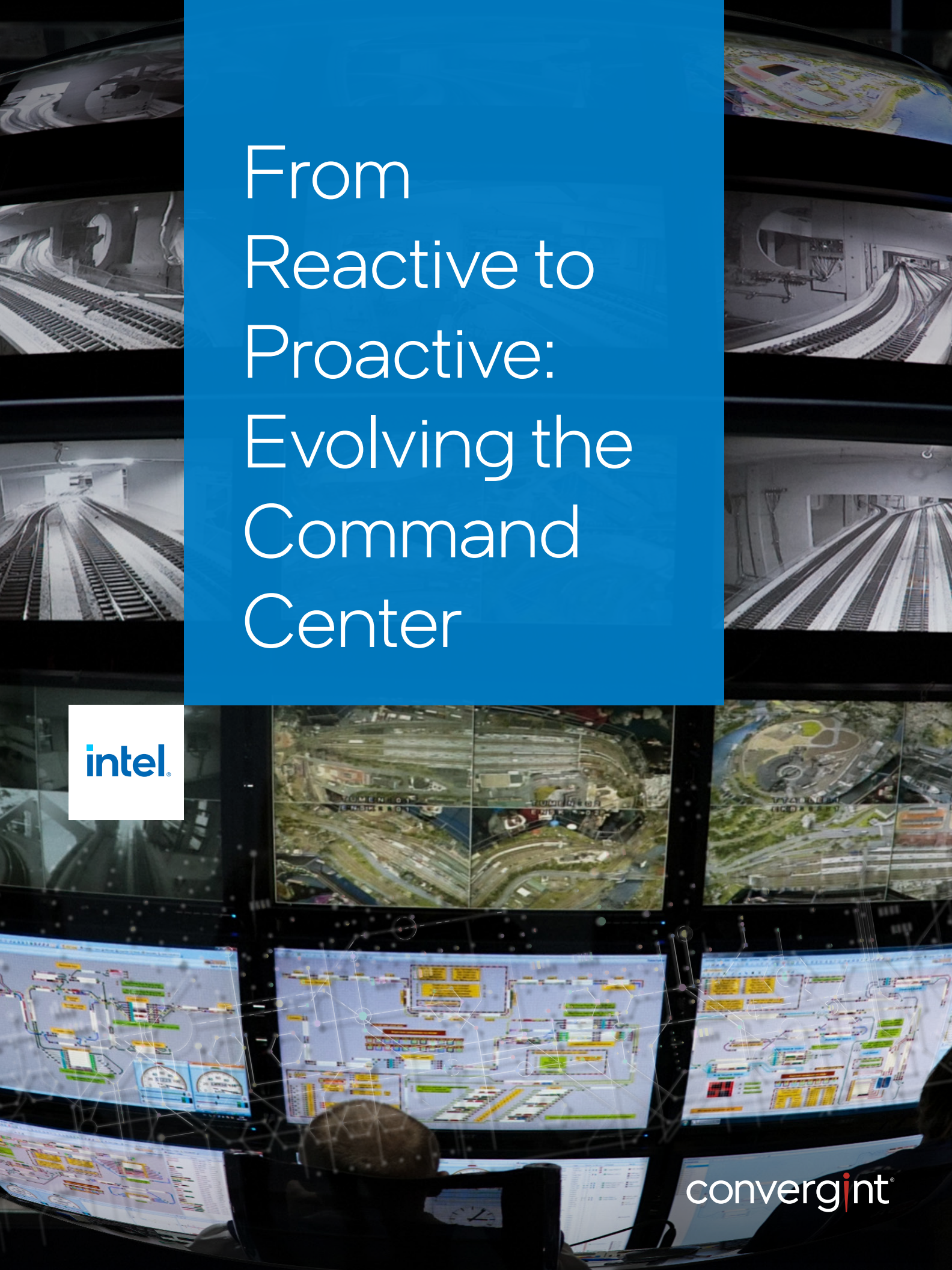
From Reactive to Proactive: Evolving the Command Center



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Convergint and Intel are laying the right technology foundation for cities to reimagine public safety. Our shared vision brings citizens greater protection and safer cities, based on an innovative public safety model that's proactive, smart, and fully integrated in urban life.

