

TIPS Open Source Message Switch Program Narrative

Statement of the Problem

Although crime rates have been declining for several years nationally, this pattern is not consistent across the country.¹ Two areas that have seen *increases* in crime are the Commonwealth of Puerto Rico and the State of Montana.

Puerto Rico. With the crackdown on drugs on the Mexican border, Puerto Rico has seen enormous increases in drug crimes and related violence in recent years.² In 2011, a task force comprised of the Coast Guard and federal and local agencies known as “Operation Caribbean Guard” seized 5,830 kilos of cocaine en route to Puerto Rico. By 2014, the amount of cocaine seized was over 17,510 kilos—a 300% increase in just 3 years.³ According to the Drug Enforcement Administration, more than 80% of the drugs passing through Puerto Rico end up in cities in the eastern U.S.⁴ Coupled with the rise in drug trafficking, the number of murders—1,135—reached an all-time high in Puerto Rico in 2011, a spike largely associated with criminal drug enterprises. While homicide rates in Puerto Rico have dropped since 2011, the Commonwealth still averages approximately 26.2 murders per 100,000 residents, which is over five times the rate for the United States. The rate for Puerto Rico is similar to the number of murders per 100,000 residents in Mexico (23.7) and the Dominican Republic (25), which are widely known for their high rates of violence.⁵

Montana. Since 2005, areas of Montana have seen precipitous increases in crime—largely associated with the burgeoning population growth in the Williston Basin in eastern

¹ <https://www.fbi.gov/news/stories/2014/november/crime-statistics-for-2013-released/crime-statistics-for-2013-released>

² http://www.nytimes.com/2014/05/30/us/in-puerto-rico-cocaine-gains-access-to-us.html?_r=0

³ <http://www.coha.org/puerto-rican-drug-trafficking-as-the-u-s-misdirects-its-focus-on-the-war-on-drugs/>

⁴ <http://www.cnn.com/2012/06/09/justice/puerto-rico-drug-trafficking/>

⁵ <https://www.unodc.org/>

Montana, which sits atop the Bakken oil field.⁶ According to the U.S. Census Bureau, the population increased by 7.8% in this area between 2005 and 2012. During the same time period, Part I Violent Crimes grew by 98%. Drug crimes also appear to be increasing in much of eastern Montana, which is a part of the same region. From 2008 to 2014, the number of evidence cases involving suspected drugs processed by the state’s crime lab increased from 1,960 to 2,702—a 38% increase.⁷

Both of these jurisdictions rely on information sharing to fight crime. Law enforcement, in particular, relies on information that is maintained in the state, national, and federal criminal justice information systems (CJIS) and is accessible through the criminal justice networks maintained by the FBI and Nlets. The key technology that provides this access is a specialized computer called a “message switch,” which relies on a legacy architecture and technologies that are increasingly expensive to maintain, support, and expand to meet increasing information sharing requirements.

Providing this capability is a singular challenge: the technologies used are old (the basic design was developed more than 30 years ago), the number of customers very small (only states and territories can provide this service), and making changes requires the agreement of the CJIS community. As a result, there are only a handful of providers for this product. This makes them expensive to use and maintain. Puerto Rico SIJC⁸ reports that their vendor charges a minimum of \$25,000 for any modification to or addition of a new message. Their annual maintenance costs are \$150,000. In Montana, the state’s Criminal Justice Information Network (CJIN) is operated by the Crime Information Bureau within the Department of Justice (DOJ) Division of Criminal

⁶ <http://www.ag.nd.gov/reports/JOINTPRODUCTFINAL.pdf>

⁷ http://billingsgazette.com/news/government-and-politics/as-drug-evidence-increases-eastern-montana-officials-plead-for-crime/article_0faa9760-3d65-5849-97fd-ee387168013c.html

⁸ The Spanish acronym for CJIS is SIJC – Sistemas de Información de Justicia Criminal.

Investigation.⁹ Montana DOJ reports that CJIN’s annual maintenance costs are approximately \$130,000, and the cost of additional capabilities ranges from \$20,000 to \$40,000 depending on the complexity of the requirements. Other states and territories face similar costs with their message switch vendors and pursuing a less expensive method of providing these services and capabilities is likely a growing concern facing other states as well. In the past, federal funds have been available to assist agencies like Puerto Rico SIJC and Montana DOJ make technology enhancements to support other operations such as criminal history repositories and Computer Aided Dispatch (CAD) systems; however, federal funding has not been readily available to refresh the aging switch architecture. Additionally, both Puerto Rico SIJC and Montana DOJ are facing state funding restrictions that jeopardize their ability to support the current technologies used for their critical messaging functions. Both jurisdictions, therefore, view open source technologies—in which the source code used to create a program is freely available for the public to view, edit, and redistribute—as a path to providing the same capabilities at significantly lower cost.

