



PSAP Networking: Consolidation without the Politics

A Whitepaper

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Virtual Consolidation

Driving Down PSAP Costs While Keeping Dispatch Local

Virtual Consolidation Gives Agencies the Best of Both Worlds

PSAP Challenges

Public safety answering points (PSAPs) are looking to gain inter-agency collaboration that will strengthen communities, improve response efforts, and combat growing threats. Yet these same agencies are facing a host of financial pressures. Phone trunks and associated services such as call routing are extremely expensive. It's also costly to acquire and maintain E911 systems for each individual PSAP.

This has led some agencies to physically consolidate PSAPs. However, some agencies quickly realized that pulling dispatchers out of their local communities caused more problems than it solved. Not only were the cost savings disappointing, agencies lost experienced dispatchers who had in-depth knowledge of local communities.

Fortunately today, there are new technologies that enable PSAPs to take advantage of “virtual consolidation” to gain the financial benefits of consolidation, while retaining local dispatch.

Traditional PSAP environments

Historically, 9-1-1 calls are sent to a telco's central office. The telco's router determines which PSAP the call should be routed to, and transmits the call over the related CAMA phone trunk. Each PSAP has its own customer premise equipment and 9-1-1 controller. The only way to reduce equipment costs is move everyone to one location.

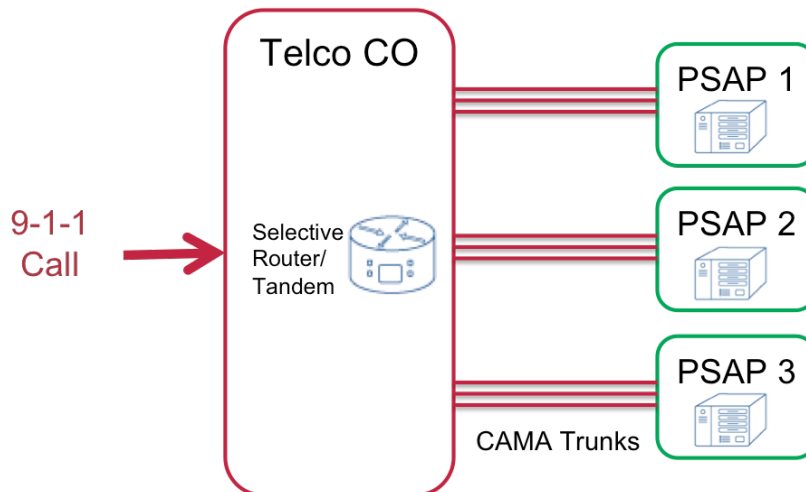


Figure 1: With traditional 9-1-1 controllers, each PSAP needs its own customer premise equipment. The PSAP pays the telco for phone trunks and selective routing.

Physical consolidation – Its benefits and shortfalls

In an effort to reduce equipment costs, many agencies are considering physical consolidation. This does offer some advantages. Namely, it requires far less customer premise equipment such as computer aided dispatch (CAD) servers and 911 controllers and allows for some pooling of phone trunks. It also fosters data sharing since all dispatchers are in the same location and all agencies are using the same software (i.e., CAD).

However, physical consolidation also brings major challenges and drawbacks that cause many PSAPs to regret embarking on such an endeavor. First, it pulls dispatchers out of their local communities. As emergency responders can attest, having dispatchers with intimate knowledge of the idiosyncrasies of the area is crucial for response efforts. Today dispatchers typically live nearby to their PSAP and as local residents they have a wealth of knowledge of the agencies and communities they serve. An experienced local dispatcher knows, for example, what bridges and roads tend to flood the fastest, and can clue responders to avoid those routes during heavy rains. Or know what local individuals might be prone to violence and warn officers as they respond to the scene of an incident.

They also know local customs, such as that fact that the police don't ticket the county assessor for parking in front of town hall, for example. All of these details that keep a local PSAP humming smoothly are lost when dispatchers are no longer serving their local community. Moreover, these moves lead to employee attrition and even greater loss of local knowledge, not to mention the time and cost of hiring and training new staff.