Scott Frigaard
DIGITAL TRANSFORMATION: DATA FUSION + AI INITIATIVES
CONVERGINT TECHNOLOGIES

Emerging and disruptive digital technologies are enhancing public safety in cities worldwide. Convergint and Intel work with cities, law enforcement, emergency management, and local governments to help better the safety, security, and quality of life for urban citizens around the globe.

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Introduction

Command Centers (C2) are the nerve center of public safety. Reacting to alarms, dispatching first responders, making sense of unfolding events, and more, C2s bring together a community's awareness of and responses to threats against people, property, and ideas.

Command Centers are outstanding at certain critical capabilities:

- Centralizing management of alarms and calls for service
- Providing real-time situational awareness into areas under video surveillance
- Centralizing communications from the C2 to local responders and administrators
- Enabling standardized operating procedures and consistent responses across the city

Command Center Challenges

Threat environments have changed. Command Centers have not necessarily shifted to address modern challenges. Today's public safety agencies must do more than react to in-process situations—they can play an active role in creating a safe, hospitable urban environment for citizens.

C2s are reactive by nature, responding to a call for service, a triggered alarm, or a detected incident. While efficient at handling those events, C2s have minimal capabilities that are proactive, predictive, or preventative.

Here's the problem: the majority of systems and data sources a C2 monitors **aren't integrated with each other.** A typical C2 operator works with a minimum of 10 different systems and data sources for alerting, device navigation, dispatch, response, notification, documentation, and reporting. The convoluted process of gathering event context, distilling it into actionable intelligence, and then identifying trends is currently overwhelmingly manual—and highly inefficient. Operators are expected to identify events and behaviors quickly and make important decisions, potentially under circumstances they haven't been trained for. Additionally, C2s are often not integrated with other departments (such as Facilities, Traffic, Utilities, Emergency Management, Crisis Response, Parks and Recreation, Parking, Fleet Management and Cybersecurity Operations) that identify additional threats to the community and/or are impacted by those threats.

The most important weakness is built into its very mission: a C2 is security-centric. This mission is rigid, inflexible, and cannot easily adapt to new public safety scenarios and situations such as COVID-19, mass casualty events, or localized political unrest.

In real life, many contemporary Command Centers are not equipped to:

- Scale to the current threat volume
- Adapt to emerging threats
- Contribute to the municipality's overall strategy, growth efforts, or initiatives

The Fusion Center

In response to communities' evolving priorities, forward-thinking leaders are looking for better ways to protect people, infrastructure, assets, and facilities. At the same time, they want to improve operational efficiency across multiple departments and gain insights to be more responsive to community needs. The next stage in the evolution of the Command Center is the Fusion Center.

The Fusion Center is a proactive, predictive, preventative nerve center that facilitates decision-making through increased intelligence and better understanding. It helps cities improve the quality of life for citizens and be more prepared for and more resilient after adverse events.

