More than just information sharing

A historical perspective on Orange County's Fire and EMS agencies' decision to undertake CAD-to-CAD interoperability in order to better meet emergency response demands, conserve tax-payer dollars, and ultimately save more lives and property

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Background – The Players, Challenges and Opportunities

Orange County CA was created as a separate political entity from Los Angeles County on March 11, 1889. With a current population of over 3,000,000, it is bordered by Los Angeles County on the north and west, San Bernardino County on the northeast, Riverside County on the east and San Diego County on the southeast. It has a land area of 789 square miles.

The county includes 34 incorporated cities, the county seat being Santa Ana.

City	Year of incorporation
Aliso Viejo	2001
Anaheim	1870
Brea	1917
Buena Park	1953
Costa Mesa	1953
Cypress	1956
Dana Point	1989
Fountain Valley	1957
Fullerton	1904
Garden Grove	1956
Huntington Beach	1909
Irvine	1971
La Habra	1925
La Palma	1955
Laguna Beach	1927
Laguna Hills	1991
Laguna Niguel	1989
Laguna Woods	1999
Lake Forest	1991
Los Alamitos	1960
Mission Viejo	1988
Newport Beach	1906
Orange	1888
Placentia	1926
Rancho Santa Margarita	2000
San Clemente	1928
San Juan Capistrano	1961
Santa Ana	1886
Seal Beach	1915
Stanton	1956
Tustin	1927
Villa Park	1962
Westminster	1957
Yorba Linda	1967

Orange County is subject to significantly higher than average (for California) tornado activity, and above average earthquake activity. The area regularly experiences severe storms, landslides, flooding, debris and mudflows, and wildfires. In fact, the number of natural disasters in Orange County is more than double the national average.

The County is geographically small but densely populated and congested which presents unique challenges for emergency response. In 2006, a County-hired consultant recommended implementation of a county-wide situational awareness solution for public safety assets to aid in response emergencies and incidents. The Orange County Fire Chiefs Association collaborated to apply for a grant to fund deploying Automatic Vehicle Location (AVL) technology for all fire apparatus.

Initially six stakeholders - - Orange County Fire Authority, Metro Cities Fire Authority, Costa Mesa, Brea, Laguna Beach and Santa Ana - - participated. The project goals were defined and agreed to by all: "To provide a common view of the assets of all participating agencies in real time." To accomplish this, FATPOT Technologies was contracted to implement a data fusion system. FATPOT integrated county-wide data using their CADfusion™ technology platform and displayed it in a common view shared by all participating agencies.

OCFA Dispatches for:
Aliso Viejo, Buena Park, Cypress, Dana Point, Irvine, Laguna Hills, Laguna Woods, Laguna Niguel, Laguna Woods, Lake Forest, La Palma, Los Alamitos, Mission Viejo, Placentia, Rancho Santa Margarita, San Clemente, San Juan Capistrano, Santa Ana, Seal Beach, Stanton, Tustin, Villa Park, Westminster, Yorba Linda and the unincorporated areas of Orange County

Metro Net Dispatches for:
Anaheim, Brea, Fountain Valley, Fullerton, Garden Grove, Huntington Beach, Newport Beach, and Orange.

Laguna Beach Dispatches for:
Laguna Beach

Costa Mesa Dispatches for:
Costa Mesa

The project took approximately 18 months to implement because of the complex requirements and interesting, but expected, challenges:

- **Selection Process**–Pre-qualification criteria were not employed which would have eliminated less qualified vendors from consideration early in the process and saved time.
- **Disparate CAD Vendors** – Four CAD vendors were involved with systems that varied in age and capabilities.
- **Dissimilar AVL methodologies** – 2 different AVL providers were involved, plus 2 agencies without AVL. Some systems housed AVL data while others had to be pulled from other locations.
- **Funding** – Department of Homeland Security Urban Area Security Initiative (UASI) grants imposed usage and reporting restrictions that took time to manage. Orange County cities were then part of the select pool of jurisdictions eligible to use this funding. The funding had specific requirements to address building and sustaining capabilities to prevent, protect against, respond to and recover from threats or acts of terrorism.
- **Automatic Aid Agreements** – had to be reassessed to ensure that technology was taken into account.

Decision - CAD-to-CAD Resource Sharing Solution Provided Best ROI

The stakeholders determined that the biggest return on their investment (ROI) would come from the FATPOT proposed solution. The AVL technology was part of the long-term plan to implement full bi-directional CAD-to-CAD. Real time dispatch of closest unit across jurisdictional boundaries requires real time location of all assets. While there was no specific impetus that made the procurement a "must to have", there were plenty of stories in the press about agencies nationwide that detailed the human and financial costs for not employing this technology.

Some agencies in the US solved their data sharing challenges by consolidating into one vendor platform. The County stakeholders determined that this was politically untenable, expensive and had many hidden costs. Not only did agencies give up control and all their prior investments, but retraining on the new platform was calculated to be very high.