Both Puerto Rico SIJC and Montana DOJ are ready to move forward with this project and have worked with SEARCH, The National Consortium for Justice Information and Statistics, to develop a common, shared approach to solve this problem using open source technologies.

Project Design and Implementation

The Commonwealth of Puerto Rico and State of Montana share a common challenge: delivering criminal justice data in a timely and cost-effective manner to those who rely on it—law enforcement officers, detectives, investigators, and other justice professionals authorized to access data from the FBI Criminal Justice Information Services (CJIS) Division. The architecture

⁹ <https://dojmt.gov/enforcement/crime-information-bureau/>

and many of the technologies used to support access to this information are decades old and rely on the use of expensive message switch computers that perform multiple tasks associated with user authentication, regulating access to information, and ensuring the appropriate use of this information through logging and auditing capabilities.

Both Puerto Rico and Montana have worked successfully with SEARCH in the past on separate information sharing projects and CJIS technology assessments. Through this common partner, the CJIS agencies in both Puerto Rico and Montana identified this shared challenge and approached SEARCH to partner in developing the proposed solution—an open source message switch that could replace and expand the capabilities of the current platform.

The goal of this proposal is to develop and implement a more flexible, adaptable, and cost-effective message switch capability using open source components that fully leverage the Global Standards Package (GSP).¹⁰ Diverging from the tightly coupled architecture of legacy message switches, the open source message switch will service-enable and decouple the major functions performed by the message switch in order to develop a more modular set of services that meet all current and planned FBI messaging requirements. Nlets, the International Justice and Public Safety Network, is working to migrate away from the legacy technologies and protocols used to support the current messaging environment and will move to technologies that align with the GSP. Montana piloted one of these components with Nlets and would like to continue developing full message switch capabilities following a similar approach. Puerto Rico SIJC has made a commitment to using open source technologies for all systems development and shares with Montana a desire to develop a message switch based on open source tools. By building an open source and modular message switch, each agency can more easily and cost

¹⁰ <https://it.ojp.gov/GSP>

effectively add information sharing capabilities that do not currently exist. These new capabilities can then be easily reused and redeployed to others, making this a viable national approach to upgrade and improve law enforcement information sharing.

The advantages of using the GSP are reflected in the approach being proposed for this project. The Global Reference Architecture (GRA) uses web services technologies to transport data, and the National Information Exchange Model (NIEM) defines the data content requirements for the messages sent over the network. The GRA has been demonstrated to meet FBI CJIS security policy requirements. Several of the most common messages handled by the Interstate Identification Index (III) and processed by the message switch have been redefined using NIEM but cannot be natively processed by the legacy technologies. For those few states that have implemented these newer NIEM-based messages, Nlets must provide the ability to transform these messages into the legacy format in order to send them to the majority of states that continue to rely on the legacy message switches.

Further leveraging the GSP, the message switch will decouple the user authentication and authorization functionality from the switch and manage it separately in a manner consistent with the Global Federated Identity and Privilege Management (GFIPM) standard and CJIS security policy requirements. Following this approach, users will be provided with a single sign-on capability using two-factor authentication that is managed locally using local directory services, such as Microsoft's Active Directory, rather than maintaining a separate identity provider at the switch itself.

In this proposal, both Puerto Rico and Montana will develop a single, shareable message switch code base that can be installed in each location and meet all communications requirements. The message switch will conform to all current requirements as published by the

FBI and Nlets. By leveraging the service-oriented nature of the GRA, they will then selectively implement individual connections to the many data sources currently available. Each will initially maintain an interface between the open source message switch and their legacy message switch, which will allow them to migrate connectivity to each data source incrementally. This approach will provide the least risk to successful implementations in both locations. By building a shareable codebase using open source technologies, the results of this project will be made readily available to others interested in doing the same thing.

Development work will be led by the Open Justice Broker Consortium (OJBC), an affiliate of SEARCH, who will provide the overall design and architecture of the new, open source message switch. SEARCH is a nationally recognized authority on the GSP, and the OJBC has developed software services used in four states that leverage all major components of the GSP. Requirements will be identified by both Puerto Rico and Montana. Development activities will occur at Puerto Rico SIJC, and the switch replacement will be redeployed later in the project to Montana DOJ.

As a result of this project, Puerto Rico SIJC will produce the two deliverables required of this project:

1. A successful implementation of an information sharing solution that will be used by both Puerto Rico and Montana, and can be reused in other jurisdictions; and
2. A BJA-branded report that documents the successful implementation as well as project outputs, outcomes and performance measures.