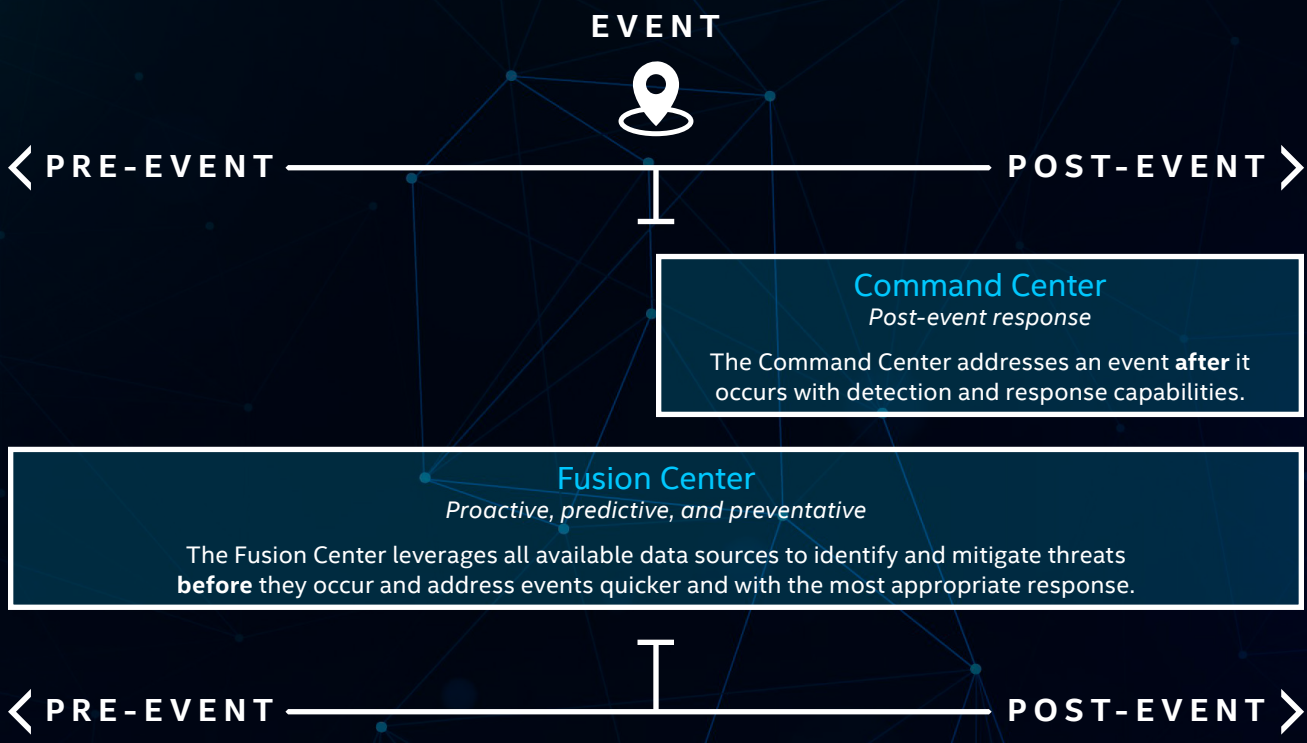
The Fusion Center leverages the existing C2 benefits of centralized management, visibility and communications and expands the capabilities to create an effective center that is:

- Fully integrated
- Fully aware
- Fully collaborative

Public Safety Event Timeline Comparison

An event is any deviation from the norm for which Public Safety should have awareness or act. The C2 does not act until/unless an event is detected or reported. C2 operators are constantly working, but event notification is what starts a workflow. They react to the detection of an event and then execute response and recovery procedures.

Unlike the Command Center, the Fusion Center does not require a triggering event to start working. The Fusion Center leverages all available data sources to identify and mitigate threats before they occur and address events quicker and with the most appropriate response.



Full Integration

There is no such thing as an isolated event.

The C2 presents an alarm to the operator as a starting point without context. A Fusion Center, by contrast, automatically correlates all related data sources in response to an incident. This gives the operator instant situational awareness of the event and then leads them quickly through the right response with the appropriate procedures.

Situational Awareness

When an event is detected, the Fusion Center provides the greatest possible context surrounding an event by leveraging as many safety, security and operational data sources as are available to the municipality. These data sources should cross city/county boundaries just as crime, weather events, natural disasters and emergencies do, not respect jurisdictional boundaries. This level of integration identifies threats earlier, giving operators and analysts more time to respond. Public safety leaders must develop collaborative relationships with other agencies and departments to identify data sources that enhance visibility across the community and then work to integrate them.

Safer + Smarter Spaces

As passengers and workers travel through airports, video surveillance can detect when the space is becoming crowded or people are not physically distanced. After viewing sensor information to validate the situation, Security can redirect people to other areas before the space becomes more hazardous.

Responsive Street Lighting

As cities deploy more intelligent lighting, streetlights can make communities safer.

Smart Street Lights can be set at minimum illumination levels at night for each pole's location to minimize light pollution into the community. Sensors on the poles detect the presence of pedestrians and increase lighting levels as the pedestrian approaches to provide greater visibility for their path as well as make the pedestrians more visible to approaching motorists.

Smart Street Lights can also be integrated into public safety efforts. Streetlights can be integrated with CAD data to automatically raise illumination levels to maximum brightness at specific poles in response to 911 calls for officer safety. Lighting levels can also be adjusted in specific areas in response to an increase in criminal activity as a mitigation tactic.