Other agencies tried some simple point-to-point interfaces between a limited number of systems. Ultimately, when the political climate changed in the County in 2009, and the County was able to move forward with the CAD-to-CAD project, the point-to-point approach was taken. Three agencies, Costa Mesa, OCFA and Metro Net elected to participate, and one of the CAD vendors was chosen to write the interfaces. After three iterations and upgrades over two years, it was decided that this architecture was fundamentally unsound and lacked the scalability needed by the County. The stakeholders determined that this solution required a huge amount of effort to build and maintain the interfaces at each agency.

The leadership team therefore decided that neither consolidation nor point-to-point interfaces were acceptable. They needed a solution that was scalable, highly configurable, and allowed each participant to maintain local control of the data being shared. That left a "message broker" or hub type of architecture. After reviewing the offerings, it was determined that there was only limited functionality available from most vendors: too few filters in the hub, no code table translation, and no rules based engines or basic business intelligence that could mimic mutual and automatic aid agreements…except for FATPOT.

FATPOT Technologies was awarded the contract to implement the CAD-to-CAD resource sharing initiative in Orange County, using its CADfusion™ product. The project began in 2010 and involved connecting a Northrup Grumman CAD at OCFA (itself a consolidated group of agencies), a TriTech CAD at Santa Ana, an Intergraph CAD at Laguna Beach, a Motorola CAD at Costa Mesa, and finally a Keystone CAD at Metro Net (another consolidated group of municipalities). The project also implemented AVL information sharing across all of the above CAD systems and agencies using the FATPOT framework.

CADfusion maintains real-time information about active CAD incidents in each connected CAD system, and when incidents and resources need to be shared between the separate jurisdictions, CADfusion translates and exchanges the information in real-time. A common code set is used for translation between systems, and CADfusion includes configuration utilities to allow administrators to modify the common codes, mappings for resource sharing, and rules for triggering incident sharing.

The flexibility of CADfusion has allowed Orange County to realize their vision and objectives of CAD-to-CAD interoperability and resource sharing. CADfusion is a platform, not just a custom built interface. It is capable of automating processes and protocols, translating behavior and nomenclature, providing information and recommendations, and empowering dispatchers and first responders to make better-informed decisions. FATPOT's dedication and innovation has established CADfusion as the premier CAD-to-CAD interoperability platform in the world.

- Transfer 30-40 calls a day

- Estimate saving over 2 minutes on each call

- Used primarily for serious accidents, working structure fire or medical emergencies

- Conclusion: FATPOT's CADfusion product has met expectations and given Orange County a platform for continuously improving interoperability

CAD Data Sharing - No Longer a "Nice to Have" but Rather a "Must Have"

The following scenarios are real and provide information as to how the technology is used in daily routine operations, as well as larger more complex events. Key to the success of the initiative is daily usage: not only does it significantly impact the return on investment, but it also creates the environment where familiarity enhances operational efficiency and routinely successful outcomes.

Scenario 1 – A typical multi-agency incident involving automated call transfer

Orange County Fire Authority has three main types of apparatus: Paramedic engines, trucks and vans. Most of their responses involve working structure fires and freeway accidents. They handle 30-40 call transfers a day to and from the partner agencies, and estimate that they save over 2 minutes on each call transfer. The time savings has undoubtedly lives when first responders arrive more quickly, especially to structure fire (*structure fires can double in size every minute*) or a heart attack (*a person's chance of survival from a heart attack decreases by 10% for every minute help is delayed*).

Scenario 2 – A larger scale multi-agency resource sharing incident

These types of incidents are very frequent for the County and represent the bulk of sharing requests. Almost everything the agencies do involve many resources handling complicated events. CADfusion is relied upon to assist all the partner agencies to respond to the right location with the right resources as quickly as possible. Moreover, CADfusion systematizes processes and procedures to provide repeatable, successful actions and reduce dispatcher stress and workload.

Scenario 3 – An atypical multi-agency, multi-jurisdiction large-scale incident

Thankfully, these are not very frequent, but when they happen they are pretty intense for all regional partners. In Orange County these most often involve wildland fires. For example, if Laguna Beach takes a call, they hand it off to OCFA and the County takes over. OCFA then pushes it to the other partner agencies as needed until sufficient resources have been dispatched. Tactically, it's very helpful when one agency is directing the response, and CADfusion enables the desired control.

Best Practices

The following paragraphs contain suggestions for leaders of data sharing initiatives. These "best practices" are actions that can be taken before, during and after the project to ensure project success by securing a strong commitment from all stakeholder leaders to overcome barriers and maintain focus on the goal. Many discussions were conducted by FATPOT with the regional partners' project managers, trainers, thought leaders, public safety administrators and managers, engineers and others in the Orange County region. Many common themes emerged.

Have a Shared Vision

The success that has been achieved in Orange County has not come because they selected the best technology although this is very important. It is because of the ongoing commitment by agency leaders to work together for a common goal. Information silos are most often a result of communication barriers and lack of trust. Orange County emergency response leaders have a shared vision and have dedicated the necessary resources to eliminate barriers and find the best solutions.

