ADOA-ASET
Arizona Strategic Enterprise Technology

Project Investment Justification

Version 01.01

A Statewide Standard Document for Information Technology Projects

Project Title: Arizona Law Enforcement Message Switch (AZLEMS) replacement

Agency Name:	**Arizona Department of Public Safety**
Date:	**04/08/2015**
Agency Contact Name:	**Gregg Hayes**
Agency Contact Phone:	
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Hover for Instructions

I. Management Summary*

The message switch being used by the Arizona Department of Public Safety (AZDPS) is old, proprietary and no longer supported. AZDPS seeks to replace the current message switch with a turnkey solution that is modern, robust and supported. A message switch is a software component that manages the receipt, processing, and dissemination of electronic messages. AZDPS, as the FBI-designated Control Terminal Agency (CTA) for the State of Arizona, uses the Arizona Law Enforcement Message Switch (AZLEMS) to manage law enforcement and criminal justice message traffic for the Arizona Criminal Justice Information System (ACJIS) community. The AZLEMS was originally developed by IBM for the State of Minnesota and was customized by IBM for the State of Arizona approximately 25 years ago. Like any piece of software or hardware, it eventually needs to be upgraded or replaced.

II. Project Investment Justification (PIJ) Type*

| | Yes | X | No | Is this document being provided for a Pre-PIJ / Assessment phase?

If Yes,

| Identify any cost to be incurred during the Assessment phase. | $0 |
| Based on research done to date, provide a high-level estimate or range of development costs anticipated for the full PIJ. | $0 |

Explain:

| | Yes | x | No | Will a Request for Proposal (RFP) be issued as part of the Pre-PIJ or PIJ?

III. Business Case

A. *Business Problem**

AZDPS has an aging, obsolete and unsupported message switch that has been highly customized over the years. It is a crucial component of the Arizona Criminal Justice Information System (ACJIS), which needs to be replaced.   The AZLEMS consists of several components that work together to provide services to the ACJIS community. The major components of AZLEMS are identified in Appendix A, with brief descriptions of their usage.

For over 25 years, AZLEMS has been supported by a staff of 2 members of the AZDPS Technical Services unit. One of these technicians is semi-retired and the other is not far behind. AZLEMS runs on the AZDPS mainframe and is written in IBM Assembly Language, a highly-efficient language but one that is being learned and used by fewer and fewer Programmers. Training in Assembly Language is hard to come by, and most newer IT personnel are not interested in learning it. Soon, finding resources to support AZLEMS will be difficult and costly. The new message switch will utilize software components that can be supported by a much larger pool of talent, both now and in the future. Since the entire Arizona criminal justice and law enforcement community must send ACJIS messages to AZDPS for processing, AZLEMS is a critical component, processing hundreds of thousands of messages every day. Although the cost of a

message switch is expensive, its availability can literally be the difference between life and death for an officer making a traffic stop or entering many other risky situations

B. *Proposed Business Solution**

AZDPS proposes to replace AZLEMS with a commercial off the shelf (COTS) message switch called OpenFox produced by Computer Projects of Illinois, Inc. (CPI). This vendor-supplied software solution is far more easily maintained, and will be enhanced by the vendor. The solution will utilize current technology and comply with industry standards. CPI's OpenFox message switch is in place in 30 FBI CTA's across the country.

At the beginning of our discovery process, the AZDPS Information Technology Bureau developed a list of requirements (listed in Appendix B.) CPI met all of the listed requirements and more. The AZLEMS will be moved off the mainframe environment into an AIX and Windows environment utilizing Microsoft Structured Query Language Server (MS SQL) for its backend and browser based tools for management/ configuration. All of these technologies are currently supported by AZDPS IT staff, and there is an ample supply of engineers and programmers with these talents available in the market.

C. *Quantified Benefits**

x	Service enhancement
	Increased revenue
	Cost reduction
x	Problem avoidance
x	Risk avoidance

Explain:

In addition to the existing, traditional TCP Sockets and MQSeries interfaces that the current AZLEMS supports, the OpenFox message Switch will utilize the National Information Exchange Model (NIEM) compliant, extensible Markup Language (XML) in a Web Service. Therefore, newer systems trying to interface with the AZLEMS will be able to use modern, industry standards rather than aging technologies. Since, the current AZLEMS is 25 years old, utilizing old programming languages and technologies, AZDPS is currently at risk of state-wide failure to the Law Enforcement Agencies (LEAs) we support. With the new OpenFox switch we are looking to avoid the problems associated with hiring and retaining people who can support the old technology, and avoid the risk of failure.