Data Fusion

City and county law enforcement agencies typically have separate and distinct criminal data sources containing critical intelligence on people, places, and events. Since these data sources are not connected or integrated, coordinating information between agencies relies on ad hoc communications and relationships.

Stakeholders in other agencies are unaware of potentially relevant data, cannot easily access or search for the information, and cannot gather insights across the various databases.

With data fusion capabilities, public safety agencies can instantly:

- Share access to data collection such as mugshots, historical 911 records, and utility billing information
- Search across multiple data sources from multiple municipalities with a single query
- Make connections between people, places, and events across different data sources
- Analyze the results to identify trends and patterns in the data
- Create dashboards for all important KPIs and metrics

Systems Integration

Power fluctuations at a facility can cause the access control servers and video surveillance cameras to drop off, leading to a flood of alarms to the C2. The traditional C2 would respond to the increase in alarm volume and assume a video server is down. Integration with building management systems that alarm on electrical deviations would enable public safety personnel to correlate the security alarms to the facility power fluctuation and immediately work with Facilities to identify the resolution.

Sensor Monitoring

An overnight windstorm sets off sensors on government buildings downtown, the local power plant, and the bridge leading into the city. Sensors monitor the state or behavior of the environment. Machine learning forms a distributed monitoring system for the city that detects potential dangers, hazards, operational failures, and malfunctions. The Fusion Center is notified, and specific responses are automatically triggered.

Predictive Policing

An emergency is reported in the southwest area of the city. Situational awareness data is generated from

drones, wearable cameras, facial recognition, video, and images. In the Fusion Center, cities and law enforcement can combine and analyze all data together. Analysis can help identify or predict hotspots for street crime. Police can deploy more efficiently.

Data Visualization

License plate recognition systems that monitor traffic flows would alert the Fusion Center that incoming vehicle traffic increased by 300% in the last 10 minutes around City Hall, giving police more time to investigate and analyze the situation rather than receiving an emergency call from the City Hall lobby that there are people in the lobby chanting and carrying signs.

Environmental Monitoring

Temperature sensors in server rooms, typically only monitored by IT staff during normal business hours, could alert Fusion Center operators that a data center is trending above normal temperatures. Operators could quickly investigate using the video surveillance cameras to determine the cause before a catastrophic failure can occur.

Incident Management

The second outcome of a fully integrated Fusion Center is that of enhanced incident management. Incident Management is the ability to act on the intelligence that is gathered which informs the standard operating procedures (SOPs) and enables instant and effective communication across the city from the Fusion Center down to the local responders and back to leadership.

Mass notification systems are an example of a fully integrated technology that enhances a city's incident response. They enable emergency operations to instantly reach every affected person in a geographic area in real time, leveraging every communications channel. Mass notification systems are critical to a municipality's emergency response plan because they simplify the way incident-specific alerts and instructions are created and distributed. Scenarios include notification of crisis alerts, severe weather events, natural disasters, active shooter situations, facility power and network outages, major police, fire, and health emergencies, and cyberattacks.

Gunshot Detection

Sensors installed on buildings and along streets detect a gunshot. These sensors can identify the location of the shooter, the number of shots fired, and the type of firearm. The city Fusion Center is alerted instantaneously, eliminating the need for the community to differentiate the gunshot from similar sounds and call 911. The Fusion Center automatically displays live video from the area of the gunshots, giving operators complete, real-time situational awareness to determine the most effective response. Officers receive near-real-time notifications on their phones or mobile data terminals (MDTs) with the gunshot data and live video. Law enforcement can respond faster to save lives and increase the chances of catching the perpetrators. Data from the gunshot event then feeds into predictive policing efforts for more accurate modeling.

Crowd Management

A large crowd gathers downtown near the sports stadium. With video analysis at the Fusion Center, the city understands when, how, and why the crowd forms. Public safety officials gauge crowd densities at different locations, assessing the number of people visiting concessions and providing queue waiting times for public toilets. Security can be alerted to direct pedestrian traffic in crowded areas.

Incident Detection and Management

Situational monitoring systems detect unusual behavior or a potential threat. First responders assess the situation via low latency optical sensors. Emergency vehicles communicate with traffic signals and hospitals. Public safety officials gain complete, accurate information for threat detection, incident management, and investigations.

