PIONEERING 911 RESILIENCY SOLUTION
Ensures Uninterrupted Emergency Response

Two of Washington State's largest Emergency Communications Centers (ECCs) formed a partnership to assure service continuity during scheduled or unscheduled downtime.

The Regional Resiliency Initiative is a major innovation combining Next Generation 911 (NG 911) with Washington State's Emergency Services IP Network (ESInet) and CAD-L, a custom-built cloud-based CAD solution designed for ECC resiliency preparedness. On June 5th both ECCs conducted a live 911 drill that was successful and validated a vision that is more than four years in the making.

PROJECT FOCUS

Re-routing incoming calls has been a feature of ESInet since 2012, enabling ECC to redirect calls to another ECC anywhere in the State. However, effectively managing incidents beyond answering the 911 call in another center with different systems and protocols is typically not feasible or possible.

Everett Washington's Snohomish County 911 (SNO911) team set out to create a backup Computer Aided Dispatch (CAD system, initially intended to cover periods of unplanned or planned system downtime, for upgrades and patching in their own center.

Nicknamed CAD-L, the cloud-hosted solution is securely accessible via a browser, operates independently of the primary CAD, and supports essential dispatch features necessary to initiate and manage emergency responses. CAD-L was deliberately designed for partner ECC's to be able to localize and easily put to use with minimal training.

Most ECCs operate a back-up location and this initiative is focused on continuity of operations while staff relocate to their back-up locations.

SNO911 has formed a partnership with Valley Com 9-1-1 in Kent, WA. Valley Com 9-1-1 is is also a consolidated multi-discipline ECC with call volumes similar to SNO911.

By making CAD-L available to Valley Com 9-1-1 and creating streamlined call-taking procedures in the event of a disruption of operations in either center, a complete resiliency framework has been built to assure responses to emergencies in both jurisdictions.

On June 5, 2024, a successful real-time test of the partnership proved the planning, technology, and partnership between the two 911 centers deliver highly reliable service to both communities. We are unaware of any other similar initiative of this magnitude anywhere in the United States.

RESPONDING, NO MATTER WHAT

SNO911 & Valley Com 9-1-1 have been adopters of Next Generation 911 advanced technology to expand access and accelerate responses to everyday emergencies.

As of mid-2020, all 86 of Washington State's 911 emergency call centers completed their upgrade to NG911 and are managing call routing on the backbone of the statewide ESInet.

The importance of readiness is taken very seriously by ECCs everywhere. Preparedness for major regional catastrophes like earthquakes or wildland fires is important, but smaller everyday incidents pose the greatest likelihood of disruption to operations.

Needing to evacuate the ECC is more likely to come from unexpected emergencies. SNO911 experienced their own close call when roofers caught a section of the roof on fire and smoke was pulled into the building. ECCs need a plan on how activity is managed while telecommunicators relocate to their back-up center.

Deepening the strategic use of ESInet, Everett Washington's SNO911 formed an alliance with Valley Com 9-1-1, a similar-sized ECC located in Kent, WA, about 40 miles from SNO911's base in Everett. Establishing pre-configured alternate Policy Routing Functions (PRF) within ESInet allows supervisors in either of the centers to quickly initiate re-routing of 911 to another ECC.

Both teams now know that even in the event of the unexpected, callers in their communities will reach the 911 lifeline so they can get the help they need.

"CALLS ARE RE-ROUTED…AND THEN WHAT?"

To put it simply: ESInet re-routing of 911 traffic so callers can reach a trained dispatcher is only part of the equation. Once the location and crucial details are gathered, police and fire must be alerted, and responses managed and that was ultimately the challenge.

911 centers everywhere plan for unplanned CAD outages, typically with a systems of cards for each emergency and written notes for tracking units responding, and runners who deliver the cards/paper to the appropriate dispatcher.

Some centers add magnet boards to track the status of responder units, and some have innovated with the use of LEGO® blocks to represent movements of response vehicles. Although these manual processes are necessary and exist in most ECCs, they are inefficient and prone for delayed responses. These manual methods have been common for years, but with advances in technologies and solutions like CAD-L, better ways exist.

A PERFECT PARTNERSHIP

Located in Everett, Washington, SNO911 is one of the state's busiest 911 centers. Their dispatch staff of 123 answered nearly 750,000 requests for service in 2023. SNO911 is a consolidated ECC dispatching 43 different Law Enforcement and Fire/EMS responders in Washington's third largest county of over 850,000.

SNO911 is known for innovations which continuously enhance services to the public and support of emergency responders.

A culture of vision for the future and proactive change management are at the core of SNO911 values.

Valley Com 9-1-1 is a consolidated PSAP coordinating emergency responses from Law Enforcement and Fire/EMS agencies in southern King County, immediately south of Seattle.

Located in Kent, Washington, Valley Com 9-1-1 provides emergency communications services to 23 emergency response agencies.

Valley Com 9-1-1's staff of 103 answered 660,117 requests for service in 2023.

