Computer-Aided Dispatch Interoperability Project

Documentation of Regional Efforts

Homeland Security

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Introduction

The Department of Homeland Security's Office for Interoperability and Compatibility (OIC) launched the Computer-Aided Dispatch (CAD) Interoperability Project (CADIP) in May 2007. CAD systems, which dispatch emergency services and assist 9-1-1 operators and dispatchers in handling and prioritizing requests for resources, serve as a major component in responding to critical incidents. CADIP addresses an issue that today's emergency response agencies may face: CAD systems that are not linked across jurisdictions and, as a result, have difficultly responding to multi-jurisdictional emergencies.

The intended audience for this document is emergency response practitioners who have experience with CAD systems and are interested in learning more about CAD system interoperability. Those that want basic information on CAD should review the CAD Business Case video, located at www.safecomprogram.gov, which highlights the benefits of CAD interoperability.

Documenting the Need for CAD Interoperability

Problem:

The main challenge is that many dispatchers do not have access to personnel and resource information in neighboring jurisdictions. Currently, jurisdictions with unconnected CAD systems are faced with logistical problems when events occur on the border between two jurisdictions and require a multi-jurisdictional response. In these situations, dispatchers often engage in time-consuming phone calls to locate and dispatch the closest resources.

Solution:

Connected CAD systems eliminate the need to make time-consuming phone calls to determine where the closest resources are because dispatchers automatically know which resource is closest to the incident. The major benefits to CAD interoperability include:

- Reduction in response time
- Increased personnel efficiency
- Increased vehicle efficiency

The reduction in response time can potentially equate to lives saved while the increase in personnel and vehicle efficiency can prove valuable to agencies with constrained funding.

The CADIP team examined different approaches to solving CAD system-specific interoperability issues. As part of the CADIP initiative, efforts were made to research different CAD system interoperability solutions developed and/or piloted by regions in the United States. This document provides an overview of each region's approach to CAD interoperability and presents practitioner-identified best practices in highlighted boxes throughout the document.

During the study, the following three regions were researched:

- Santa Clara County (Silicon Valley), California
- Portland Metropolitan Area, Oregon
- Phoenix-Mesa Metropolitan Area, Arizona

The three regions were selected to be part of the study based on recommendations from CAD experts in the field. After conducting additional research, OIC confirmed that these regions were the closest to implementing multi-jurisdictional CAD interoperability solutions in a real-world environment.

This document reflects the responses of 39 emergency response and government representatives across the 3 regions researched by the CADIP team. Interviewees included dispatchers, dispatch managers, emergency managers, city managers, mayors, fire chiefs, deputy fire chiefs, vendors, police managers, information technology representatives, project managers, communications directors, and city chief information officers.

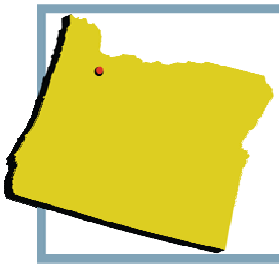
The information presented in this document is factual and does not favor one approach over another. For jurisdictions looking to implement CAD interoperability in the future, it will be beneficial to consult the work of regions that have already begun to implement CAD system interoperability solutions. This document does not address every issue that jurisdictions, regions, or states may face when seeking to implement a CAD interoperability solution. Each area should develop a solution that meets their specific requirements. However, agencies should still try to adhere to recognized best practices – such as strong governance and a standards-based approach — and avoid common barriers — such as a lack of communication between operational and technical teams and a failure to define requirements at the beginning of the project.

Documentation of Regional Efforts

Outlined below are the three jurisdictional CAD interoperability solutions. Each regional approach is described in detail in the sections that follow.

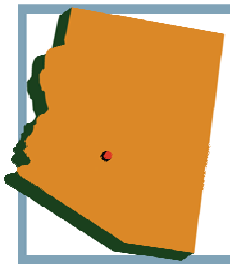
Santa Clara County (Silicon Valley), California:

- Currently in pilot phase to connnect disparate fire CAD systems across three counties (San Jose, Milpitas, and Santa Clara County).
- Full roll-out will include all 13 fire agencies in Santa Clara County.



Portland, Oregon Metro Area:

- Working on CAD integration via a standards-based Enterprise Service Bus technology.
- Currently in Phase I, which includes the exchange of incident information.
- Phase II will include sharing the status of available units.



Phoenix, Arizona Metro Area:

- Currently sharing event messages and unit information for fire agencies across separate CAD systems.