Boosting Visitor Safety at the National Mall in Washington, DC

Convergint Technologies donated a comprehensive, state-of-the-art security system to the National Park Service to boost safety and situational awareness for the National Mall and surrounding monuments and memorials.

Along with eleven industry partners, Convergint donated and deployed the technology infrastructure necessary to improve safety at the National Mall and surrounding historical monuments, which experiences more than 35 million visits annually.

The donation from Convergint and its partners enhances and expands security coverage, upgrades technology from legacy systems, and allows the National Park Service to use real-time information and communication technologies to respond to issues quickly. Phase one of the project included the enhancement of a centralized monitoring center, intercom stations, public address capabilities, and upgrading from analog to IP-based cameras. Phase two will further extend situational awareness at various monuments by adding additional IP-based cameras back to their headquarters.

Full Awareness

In a fully integrated Fusion Center, there is greater situational awareness. But the workflows are still reactive, and response begins only after the incident has begun. A fully aware Fusion Center seeks to:

- Reduce the total number of alarms that require operator input
- Automate standard operating procedures (SOPs)
- Proactively identify threats sooner

Artificial Intelligence (AI) for Pattern and Trend Detection

With ever increasing amounts of data coming into the Fusion Center, Artificial Intelligence works to identify trends in vast amounts of data. For instance, AI can analyze the millions of roadway safety data points to help identify broken sidewalks and other hazards that can cause pedestrians to walk into the streets and be more vulnerable to oncoming traffic.

System Health Monitoring

Public safety agencies are blindsided when Fusion Center operators attempt to retrieve video but instead discover a camera was offline, was not recording, or the camera was not focused on the incident. To address this, most municipalities assign operators the manual task of checking cameras during their shifts. This can take significant time, depending on the number of the cameras in use, and results in operational inefficiencies and lost productivity. System health monitoring applications automate the process of checking camera status, provide instant notification when a camera's state changes, and can be configured to automate the resolution process.

Proactive Threat ID

Alarm reduction strategies aim to minimize the volume of information that is presented to the operators. In the proactive threat identification phase, the objective is to enable public safety operations to detect threats as early as possible.

Personnel

Once the volume of alarms is reduced, the Fusion Center can replace alarm-responding operators with forward-looking analysts. These analysts are not responding to alarms. Instead, they focus on proactively identifying threats from other data sources, combining multiple data points to create information which is ultimately turned into actionable intelligence.

Mobile Incident Reporting

Mobile Incident Reporting tools enable all citizens to report incidents and threats from their mobile devices, acting as a public safety force multiplier. If a citizen observes an event or identifies something out of place, they can use a mobile app to take a photo that contains geo-location data and upload that image to the Fusion Center. Fusion Center operators treat this report like an incoming 911 call. Unlike incoming calls, the incident can be tracked through the resolution process and included in Fusion Center dashboards.

Risk Monitoring

Risk Monitoring enables the Fusion Center to support city-wide objectives with advanced threat detection. These systems proactively monitor, identify, analyze, and alert on threats against the city's infrastructure, citizens, and more. Risk Monitoring scours thousands of open source and social media sites worldwide in real time to detect events and incidents that pose a potential threat. These alert the Fusion Center, where analysts monitor and analyze the data.

Investigations/Case Management/Data Fusion

Additional technologies are designed to detect insider threats, fraud and other unwanted activities that cannot be detected and resolved in a matter of minutes. These tools enable complex investigations into multiple internal, open source and dark web collections and provide case management, link analysis, and other critical capabilities.

Cities and counties face a constant need to detect, identify, and respond to threats and mitigate risk, amid an ever-changing threat landscape. These tasks have previously been performed with different software applications, but Fusion Centers integrate numerous functions in a single application that includes:

- Enterprise search
- Insider threat
- Case management
- Link analysis
- Analytics
- Open-source intelligence (OSINT)
- Fraud detection
- Cyber security
- Organized crime

These tools give public safety an edge with rapid intelligence acquisition and intuitive data aggregation so the analysts can more quickly identify the people, places, and events that matter.

