

Project Investment Justification

MEDSIS Modernization

HS23009

Department of Health Services

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1. GENERAL INFORMATION

PIJ ID: HS23009

PIJ Name: MEDSIS Modernization

Account: Department of Health Services

Business Unit Requesting: Business Intelligence Office

Sponsor: Susan Robinson

Sponsor Title: Chief Business Intelligence Officer

Sponsor Email: susan.robinson@azdhs.gov

Sponsor Phone: (480) 435-3929

2. MEETING PRE-WORK

2.1 What is the operational issue or business need that the Agency is trying to solve? (i.e....current process is manual, which increases resource time/costs to the State/Agency, and leads to errors...):

The current Medical Electronic Disease Surveillance Intelligence System (MEDSIS) solution went into production in 2006, and has been modified over the years to adapt to Arizona's changing needs in disease surveillance and intelligence. The evolution over time has created the following challenges:

- Accumulated technical debt is raising cost to enhance and maintain
- Need for improved performance and scalability to meet current and future data needs
- Challenging user experience in portions of the application
- Meeting the needs of an expansive user base with complex and competing priorities

Through the years, Arizona Department of Health Services (ADHS) has worked to reduce the number of disease surveillance systems that must be maintained, by integrating surveillance for these and emerging diseases into MEDSIS. The MEDSIS system needs to be modernized to address the above challenges and be efficiently adaptable to meet the changing disease surveillance needs of the State and the Agency.

2.2 How will solving this issue or addressing this need benefit the State or the Agency?

MEDSIS will provide quick, user-friendly, flexible, secure, compliant, and stable methods to work with disease surveillance data and collaborate with partners to improve public health.

Collaborating partners span from ADHS programs to local public health jurisdictions, to tribal communities, hospital systems, and laboratories. This ecosystem of partners is involved in gathering, accessing, analyzing, and sharing data. MEDSIS is the platform for collaboration in supporting Health and Wellness for all Arizonans.

The vision is to modernize MEDSIS to align with the Agency priority to analyze and share data with public health partners in a meaningful and expedited manner and strengthen the resilience of critical public health systems. Actionable data aids in early warning detection, rapid response, outbreak management and establishment of trends in morbidity and mortality.

Greater than 75% of feature requirements of onboarding new programs are covered through configuration as defined in program onboarding documentation.

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Maintain MEDSIS application 99.999% availability (excluding scheduled downtime).

Users have the functionality available to perform all activities they were able to perform in the current MEDSIS version. Functionality described in the Features List is available, allowing for:

Users can access their authorized data without switching user roles (user-based permission model)

New system enhancements and development time can be cut in half

Back end system jobs run time can reduce to half or less.

2.3 Describe the proposed solution to this business need.

The objective is to enhance the MEDSIS web-based application by applying a service oriented approach and implementing modern cloud and application architecture patterns to support high availability, scalability, and resiliency. Additionally, the plan is to introduce a modern, intuitive user interface to provide an enhanced user experience. The technology stack includes Microsoft .NET Core 7.0 (or its latest version), Bootstrap 5.0, React, Docker containers, and Microsoft SQL Server.

The application architecture will use Domain-Driven Design (DDD) to create a clear and maintainable domain model that represents the business logic of the application. The model will serve as a common language for developers, domain experts, and stakeholders, facilitating better communication and understanding of the business requirements. This will allow for easier evolution of the application and facilitate testing.

From a data storage perspective, the primary database that will be used to store structured data will be SQL Server and leverage MongoDB for unstructured data. MongoDB will be used as a supplemental data store for use cases that require unstructured data storage. This allows for more flexibility in the storage of data and ensures that the application can efficiently handle all types of data as needed.

Entity Framework and Dapper will be used as Object-Relational Mapping (ORM) frameworks to manage the interaction between the application and the databases. The ORMs will provide a convenient way to work with the databases while maintaining separation of concerns and scalability. The utilization of Dapper will be limited to instances where better performance is required than what Entity Framework Core can deliver.