Santa Clara County (Silicon Valley), California

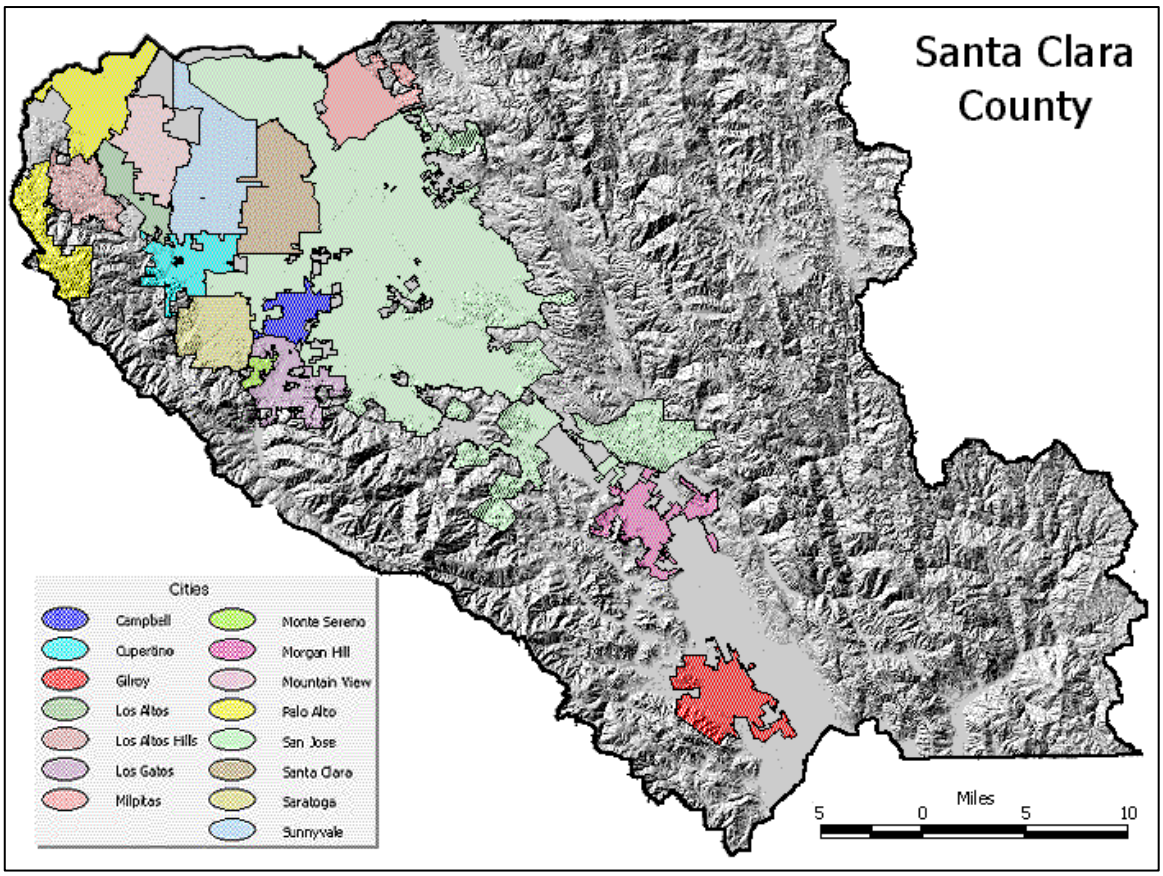


Figure 1: Map of Santa Clara County

Background

In 1998, 18 Santa Clara County jurisdictions (see figure 1)—representing 30 emergency medical service (EMS), fire response, and law enforcement agencies—partnered to address gaps in interoperable communications efforts among their emergency response agencies. This partnership led to the creation of the Silicon Valley Regional Interoperability Project (SVRIP), which strives to attain communications interoperability through different approaches and technologies. Since its inception, SVRIP has actively sought to leverage existing systems to create a regional communications network for both strategic and tactical communications.

One of SVRIP's key projects is the CAD to CAD data interoperability effort. The project was born from the desire of local fire chiefs who wanted to streamline the process of capturing 9-1-1 information and responding to incidents with the closest, most appropriate emergency response resource. This project became even more important after a fire at a major local shopping district in 2002. Resources in the area were available, but a lack of CAD interoperability inhibited a coordinated response of resources. Although there was no loss of life, the fire resulted in millions of dollars in building damage. Since the disaster, Santa Clara County has been aware of the importance of CAD interoperability and has been more proactive in identifying solutions to interoperability overall.

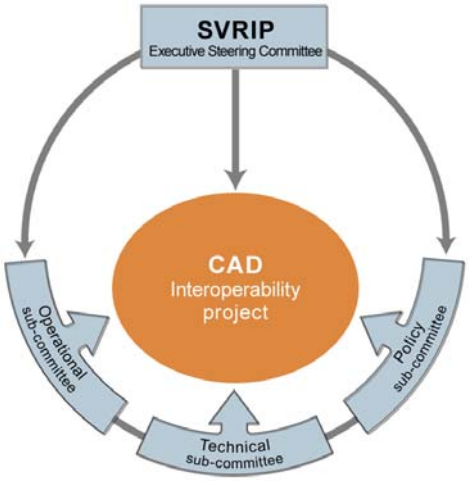


Figure 2: SVRIP Governance

Best Practice: Bring the right people together to define requirements for the new CAD interoperability solution at the beginning of the effort. Addressing these issues in advance will save time and money throughout the project's lifecycle.

Governance

An Executive Steering Committee consisting of 13 executive representatives was established in 2001 to oversee SVRIP. These representatives are individuals who hold positions that enable them to make decisions on behalf of their organization. The Executive Steering Committee provides oversight and manages all of SVRIP's interoperability projects. The committee includes subject matter experts as well as representatives from the County Police Chief's Association, the Cities Managers' Association, the Fire Chief's Association, and the County Sheriff's Office.

Best Practice: To ensure broad support and spur information sharing, include stakeholders from various disciplines in governance groups.

SVRIP's projects are supported by fire response, law enforcement, and EMS stakeholders from the following jurisdictions: the cities of Campbell, Gilroy, Los Altos, Milpitas, Monte Sereno, Morgan Hill, Mountain View, Palo Alto, San Jose, Santa Clara, Saratoga, and Sunnyvale; San Jose State University; Santa Clara County; the Santa Clara Valley Water District; the South Santa Clara County Fire District; and the towns of Los Altos Hills and Los Gatos.