Emergency Response and Smarter Infrastructure

An earthquake hits the region. A pole-mounted seismometer registers and analyzes the event. The tsunami sensor triggers immediate phone alerts. The city Fusion Center is alerted, and emergency services are automatically dispatched. Community kiosks and digital signage are updated with emergency instructions. Command center dashboards centralize information and enable real-time situational awareness. The possibilities for protecting first responders and improving the lives of citizens through implementing a smarter infrastructure are endless. Connecting sensors at the edge through high-speed, modern networks to the data center and cloud for High Performance Computing (HPC) create unique opportunities for learning from data in fluid, fast paced situations as well as longer-term, subtle trends.

Pedestrian Safety

Crossing the street as a pedestrian can be a deadly activity. Technology can make the streets safe for all citizens. Sensors, installed on light poles, can provide constant counts of vehicle and pedestrian activity and data about vehicle speeds. Visual data from cameras can be analyzed to assess the number and speed of pedestrians, bicyclists, and motor vehicles and identify where pedestrians are crossing the streets. The sensor data leads to improved safety design to avoid future incidents.

Full Collaboration

Building on the integrated and aware capabilities, a fully collaborative Fusion Center equips the entire municipality to adapt to change more quickly by:

- Aggregating the data that drives decisions
- Creating tight integrations between public safety and other agencies
- Sharing information and intelligence with more stakeholders

Stakeholders

Interagency collaboration is critical for the Fusion Center to grow beyond public safety's borders and truly serve the community. Agencies and departments can build barriers through culture, policies and procedures that limit the flow of information and create silos.

The owners of data ingested into the Fusion Center become Fusion Center stakeholders. The Fusion Center concept invites key stakeholders to have ongoing involvement in the Fusion Center, with the goal of real-time information sharing, accountability and more effective partnerships.

Citizen Services Continuity

The final component of a fully collaborative environment is virtualization. With technology available whatever the center's physical location, the Fusion Center can relocate if needed. For example, if wildfires cut electrical power to the area for an extended time, the Fusion Center could be instantly distributed to another facility anywhere in the area with no interruption of services. Or, in response to a crisis, if the Fusion Center is overwhelmed by inbound calls, Fusion Center tasks can be distributed across multiple regional facilities to ensure continuous service.

Cross-Department Coordination

A series of floods and mudslides hit the city and agencies must coordinate response. Public safety agencies and government departments work together from a shared operations center. Appropriate information is shared across departments to improve coordination. Data is centralized for agencies to access and utilize as needed. High-risk areas are mapped to help identify coordinated responses.

Public Health

A potential public health issue arises in a city neighborhood. The city combines Big Data analysis with healthcare information to predict a potential emergency. Visualized health data, mapped by location, enables targeted interventions by neighborhood. The city can understand issues such as child abuse and neglect, drug abuse, unemployment, and health issues. Resources can be focused on neighborhoods or housing developments in need.

EVENT

PRE-EVENT — POST-EVENT

The Comprehensive Fusion Center

COLLABORATIVE

Stakeholders

- Crisis management
- Emergency ops
- Human resources
- Supply chain
- Facilities
- Operations
- IT/Cyber
- Fleet
- Communications
- Customer support
- Compliance and regulation
- First responders

Business continuity

- Virtualization

AWARE

Alarm reduction

- AI for false alarm reduction
- AI for trend detection
- System health monitoring

Automation

- Multi-factor correlation

Proactive threat ID

- Analysts
- Mobile incident reporting
- Analytics
- Risk monitoring
- Investigations
- Rapid intel collection
- Fraud
- OSINT/Deep/Dark

INTEGRATED

Situational Awareness

Security

- Access control
- Video
- LPR
- Intrusion detection
- Visitor management
- RTLS/Asset tracking
- Video analytics
- Weapons detection
- Drone detection
- OSINT
- Fire
- Risk monitoring

Emergency ops

- Weather
- Personnel safety

Operations

- Assets
- Geo-location
- Buildings
- Parking
- Fleet and fuel
- Transportation

InfoTech

- Cybersecurity

Incident Management

- Communications
- Mass notification
- Visualization
- Device/Asset locations
- Maps and floorplans
- Reporting

PRE-EVENT — POST-EVENT

Powering the Fusion Center

Protect people, critical infrastructure, assets, and facilities with the Convergint Fusion Center powered by Intel® technologies. This unified platform builds a complete operating picture that provides public safety agencies with enhanced situational and incident awareness, proactive response to threats, automation, and collaborative command and control. Forward-thinking technology can provide a platform that facilitates communication and collaboration to improve public safety and support the advancement of the city and its interests.

