Data Analytics Pilot Project Description and Outcomes

Statement of Need

All Public Safety Answering Points (PSAPs) across Virginia currently have a Management Information System (MIS). These systems gather, store and can report on, an abundant amount of information regarding many aspects of 9-1-1 calls. This includes call delivery, call processing and the overall performance of the 9-1-1 network. However, these systems are often complex, and are therefore often underutilized by PSAPs, and are not currently accessible for analysis on a statewide level. The variety of systems creates a variety of ways that call information is captured, categorized, analyzed, and reported. It also makes required annual call reporting (True-up) labor intensive and inconsistent among PSAPs.

As the Commonwealth plans the transition to Next Generation 9-1-1, it has become apparent that a single, centralized data collection and analysis tool for standardized call reporting and system monitoring would be valuable. A system of this nature will assist with forming a better understanding of the health of the entire 9-1-1 system, and will lead to more informed decision making regarding issues such as funding, network reliability, Next Generation 9-1-1, wireless call delivery/routing, 9-1-1 service provider performance, network and PSAP efficiencies, and so on. Advanced use of this system will help ensure that 9-1-1 service continues to function as expected and hopefully improves in the future. All of these items have been identified by the E-911 Services Board as ones that must be addressed as we move forward. Having this type of system in place commonwealth wide will support several guiding principles as established by the Board. These principles include:

- ✓ Need to address all of 9-1-1, not just NG9-1-1.
- ✓ Services must not be degraded.
- ✓ Economies need to be leveraged.

Pilot Project Description

The Virginia Information Technologies Agency's Integrated Services Program (ISP) Division, partnered with the Augusta County, City of Staunton, City of Waynesboro, and Fluvanna County PSAPs in an MIS pilot project utilizing the Emergency Call Tacking System (ECaTS), a product of Direct Technology. This system was chosen because it uniquely has the ability to seamlessly report on call statistics from any web-based location/device, regardless of the type of call handling equipment in place at the PSAP. Direct Technology provided remote monitoring and on-site support of the system components and full trouble ticket management services. Following were the goals of the project:

- Install ECaTS at each PSAP and receive training.
- Allow access to the system and data by all participants.
- Collaboratively evaluate the functionality and usefulness of the system through systematic review of the data and reports.

- Evaluate the data and reports to assure efficiencies in 9-1-1 call delivery and handling.
- Provide the PSAPs with this tool to support informed decision making regarding PSAP operations.
- Evaluate the system to determine its appropriateness for further implementations.

The pilot ran for a total of 90 days. Localities were able to keep in place the MIS systems they currently have, while the new system was installed and evaluated.

Lessons Learned

Pilot participants evaluated both the product and the service during each phase of the project. Following are some important discovers that were made during the various phases. These discoveries include unexpected or unknown issues that needed to be addressed, as well as positive outcomes concerning functionally and usefulness of the system.

Pre-Installation

Before the physical installation of equipment, ECaTS will work with their clients to gather information necessary for a successful installation. The following is not a full listing of items that need to be completed, but are important items that must be considered and addressed:

1. Call Detail Record (CDR) port licenses and activation.

   The CDR port(s) must be activated so that call data passes through them and can in turn be collected by the ECaTS Remote Data Distribution Module. Sites with West call handling equipment (CHE) installed have the ports activated. Sites with Airbus DS CHE installed do not inherently have the ports activated. Licenses for Airbus DS systems had to be purchased and activated prior to ECaTS installation. This increases overall project cost. In this pilot the licenses were purchased through the reseller CenturyLink, with whom the PSAPs contract for CHE maintenance and service.

2. Inclusion of appropriate IT support.

   IT support must be involved early in the project. In addition to the RDDM box installed at each PSAP, ECaTS requires internet access to transport the collected data to their data center for configuration and analysis. This access needs to be set up by IT staff. Depending on the organization of staff at the locality/PSAP, this may be handled by “in-house” IT staff, or it may require involvement of a contractor. Both situations occurred at PSAPs involved in this pilot. Also, local IT staff/support must determine if any additional hardware components, such as switches, ports, cabling, etc. are necessary. If appropriate support and components are not in place, extra purchases (service and hardware) may be required and will increase the overall project cost.

Post Install Configuration

After the ECaTS equipment is installed, call detail records are sent to the data center and checked for appropriate configuration. During this time issues with the data and performance of the system including telephone trunks and CHE configurations can be detected. When these issues are found by ECaTS, the service provider for the PSAP's CHE must be called in to correct the issue. For example, data spills coming through the CDR port my not be parsed correctly. The service technician will need to be called in to work with ECaTS to troubleshoot and correct this issue. Depending on the complexity of the issues and the availability of a technician, correcting issues can take additional time.

Review of Reports

1. Discrepancies between ECaTS and the original MIS.

   For this pilot, ECaTS was installed at each site and the original MIS was also left in place. For validation and assessment of the system, call count totals for a specific time period were captured through both systems. In two sites the call totals matched across systems. In two other sites, the numbers varied greatly between systems. The service technician was brought in to evaluate the discrepancies. At one site it was determined that the original system was not processing the call data correctly and was therefore providing erroneous call counts. After an upgrade of system software, call total numbers between the two systems matched, although a discrepancy between the categories that calls are placed in (wireless 9-1-1 or wireline 9-1-1) still exists. An upgrade at the other site still needs to take place to determine if this elevates the disparity in total numbers there.

   Because of this evaluation, and determined solution of needed CHE software upgrades, ECaTS is more accurately counting and categorizing incoming 9-1-1 calls than the original MIS.

2. CHE Software Upgrades

   In order for full ECaTS functionality to be available, for example the ability to generate reports to the agent/operator level, a particular release/version of existing CHE software must be in place at the PSAPs. If the PSAP does not have the applicable software version (ex. Vesta 4.3.2 or higher) data required to generate all reports is not available from the CDR port.