At the beginning of the CAD interoperability effort, end users—dispatchers, dispatch managers, and other key stakeholders from the region—identified requirements for the functionality of the future system. The end users' high-level goals included:

- Automating current manual processes to enact mutual and automatic aid
- Establishing real-time resource status and tracking
- Developing a composite view of incidents and allocated resources
- Connecting three fire CAD systems through the Regional Interoperability Information Broker (RIIB), outlined in the solution section below
- Enabling the transfer of call information between three disparate CAD systems

Best Practice: To ensure success as you develop your solution, establish a solid project management approach and a dedicated project manager.

Under the direction of the Executive Steering Committee, SVRIP organized operational, technical, and policy sub-committees (see figure 2) to address specific goals for the CAD to CAD project. These specialized sub-committees grouped participating individuals with their particular area of expertise. This ensured the operational, technical, and policy requirements for each region were addressed and met. In addition, a project manager was assigned to oversee the project to ensure the effort maintained momentum and addressed the identified requirements.

Technology Solution

In 2003, SVRIP hired a systems integrator to develop a plan to integrate the CAD systems throughout the region. After considering multiple approaches, SVRIP and the integrator determined that the best way to integrate the systems was through the RIIB.

Best Practice: Plan ahead! Advanced planning will help eliminate potential roadblocks and will ensure the project is set up to accomplish its goals.

Developed by the systems integrator, the RIIB enables dispatchers to transfer incident information from one agency to one or multiple agencies connected to it. While the RIIB is designed to augment emergency response operations, it is not designed to replace existing mission-critical systems. The RIIB can only react to data that is passed to it. Once information has entered the RIIB, the data is translated into a standardized messaging format. After the data is translated into the standard format, the RIIB enhances, filters, and delivers the data to the correct destination. Before sending the information to the destination system, the data is translated back to the original format, allowing a seamless system to system transfer of information that does not require all agencies to use the same CAD software.

Once the concept for the RIIB was complete, SVRIP elected to conduct a pilot project to develop an implementation strategy. This project was designed to test the implementation of the RIIB across three agencies. In late 2006, SVRIP secured $2.5 million in Urban Area Security Initiative (UASI) funding for the pilot project. With funding in hand, SVRIP sought RIIB implementation approaches that used an off-the-shelf, vendor-neutral solution rather than a custom design and that leveraged existing legacy systems. SVRIP favored off-the-shelf approaches as they provided a solution that could be replicated throughout the Nation. After reviewing 25 proposals based on the aforementioned criteria, the SVRIP team identified a vendor that could achieve the project goals in a limited amount of time.

In December 2006, the vendor was awarded a contract to implement the pilot project using the RIIB design. The pilot itself did not begin until early 2007 and it is still in progress. The primary objective of the pilot is to demonstrate the following RIIB functions:

- The ability to share the status of one fire response agency's resources with other fire response agencies connected to the RIIB
- The ability to transfer incident information from one fire response agency to other fire response agencies connected to the RIIB

In fulfilling these two functions, the RIIB solution effectively establishes an information sharing network. With it, emergency response dispatchers from one jurisdiction are able to monitor resources and automatically share call information with the appropriate dispatch center's fire CAD system.

Usage

The RIIB is currently being piloted across three regions—the City of Milpitas, the City of San Jose, and Santa Clara County—to connect their fire response CAD systems. SVRIP contracts with the City of Milpitas to provide information technology support and manage the RIIB Network.

In conjunction with the pilot, the SVRIP project team is identifying operational gaps and verifying the design and functionality of the RIIB.

Once fully implemented, the RIIB will provide, at a minimum, the following functions and features:

- CAD call creation and forwarding to one or more agencies

- Real-time resource availability and status changes of all participating agencies
- Ability to request specific units based on the type of incident
- Premise information on hazards
- Assistance requests (mutual aid)
- Automation of the county mutual aid plan
- Messaging between Public Safety Answering Points (PSAPs) and field units
- Ability to view run-time information for calls in other jurisdictions
- Ability to share multi-casualty or other major incident information in real time

Funding

The SVRIP continues to pursue all avenues to fund the build-out of the CAD system interoperability solution. These include UASI grant sources, the Federal Emergency Management Agency Assistance for Firefighters Grant Program, and congressional support, specifically, by advocating for funding language in appropriations bills. Local maintenance and ancillary costs are covered by local contributions of general funds and/or in-kind contributions of costly staff resources.

Training & Exercises, Standard Operating Procedures, and the Future

As the pilot work enters its final stages, the system is being fine-tuned to improve the speed in delivering multiple and simultaneous messages; this is being done to prepare for a full production environment. In addition, the operations and policy sub-committees are completing their work on changes to business practices. More specifically, the organizational policies and procedures will be updated while operational processes will be documented. These standard operating procedures (SOPs) were not critical in the pilot phase; however, they will be addressed during the production phase. Operating procedures will need to be consistent among all involved parties during real-world events to ensure resources are dispatched as efficiently as possible. Once changes to the business practices are identified, dispatchers, supervisors, and technical staff will be trained on the new operating procedures. Ongoing work will continue through build-out and the inclusion of law enforcement resources and information as well as records management data.

The SVRIP Executive Steering Committee will conduct a full and final review of the pilot and will provide any recommendations to migrate the test system to a "mission-critical" production environment. The Steering Committee will consider whether to release a Request for Proposal (RFP) or leverage the vendor used in the pilot program to build out the system under sole source arrangements.

Once the RIIB is successfully migrated to the production environment, the SVRIP will leverage lessons learned from the pilot to integrate systems from the remaining cities with the RIIB.

