



APPLICATION FORM

All applications must include the following information. Separate applications must be submitted for each eligible program. **Deadline: June 3, 2019.** Please include this application form with electronic entry. If you do not receive an email confirming receipt of your entry within 3 days of submission, please contact [Gage Harter](#).

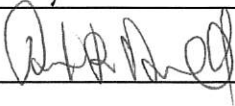
PROGRAM INFORMATION

County: Roanoke County
Program Title: Roanoke Valley NextGen 911 PSAP Data Aggregation and Sharing
Program Category: Regional Collaboration

CONTACT INFORMATION

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SIGNATURE OF COUNTY ADMINISTRATOR OR DEPUTY/ASSISTANT COUNTY ADMINISTRATOR

Name: Dan O'Donnell
Title: County Administrator
Signature: 

THE PROBLEM OR CHALLENGE

The Roanoke Valley is home to three municipal governments - the County of Roanoke, the City of Salem, and the City of Roanoke - that share common geography. Within the valley, these three governments shared a vision to establish a dynamic regional dataset designed to support Public Safety Answering Points (PSAP) today, while building the foundation for tomorrow's NextGen 9-1-1 services.

Location data has always been central to 9-1-1 to help direct response teams to the appropriate destination, and provide mutual aid services across jurisdictional boundaries. Problems with the data prior to this project included lack of compatibility of spatial data architecture in GIS and Public Safety systems, and lack of seamlessness for routing, across localities. The ever-increasing presence of GIS paralleled by advances in location technology offered an opportunity to streamline regional data management and access across each jurisdiction and between the public safety agencies of each local government.

Roanoke County, the City of Roanoke and the City of Salem leveraged GIS to compile, manage and host web-based map services that represent the most up-to-date versions of the datasets from each locality. The core data is comprised of road centerlines, address points, building footprints, emergency service zones, PSAP boundaries, and authoritative administrative boundaries.

A dynamic and consistent 9-1-1 dataset is a necessary component to create the foundation for the next generation of dispatch communications for the many public safety agencies across the Roanoke Valley.

Accurate location data has always been central to 9-1-1 in helping dispatch police, fire and rescue, and emergency services to the appropriate destination. To support regional mutual aid agreements and other cooperative efforts, Roanoke County, the City of Roanoke and the City of Salem have been seeking ways to compile, manage and host web-based map services that represent the most up-to-date versions of the datasets from each locality. The core data is comprised of road centerlines, address points, building footprints, emergency service zones, PSAP boundaries, and authoritative administrative boundaries. A comprehensive data store of accurate and consistent data promises to streamline regional data management and access across each of the three jurisdictions.

The challenge is that much of the data resides within disparate databases in each locality, with varying data models (schemas), and diverse maintenance processes. As part of developing this regional dataset, grant funding was received from the Virginia 9-1-1 Services Board to help accomplish the following tasks to integrate each localities' data:

- Facilitate the creation of a data service or feed at each locality containing the core datasets from each locality using ESRI's Portal to Portal Collaboration;
- Establish automated processes for the local data service/feed to be updated in real or near-real time;
- Develop automated data acquisition methods to consolidate data sources from separate in-house systems;

- Create a series of advanced scripts to extract, transform and load (ETL) each data source into a standard data schema;
- Construct the new regionalized version of the data as a centrally hosted service that can be generically consumed across communities;
- Migrate Regional PSAP GIS data into CAD (Computer Aided Dispatch) software in each participating locality;
- Facilitate distribution of the data back to each locality to serve as a multi-point failover strategy

Leveraging GIS as a common, regional platform between each locality, allows a consolidated approach to increasing the quality, reliability, and consistency in the underlying location data needed for each PSAP.

The goal of this project is to create a consistent and consolidated dataset for PSAP use between Roanoke County and the two neighboring cities. A large part of the project includes designing a central data store to receive accurate data from each locality system, transform that data into a common base for GIS integration, and then automate the extraction of consolidated data back into the partner agencies' in-house systems.

Roanoke County applied for and received a \$485,490.59 grant from the Virginia 9-1-1 Services Board to implement the project. The project kick-off meeting between Roanoke County and the cities of Salem and Roanoke was held on October 6, 2016, and completed in December 2018.

The implementation of this program is a multi-faceted, highly collaborative process that spans five key phases.

1. **Planning & Analysis:** This phase included both preparatory activities (project authorization, RFP development/release, selection process) and project initiation and controls (kick-off meetings, working sessions, status meetings and progress reporting).
2. **Design:** The Design phase was intended to identify and document the detailed approach through a highly collaborative process. The design has spanned technical coordination and logistics, data reviews and crosswalks, schema development, system infrastructure design, and code framing.
3. **Development:** Development is where the core work has been undertaken and where design is translated into operational solutions. Within this phase, the team has implemented processes and access points, developed the automation procedures (scripts) to acquire and transform the data, established logging and reporting, published & distributed the data, and created system and administrative documentation.
4. **Testing & Acceptance:** With any solution, testing is a requisite step, but a multi-agency solution requires additional effort to ensure that all aspects of the solution are reviewed both together and independently. Stakeholders from all groups have had the opportunity to participate in a review and feedback process that, in turn, has driven iterative refinements of the data and also the scripting behind the automated processes.