And then there are the anticipated equipment cost savings. Although PSAPs find they are able to reduce costs by consolidating servers, these gains are often offset by higher real estate costs required for a new state-of-the-art communications center. For instance, bringing larger 911 hardware systems into one location requires high-end cooling to keep equipment running efficiently. These added electric costs come at no small price. In fact, data center power and cooling expenses are growing four times as fast as new server spend. (Source = *Worldwide Software 2008-2012 Forecast Summary*, IDC, July 2008)

There are additional practical considerations. Consolidating all equipment and staff into one location typically involves years of planning to properly implement.

In addition, this physical consolidation forces disparate agencies that are used to working in their own way to follow one set of standard operating procedures. This increases the learning curve and causes delays in response times that agencies can ill afford.

After all the time, effort, and money spent for physical consolidation, many agencies discover they are not realizing the financial benefits they imagined. While they are able to reduce the number of servers, their legacy 911 controllers still require expensive CAMA phone trunks, and paying the telco to provide selective routing.

Virtual Consolidation

There is a better alternative. New Next Generation (NG) technology enables “virtual consolidation”—centralizing all the 911 technology, while keeping all existing PSAPs open and dispatchers local. This helps PSAPs drive down equipment costs while preserving all the critical historic knowledge needed for emergency response.

However, it's important to choose the right type of controller to truly gain financial returns. There are two types: a “basic” NG 9-1-1 controller (with no selective routing) or an “advanced” NG 9-1-1 controller (with selective routing). First we'll discuss the basic approach. The agency installs a basic NG controller in a central emergency communication center (ECC), which sends 9-1-1 calls out to the “remote positions” over a public safety IP network.

This approach has serious shortcomings. First, this doesn't reduce the number of phone trunks needed. Each PSAP still needs its own dedicated trunks, so they're not gaining any cost advantages in that respect. They're just re-routing calls to the ECC.

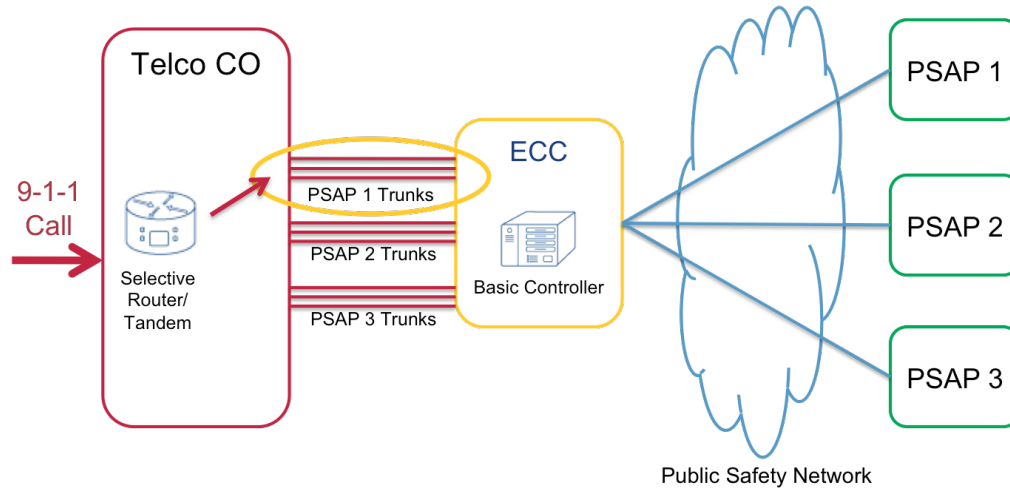


Figure 2: With basic NG 9-1-1 controllers, the telco still provides selective routing to determine which PSAPs the 9-1-1 call belongs to and sends the call over dedicated trunks to the basic NG 9-1-1 controller in the ECC. The controller forwards the call on to the right PSAP based on which trunk the call came in on.

Second, attempting virtual consolidation with a “basic” NG9-1-1 controller puts operations at great risk. Today, there are so many PSAPs that if one goes down, the telco can easily reroute calls to another center in the area. However, if agencies consolidate equipment and using a “basic” NG controller to send calls to “remote” positions in other PSAPs, they’re relying entirely on the ECC for receiving all emergency calls for all agencies in the entire region. In other words, if that one ECC goes down, 9-1-1 goes down.