This project will combat, address, or otherwise respond to the precipitous increase in crime reported by these two jurisdictions by making significant “Criminal Justice System Improvements.” The core outcome of this project is to improve information sharing by law

enforcement, which relies heavily on information provided through the criminal justice information system and other non-law enforcement data systems. Improvements include:

- An open source message switch, which will improve technology integration by providing a standards-based messaging capability that will support the legacy technologies currently in use—until they can be migrated.
- Adding new, non-CJIS data sources, such as data from courts, prosecutors, probation and parole, and corrections, as well as law enforcement data systems that are not currently a part of a CJIS, such as incident data maintained in local agency records management systems.
- Adopting the single sign-on capabilities provided by GFIPM, which places identity management (user authorization and access control) at the agency level rather than in a separate, centralized application.
- Implementing a proven entity resolution capability that will improve data matching and linking. The program can match data where exact matches, such as those based on biometric identification, do not exist.
- Lastly, Puerto Rico, in particular, is targeting the development of a mobile application that can be used by officers in the field. The use of laptops and PCs with mobile technology is limited, and a mobile capability that operates on a smartphone or similar device promises to provide the broadest and most cost-efficient access to CJIS data by law enforcement. By improving information sharing in this way, law enforcement is armed with more complete information that can enable them to have a measurable positive impact on work in the field on a daily basis.

Once implemented, both Montana and Puerto Rico can competitively engage resources to

provide long-term support for this platform. Since the platform is open source, all code will be available to each agency, and each agency can chose the support mechanism that best fits their environment and circumstances. They can bring this function in-house and use existing or new staff to support the platform. They can contract with any number of software development resources to provide support, including SEARCH's Open Justice Broker Consortium (OJBC).¹¹

Capabilities and Competencies

Puerto Rico Department of Justice has received numerous Federal awards and managed multiple successful projects. SIJC Administrative Director Heriberto Luna has used Federal funds to support new software application functionality within his department. Most recently, he was responsible for the development of a new state-level criminal history and prosecutor case management system called Integrated Criminal Records (RCI in Spanish), which was developed using open source technologies. Mr. Luna would like to expand on this foundation of open source technology by developing an open source message switch.

Puerto Rico SIJC and Montana DOJ approached SEARCH to serve as the prime contractor on this project because SEARCH is committed to developing a solution that meets business and functional requirements and aligns with the GSP. SEARCH has developed a variety of software components and capabilities that meet many facets of all Global standards. SEARCH has deployed multiple information sharing capabilities in a dozen states that leverage some or all of the Global standards: the GRA, NIEM, GFIPM, and the Technical Privacy Framework. SEARCH is committed to the Bureau of Justice Assistance's (BJA) mission of promoting reuse—and released the majority of the code it has developed under an RPL open source license in spring 2015. All code developed through this project will also be released under an RPL open

¹¹ www.ojbc.org

source license to promote wider adoption and reuse of this solution.

Following its own imperative to “make once and reuse,” SEARCH will minimize development costs by developing one common code set that can be shared by any agency that wants to implement an open source message switch. It will reuse and incorporate many components already in use in other jurisdictions, such as GFIPM single sign-on in the State of Vermont, entity resolution in Hawaii, and numerous adapters and connector components developed to access data on source systems will be reused and modified as needed.

Both Puerto Rico SIJC and Montana DOJ will identify and assign a point of contact/project manager to ensure that all requirements are met and the phased implementation approach proposed meets their individual requirements. The POCs for each are:

- Heriberto Luna, Administrative Director, Puerto Rico SIJC, will serve as the point of contact for Puerto Rico and subject matter expert. Mr. Luna will also serve as a subject matter expert on this project.
- (b)(6) Application Services Bureau Chief, Information Technology Services Division, Montana DOJ, will serve as the overall project manager and point of contact for this project. (b)(6) will also serve as a subject matter expert on this project.

Key personnel from SEARCH include:

- (b)(6) Development Director, will be responsible for coordinating all development work and will serve as chief designer and architect.
- (b)(6) Lead Developer, will serve as the primary software developer and system implementer.
- (b)(6) Director of Information Sharing Programs, will serve as the project

manager for SEARCH and perform business and functional requirements analysis.

Plan for Collecting Performance Measures Data (1 page)

The project team recognizes and understands the reporting requirements for this solicitation. Should this project receive funding, the project team will work with BJA to finalize the specific metrics required for a proposal of this nature, and baseline data will be collected by each jurisdiction based on these metrics. Ironically, by improving the ability to respond to crime through improved information sharing, a key measure of this initiative, the reduction in the crime rate may not occur because law enforcement becomes more effective. Consequently, the metrics selected and measured will focus on the other, less direct outcomes identified in the solicitation—the number of transactions processed by each jurisdiction, any increase in the number of authorized users using the system due to system improvements, etc. In Puerto Rico, SIJC provides system automation services to the prosecutor as well as serving as the criminal history repository. This relationship should enable SIJC to capture some of the other performance measures identified in this solicitation, such as “percentage of investigated cases referred for prosecution.” Process measures will also be documented that align with the requirements of this solicitation, such as the number of NIEM-conformant information exchange package documents (IEPD) developed, number of users enabled by the use of GFIPM, number of service specification packages (SSP) developed, GRA-compliant components installed, and documentation of specific GRA conformance.