The application will be hosted in the Amazon Web Service (AWS) Cloud public environment US West 2 Oregon Region. The architecture will consume managed resources such as AWS Relational Database Service (RDS) for SQL Server, AWS DocumentDB, and AWS ElastiCache for Redis. The cloud architecture will use serverless computing for container-based architecture to allow for greater flexibility and scalability. Docker for containers, AWS Elastic Kubernetes Service (EKS) for container orchestration, AWS Fargate for serverless computing, and AWS Elastic Container Registry (ECR) for storing, sharing, and deploying container application images.

2.4 Has the existing technology environment, into which the proposed solution will be implemented, been documented?

Yes

2.4a Please describe the existing technology environment into which the proposed solution will be implemented.

2.5 Have the business requirements been gathered, along with any technology requirements that have been identified?

Yes

2.5a Please explain below why the requirements are not available.

3. PRE-PIJ/ASSESSMENT

3.1 Are you submitting this as a Pre-PIJ in order to issue a Request for Proposal (RFP) to evaluate options and select a solution that meets the project requirements?

No

3.1a Is the final Statement of Work (SOW) for the RFP available for review?

3.2 Will you be completing an assessment/Pilot/RFP phase, i.e. an evaluation by a vendor, 3rd party or your agency, of the current state, needs, & desired future state, in order to determine the cost, effort, approach and/or feasibility of a project?

No

3.2a Describe the reason for completing the assessment/pilot/RFP and the expected deliverables.

3.2b Provide the estimated cost, if any, to conduct the assessment phase and/or Pilot and/or RFP/solicitation process.

3.2e Based on research to date, provide a high-level cost estimate to implement the final solution.

4. PROJECT

4.1 Does your agency have a formal project methodology in place?

Yes

4.2 Describe the high level makeup and roles/responsibilities of the Agency, Vendor(s) and other third parties (i.e. agency will do...vendor will do...third party will do).

The ADHS IT Team will provide:

1. UAT Support - Test Case Creation
2. Project Management - Theresa Carter
3. User Interface Design
4. ADA Compliance Designer (when necessary)
5. Information Security

1. Requirements Signoff
2. User Acceptance Testing

The System Integrator will provide

1. Discovery/needs assessment
2. Sprint planning and execution
3. Requirements gathering
4. System Development
5. Quality Assurance
6. Deployment
7. Change Management
8. Training

4.3 Will a PM be assigned to manage the project, regardless of whether internal or vendor provided?

Yes

4.3a If the PM is credentialed, e.g., PMP, CPM, State certification etc., please provide certification information.

4.4 Is the proposed procurement the result of an RFP solicitation process?

No

4.5 Is this project referenced in your agency's Strategic IT Plan?

Yes

5. SCHEDULE

5.1 Is a project plan available that reflects the estimated Start Date and End Date of the project, and the supporting Milestones of the project?

Yes

5.2 Provide an estimated start and finish date for implementing the proposed solution.

Est. Implementation Start Date	Est. Implementation End Date
6/21/2023 12:00:00 AM	6/30/2024 12:00:00 AM

5.3 How were the start and end dates determined?

Based on project plan

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5.3a List the expected high level project tasks/milestones of the project, e.g., acquire new web server, develop software interfaces, deploy new application, production go live, and estimate start/finish dates for each, if known.

Milestone / Task	Estimated Start Date	Estimated Finish Date
Tool Installation and Initial Setup	06/26/23	07/10/23
Complete Project Plan, detailed Sprint Summary to be Delivered after Kickoff and Initial Setup with Slalom.	06/26/23	07/07/23
Project Kickoff	06/26/23	06/26/23
Requirements Refinement	06/26/23	04/30/24
Development	07/10/23	05/10/24
Quality Assurance	07/20/23	05/15/24
Demo User Acceptance Testing	05/15/24	05/19/24
Organization Change Management and Training	05/20/24	05/23/24
Penetration Testing	05/24/24	05/24/24
Release to Production	05/25/24	05/25/24
Hypercare	05/26/24	06/09/24
Transition to Support Team and	06/10/24	06/30/24

Training	06/10/24	09/30/24
Project Retrospective	06/10/24	06/10/24
Project Closeout (Pay Invoices, Release Project Team, Retrospective, Documentation Cleanup)	06/30/24	09/30/24

5.4 Have steps needed to roll-out to all impacted parties been incorporated, e.g. communications, planned outages, deployment plan?

Yes

5.5 Will any physical infrastructure improvements be required prior to the implementation of the proposed solution. e.g., building reconstruction, cabling, etc.?

