



Public Safety Without Borders:

The Future of Emergency Response with CAD-to-CAD Interoperability

By Steve Seoane, EVP and GM, Public Safety

WHY READ THIS WHITEPAPER

Learn why neighboring agencies should prioritize making their CAD systems interoperable before the next emergency hits. Those who do are better prepared to utilize resources efficiently, coordinate communications and above all, send help fast to those who need it.

Reading Time: 15 minutes



Idea in Brief

THE PROBLEM

Technology has dissolved jurisdictional boundaries in almost every way except one – emergency response. When a crime or emergency occurs, like a heart attack or drowning, the initial response is often limited to the agencies within those jurisdictional boundaries, even if a neighboring agency’s units are closer.

THE SOLUTION

Many neighboring public safety agencies are on disparate CAD systems that lack an easy, instant way to connect and share resources during an emergency. CAD-to-CAD interoperability is the cross-jurisdictional glue that connects public safety agencies to one another when a crisis strikes.

THE IMPACT

240 million calls to 911 are made each year. By cutting response time by even one minute, an additional 253,032 lives can be saved annually. When PSAPs and agencies connect their CAD systems they benefit from the smarter utilization of resources, greater data accuracy, faster response times and more in order to save lives and restore order.

Technology has a near-unlimited scope in its ability to connect people, businesses and government agencies together. When technology’s power of instant communication connects people, it’s convenient. When it connects government agencies, it can be a lifeline.

In the event of an emergency, CAD-to-CAD interoperability has the potential to connect agencies at the very inception of a crisis. When systems are not compatible and connected, jurisdictional boundaries cause confusion and get in the way of getting the closest and most appropriate first responder to every incident. Neighboring agencies should prioritize making their CAD systems interoperable so that when the next disaster hits, they are already prepared to utilize resources efficiently, coordinate communications and above all, send help fast to those who need it.

EVOLUTION OF THE PUBLIC SAFETY LANDSCAPE

To evolve implies a slow change over time. Technology hasn’t so much evolved as it has been radically transformed over the last two decades, exponentially so with each passing year. While public safety agencies have embraced some technological advances such as GIS-centered mapping, drones, mobile laptops, smartphone apps and 3D crime-scene imaging, the overall public safety technology landscape has not radically changed in the same way. Most public safety technology is still prohibitively expensive, cognitively complex and when implemented, often installed in segmented, siloed environments. Yet, technological advances are available right now that enable law enforcement and emergency response to improve communication, automate administrative tasks, solve crimes faster and use manpower more efficiently.



A CONSTANTLY EVOLVING, UPHILL BATTLE

Even though helpful improvements in public safety technology are available today, new challenges continue to undermine the real-world impact on law enforcement officers, firefighters, EMTs and telecommunicators.

As public safety technology continues to evolve, the challenges law enforcement officers face have increased aggressively. Citizen expectations have soared. First responders are expected to respond to situations in the same amount of time as it takes to send a text. Agencies are expected to handle major societal issues, like the opioid epidemic and securing large-scale public events and spaces, while their resources dwindle, budgets are cut and the attrition rate for law enforcement steadily grows.^[1]

Agencies are facing a rise in higher-profile challenges such as armed aggressors attacking vulnerable public institutions such as churches and schools, and the impact of natural disasters increasing in areas where populations have soared. One troubling example of these trends is the fact that the number of mass shootings has more than doubled in the last decade.^[2] Effective, fast, and consistent multi-agency communication is essential regardless of jurisdictional borders. Cutting down on response time, even by seconds, can enable law enforcement to slow attackers' progress, neutralize threats and save lives.

When agencies operate on different communication systems and relevant data is not shared in real time, emergency responders can be sent headfirst into dangerous situations without all the necessary details. This lack of information increases the risk to officers, emergency personnel and civilians and delays response. Even when critical information is communicated, details can be lost in translation between agencies. What may seem insignificant to one agency may be critical information to another. Pertinent details may be miscommunicated when phone calls or radio transmissions are the primary modes of communication during the chaos of an unfolding crisis. Essential details such as the nature of a call, the priority or even the address may have to be repeated multiple times and reentered into each call-taking system, wasting precious seconds.