From the beginning, it was important that the two partners have similar characteristics: similar capacity to handle heavy call volume, experience in consolidated multi-discipline call-taking (Police, Fire & EMS) and dispatching, and the immediate availability of a backup center in the case of emergency.

In 2017 Snohomish County Washington consolidated two PSAP operations into what became SNO911 a consolidated, multidiscipline PSAP managing police, fire and EMS emergency responses. In a forward-looking decision by the Board of Directors, the second 911 center in Mountlake Terrace was preserved as a backup center, kept ready to take over operation immediately.

Policies were put into place to rapidly evacuate the Everett center and transport staff to the backup location, however there was never a good solution to manage activity while dispatch staff relocate to the back-up.

During the intense challenges of the COVID pandemic, SNO911 was able to maintain physical distancing by scheduling a percentage of the staff complement to work in each center, protecting the health of staff. At the time, splitting operations was useful, however it carried its own challenges and was not a permanent option.

> *"We are a large ECC, but not an LA or NYC who have the resources to staff and operate two geographically diverse ECCs."*
>
> Andie Burton, SNO911 Director of Operations.

Like SNO911, Valley Com 9-1-1 is a busy center, accustomed to handling peak demand volumes. Like SNO911, Valley Com 9-1-1 is a multi-jurisdictional 911 center providing emergency communications for police, fire & EMS. Valley Com also has a dedicated backup facility in the King County Sheriff's Office dispatch center, equipped and ready to be operational rapidly.

Both backup centers keep a high-availability 'mirrored' instance of their critical systems using virtualization and geographically diverse networking. The only thing that is needed is the staff. The similarities between the alliance partners make for a perfect match with capacity to support each other during unanticipated operating interruptions. For each center, downtime is likely to be very brief – roughly 30 minutes to relocate dispatch teams and restore nominal operations. The question was: *"How do we manage activity during the time teams are relocating?"*

Notably, proximity of the partners has proved unimportant. The cities of Everett and Kent are more than 40 miles apart, separated by the densely populated city of Seattle and several suburban communities. SNO911 and Valley Com 911 do not share a border. Effectively, the partners in the Regional Resiliency Initiative could be on opposite sides of the state.

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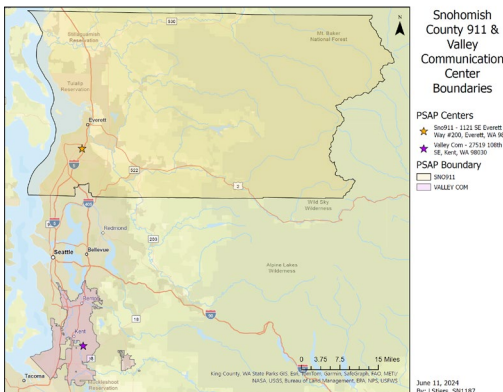
AN AUDACIOUS IDEA

Derek Wilson, Operations Manager summed up the inspiration for CAD-L and developing this level of redundancy: *"It was clear to us that we had a duty to work on this, to make sure that if we need to evacuate (bug-out), there will be a process to continue service, both answering calls and dispatching responders."*

It's easy to imagine the massive emergencies that would interrupt 911 services, but operating disruptions are more likely to be caused by commonplace accidents like a roof fire, or an HVAC failure. While operating in 'backup mode' for long periods is feasible, the partnership is intended to cover brief periods when staff relocates during an evacuation.

Wilson went on to say: *"Given the rerouting control of ESInet and capacity to manage call routing, combined with contemporary cloud software engineering, we can address both workloads. We saw an obligation to make sure we are ready, no matter what."*

Initiating ESInet call re-routing is rapid and in the control of an on-duty supervisor. Washington State's NG911 contractor Comtech enabled each ECC with a secure ability to access the Comtech Policy Routing Function (PRF) table and re-route their 911 traffic to their backup partner ECC. Once an ECC is ready to take their own 911 calls back, they can simply log back into that same secure system and take back their own 911 calls.

> *This is one example of software-driven next generation technology for critical infrastructures like 911 making a difference. Comtech is pleased to support the forward thinking of both Sno911 and Valley Comm 911."*
>
> **Whitney Maxfield, Sr. Technical Program Manager, Comtech**

BETTER THAN CARDS

The CAD-L concept began to take shape in 2018 as SNO911's leaders evaluated how to ensure up-time and leverage the re-routing capabilities of the ESI-net. Then came the challenging question of: "then-what?" Unable to find a commercial solution, the agency set forth creating their own tool by commissioning one of Seattle's top software development firms.

The more complex task was developing a streamlined but effective mission-critical CAD resource. 911 centers use an array of CAD systems, and every jurisdiction localizes their system to match their own has unique protocols and event codes. To ensure ease of use for the covering ECC, six generic type codes were developed. Once narrative info is reviewed at the home agency, a final coding is assigned and resources dispatched.