To protect against this risk, agencies would have to establish a backup ECC, which needs its own set of costly phone trunks, negating the initial cost benefits. In fact, it would require doubling the number of trunks they had before when they maintained individual centers. Moreover, this setup still requires agencies to pay the telco for selective routing.

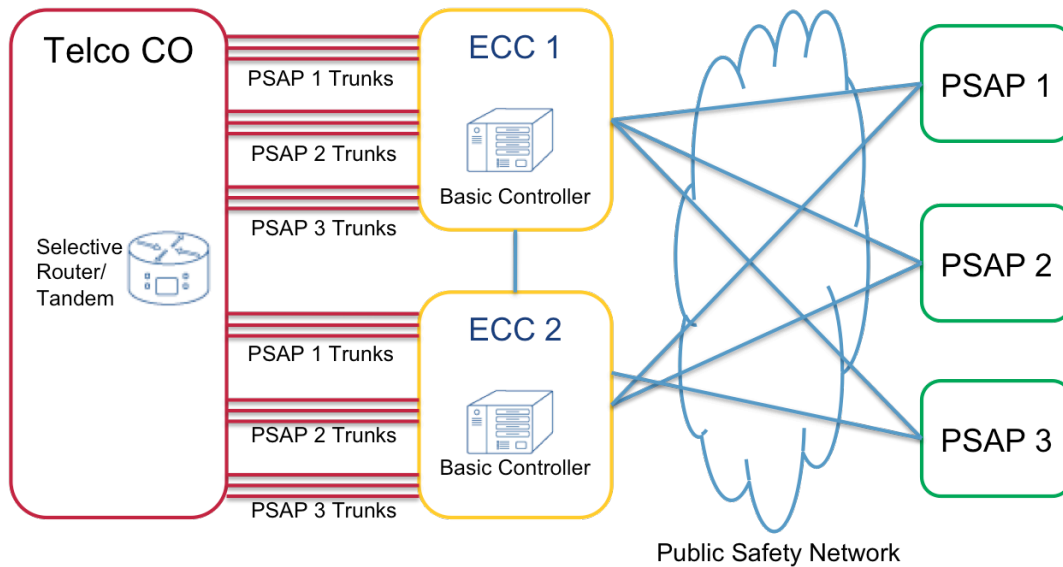


Figure 3: Attempting virtual consolidation using a basic NG controller is costly because it requires use of a secondary ECC, with duplicate phone trunks for every PSAP in the network, for backup and disaster recovery purposes.

Virtual consolidation with selective routing

Fortunately there is a far better approach. Advanced controllers enable agencies to realize the full benefits of virtual consolidation. This approach eliminates selective routing costs as well as the huge expense of additional phone trunks—all while keeping local staff dispatching in their own communities. Customer premise equipment is moved to a central location and is fed out over the network to all the individual PSAPs via an advanced IP-enabled NG controller.

Once agencies have the phone controller in a central location, consolidating other software systems is a natural next step. For example InterAct's Next Generation CAD system, *InterActCADtng*, empowers agencies to take advantage of the cost benefits of multi-tenant capabilities whereby there's one CAD server shared by multiple tenants (agencies) operating independently. This means agencies can share the cost of one CAD server while continuing to use their own individual processes. The systems are built for maximum scalability, giving agencies the assurance that they'll continue to experience optimum performance, regardless of how many dispatch stations they're using.

With the system's peer-to-peer architecture, dispatcher stations can continue to operate, even if the central database is down. They can also run remote dispatch stations on low-bandwidth communication networks. This allows agencies to set up temporary mobile command stations with true dispatching, using just a wireless air card in the case of emergency or special events. They retain all the security and data access that they would right in the PSAP.