Create Strong Governance

The effort to create a governance organization has not only provided a means to resolve problems that arise, but it has also helped establish an attitude of cooperation and trust across the entire organization. Strong governance provides a framework of understanding all the relevant decisions affecting the common goal. Of particular help was a white paper published by the IJIS Institute entitled "Governance Agreements in Public Safety Data Sharing Projects" which is available on the IJIS Institute web site: http://www.ijis.org/?page=Reference_Papers

Establishing and maintaining an empowered governance process is critical to the success of a multi-agency, multi-system, information and resource sharing solution. A governance organization, sponsored by agency leaders, accountable for meeting established objectives, reporting and measuring performance regularly is indispensable. The results are measured in saved lives and reduced property damage.

Obtain Stakeholder Buy-In and Commitment Early On

Getting buy-in from all parties and the agreement that this project is a priority is critical to success. This includes the commitment that they will dedicate the people as needed to get the job done in a timely manner. Agencies often underestimate their needed contributions, that is, people who are knowledgeable enough to make decisions and have the time to do so.

Beware of the unrealistic expectation that the data sharing company will come in, wave a magic wand and your project is miraculously all done. Also, partner stakeholders have to make the Investment of time to understand the product they have purchased and its capabilities. Without understanding the art of the possible, data sharing will be limited and not fully utilized.

Choose the Right Architecture

There are several architectural issues that should be addressed early on. This will impact scalability and the ability to add new agency partners to the systems in the ensuing months and years. It is often challenging to get cooperation between CAD service providers, so coordination and cooperation between all participants is enhanced by having a neutral third party hub provider in the middle. The hub needs to have strong capabilities to be able to work with differences between the CAD systems and the CAD providers. Technical decisions related to such things as how often the data is updated, what initiates the data transfer, what is supposed to happen to the transferred data, as well as file, network, and error processing must be addressed. All of these decisions and the related complexity is greatly simplified by having a centralized intelligent hub at the center. Be sure to carefully define your needs and expectations. Pre-defining use cases up front can be very helpful in answering these questions.

Be Open Minded to Using the Technology

In the early period of implementing and using the system in Orange County, the attitude of the separate agencies towards sharing of resources was controlled by manual approval of the automated request. Each

sharing agency desired to manually review and approve the automated request before allowing CADfusion to dispatch a shared resource to a shared incident.

After a year of operating in this mode, it was determined that no request for an available resource was ever denied, so the agencies elected to extend automation and forego the manual approval and dispatch process. Chief Jeff LaTendresse of Laguna Beach stated, "Let's just make the assignment of the requested resource automatic. We are not going to reject a resource request if it is available, so let the system make the assignment automatically."

Learn all You Can from Similar Projects

While there are many good books on project and change management that offer excellent insights, an often overlooked resource are others who have undertaken similar projects. Orange County reached out to leaders of other data sharing projects and asked for their lessons learned. Below are some of the best practices they learned:

- Create and communicate a sense of urgency – letting others know why you are doing this project needs to be communicated broadly and deeply throughout all partner organizations. Failure to communicate the right message to the right people, and failure to communicate often enough throughout the project seem to be common mistakes.
- Get executive buy-in and assemble a strong leadership team - failure to get the buy-in from executive and middle management, and to have their sustained commitment, is always a challenge. Anticipate that it will happen and take appropriate steps. Make sure that your vision (how the future will be better) and strategy is conveyed to all stakeholders.
- Don't let up on communication and messaging – communication within and among all stakeholders must be constant and consistent. You must plan to reach out to all appropriate players, much more than you think, so that your message will be heard, understood, and internalized. Also, plan to communicate your project's early successes and do not let up on these communications. This will improve the value both internally and externally (among the community).
- Change the culture – this is where daily usage becomes the new norm that users demand. In essence, they cannot conceive of working without the new solution.

Summary

CAD-to-CAD interoperability has **helped** Orange County emergency respon**ders** to achieve their objective of effective and efficient resource sharing.

The County's visionary approach to effective resource sharing has improved response times, conserved taxpayer dollars, and saved lives and property. The availability of neighboring agency resources is now visible and usable in emergency situations when local resources are busy or too distant to respond effectively.

CAD-to-CAD interoperability through FATPOT's CADfusion is a lower cost alternative to CAD system consolidation. Autonomy and critical decision making is maintained by local agencies while retaining the ability to share with or receive aid from neighboring agencies. The results have been greater effectiveness and cost savings while being able to meet increased demands.

Ongoing communication that maintains trust is key to achieving this level of success, enabled by the right technology and the right governance. The Orange County region has affirmed that FATPOT understands how CAD systems work and has developed the best architecture for CAD-to-CAD interoperability. The flexibility of the CADfusion system has allowed the agencies to evolve their operating procedures when faced with changing requirements without incurring expensive modifications typical of custom point-to-point interface projects.

Anyone considering implementing a CAD-to-CAD interoperability solution should seriously investigate the FATPOT CADfusion platform and the benefits that it provides.