Portland Metropolitan Area, Oregon

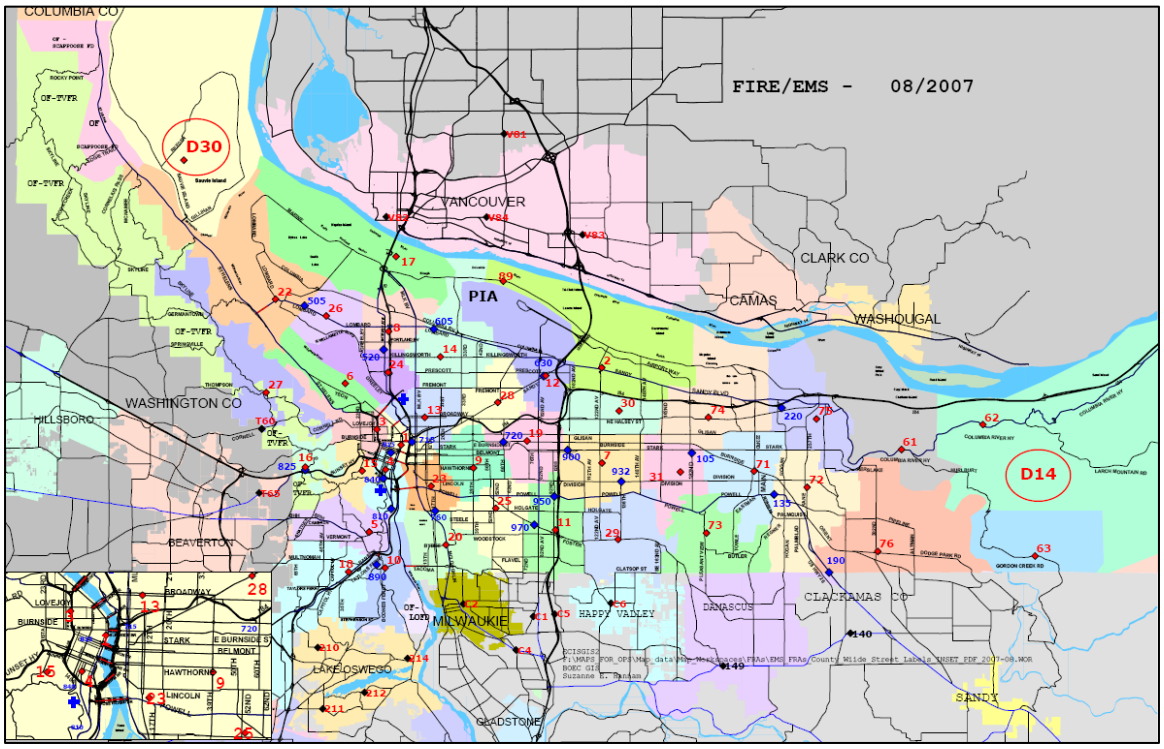


Figure 3: Map of Portland Metropolitan Area

Background

The State of Oregon has been addressing communications interoperability issues for decades. Once regional agencies had made substantial progress with voice interoperability, emergency response leaders decided CAD interoperability should be their next communications interoperability issue to tackle. Building upon previous interoperability work, the Portland Metropolitan Area (see figure 3)—Oregon's largest metro region—began developing an advanced information sharing solution. This solution will eventually enable 18 jurisdictions to instantly share CAD system information.

Governance

In 2003, the UASI Point of Contact Group was established to oversee the distribution of UASI grant dollars for the region. As depicted in figure 4, the group is comprised of six emergency managers from the region; these managers oversee the 10 working groups that were established to manage the UASI-funded projects. The Communications Working Group (CWG) is one of those 10 groups. The CWG established five priorities to address with UASI grant funding, including CAD system interoperability, which would improve response times and interoperability across the region.

Best Practice: At the beginning of the effort, develop a governance structure that represents all key stakeholder groups and meets the needs of the project.

The CWG includes communications managers representing the following jurisdictions: the City of Lake Oswego, the City of Portland/Multnomah County, Clackamas County, Clark County, Columbia County, and Washington County.

