life for residents and visitors. The potential benefits of safe cities include:

Security and safety:

- Live surveillance and alerts in case of an incident through a network of cameras
- Greater coverage of surveillance within the city, with more eyes on the street
- Supporting operations at major events, such as crowd control and safety
- Preventing crimes by detecting and deterring criminal activity, and by helping identify and assist in the apprehension of offenders, leading to their prosecution

Improved responsiveness:

- Providing citizens with access to the police for quick and effective response, along with improved visibility and transparency
- Improved response times and a general reduction in the fear of crime in an area
- Providing assistance to emergency services and fast turnaround time

Effective policing:

- Addressing threats of terrorist attacks
- Assisting in the management and policing of large-scale events
- Aiding investigations by the police department by integrating analytics tools
- Providing evidence for criminal and civil action in courts



1/3 of all U.S. cities either use or are considering predictive or data-driven policing.⁹

Improved management:

- Helping in maintaining law-and-order situations
- Helping to improve traffic discipline
- Acting as a tool for municipal corporations and other government agencies in the monitoring and maintenance of their functions
- Providing a framework to all the stakeholders, so that there is proportionality and transparency in their use of surveillance
- Ensuring scalability and interoperability of systems



Verizon Intelligent Traffic Management

Uses machine-to-machine (M2M) technologies and wireless networking to gather data on traffic density and patterns to help identify problem areas and improve traffic flows.



Traffic Data Services

Utilizes billions of accurate cellular network records to provide near real-time traffic data and population movement analytics.



Intersection Safety Analytics

Uses cameras and cloud-based software to provide insights about traffic volume, speed and direction. Delivers data on vehicles, pedestrians and cyclists, plus trends and historical data, to help manage congestion, plan traffic improvements and measure progress on Vision Zero goals.

Related Smart Communities solutions



Intelligent Lighting

Helps reduce costs, conserve energy and improve compliance and the perception of safety. Each fixture can function as a node for other IoT sensors and devices, including cameras, ambient light sensors, microphones and more.

Learn more

Discover how the Verizon portfolio of integrated solutions can help you adopt safe city technologies.

enterprise.verizon.com/realtimeresponse



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