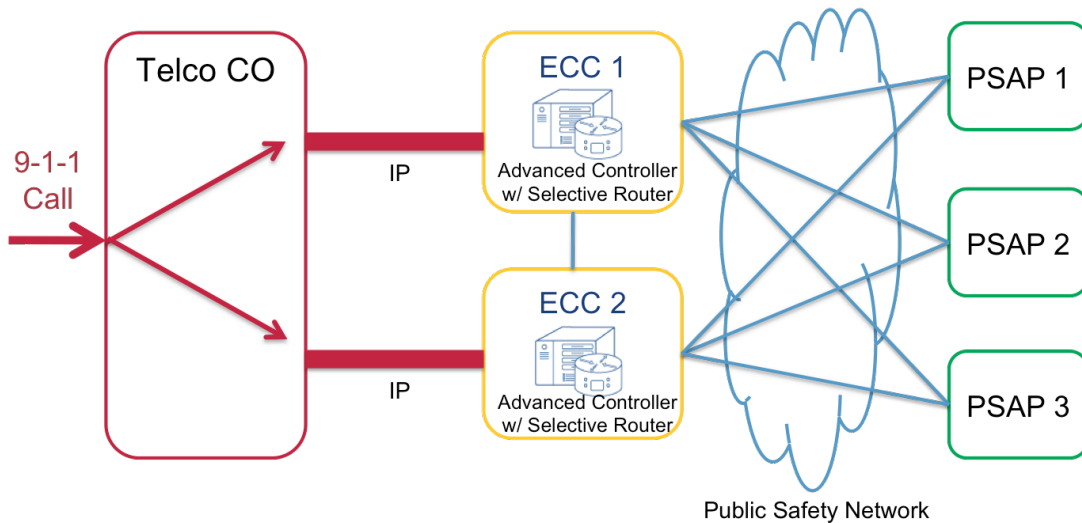


Figure 4: Virtual consolidation with an advanced NG controller eliminates the cost of phone trunks and selective routing while enabling agencies to keep dispatchers in their local communities—and share access to CAD, RMS, mapping, and other critical public safety applications.

Benefits of virtual consolidation

Tremendous financial savings. With an advanced NG controller, the 9-1-1 call comes into the telco, and is passed to either ECC via an IP line. Agencies can eliminate all the phone trunks because the call is transmitted via IP directly into the controller. This results in tremendous cost savings by consolidating customer premises equipment and eliminating phone trunks and selective routing fees.

Employee and knowledge retention. Virtual consolidation frees agencies to continue doing business the way they're accustomed to, retain control of their data, and keep their dispatchers in the local areas they know best. They can continue to use their own standard operating procedures and even their own unique event codes, incident numbering conventions, unit configurations, and more. This setup also prevents the attrition that's likely to occur with physical consolidation.

In fact, dispatchers continue to work as they always have. It's completely transparent to them that any equipment consolidation has taken place. They stay in the same center, working as usual, while the customer premise equipment is simply moved to whichever center in the area has space for it.

Sharing of CAD and other public safety systems while continuing to operate independently. With advanced NG controllers in place, multiple agencies can share the cost of a CAD, RMS, mobile, mapping, or other system, yet continue to operate independently. The agencies share one set of hardware, yet are free to continue to follow their own unique processes. They can choose to share as much or as little data as warranted. This information sharing encourages agencies to collaborate in fighting crime.

Prepared for the future with IP capabilities. Having an advanced NG controller also makes the agency IP-ready so it can take accept video, audio, instant messages, OnStar data, camera and sensor inputs, and more. – with no forklift upgrade needed.

Ability to redirect calls on demand. In addition, advanced NG controllers allow calls to be rerouted on the fly, so that dispatching can be conducted from virtually anywhere. This is critical in a disaster. If a PSAP is faced with an outage, dispatchers can easily be rerouted to continue fielding emergency calls elsewhere, without interruption in service.

With this handy capability, agencies can also establish mobile PSAPs to support special events. For example, during a major music festival, a PSAP relocated part of its team to the festival grounds, where they had a fully functional dispatch position, including phone, CAD, and mapping capabilities. All 9-1-1 calls coming into a five-block area surrounding the festival were automatically rerouted to the mobile PSAP during the event, helping to keep field dispatchers aware of emerging situations and ensure prompt responses to calls of distress.

This setup also makes it easy to share data with other agencies to foster better cooperation in combating and solving crimes. With these advanced capabilities, agencies can connect 9-1-1 call processing systems directly to their CAD, mapping, and mobile applications—helping to improve response times and eliminate time-consuming and error prone data entry.