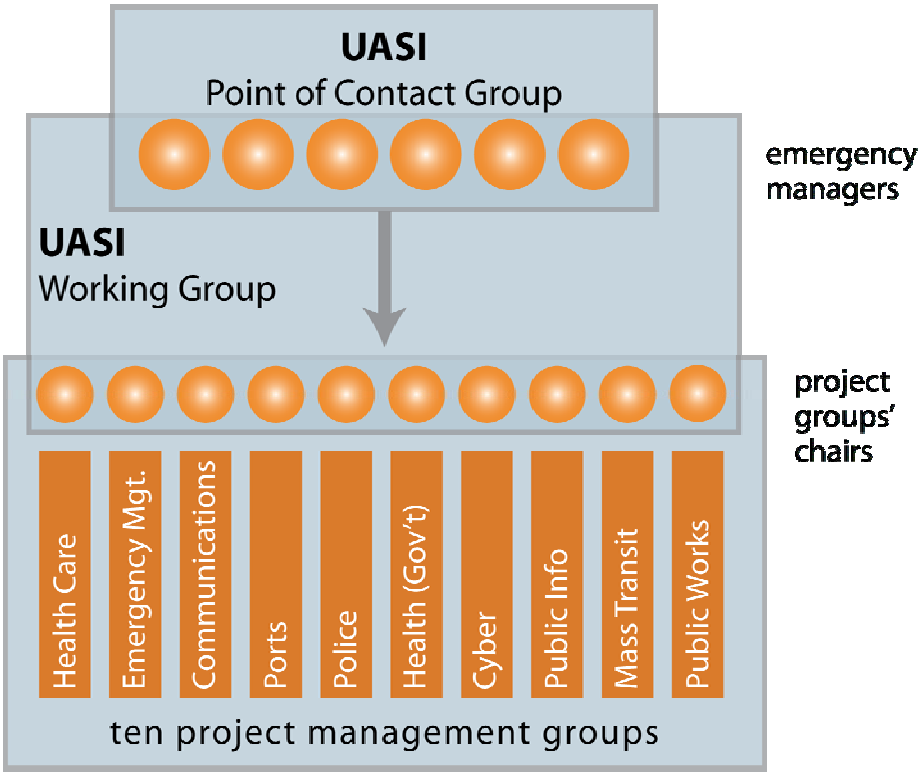


Figure 4: UASI Point of Contact Group Organizational Structure

Under the CWG, an Operations Group composed of dispatchers and supervisors was established to help define the requirements of the advanced information sharing solution. A Technical Group comprised of technical staff from agencies represented in the CWG was also created to translate requirements to the vendors and help build the technical interfaces between each existing CAD system.

The members of the CWG created the Portland Dispatch Center Consortium (PDCC). PDCC is a legal entity that consists of dispatch managers from the seven PSAPs. The group focuses on future PSAP issues and concerns; the group also improves interoperability by connecting the area's seven CAD systems. Although some agencies in the region can already view and monitor the activity in neighboring jurisdictions, they cannot send calls between the PSAPs. As a result, vital response time is wasted when dispatchers are forced to repeat information over the phone. PDCC aims to improve situations such as this by employing a new technology solution to improve CAD interoperability.

Technology Solution

In 2003, the PDCC received a $700,000 UASI grant to integrate the Portland metropolitan area CAD systems. The intent was to break down the process into simple phases. Phase I would allow for a call for service message and a chat message to be passed between systems. Each call for service (CFS) message would contain five key pieces of information: location, name, problem, passing remarks, and one callback number. Phase II would add capabilities to share messages, the status of available resources, and, potentially, police records among field units.

Best Practice: Employ a phased implementation to help mitigate challenges in the project.

The initial Phase I time frame was estimated to be one year. In reality, it took almost three years to complete due to issues related to interagency agreements, legal complications, changes in leadership, and vendor contracts.

In 2005, the PDCC initiated Phase I and contracted with a vendor to develop a CAD to CAD Enterprise Integration Solution (EIS) for information sharing and data integration across the region's PSAPs. Depicted in figure 5, the EIS provides agencies with a direct tool to send call data. Known informally as the CAD to CAD message switch, the solution includes the following functions and features:

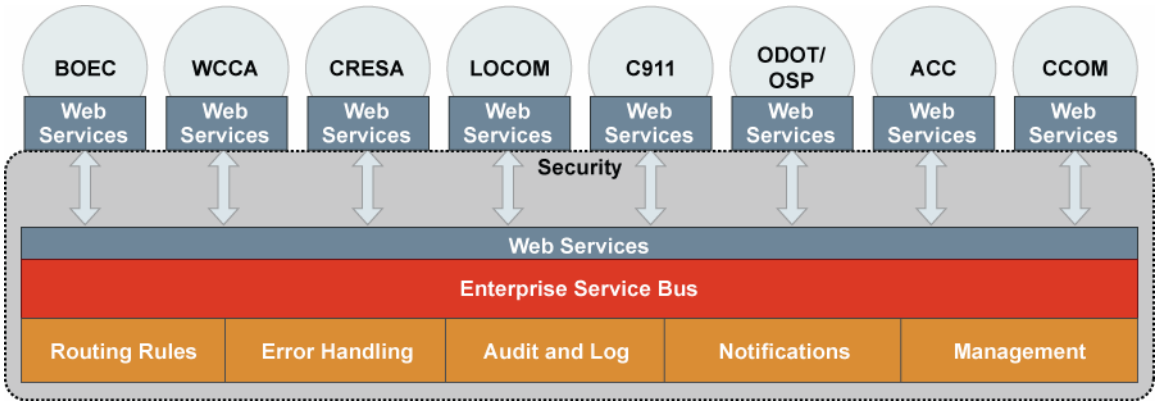
Best Practice: Bring together all involved vendors in a CAD system interoperability effort and maintain communication between vendors and the CAD interoperability project team. This will ensure end-user requirements are met.

CFS Message Exchange: The exchange of the incident location, description, and ID; intended audience; reporting person's name, address and phone number; passing remarks; and call date and time information

Information Message Exchange: Informational messages that can be sent between PSAPs

The CAD to CAD message switch provides real-time data exchange between PSAPs—a method of accurately transferring data for multi-jurisdictional incidents and real-time feeds into neighboring agency systems that will eliminate call delays. The system also contains failover features which ensure that if a component fails, the backup component will take over seamlessly to continuously provide service to the PSAPs.

Figure 5: Breakdown of System Components for Portland CAD to CAD EIS Solution



The defined scope of work for the EIS includes the following:

- **Establish an Integration Backbone:** The integration middleware backbone will be based on distributed, open network architecture. The backbone will be built with Enterprise Service Bus (ESB) technology.
- **Create an Incident CFS Message Exchange:** The EIS project will enable participating agencies to exchange incident CFS data via the integration backbone. Included in this message exchange is the ability to send updates about a previously transferred CFS.

Data Sharing Elements

In Oregon, the CWG and PDCC worked together with dispatchers to determine what elements of data to share. As they selected data elements, the two groups considered what would make it easier for the PSAPs to process more calls effectively.

Best Practice: At the beginning of a project, identify what information and data to share across the integrated CAD system. Doing so will ensure a successful interoperability solution.