IV. Technology Approach

A. *Proposed Technology Solution**

The OpenFox system is Services Oriented Architecture (SOA) compliant, utilizing such standards as Web Services, Simple Object Access Protocol (SOAP), Web Services Definition Language (WSDL)), extensible markup language (XML),as well as Extensible Style Sheet Language Transformation (XSLT). It is a java based application server and will run on AIX Power7 and Power 8 hardware. On-site high availability is built into the

application and a failover site that will also have the software installed for business continuity and disaster recovery is architected into the solution.

A component of this project is called the Archive Retrieval Database. Its purpose is to copy and archive the message switch's log of messages that include who (and from what agency) requested what information and when it went through the switch. This log is a key component in CJIS systems and is kept for 10 years plus the current year. The Archive Retrieval Database utilizes the MS SQL Server to organize, store and retrieve data. The OpenFox Configurator and Archive Retrieval front ends are java applications and will run on Windows workstations. All communications from clients to server use FIPS 140-2 approved encryption as required by the FBI CJIS Security policy.

B. *Technology Environment*

The current AZLEMS is a 25 year old, essentially home-grown system that is mainframe based and comprised of several components including TN3270 connectivity. Please see Appendix A for details. As stated, finding and employing engineers/programmers with the mix of knowledge to support this aging system is increasingly difficult. The current log archive is also stored on the mainframe as a series of flat files. Searching through these logs is a processor intensive process that needs to be moved away from the production mainframe and utilize a properly indexed Database Management System (DBMS).

The current AZLEMS uses either a TCP Sockets or MQSeries interface to communicate with the various systems it must interface with, including the AZDPS mainframe based ACJIS applications, the FBI's NCIC, NLETS, MVD, the AZDPS Computer Aided Dispatch (CAD) system, Nextest which is the Terminal Operator Certification system, plus CAD and Records Management systems at LEAs across the State. It is imperative that the new message switch can seamlessly continue to communicate with these systems, so that migrating from the old AZLEMS to the new one will not be held up by the need to convert to a new interface standard.

The OpenFox message switch, along with the Archive Retrieval component, utilizes modern, standards based technologies but also will communicate with these legacy systems using the interface technologies and standards that they currently use to communicate with the old AZLEMS. When new systems come on-line and need to utilize the OpenFox message switch, they will utilize the NIEM compliant XML based web service. If and when one of the existing interface agencies or systems managers is ready to utilize the modern web service, it will be readily available to them. Any new features that are made available through the OpenFox message switch will be written for the Web Service interface rather than the old TCP Sockets and MQSeries interfaces -- thereby, creating an incentive to migrate. However, all current features will continue to be available through the legacy interfaces, so no loss of functionality or service will be incurred if an agency or system manager cannot afford the time or expense to migrate.

C. *Selection Process*

AZDPS completed an RFI process to get preliminary assessments from the message switch vendor community, and conducted more than a year of research including

queries of other states to get a feel for the Law Enforcement Message Switch market including costs, products/vendors used, and level of satisfaction.   Finally, AZDPS engaged the ACJIS community for their input.

The market place is small. There is only one agency (the CTA) in each state that maintains a law enforcement message switch. CPI is the clear market leader with more than 30 message switches in production. The AZDPS RFI produced only two other vendors with an existing, viable product, but they did not meet the needs that we published. We are confident in our choice based on the technology, as well as their reputation for service. In addition, because they have such a large market share, they have experience interfacing with the majority of CAD and RMS systems that AZDPS and the states' LEAs utilize.

V.   Project Approach

A.   *Project Schedule**

Project Start Date: 07/06/2015   **Project End Date**: 12/31/2016

B.   *Project Milestones*

Major Milestones	Start Date	Finish Date
Phase 2 – OpenFox Installation: Configuration, Development, Testing and Training	07/06/2015	02/07/2016
Phase 3 – Nextest: Configuration, Development, Testing	01/04/2016	02/07/2016
Phase 4 – Custom Interfaces: Remote Agencies MQ Interfaces, Game & Fish Socket Interface, Message Switch AZ Specific Modifications	02/01/2016	08/10/2016
Phase 5 – MVD Interface, Message Switch AZ Specific Modifications, Testing	07/01/2016	09/15/2016
Phase 6A – TN3270 Conversion (AZDPS only)	02/08/2016	09/14/2016
Phase 6B – Apps Transition: Configuration, Development, Testing	09/15/2016	12/31/2016

VI.   Roles and Responsibilities

A.   *Project Roles and Responsibilities*

Project Management – AZDPS and CPI
Arizona Customization – There will be Arizona customization relative to the size of the project. The bulk of the customization will be done by CPI with support by AZDPS personnel.
Installation and Testing – The bulk of product installation and testing will be handled by CPI with AZDPS personnel as support.