Advanced NG controllers also free agencies to progress at their own pace. For example, some agencies might still choose to physically consolidate operations and use an advanced NG controller to eliminate the cost of phone trunks and selective routing. Others might simply acquire a selective router without a controller for their central location and keep their legacy equipment. Because the selective router can accept calls via CAMA trunks or IP, the agency can take advantage of NG capabilities such as video/audio, sensor, and camera inputs now and upgrade their systems at a time of their choosing.

What to look for

There are several factors to keep in mind when considering virtual consolidation.

a. Data security. Agencies should look for a solution with multiple levels of security, such as VPN, encryption, and authorization capabilities. These are the same security capabilities that financial institutions use to transfer billions of dollars every day. Protecting public safety data is just as important if not more so.

Data security should include:

- Two-way encryption to ensure data transmitted between a user and the ECC cannot be intercepted
- Authentication to validate the identity of users
- Virtual private network (VPN) to provide a secure pathway for transmitting data between a remote user and the agency network

b. Selective routing. Additionally, those considering virtual consolidation will maximize financial benefits by investing in an advanced NG controller that offers selective routing. Otherwise they can't eliminate phone trunk and selective routing expenses from the telco.

c. Multi-tenant applications. Another important aspect to consider is the choice of application environment. A multi-tenant application environment is ideal, as it enables multiple agencies can subscribe to the same CAD server to lower costs, continue to follow their own incident management procedures (ex: event codes, incident questions, etc), and seamlessly integrate with other systems such as mobile, mapping, and records management.

Some agencies are even leveraging multi-tenant solutions as a way to generate revenues. A small city, for example, recently purchased its own multi-tenant CAD system and is selling CAD licenses to neighboring agencies. The nearby agencies pay annual fees to connect to the city's CAD system. In turn, the city gained use of a highly functional CAD system and brought much needed funds into the community. Each agency also has the freedom to customize the CAD system to their unique needs, based on their processes and event codes. Their dispatchers aren't

even aware that they're using a shared system. Individual agencies can also choose whether or not they wish to share data with cooperating agencies, and determine various types of data to be shared.

d. System redundancy. The reliability of dispatch technology is also critical. Agencies need assurances that the IP network has guaranteed quality of service with 99.999 percent uptime or better. Moreover, they need confidence that the system workstations will continue operating if a server goes down. These are important considerations to protect against business disruption.

Conclusion

Agencies are looking for creative solutions to drive down operating costs without putting their critical operations at risk. Virtual consolidation offers the promise of significant cost savings without disrupting dispatch personnel—yet it needs to be implemented with the right controller type. Otherwise, financial gains will be negligible. In fact, the only real way agencies can save money using a basic NG controllers is if they physically consolidate people and hardware, which leads to its own problems such as loss of critical staff and knowledge and the inherent hassles of moving to one monolithic operation.

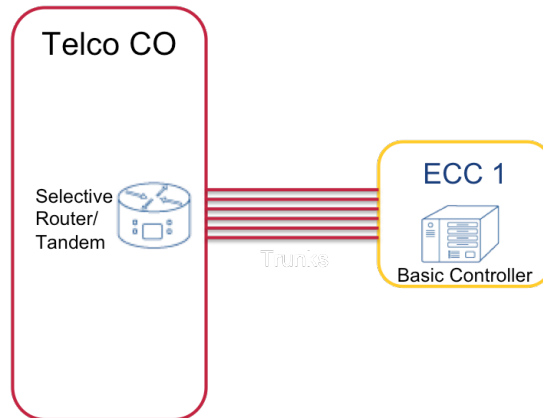


Figure 5: Basic NG controllers provide no selective routing capabilities and offer only limited financial return.

The real benefits of virtual consolidation are gained with an advanced NG controller. This provides the best of both worlds—enabling agencies to achieve substantial cost savings without losing local control or local knowledge. This innovative approach allows agencies to eradicate exorbitant telco costs and pare down customer premise equipment while keeping dispatchers right in the community they serve. This results in more savings for agencies while leaving control local, right where it belongs.

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InterAct CONNECTIONS FRAMEWORK



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