Funding

Grant funding does not cover the operation and maintenance costs of the system. The ongoing maintenance is funded through a cost-sharing approach that is determined by a population formula. Smaller counties pay a minimal percentage while larger counties cover the balance of the costs. Because the servers are on the City of Portland's network, Portland pays the initial costs and charges the UASI group based on the population formula.

Best Practice: Establish a maintenance plan during initial project estimates to ensure the continuation of CAD interoperability.

Along with the ongoing maintenance costs, each agency had to purchase the ESB and pay its vendor to develop an interface to the ESB. Because this CAD system interoperability approach was relatively uncharted territory, the vendors underestimated the time and cost of their efforts. This resulted in several requests for additional funding and an extension of the project time frame from one year to two years.

Usage

All seven PSAPs have successfully conducted testing and the majority of them are running the system in a live environment. The City of Lake Oswego, the City of Portland, Clackamas County, and Washington County are currently using the CAD to CAD message switch daily. The counties of Clark and Columbia are planning to go live in the near future, and the Portland Airport Communications Center is also anticipated to join. The Oregon Department of Transportation and State Police are still determining their level of participation in the effort.

Once live, each PSAP will be able to enter call information—location, name, problem, passing remarks, and one callback number—into their own system and successfully transfer that data to another jurisdiction if it is determined that the other agency's resources are closer to the incident.

Training & Exercises, Standard Operating Procedures, and the Future

Before making a full switch to the new system, agencies made numerous preparations, including training dispatchers. Because the changes to the system were so minor, very little training was required for dispatchers. Most agencies simply updated training exercises to include the new system. Instead of relying on training, most agencies reinforced new practices and procedures through daily usage. Similarly, there were few updates to the SOPs. As a result, minimal changes were incorporated into each agency's SOPs following the development of the solution.

After the completion of Phase I, all seven PSAPS will be able to share and transfer calls, and dispatch the closest available resource to an incident. Phase II of the project will expand on those capabilities and will enable agencies to do the following:

- Share messages among field units from different jurisdictions
- Share the current availability of units
- Potentially share police records through interfaces between databases

Ultimately, the call data will be relayed to an emergency responder's mobile data computer using the CAD to CAD message switch. Although end-to-end user communication will not be available, messages will have the capability to be sent through the switch and passed to an end user in the field.

Multi-Agency CAD

The Portland metropolitan area is also planning for further integration of its CAD systems. The multi-agency CAD approach will use a single CAD system to dispatch several agencies in a region. This solution is ideal for regions such as the counties of Clackamas and Washington where it has already been instituted. Sharing a CAD system allows for significant operational and financial efficiencies. Before the solution was implemented, only two percent of Clackamas County's CAD system was being used; with such minimal traffic, the system could easily accommodate usage from other areas. In contrast, Washington County experiences heavier traffic on its outdated CAD system. With the help of the PDCC and UASI funding, Washington County was able to join Clackamas's system and avoid purchasing a new system. The operational advantages of the multi-agency CAD include the ability for the agencies to share calls and units while maintaining their existing PSAPS and protocols. Even with Washington County participating on their system, the Clackamas County system is still able to accommodate additional agencies. It serves as a regional resource should other agencies want to participate in the multi-agency CAD system.

While some jurisdictions are considering the multi-agency CAD system as a potential solution, the CAD to CAD message switch will remain a viable solution to share information with agencies not connected to the multi-agency system. The multi-agency CAD system will also be linked to the ESB, providing a link to the other systems connected to the ESB. The capabilities enabled by the CAD to CAD message switch could expand to other areas outside of CAD system interoperability. The CAD to CAD message switch will allow those with an interface to share other types of data, such as transportation and public works information, if those agencies have interfaces with the ESB.