Together, Intel and Convergint Technologies are bringing new capabilities to the edge with performance-optimized, cloud-ready, interoperable, and compatible solutions that excel even in space- and power-constrained environments. These proven solutions can help reduce the cost and complexity of IT by consolidating data and applications, even while delivering new capabilities like vision and inference. This means public service agencies and cities can improve efficiency, reduce total cost of ownership (TCO) with a consistent infrastructure, and create safer cities.

From edge to cloud, Intel® solutions cover the full spectrum of technology that powers the Convergint Fusion Center. Convergint combines their expertise with Intel expertise to create integrated, optimized environments.

> *The evolution from a Command Center to a Fusion Center does not require a complete or immediate overhaul of the Command Center. Cities can phase in components and capabilities as suits their needs and unique challenges.*

Convergint Technologies

Convergint Technologies, in collaboration with Intel®, enables critical Fusion Center capabilities.

Integrate Platforms

Integrate all client-owned and third-party devices and data sources into a single interface. This allows for complete situational awareness, rapid threat detection, streamlined investigations, and more appropriate responses to incidents.

Incident Management

Act on gathered intelligence to inform standard operating procedures and enable instant and effective cross-city communication from the Fusion Center to staff and leadership.

Data Fusion

Identify trends and make connections faster by means of the integration, search, and analysis of client-owned, third-party, social media, and open data sources.

Mass Notification

Instantly notify designated contacts with geo-centric alerts and instructions across any communications platform.

Community Enablement

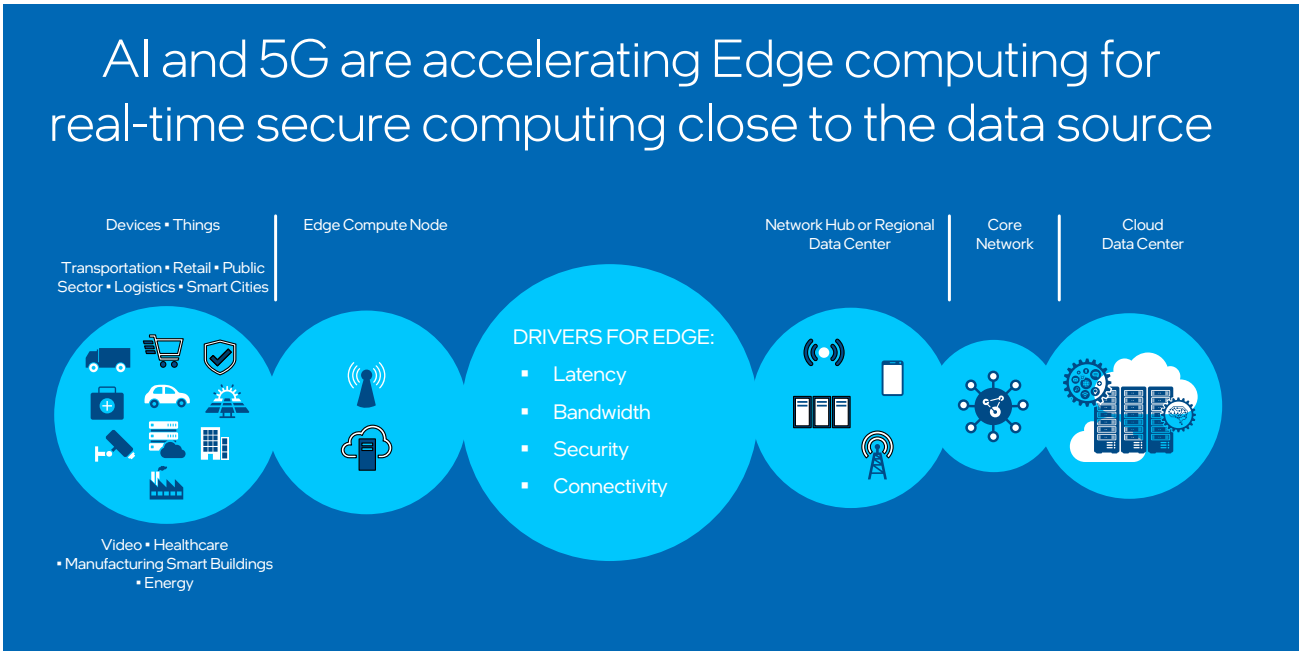
Enable citizens to be more proactive in their safety, allow municipalities to deliver services more effectively, and foster better collaboration between the community and first responders.