Another challenge law enforcement agencies face is maintaining transparency and visibility with their communities. The mistakes or unnecessary conflict that can stem from officers working without critical information can interfere with public safety and inhibit healthy relationships with the community. The widespread use of body-worn cameras has been able to create an atmosphere of enhanced transparency, increased civility and quicker resolution of citizen complaints against officers.^[3] However, there have been some instances where important incident details are missed because the device wasn't recording. The unforeseen costs of managing hundreds of cameras, storing video footage, responding to open records requests and preparing footage for evidentiary purposes have resulted in some agencies scaling back the use of, or even abandoning, body-worn cameras.^[4]

Additionally, public safety is facing a shortage of telecommunicators and police officers everywhere from rural areas to major cities as a high rate of attrition continues to be a thorn in the side of communication centers and law enforcement.^[5] Job characteristics that contribute to attrition include telecommunicators and officers wanting better pay and benefits, job stress, lack of flexibility, negative public perception and increasing numbers of military call-ups.

Communication centers and law enforcement agencies have a constant need to hire and train new recruits in order to keep pace with job vacancies. Many centers and agencies around the country are operating with staff shortages and have done so for months, and even years. Even in the face of personnel shortages, and the training process for new hires is lengthy, taking up to a year for new telecommunicators, and a minimum of two years for new officer recruits from starting at the police academy to serving as an experienced officer. New recruits are required to undergo physical fitness tests, reading exams, drug screens, polygraphs and psychological evaluations. Officers must then complete police academy, field training with a senior officer and the necessary administrative training. With a declining candidate pool and high turnover, this length of training required to get new, qualified officers on the streets makes it difficult for many agencies to keep up with the growing demand.



HELP IS ON THE WAY: CONNECTING TECHNOLOGY TO A CRISIS

Technology should be the force multiplier that emergency response agencies utilize to meet these increased needs.

The primary benefit of introducing technology improvement into public safety is to provide more accurate, concise, timely and actionable information sharing. As populations increase, the invisible borders defining cities, towns, counties and villages have become irrelevant to the public. Agencies are finding it necessary to share data across jurisdictional lines as needs overlap. The rise in active shooter incidents, natural disasters and other emergency events necessitates instant communication and cooperation across different agencies. The public doesn't care which ambulance or fire truck gets to their home first—as long as it gets there fast.

Smarter, more responsive technology provides a unique opportunity for public safety to be as proactive as possible during dynamic and rapidly evolving events. Agencies that coordinate resources and information sharing immediately run parallel responses to emergencies, decreasing response times and minimizing the potential for harm. Smart and effective information sharing technology for public safety should be intuitively designed to ensure user-friendly features while streamlining relevant data to the appropriate resources.

Another significant improvement that technology brings to law enforcement agencies is greater data analysis. Technology has enabled public safety agencies to acquire massive amounts of data, but without an intelligent way to analyze and leverage massive data sets, it quickly becomes useless. Increasing data intelligence through analysis of patterns, trends and insights would help agencies be better prepared to adapt to changes in their surrounding communities. Nashville recently used an in-depth analysis of their city's pedestrian, road, traffic and weather data to better predict the likelihood of when and where incidents like auto collisions and fires would happen in the future and to better allocate resources to those incidents.^[6]

ANSWERING THE CALL: A SOLUTION IN CAD-TO-CAD

The interoperability inherent in CAD-to-CAD sharing allows PSAPs and agencies to maintain their own preferred CAD systems, yet still operate across jurisdictional boundaries to instantly share information on calls and units, thereby improving the speed and accuracy of emergency response. Information sharing can be achieved by creating a custom data exchange, building custom CAD-to-CAD interfaces, or the best option, utilizing an off-the-shelf, API-based, configurable CAD-to-CAD solution designed as a hub-and-spoke network. The hub-based solution ensures resource and call sharing embedded directly in almost any CAD system, regardless of vendor or version. Utilizing a publicly-available API allows each participating CAD vendor to develop and maintain connectivity to the hub independently. This is especially important for mutual aid emergencies that occur near a border, where another agency's resource is closer than those of the PSAP receiving the 911 phone call.