Phoenix-Mesa Metropolitan Area, Arizona

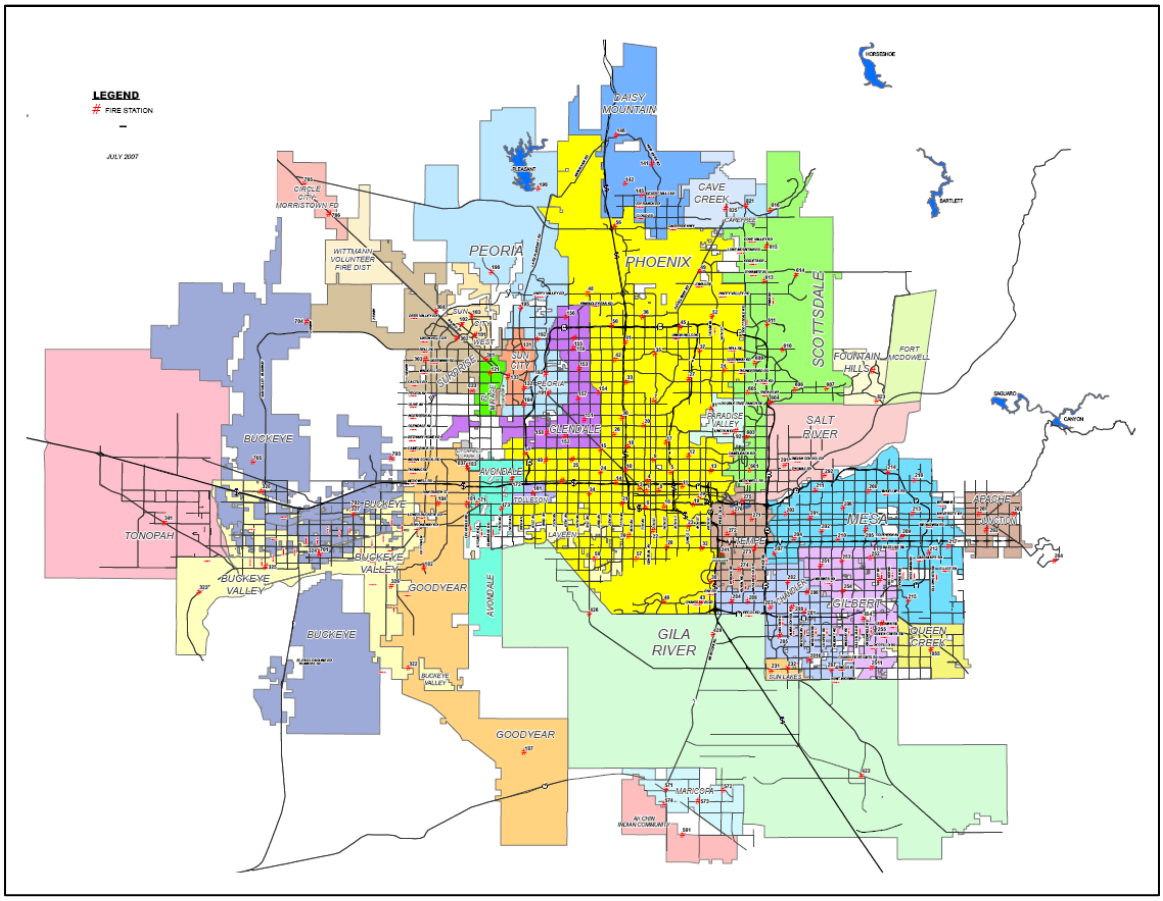


Figure 6: Map of Phoenix-Mesa Metropolitan Area

Background

Best Practice: Put turf issues aside and focus on what is most important: Meeting customers' needs by responding to incidents as quickly and effectively as possible.

CAD system interoperability is not a new concept for Phoenix metropolitan area emergency response agencies. The driving factor in establishing CAD system interoperability in the Phoenix-Mesa region (see figure 6) was the interest of the fire chiefs. Now-retired Phoenix Fire Chief Alan Brunacini took a special interest in this project as a way to provide better service to the community. He believed sharing information was more important than autonomy or holding on to turf. Chief Brunacini also had a team viewpoint when it came to funding the initial efforts. He decided the larger municipality should contribute more funding to get the partnership off the ground.

The Phoenix CAD system encompasses all agencies in the jurisdictions surrounding the city of Phoenix, including the western jurisdictions. While each city in the Phoenix region dispatches its own police resources, the Phoenix CAD system dispatches the resources for 21 fire departments, mostly in the western area of the county. Mesa and various jurisdictions to the southeast are on a separate CAD system from Phoenix's. Mesa's CAD system is operated by the Mesa Police Department and dispatches

both police and fire resources. While Phoenix and Mesa dispatch for 19 other jurisdictions, each of those jurisdictions has their own resources. It is important, therefore, for Phoenix and Mesa to share their resource status information.

As these two large communities quickly expanded next to each other, they recognized that sharing information across their desert landscape would improve their response efforts. It was determined that CAD interoperability was a priority as it would allow for the closest available resource to be dispatched to an incident. Approximately 10 years ago, the communities made the decision to provide automatic aid response for one another. In this arrangement, automatic aid takes advantage of the resources of the entire county by dispatching the closest resource to the incident.

Governance

The Phoenix-Mesa region has had informal governance for 15 years. However, all agencies dispatched by Phoenix and Mesa are signatories to an intergovernmental agreement for fire protection and other emergency services. There is an ad hoc Phoenix CAD Consortium user group comprised of representatives from agencies that are dispatched by Phoenix. This group meets regularly to discuss dispatch issues; Mesa has a similar user group.

Best Practice: Share information across CAD systems daily. This frequent usage will improve response time more than sharing information only during large-scale incidents.

In addition to these user groups, the Central Arizona Life Safety Response System Council (CALSRSC) was established in 1991 to help make decisions on automatic aid. Members include, but are not limited to, fire chiefs from every city in the region. Others can petition to join the group. Full membership is given to automatic aid partners; associate memberships are given to limited mutual aid and full mutual aid partners.

Under the CALSRSC, Regional Operations Consistency and Communications Consistency sub-committees participated in the development of the CAD Interconnect—a technology solution intended to improve CAD interoperability. A quarterly CAD system supervisory meeting was established to report to the CALSRSC. In addition, each month CAD partners meet to discuss task-level issues such as the use of mobile data terminals and radios.

Technology Solution

With such a strong reliance on automatic aid procedures, Phoenix-Mesa's CAD solution took shape in the form of the CAD Interconnect. The Interconnect was created to reduce the amount of time needed to execute automatic aid between agencies dispatched by different dispatch centers.

The CAD system interoperability concept started in the late 1990s, but took years to get off the ground. Phoenix officials originally approached Mesa with the idea of using an open standard to share information between their two systems. Although they garnered support from Mesa, efforts to coordinate with Mesa's vendor slowed the initial development of the Interconnect. Following these delays, the two regions joined together and developed a detailed statement of requirements for the Interconnect. The Mesa vendor then developed the protocol for the Interconnect and translation tables were developed by respective system owners for data elements that differed between the two CAD systems.

Best Practice: Before working on the technical aspects of the project, identify the future concept of operations and validate it with stakeholders.