B.   *Project Manager Certification*

☐   Project Management Professional (PMP) Certified

x	State of Arizona Certified
	Project Management Certification not required

C.   *Full-Time Employee (FTE) Project Hours*

Total Full-Time Employee Hours	2310
Total Full-Time Employee Cost	$

VII.   Risk Matrix, Areas of Impact, Itemized List, PIJ Financials

VIII. Project Approvals

A. Agency CIO Review*

Key Management Information	Yes	No
1. Is this project for a mission-critical application system?	X	
2. Is this project referenced in your agency's Strategic IT Plan?	X	
3. Is this project in compliance with all agency and State standards and policies for network, security, platform, software/application, and/or data/information as defined in http://aset.azdoa.gov/security/policies-standards-and-procedures, and applicable to this project? If **NO**, explain in detail in the "XI. Additional Information" section below.	X	
4. Will this project transmit, store, or process sensitive, confidential or Personally Identifiable Information (PII) data? If **YES,** in the "XI. Additional Information" section below, describe what security controls are being put in place to protect the data.	X	
5. Is this project in compliance with the Arizona Revised Statutes (A.R.S.) and GRRC rules?	X	
6. Is this project in compliance with the statewide policy regarding the accessibility to equipment and information technology for citizens with disabilities?	X	

B. Project Values*

The following table should be populated with summary information from other sections of the PIJ.

Description	Section	Number or Cost
Assessment Cost **(if applicable for Pre-PIJ)**	II. PIJ Type - Pre-PIJ Assessment Cost	$
Total Development Cost	VII. PIJ Financials tab	**$1,371,807.98**
Total Project Cost	VII. PIJ Financials tab	**$1,838,017.98**
FTE Hours	VI. Roles and Responsibilities	**2310**

C. Agency Approvals*

Contact	Printed Name	Signature	Email and Phone
Project Manager:	Gregg Hayes		
Agency Information Security Officer:	Roger Baune		
Agency CIO:	Gregg Hayes		
Project Sponsor:	Gregg Hayes		
Agency Director	Colonel Frank L. Milstead, Director		

IX. Glossary

ACJIS – Arizona Criminal Justice Information Systems

AZLEMS – Arizona Law Enforcement Message Switch

CTA – Control Terminal Agency – Each State, District, Territory and Province of the US has 1 agency responsible for the management, dissemination and safe-keeping of Criminal Justice Information. AZDPS is the CTA for the State of Arizona.

CJIS – Criminal Justice Information Systems

COTS – Commercial, Off the Shelf software

LEA – Law Enforcement Agency

NIEM – National Information Exchange Model

X. Additional Information

The new message switch will transmit CJIS data, which includes PII information. The switch will meet all CJIS regulations and will be secured following the CJIS guidelines. These guidelines are very strict policies maintained by AZDPS and developed/audited by the FBI.

Links:

ADOA-ASET Website

ADOA-ASET Project Investment Justification Information Templates and Contacts

Email Addresses:

Strategic Oversight

ADOA-ASET_Webmaster@azdoa.gov

Appendix A – Components of existing Message Switch

COMPONENT DESCRIPTIONS

1. Communications Server
   This is a component of the z/OS mainframe that is responsible for management of the System Network Architecture (SNA) and Transmission Control Protocol/Internet Protocol (TCP/IP) communications environment, via IBM-supplied code and AZDPS-maintained definitions.

2. JES
   The Job Entry Subsystem (JES) is another component of the z/OS mainframe. It provides services in support of batch job input and output processing.

3. MQSeries
   Another piece of IBM software, MQSeries provides a multi-platform environment for the processing of messages. MQSeries reduces the need for AZDPS-written communication and message-queuing code. AZDPS has separate MQSeries queue managers for Test and Production, and supports ACJIS interfaces for agencies running either MQSeries Server or MQSeries Client.

4. CICS/ACJIS Message Switch (TOR)
   The Message Switch region is the heart of AZLEMS. Borrowing from IBM's CICS Multiple Region Operation (MRO) concept, the Switch is essentially a Terminal-Owning Region (TOR), as it is the communications point in AZLEMS for all ACJIS agencies and external servers. The TOR is responsible for message queuing, logging, message reformatting, and security services.

