

Three North Central Florida Counties Provide a Foundation for NG9-1-1

The North Florida Routing Network connects 14 counties, using the State of Florida's private network facilities, specialized routers, data sharing techniques and innovative architecture to solve call routing issues, connect carriers directly to the PSAP, and provide needed backup and disaster recovery paths.

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Advances in modern communications have created a need for an equally advanced 9-1-1 system. New telecommunications architecture capable of passing calls and multi-media data from non-traditional devices is envisioned as the next chapter for the aging 9-1-1 system. This new, or next-generation 9-1-1 (NG9-1-1), system is already taking shape in Northern Florida through the use of IP networking to tie together multiple counties in a network that is providing a foundation for NG9-1-1.

While many in the 9-1-1 industry are preparing for the new possibilities NG9-1-1 will bring, they are also challenged by its complexities. These challenges are both technical and operational, and include incorporating new operational procedures into the PSAP, training of personnel, creating interagency agreements, and, of course, the technical and implementation challenges. Also challenging is the funding of new networks and replacing PSAP CPE that is not compatible with NG9-1-1. However, in Florida, the Sunshine State, projects are already underway that have bested some of these hurdles. One such project, known as the NFRN (North Florida Routing Network) uses innovative IP technology to create a foundation for NG9-1-1 to evolve as new standards are defined.

The NFRN, which connects 14 counties, uses the State of Florida's private network facilities, specialized routers, data sharing techniques and innovative architecture to solve call routing issues, connect carriers directly to the PSAP, and provide needed backup and disaster recovery paths. It started as a trial linking together three adjacent North Florida Counties with a unique set of problems.



Madison, Taylor and Suwannee Counties in North Central Florida share boundaries but not Local Exchange Carriers, making it impossible to transfer calls with ANI or ALL. Image courtesy of AK Associates.

The North Florida Routing Network

Madison, Taylor and Suwannee counties in North Central Florida have a combined population of about 85,000 people and are served by three different Local Exchange Carriers (LECs). They could not transfer misrouted calls with ANI and ALL across county boundaries or LEC LATA boundaries due to the lack of connectivity between the three separate LEC 9-1-1 networks. Connecting these counties with alternate network facilities using NG9-1-1-ready equipment not only solved these problems, but provided the counties with much needed back up alternatives and made them ready for NG9-1-1 technologies.

The North Florida Routing Network was the 2006 brainchild of Arthur Kraus, Chief Executive Officer of AK Associates. Pat Welte, 9-1-1 Coordinator of Duval County (Jacksonville), recommended using the State's MyFlorida Network (MFN) to

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NORTH FLORIDA ROUTED NETWORK