3. Valuable Reports

   The use of ECaTS during this pilot allowed participants the opportunity to investigate and evaluate the many reports available in the system. There are three main reporting sections in ECaTS. That includes Standard Reports, which should be run and reviewed on a regular basis to assure efficiencies in both network and PSAP operations, Management Reports which are used to show exceptions to expected performance, and Wireless Routing reports which can be used to assure proper routing of wireless 9-1-1 calls. The system also has a valuable Ad-hoc reporting section where users can create reports on any call data using filters and criteria they determine to be useful.

The following reports were found to have significant value to both the PSAP and ISP:

a. Calls By Circuit
   This report provides call totals for each 9-1-1 circuit (trunk) and would be utilized in the Annual True-up process. During that process every primary PSAP in the Commonwealth is required to provide incoming 9-1-1 and wireless 9-1-1 call totals. The current PSAP funding formula uses this data to determine the percentage of the wireless fund that each PSAP receives; therefore, the accuracy and comparability of this data among PSAPs is essential to assure equitable distribution of funds.

b. Call Transfer Report
   According to the recent Next Generation 9-1-1 Feasibility Study undertaken in the Commonwealth, it was reported that about 9% of all 9-1-1 calls are transferred. Transferring calls takes additional processing time and ultimately delays response. Through this report a call can be traced from the originating PSAP, to the PSAP the call was transferred to, from the initial call delivery to termination by the caller. This report can be generated for PSAPs that have the ECaTS system in place. It will reveal information about the number of transfers, the class of service associated with the call and the call duration. These reports can be used to help determine if current wireless 9-1-1 call routing is efficient or if some action needs to be taken to optimize the call routing.

c. Wireless Call Sector Report
   This report allows users to see the number of, and details about, call transfers based on the cell tower sector from which they were received. It can be reviewed to determine if the current routing of the cell sector to a specific PSAP is appropriate or if changes to the sector routing should take place making call processing more efficient and response times quicker.

d. Wireless Transfer Summary
   The Wireless Transfer Summary report will look at the total number of calls that a PSAP/destination received from a particular tower, sector and carrier. The report will then consider the total number of calls transferred from that tower, sector and carrier. Based on the PSAP/destination that each call was transferred to, the report will provide the overall percentage of calls received from that tower, sector and carrier that were transferred to the Transfer PSAP/destination.

e. Circuit Utilization
   This report provides details about the amount of time that one or more circuit in each trunk group is utilized simultaneously. It will help assure that a PSAP as the appropriate number of trunks and can lead to cost savings if it is determined that the PSAP is “over-trunked”.

The PSAPs involved in this pilot found the above reports to be quite informative and useful. They have begun to review many of the call transfer reports and are working together to assure that wireless 9-1-1 calls are routed as efficiently as possible. The PSAPs have also found that many of the available ECaTS reports are also helpful in reviewing PSAP specific operations, and determining if any operational modifications or trainings are needed to enhance performance. Those reports include but aren't limited to:

- Top Busiest Hours
- Average Call Duration
- PSAP Answer Time
- Call Taker Ring Time
- Calls by Operator
- Operator Speed of Answer

Support, System Monitoring and Alerting

Pilot Participants were very pleased with the vendor's dedication to customer support, and their system monitoring and alerting functions. ECaTS will assist with initial and continued product training, custom data requests, data validation against other MIS packages, explanation of questionable data and report building. They also offer system monitoring and alerting, where all aspects of the application, including data collection and transfer points, the health of the RDDM components, the condition of databases, web services, etc. If any errors are detected at any level of the application, a trouble ticket is placed in the database and appropriate resources are immediately allocated to the correction of the issue. The PSAP is also notified and if applicable will then be able to determine if other resources, IT or service and maintenance technicians are necessary to fix the issue.

Considerations

Through this pilot it was learned that several items must be considered as some participants would like to continue with the product beyond the pilot and as a wider implementation is pursued.

- Access to data/Data sharing agreement
- FOIA and Records Retention
- Management of data in the cloud environment.
- Process and procedures for additional ECaTS implementations.

Outcomes

The Data Analytics Pilot Project gave ISP and PSAP staff the opportunity to explore the ECaTS product, its functionality and the service of the vendor. Overall, both the PSAPs and ISP staff were pleased with the product, its functionality and reporting capabilities and with the services offered by Direct Technology. All users found the product to be "user-friendly" and to have superior performance and capabilities over existing systems. The users were also impressed by the level of support and service offered by the vendor, including notifications of any inconsistencies or errors regarding call and data delivery and a willingness to assist the PSAPs and maintenance/service providers with correcting these issues. The bottom line is that the system met both the needs of the Commonwealth for statewide information to monitor overall system performance and the needs of the localities for PSAP information to manage their daily operations.

Due to the performance and capabilities of both the product and the company, continued use of the system is desired by all 4 PSAP participants and will be accomplished through awarded grant funds and ISP financial support. Also, ISP staff will be planning for a wider implementation among PSAPs to accomplish the following:

1. Have a standard, comparable system among PSAPs to collect and analyze 9-1-1 call data.
2. Acquire Commonwealth wide Annual True-up data that is aggregated with common criteria.
3. Acquire a baseline of data to measure the performance of the 9-1-1 network as it exists currently.
4. To analyze future data to assure that the transition to NG9-1-1 does not adversely affect 9-1-1 call delivery or processing.
5. Optimize wireless 9-1-1 call delivery, reduce the number of transferred 9-1-1 calls, and ultimately reduce response times.
6. Provide the PSAPs with a more "user-friendly" tool and service for evaluating operations within their centers.
7. Overall, to promote better, well informed, data driven decisions at both the state and local level.