Regardless of the method that is used to connect the CAD systems, CAD-to-CAD capability provides a variety of benefits:

- **Response time.** When limitations to jurisdictional resources are removed, calls are processed more quickly, enabling responding units to reach the emergency faster.^[7] For example, Orange County Fire, in conjunction with their neighboring PSAPs, reduced time per request from an average of two and a half minutes to just 15 seconds. They did so by using CAD-to-CAD for boundary-less dispatch, regardless of the PSAP that answered the call and requesting a unit from whichever agency had the closest available unit. Every second saved on a drowning, cardiac arrest and other life-threatening emergency saves lives.
- **Fewer errors.** CAD-to-CAD reduces or eliminates the errors prevalent when incidents are shared or transferred by phone or radio. Instead of passing incomplete, misunderstood or complex information via phone or attempting to share abbreviated details via radio, interconnected CAD systems provide seamless



incident sharing in real-time with all relevant details. When Columbus, Ohio instituted a CAD-to-CAD system, they cut down mutual aid resource request time by 60%, from over 90 seconds to less than 30 seconds. The solution eliminated call queuing and dispatchers no longer needed to spell out details such as street names over the phone.

- **Immediate access.** Having the latest information during an evolving crisis or incident allows agencies to carry out efficient, coordinated response with accurate and timely information. In large wildfires, for example, fire departments can use CAD-to-CAD to provide the latest, most updated information to responders from law enforcement, fire and EMS, which is essential to protecting lives and property.
- **Data accuracy.** Shared unit information including status, location and call details such as ongoing call comments can be updated in real time and even sent to mobile response units. The amount of information shared is defined by each participating PASP and agency and configurable by the participants. Having this updated and accurate information is beneficial both during on-the-scene response and for follow-up, including incident investigation, analysis of deployment, response and future reporting needs.
- **Greater situational intelligence.** When responders and dispatchers have access to complete data, they can do more than simply respond to incidents. They have the information they need to understand the complex dynamics of their environment and are better able to anticipate what happens next.^[8] This helps them to make fully-informed decisions in taking preventive action that protects themselves and the public.
- **Smarter resource utilization.** As communities across the nation deal with fewer resources and increased demand, it's more important than ever to use existing equipment and staff for maximum effect, particularly if available staff or equipment is across a jurisdictional boundary. CAD-to-CAD empowers agencies to make sure that their resources are located and deployed in places where they will have the most benefit to the public. Integrated CAD-to-CAD enables each PSAP

to define external resources, such as those owned by neighboring agencies, as units in their own CAD system. The CAD-to-CAD connection updates the status and location of these resources in real time, and the resources can then be included in Run Cards and Recommended Units by each connected CAD system. When a primary PSAP needs to request a resource from a secondary PSAP or ambulance company, CAD-to-CAD allows the primary PSAP to instantly know where units are available.

- **Crossing jurisdictional boundaries.** A CAD-to-CAD system that connects seven communication centers and ambulance providers in communities that span south of Portland, Oregon to north of Vancouver, Washington has allowed responders to share real-time information about accidents on two bridges that cross state lines.
- **Connections to external systems.** CAD-to-CAD systems can be expanded to share data beyond other dispatch systems. For example, agencies could use CAD-to-CAD to receive electronic notification of major accidents that could wreak havoc on major highways and roadways. This allows non-emergency personnel to take immediate measures to mitigate negative impact.



THE FUTURE OF INTEROPERABILITY

As technology evolves, the meaning of interoperability continues to evolve along with it.^[9] Within the next decade, public safety technology will accommodate more mobile



technology, real-time data and analytics and emerging technologies such as machine learning, AI and the Internet of Things (IoT). As agencies continue to look for more ways to improve response time and coordination between agencies, CAD-to-CAD will drive further improvements:

- **Pre-dispatch technology.** As agencies have access to more rich data through NG911, dispatch centers and PSAPs, they increasingly will be able to analyze that data for better decision making prior to the dispatch of calls. The National Association of 911 Administrators anticipates a day coming soon when communication center technology will rely on a variety of data, such as implanted heart monitors, home security systems and its own public safety software to initiate calls.^[10] Our next generation of public safety technology will be able to anticipate call type and even location, using current and past data.
- **ASAP-to-PSAP for a region.** The current deployment model for ASAP-to-PSAP deployment is for each CAD system to have a standalone connection to the alarm company network. CAD-to-CAD interoperability provides the option of creating a single connection from the alarm company to the hub, which then uses the existing CAD-to-CAD capabilities to share the alarm call with the appropriate PSAP.
- **Asset distribution.** When multiple agencies work together for interconnected response, they can take the next step and coordinate their equipment, staff and even facilities for more efficiency. As a result, emergency incident response can be taken beyond jurisdictional limits with the purpose to minimize harm to both the community and public safety responders.
- **Advanced next-gen 911 across PSAPs.** As citizens get more comfortable texting 911, they will begin sharing pictures and even stream videos. Telecommunicators will need streamlined ways to share media with neighboring PSAPs and agencies.
- **PSAP backup and failover options.** Effective CAD-to-CAD technology provides a foundation that can be leveraged as part of a robust, offsite backup and failover solution from one PSAP to another. If one

PSAP has to be abandoned, for instance, during a flood or bomb threat, all of the active calls can be instantly available at a neighboring PSAP that is connected via CAD-to-CAD.

- **Regional outbound text and email alerts.** When an emergency occurs, notifying neighboring PSAPs and agencies may only be the first step. CAD-to-CAD can provide direct notifications via text message, emails or existing mobile apps and programs to incident commanders, investigators and others not directly responsible for initial response but who still may need to be made aware of specific incident types or events in defined geographic areas.
- **Information sharing to other stakeholders.** CAD-to-CAD not only allows for instant communication between PSAPs and agencies throughout a region, like Department of Transportations, state police, emergency operation centers and school districts, but can be used as a real-time feed of incidents to partners such as state agencies. The receiving agencies don't need a CAD system to have view-only access of live incidents and vehicles on a map.

SHAPING THE FUTURE

Agencies across the United States and Canada are already seeing the benefits of CAD-to-CAD interoperability, but we can do much more. As we move forward, widespread use of CAD-to-CAD will provide new levels of coordinated response and the ability to handle major events and incidents with the best possible outcomes. Sharing live data on events, personnel, vehicles and equipment across borders will change the game for public safety, allowing for more transparency and a better level of service to the public.

Americans make 240 million calls to 911 each year.^[11] Consolidated dispatch centers can help provide more efficient services, but even the largest jurisdiction has boundaries. A virtual CAD-to-CAD network connecting existing PSAPs and dispatch centers would allow communications centers to preserve their autonomy, yet seamlessly integrate law enforcement, fire and EMS resources with neighboring communities. Connecting all



first responders to real-time situational awareness across jurisdictions could cut response time by up to two minutes per incident, potentially saving thousands of lives nationwide.

Embracing connectivity will allow public safety to move far beyond borders. CAD-to-CAD has the potential to bring together the complex operational environments of medical, law enforcement and fire agencies to truly improve public safety.

SCORECARD

Is your agency CAD-to-CAD ready? Use the scorecard below to determine how prepared your agency is for the next crisis and whether CAD-to-CAD interoperability is in your future:

- In the event of a natural disaster or mass casualty situation, your agency would be able to coordinate and communicate quickly with neighboring agencies.
- Your agency's dispatchers never need to input the same data twice across multiple platforms.
- Your agency is able to see other available units from neighboring agencies that might be closer to your 911 call.

If you answered no to one or more of these questions, your agency needs to prioritize CAD-to-CAD interoperability in order to better serve your citizens. Learn how at [CentralSquare.com](https://www.centrosquare.com).

ENDNOTES

- [1]. https://www.rand.org/content/dam/rand/pubs/monographs/2010/RAND_MG959.pdf
- [2]. https://ovc.ncjrs.gov/ncvrw2018/info_flyers/fact_sheets/2018NCVRW_MassCasualty_508_QC.pdf
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- [6]. <https://www.govtech.com/public-safety/Data-Drives-Down-Nashvilles-Emergency-Response-Times.html>
- [7]. <https://www.mnecb.org/DocumentCenter/View/1531/Improving-PSAP-Interoperability-with-CAD-to-CAD-Connectivity-1-31-2019>
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- [9]. <https://www.govtech.com/em/next-gen-911/Unlocking-Interoperability-What-It-Means-for-Next-Generation-Public-Safety-Communications.html>
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