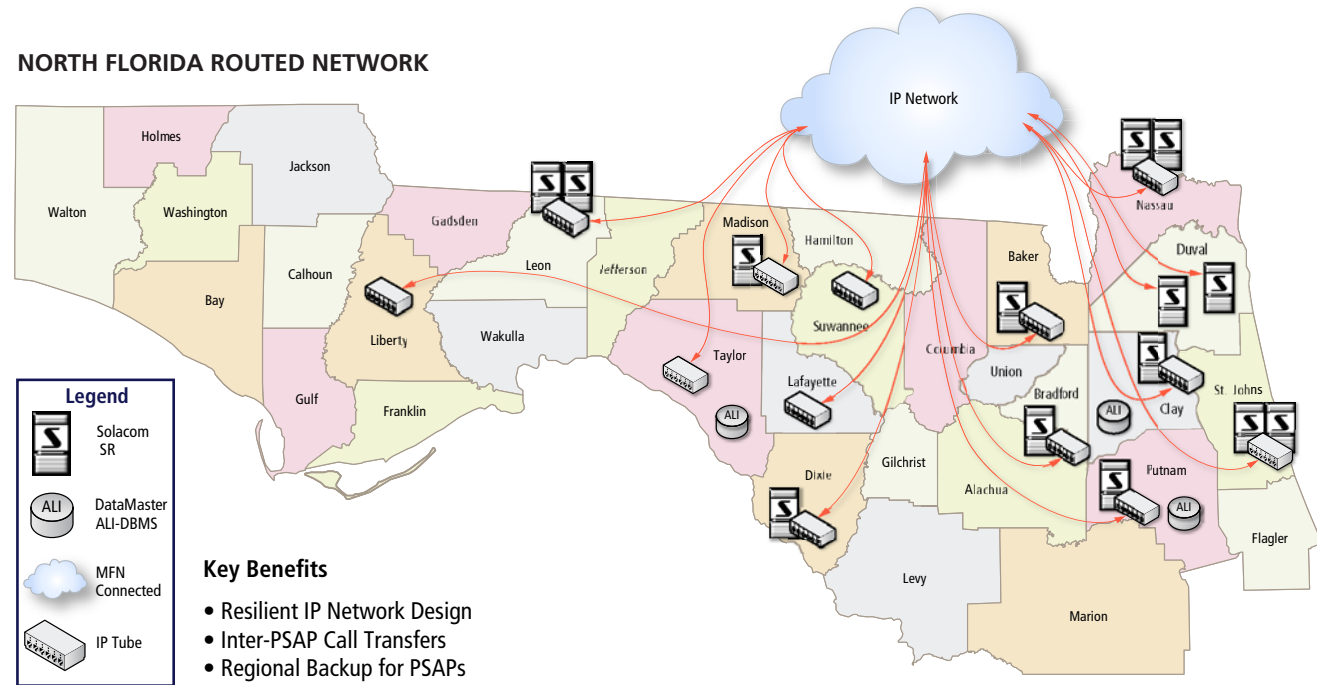


Figure 1: The North Florida Routing Network uses specialized routers, data sharing techniques and innovative architecture to solve call routing issues, connect carriers directly to the PSAP, and provide needed backup and disaster recovery paths. Image courtesy of SolaCom.

realize significant cost savings compared to purchasing similar network facilities from a traditional provider. The MFN is a private IP network provided by the State of Florida and maintained by AT&T. AK Associates engineered the connections, placing these counties in a position to handle NG9-1-1 without forklifting or changing out their existing equipment.

With the IP network in place, additional equipment was used to provide the desired functionality. This equipment varies by county but may include SolaCom ESP (Emergency Service Platform) IP selective routers and IP gateways, Engage IP tubes and Adtran channelizers. The overall solution provides for county-to-county call routing with ANI and ALI, selective transfer, alternate/overflow routing options, disaster recovery options and i2/i3 capabilities.

Network and Connections

AT&T installed a Cisco 1841 router at each county that is leased by each. The MFN for 9-1-1 is a private network with no public access. AT&T is responsible for the network up to the router, and AK Associates is responsible for all of the other 9-1-1 equipment at each PSAP.

The network design is continually evolving as new equipment and methods become available. In fact, one of the great challenges of this or any Next Gen network is that the technology and methods are changing so rapidly that counties that connect six months or a year later than their neighbor may use entirely different equipment or engineering principals.

Once the three-county pilot project was tested and approved, other counties began to connect to the NFRN. Leon County (Tallahassee, the state capitol) and Duval County will each have two SolaCom ESP selective routers that are geo-redundant within and between the two counties and are the two primary nodes. From the two primary nodes, eleven additional counties are in the process of being connected, and several other counties are ready to start the process (see Figure 1).

ANI, ALI

Between each of the connected sites, incoming and outgoing trunks are built in the PSAP 9-1-1 equipment. These connections provide the same functionality as a transfer via a selective router wherein the ANI, ALI and voice can be transferred to whatever destination the operator desires. This allows transfer of misrouted wireless and landline calls from areas of overlap that was impossible prior to the NFRN.

It doesn't matter if a county is using ALI from a LEC or if they have a stand-alone ALI database. In either case this configuration works perfectly. For stand-alone ALI database sites, each site's ALI database server has all of the wireless carriers ESRK ranges loaded for all of the other connected sites. The ESRK is used to retrieve the ALI from TCS or Intrado for each transferred wireless call. ALI sharing ports are built between the local ALI stand-alone servers. ALI steering is built within the servers to route an ALI request by ESRK, ESQK or CPN to the appropriate location's ALI server. This is completed by virtual comm port using client/server over the MFN. This allows any PSAP to retrieve the ANI and ALI from their stand-alone database or another county's ALI provider.