5. CICS/ACJIS Application Region (AOR)
   The ACJIS application region is where AZDPS-written ACJIS programs reside and execute. In MRO parlance, an Application-Owning Region (AOR) typically is downstream of a TOR and is

responsible for application services. In addition to accessing ACJIS databases for inquiry and maintenance purposes, the AOR application programs contain business rules that would normally be part of the main message switch region

6. CICS/MIS Application Region
    The Management Information Systems (MIS) region plays a small, yet significant, part of AZLEMS. Applications that are considered non-ACJIS still feed transactions to the AZLEMS, via a batch job process.

7. z/OS Files
    The vast majority of AZLEMS support files utilize IBM's Virtual Storage Access Method (VSAM). VSAM supports both key-sequenced and entry-sequenced files, and these contain not only the actual messages that are input to and output from ACJIS, but also a structure that associates these messages with the routing indicators that send and receive them. Additionally, the ACJIS log is a flat file that can only be processed sequentially.

8. z/OS CSA
    The z/OS Common System Area (CSA) is a storage area that can be accessed by multiple address spaces, or regions. It is a convenient way to facilitate inter-region communication. At Initial Program Load (IPL) time, an area in the CSA is carved out for usage by the AZLEMS.

9. ADABAS
    Almost all AZDPS ACJIS data is contained in ADABAS databases. ADABAS uses a hierarchical structure and has been in use at AZDPS for almost 35 years. The vast majority of ACJIS AOR application programs contain proprietary code for accessing ADABAS files.

Appendix B

REQUIREMENTS

(The requirements list below is not all inclusive)

a. Open systems and open standards. AZDPS interprets open systems to mean computer software and hardware systems that provide portability and interoperability between seemingly disparate environments (such as AIX and Windows).

b. Advanced System Management tools (i.e. transaction log retention and access, advanced search capabilities, automatic back-up and recovery etc.).

c. Multiple environments for Production, Production Fail-Over, Training and Test. If not truly fault tolerant the fail-over capabilities must be advanced sufficiently to prevent an interruption of service.

d. Flexibility and extensibility to comply with advancing standards and increasing transaction volumes.

e. Provide an easy and cost efficient way of adding new transaction capabilities.

f. Provide a disaster recovery capability that addresses the issue of loss of the primary physical location, or any part of the system's technical architecture that renders the entire system inoperable.

g. The system must be designed to provide remote maintenance and troubleshooting.

h.   In the event that any disk or other synchronized storage device is out of sync, the system shall automatically synchronize the deficient storage device without operator intervention and without degrading the performance of the application.

i.   The database management system provided with the message switch shall be ODBC and SQL compliant.

j.   The proposed message switch design will allow AZDPS the ability to develop, test and train on the message switch application without accessing the production version of the application. This could be accomplished by implementing separate production, training, QA (test), and development systems. However, AZDPS is open to other designs, including virtualized non-production environments, which will accomplish the same objective.

k.   The system shall utilize the services of a transaction monitor or similar programming scheme to ensure that all transactions can be rolled back and successfully completed in the event of a hardware, software or application failure.

l.   The message switch shall be designed to provide 99.9% availability of the application, including planned and unplanned downtime, and software and hardware errors, based upon a 24 hour / 7 day week.

m.   The proposed message switch will be designed so that upgrades can be installed on one server/ host computer while the message switch continues to serve users from another server/ host computer.

n.   The proposed message switch should be designed to operate on servers located at different physical sites in order to protect the system against catastrophic site failures.

o.   Based upon transaction figures for the current daily and hourly peak periods that will be provided in the RFP, the message switch proposed must be capable of handling this workload for no less than 8 years at a sustained growth rate of 6% each year.

p.   The message switch will incorporate role-based security and the switch will be compliant with the current release of the FBI's CJIS Security Policy.

q.   Vendor offerings will include the full complement of ACJIS, NCIC and NLETS transactions, robust Data Export capabilities, a Help System with adequate Documentation, Message Acknowledgement and Failure Processing capabilities, industry standard interface capabilities, and provide solutions for the "Legacy Program Special Issues".

r.   AZDPS requires a system that is designed to allow in-house technical staff to perform routine maintenance activities. AZDPS also requires a system that is designed to allow in-house technical staff to add additional transaction processing capabilities. If a new type of criminal justice query is required, we would like to have the wherewithal to build and implement that query without engaging the vendor. This would require the vendor to provide documentation for building and deploying that query. The purpose for requesting this capability is that new criminal justice queries are being developed all the time, and having in-house staff at AZDPS perform that task would most likely reduce the overall time to implement the query.