Duplicating two exact data frameworks and system user experiences, is unreasonable at several levels, not the least being an expectation that a dispatcher could develop proficiency with two very different systems.

> *"The magnitude of this operational functionality between ECCs in different counties must be appreciated. Through innovative collaboration and improved technology, this endeavor allowed us to add another level of continuity to better serve the public, our communities, and partner agencies without interruption or delay. "*
>
> **- Angee Bunk, RPL, CPE, Deputy Director, Valley Com 9-1-1**

FORMULA FOR SUCCESS

Success in this Regional Resiliency solution involves three major components:

1. A partnership between two ECC's with similar operating scope and resources, ready to immediately provide backup for each other and form a collaboration to establish and practice procedures for diverse emergency situations.

2. Pre-configuration of the Policy Routing Functions to activate call re-routing via ESInet

3. Adoption, training and practice of CAD-L to manage call and dispatch operations


CAD-L CAPABILITIES

The application provides an impressive suite of core CAD functionality, localized for each ECC, and includes:

- The ability to geo-validate locations and common places against the home agency GIS
- Identify jurisdictional boundaries and beats
- Designate incident types and priorities
- Provide assignment recommendations,
- Assign and track units
- Add narrative and filter views by jurisdiction.

It includes a command-line, integration with RapidSOS, and the ability to send alerts to responders. The application can operate on a single monitor or span across multiple. These capabilities and ability to localize make it easily adaptable for each ECC.
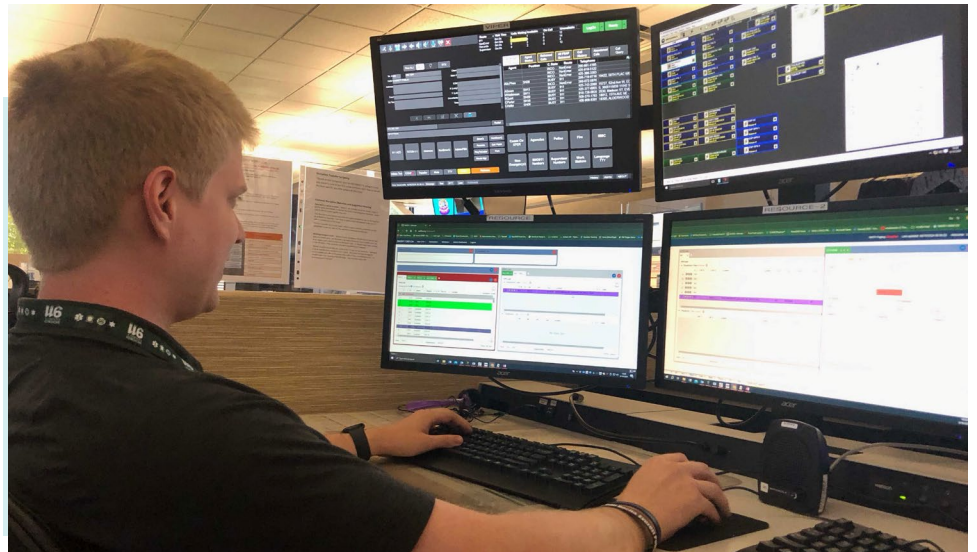
An Elastic web-application securely hosted in the cloud; the solution dynamically scales based on workload which ensures the system can meet peak demands at any moment. This also keeps costs minimal when the application isn't being used and ensures the system can adapt and increase resources automatically during use.

The application is hosted in the highly secure Amazon Web Services GovCloud (AWS GovCloud), an environment designed for sensitive workloads.

Snohomish County residents have faith that 911 will be available whenever needed, without fail. To meet that expectation, we continuously evaluate risks our own ECC may encounter, and plan in advance to prepare and maintain services.

Kurt Mills, Executive Director, SNO911

TESTED AND PROVEN

The Regional Resiliency Initiative is designed for brief temporary activation however there is no reason the capabilities couldn't be sustained for longer periods of time. Several iterations of CAD-L were tested, improved and iterated by the SNO911 team before introducing it to Valley Com 9-1-1.

Over the course of several months, there were continued improvements, staff-wide training and drills of both call routing and CAD-L. This was a major investment in the collaborative effort by both ECC's.

At 8:00AM on Wednesday, June 5th, 2024, the partnership and technologies were tested in a live operating mode. This was no simulation.

 "We had several simulation and table-top drills, but at some point, we knew we needed a live exercise," said Andie Burton.

911 calls were re-routed from each center to the other and CAD-L was used in real-time call-taking and dispatch.

As with all testing of new procedures, there were technical and operational learning opportunities for all. However, the system, staff at both ECC's, and partnership itself exceeded expectations even during a busy mid-week commute.

Executive Director Mills summed up his congratulations to both teams:

"The collaboration between VCC and SNO911, two of the largest Emergency Communications Centers in the state, which do not even share a border, is a testament to the conscientious effort and teamwork displayed by all involved. This accomplishment is a significant achievement and helps increase the 911 resiliency for our combined populations of more than 1.5 million."