Routing, Recovery and Backup

In the early days of the NFRN, wireless carriers were connected directly to the counties. But, as the network has evolved, routers have become more sophisticated, and more counties have connected to the network, it's made it possible to reconfigure those routes more efficiently. AK Associates is consolidating wireless trunking from each county to the two geo-redundant routers in Leon and Duval counties. This configuration provides two routes for each PSAP, compared to the single route that is used today. This configuration will save the State of Florida significant wireless interconnection costs.

Another requirement of the counties was to implement alternative backup capabilities in the event of PSAP evacuation—after all, Florida

is Hurricane country. This has been accomplished by using the NFRN to connect 9-1-1 wireless and IP call taking equipment remotely to another county that has not been impacted. One piece of equipment being used for this is the PlantCML CommandPost product. It is an answering position in a hardened portable case that can connect to other counties' 9-1-1 systems using wireless or IP connectivity. The PlantCML CommandPost can also be picked up and carried to another site and connected for instant call taking ability.

VoIP

Originating Voice over IP (VoIP) calls have been tested using the NFRN. Test calls using a VoIP soft phone have been placed to the Madison County SolaCom ESP Selective Router (using DSL access) and then routed by ANI to the correct County (Suwannee, Lafayette or Taylor) over NFRN. The SolaCom IP Router has the ability to connect IP facilities with legacy 9-1-1 facilities allowing IP calls to be selectively routed to the appropriate destination in the format compatible with the receiving equipment. In the future, as more destinations are compatible with native IP, the legacy connections will be converted. In NG9-1-1 terminology, SolaCom equipment provides the function described as an ESRP (emergency services routing proxy).

Native IP Trunking

During testing and implementation, native IP trunking from a SolaCom ESP Router to another IP Router within the NFRN has been proven. In the future these will become the preferred connection due to the speed and efficiency they provide compared to legacy networks. These tests have been done between Duval, Madison and Putnam counties.

Funding

Funding for the project was provided in large part by the State of Florida E9-1-1 Board. Established in 1999 through wireless 9-1-1 cost recovery legislation, the Board maintains a grant program for rural counties who need funds to install and maintain Enhanced 9-1-1 systems. This innovative program has provided approximately \$11 million in assistance to Florida's 30 rural counties (counties with populations of less than 75,000) since its inception, and has resulted in making Florida an Enhanced 9-1-1 State.

Madison, Taylor and Suwannee Counties applied for funds from the Rural Grant program in 2007. The Board approved the funds, then monitored the pilot project. After an eight-month test, the Board approved additional funds for other rural North Florida counties to connect. Concurrently, larger counties with sufficient funds or other grant funds also purchased the needed equipment, ordered circuits and connected to the network, creating the system that now exists. All of Florida's 67 counties are complete with Phase 1 and Phase 2 Enhanced 9-1-1 and have been since March 31, 2008.

Outlook

With the addition of an IP Router at each PSAP, true IP connectivity from any PSAP to any PSAP connected to the MFN can be achieved, complete with redundant routes and backup capabilities. Also, with establishing connectivity from telephone service providers to the NFRN primary nodes, a true one point of access with diversity and redundancy will be achieved and will take almost all cost of existing recurring T1 charges off the books.

AK Associates has committed to assisting any Florida county in connecting to and implementing the NFRN via the MFN free of charge, even if that county is serviced by another vendor. AK Associates believes it will save lives and property, and will save Florida taxpayers significant funds.

At AK Associates, they believe NG9-1-1 technology is here today. PSAPs that have been unable to resolve issues with their legacy technology can implement cost-effective solutions that solve problems in practical and cost-effective ways. Today, these Florida PSAPs are solving routing problems, creating backup alternatives and building a foundation for NG9-1-1 to evolve as standards continue to be developed. In this manner, it is possible to design, build and use NG9-1-1 technology today ECPM

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