Risk Monitoring

Proactively monitor thousands of data sources to identify, analyze, and alert communities about threats and unexpected events.

Artificial Intelligence/Analytics

Technology that helps users analyze very large and often disparate data sets to detect patterns, make predictions, and identify connections between seemingly unrelated events.



Intel® Vision Products

With Intel® Vision Products, a portfolio of acceleration tools designed specifically for AI at the edge, Smart Cities can take advantage of near real-time information to help them make better decisions in a timely manner. Intel® technologies enable Smart Cities to innovate AI models and computer vision solutions that are high performance, low power, and easy to scale.

From smart cameras built on Intel® silicon, to edge compute devices (e.g. Network Video Recorders, gateways, video analytics appliances, etc.) powered by Intel® acceleration silicon, to the cloud—where training and analytics can run—Intel now offers the industry's broadest portfolio of assets to cover Artificial Intelligence use cases from the camera to the cloud:

- **Intel® Xeon® scalable processors:** powerfully designed to handle the broadest range of AI workloads including vision and deep learning.
- **Intel® FPGA:** real-time, programmable acceleration for deep learning inference workloads.
- **Intel® Movidius™ Myriad™ VPU:** cutting edge solutions for deploying on-device neural networks and computer vision applications at ultra-low power.
- **Intel® Vision Accelerator Design products:** to meet the demands of computer vision applications at the Edge and to enable solution providers and their customers to take advantage of a wide spectrum of video analytics-based use cases. Based on Intel® Movidius™ VPUs and Intel® Arria® 10 FPGAs, the Intel® Vision Accelerator Design products provide powerful deep neural network inference for fast, accurate video analytics.
- **Intel® Distribution of OpenVINO™ Toolkit:** comprehensive toolkit for quickly developing multiplatform applications and solutions that emulate human vision.

The Intel® Movidius™ VPU (Vision Processing Unit) product line offers key capabilities for computer vision at the Edge. It features high performance inferencing, low power, low cost, a small footprint, and broad and easy scalability. Intel FPGAs parallel hardware enables developers to customize Real Time AI engines optimized for performance, power, and cost. These two technologies, combined with the existing Intel® architecture portfolio, create a continuum of training to inferencing capabilities from the camera to the cloud, providing the right choice of silicon to match acceleration to the desired use case.

Finally, to accelerate development across Intel's wide range of Intel® processors and accelerators, Intel offers rich software tools, including the Intel® Distribution of OpenVINO™ Toolkit designed to fasttrack development of computer vision applications and streamline deep learning inference. The toolkit allows developers to quickly scale workloads across multiple types of silicon to leverage the best choice of Intel® technologies across their designs.[1]

Get Started

The Fusion Center is a natural evolution of a traditional Command Center, with existing technology enabled to adapt to a rapidly changing threat landscape. A proactive approach enables public safety to become more effective. Incidents can reach resolution faster when more intelligence is available and can be investigated with fewer manual processes.

Convergint and Intel are dedicated to helping you achieve your public safety goals. Our companies will partner with you to explore, evaluate, and implement a Fusion Center. Your journey can begin with small steps, such as a free assessment to evaluate your current state and pinpoint your most critical needs.

Contact Convergint for more information and to get started.

1. Participate in a free assessment
2. Explore how the Fusion Center can provide greater protection, enhanced efficiency, and better insights for your community

Interested in learning more about Fusion Center? Go to **Convergint.com**!

Endnotes

1. **While any standard algorithm will run on any Intel® silicon architecture, performance may vary from one architecture to another. However, in some cases, extra work may be needed using the Intel® CV SDK to port an algorithm from one architecture to a difference architecture.**


convergint
Think big
Evolve the command center
Start small
Get going with projects and opportunities
Move fast
Learn, adjust, iterate
intel