5. Implementation: The final phase involved deploying all infrastructure, data, scripts, services, and applications to the production environment. During implementation, the team provided onsite training for the intuitive tools, knowledge transfer and delivered final documentation to support ongoing maintenance of the system, while simultaneously coordinating system release for day-to-day access.
6. Post-Implementation: Post-implementation is intended to support the transitional period immediately following system release, during which both administrators and users may have questions, and to address any issues that arise from formal adoption or increased utilization. As of this date, we are in this phase of this project.

The goal of the program is to support the continuity and enhancement of wireless E-911 across and between the public safety agencies of Roanoke County and the cities of Salem and Roanoke, especially as it relates to implementing NextGen 9-1-1 services.

Building the foundation for these services required a dynamic and consistent NextGen 9-1-1 dataset shared among each of the localities. Roanoke County's Enterprise GIS serves as the foundation to collect, edit and share out this common data back to each locality's in-house systems. By using the ArcGIS platform to build an efficient automated ETL Script, maintenance times are minimized to provide regional 9-1-1 data sharing in real-time or near real time.

This project used the following benchmarks to measure success of the implementation:

- PSAPs adopted the mutually agreed upon processes for data sharing
- A hosting environment that meets the service level needs of the participating PSAPs was successfully established
- Created an automated, end-to-end data process with periodic administrative oversight
- Achieved a viable and consistent regional dataset that can support PSAP operations
- Satisfied the collaboratively derived definition of “near real time” regional data
- Demonstrated a fully operational, regionalized dataset to support the participating PSAPs
- Successfully created all new feature datasets and published them to the ArcGIS Server REST Endpoint environment
- Migrated available data to be ready for use in the Computer Aided Dispatch Systems in each locality
- Converted existing ETL script used to extract data from all 3 localities, transform the data into new schema and load into a regional PSAP GIS dataset, from Python 2.7 to Python 3.x and leverage the ArcGIS Python API
- Changed topology checks mechanism to avoid known system resource issue in current format
- Developed data stitching process to remove topological issues between locality datasets
- Improved data validation process when merging datasets together

- Created metric tracking tables to visualize changes to the data over time via dashboards
- Crowdsource reporting and management for trouble areas noted in the datasets
- Included MSAG and ALI analysis checks on the data to make sure data is at 98% compliance
- To improved transparency, communication, and drive success of the entire project, Roanoke County created additional reporting tools for all municipalities. Using Operational Dashboards, members from all municipalities are able to track the following:
 - Known topology issues that data stitching must correct
 - Bad (incorrect) dispatches reported by each municipality
 - Editing completed on all datasets used in the ETL Process
 - MSAG, ALI and GIS data analysis metrics

Roanoke County, Virginia's project is a model for regional and collaborative development of NextGen 9-1-1 services for other localities to emulate. Roanoke County leverages the previous investment of Enterprise GIS infrastructure to develop a common platform for sharing data across the Roanoke Valley's public safety agencies.

As a result of the efficiency of coordinating data between agencies and the ability to quickly generate a valid and consistent dataset, public safety agencies in Roanoke County, City of Salem and Roanoke City will be able to access best

available data for the future deployment of NextGen-9-1-1 services. These services will help ensure the protection of citizens across the valley.

Roanoke County is better serving the needs of its citizens through this new near-real-time NextGen-9-1-1 valid GIS dataset for City of Roanoke, County of Roanoke and City of Salem PSAPs. Please view the public facing web application at <https://gisweb.roanokecountyva.gov/psap/>.

EXECUTIVE SUMMARY

Roanoke County, along with the adjacent cities of Roanoke and Salem, have collaborated to build the foundation of NextGen 9-1-1 services across the Roanoke Valley. A consolidated and consistent Geographic Information Systems (GIS) base is vital to the success of NextGen 9-1-1, and Roanoke County led the effort to create a dynamic process to receive and feed GIS data into partner 9-1-1 systems.

“NextGen-9-1-1” represents the move from legacy analog telephony and network communications for transferring phone and addressing data for emergency communications to updated digital IP-based technology allowing more seamless communication across the 911 network and to emergency responders. Through significant coordination and adoption of technology, NextGen-9-1-1 will use unified networks and data transferability of caller and incident data between localities, for greater resiliency and reliability of services for the public, and make use of new telecommunications technologies including voice, photos, videos, and text messages. GIS data is a foundation for NextGen 9-1-1 address and location data, and routing for emergency services.

The goal of the project was to create a Real-Time NextGen-9-1-1 valid GIS dataset for Roanoke City, Roanoke County and Salem City Public Safety Answering Points (PSAP). The data included Road Centerlines, Address Building Points and/or Polygons, Emergency Service Zones, PSAP Boundaries, Authoritative (Fire and Rescue, Law Enforcement, or PSAP) Boundaries, and County/Municipal Boundaries.

Each locality determined any data concerns or errors for each dataset and worked to resolve those issues into a central GIS repository to create a complete and seamless dataset accessible by public safety agencies across the Roanoke Valley. The project

supports PSAP readiness for future technology and enhances the current efficiency of each municipal public safety agency.

Business intelligence and ESRI's Portal to Portal Collaboration was incorporated into the automated process to support efficiencies in government service delivery across Roanoke County and the greater Roanoke Valley. The Portal to Portal Collaboration is a feature of ESRI Arcgis Portal that has not been implemented successfully by many customers. Roanoke County is one of the first to use the technology, in support of this project.

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BRIEF OVERVIEW

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