The Interconnect allows CFS and resource messages to be exchanged between Phoenix and Mesa through interfaces

specifically designed for each system. Pre-defined Extensible Markup Language messages containing the resource status, capability, and location information are exchanged as status updates occur. This real-time message exchange allows the two CAD systems to mirror current status information. This permits each system to request resources dispatched by the other CAD system. Once the message is received, each receiving system translates the message to its own language or protocol. The message is then processed and acted on based on the receiving agency's business rules, which are defined in the system.

Funding

Mesa and Phoenix each paid to develop the interface for their own system. To develop each interface, costs ranged from $100, 000 to $300,000. Phoenix obtained funding by ensuring the project was part of the city's five-year strategic technology plan. Projects that are part of the plan are highly likely to be funded from the city's annual budget.

Usage

The Interconnect went live in June 2006 and has been used daily for more than two years. Several hundred times per month the Interconnect dispatches units belonging to agencies that are managed by a different dispatch center.

Dispatchers for Phoenix and Mesa are now able to see the current status of resources for the entire region. This enables dispatchers to electronically request resources they know are available, thus saving vital minutes in dispatch and response times.

Training & Exercises, Standard Operating Procedures, and the Future

To successfully implement new technology solutions, Phoenix and Mesa determined that strong processes and procedures needed to be in place. Before the initial design of the Interconnect was even completed, Phoenix and Mesa reviewed their operational procedures and terms for consistency. The two regions considered what was involved in sharing information with a neighboring jurisdiction while modifying SOPs. With this information, they updated their SOPs to ensure that the Interconnect was adequately addressed.

In addition to updating their processes, the two cities instituted cross-disciplinary, cross-jurisdictional training programs. All agencies in Phoenix and Mesa now conduct regular training exercises with one another. This training regimen allows responders to practice sharing information and working with other disciplines in the area in different situations. Ultimately, the training and exercises increase the ability of the Phoenix-Mesa agencies to communicate seamlessly in the real world.

Despite recent improvements to CAD interoperability, Phoenix and Mesa both anticipate the need to replace their CAD systems within 10 years. It is currently not possible for either system to alert units that are directly dispatched by the other PSAP. Dispatch centers are currently upgrading the station alerting systems they both use. The upgraded station alerting systems will make it possible for both CAD systems to directly alert stations that are part of the dispatch service areas. The two cities may also release a joint RFP to purchase a shared system. The intent of the RFP is to overcome similar issues they have had with incompatible systems and vendors.

Closing

The three case studies in this document are a snapshot of CAD interoperability efforts in the United States; however, they do not represent the full picture of CAD interoperability across the Nation. The information presented in the case studies may not apply to all situations, but should be assessed and applied based on the needs of individual projects. CAD system interoperability can be addressed with a variety of solutions. Each agency must review their information sharing requirements and determine what kind of solution best meets them. While the focus of the case studies is on interoperability among CAD systems, CAD interoperability should be a part of the overall interoperability strategy of any state or region.

Best Practice: When developing your solution, consider a comprehensive approach to interoperability that includes both data and voice communications. This approach will efficiently leverage resources and increase your agency's ability to improve response.

International CAD Consortium

An annual International CAD Consortium Conference meets annually and permits practitioners to learn about and share best practices and challenges relating to CAD and interoperability. The conference is open only to practitioners. Its purpose is to foster in-depth discussions on more than 100 practitioner-prioritized issues generated from the previous year.

CAD system interoperability was the highest priority topic discussion at the International CAD Consortium conference in 2007; it has been at the top of the Consortium's issues list for the past several years. This emphasis on CAD system interoperability indicates that it is no longer just a concept, but a real practitioner need.

The conference is a helpful venue for agencies seeking to buy a new system. It provides agencies with an opportunity to talk about CAD interoperability solutions and to learn about new standards and ways to improve response by leveraging CAD systems.

Conclusion

There is no single solution to CAD system interoperability. Still, by learning from others who have already successfully linked together CAD systems, agencies can identify better solutions. Finding the most appropriate method of sharing information across CAD systems can potentially improve response and save lives.

This case study report and other CAD interoperability tools can be found at www.safecomprogram.gov.

Acronym List

ACC – Airport Communications Center/Portland International Airport

BOEC – Bureau of Emergency Communications, City of Portland

C911 – Columbia 9-1-1 Communications District

CAD – Computer-Aided Dispatch

CADIP – Computer-Aided Dispatch Interoperability Project

CALSRSC – Central Arizona Life Safety Response System Council

CCOM – Clackamas County Communications

CFS – Call for Service

CRESA – Clark County Regional Emergency Service Agency

CWG – Communications Working Group

EIS – Enterprise Integration Solution

EMS – Emergency Medical Service

ESB – Enterprise Service Bus

LOCOM – City of Lake Oswego Communications

ODOT/OSP – Oregon Department of Transportation/Oregon State Police

PDCC – Portland Dispatch Center Consortium

PSAP – Public Safety Answering Point

RFP – Request for Proposal

RIIB – Regional Interoperability Information Broker

SOP – Standard Operating Procedure

SVRIP – Silicon Valley Regional Interoperability Project

UASI – Urban Area Security Initiative

WCCCA – Washington County Consolidated Communications Agency

The Department of Homeland Security established the Office for Interoperability and Compatibility (OIC) in 2004 to strengthen and integrate interoperability and compatibility efforts in order to improve local, tribal, state, and Federal emergency preparedness and response. Managed by the Science and Technology Directorate's Command, Control and Interoperability Division, OIC is committed to developing technologies and tools—methodologies, templates, models, and educational materials—that effectively meet the critical needs of emergency responders in the field.

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