No

5.5a Does the PIJ include the facilities costs associated with construction?

5.5b Does the project plan reflect the timeline associated with completing the construction?

6. IMPACT

6.1 Are there any known resource availability conflicts that could impact the project?

No

6.1a Have the identified conflicts been taken into account in the project plan?

6.2 Does your schedule have dependencies on any other projects or procurements?

Yes

6.2a Please identify the projects or procurements.

This implementation is dependent on the successful deployment within the Data Lakehouse of the reporting data and data extracts for end-users from the MEDSIS application. This effort will be developed as part of the Data Lakehouse project.

The legacy reporting solution will be utilized until the new reporting functionality is available from the Data Lakehouse project.

6.3 Will the implementation involve major end user view or functionality changes?

Yes

6.4 Will the proposed solution result in a change to a public-facing application or system?

Yes

7. BUDGET

7.1 Is a detailed project budget reflecting all of the up-front/startup costs to implement the project available, e.g, hardware, initial software licenses, training, taxes, P&OS, etc.?

Yes

7.2 Have the ongoing support costs for sustaining the proposed solution over a 5-year lifecycle, once the project is complete, been determined, e.g., ongoing vendor hosting costs, annual maintenance and support not acquired upfront, etc.?

Yes

7.3 Have all required funding sources for the project and ongoing support costs been identified?

Yes

7.4 Will the funding for this project expire on a specific date, regardless of project timelines?

Yes

7.5 Will the funding allocated for this project include any contingency, in the event of cost over-runs or potential changes in scope?

Yes

8. TECHNOLOGY

8.1 Please indicate whether a statewide enterprise solution will be used or select the primary reason for not choosing an enterprise solution.

Other (please specify)

8.2 Will the technology and all required services be acquired off existing State contract(s)?

Yes

8.3 Will any software be acquired through the current State value-added reseller contract?

Yes

8.3a Describe how the software was selected below:

- 1) Reviewed the possibility of using the existing Salesforce platform, but we didn't have the funding identified for sustaining the license
- 2) Considered staff augmentation, which might have been a lower cost. Determined that this option would have been more difficult to manage and would introduce more risk.
- 3) Reviewed the possibility of using a system integrator, like we do for the Women Infants and Children (WIC) program. This option will allow us to augment our team and to get more completed in a shorter time period, utilizing an architecture that we could support internally.
- 4) Maven software was evaluated and did not provide the functionality needed.
- 5) EpiTrax software was evaluated and did not provide the functionality needed.

8.4 Does the project involve technology that is new and/or unfamiliar to your agency, e.g., software tool never used before, virtualized server environment?

Yes

8.5 Does your agency have experience with the vendor (if known)?

Yes

8.6 Does the vendor (if known) have professional experience with similar projects?

Yes

8.7 Does the project involve any coordination across multiple vendors?

No

8.8 Does this project require multiple system interfaces, e.g., APIs, data exchange with other external application systems/agencies or other internal systems/divisions?

Yes

8.9 Have any compatibility issues been identified between the proposed solution and the existing environment, e.g., upgrade to server needed before new COTS solution can be installed?

No

8.9a Describe below the issues that were identified and how they have been/will be resolved, or whether an ADOA-ASET representative should contact you.

8.10 Will a migration/conversion step be required, i.e., data extract, transformation and load?

Yes

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8.11 Is this replacing an existing solution?

Yes

8.11a Indicate below when the solution being replaced was originally acquired.

MEDSIS first went live in 2006 following CDC's National Electronic Disease Surveillance System (NEDSS) database object model, and was used for infectious disease surveillance. The outbreak management module was developed in 2009 using the ASP .NET 3.5 framework. In 2012, MEDSIS was rewritten using ASP.NET 4.0 and the NEDSS object model remained; data from the legacy MEDSIS application was migrated to the current 2012 in-house application. The outbreak management module was not rewritten and is now almost fifteen years old.

8.11b Describe the planned disposition of the existing technology below, e.g., surplus, retired, used as backup, used for another purpose:

MEDSIS legacy system to be retired

8.12 Describe how the agency determined the quantities reflected in the PIJ, e.g., number of hours of P&OS, disk capacity required, number of licenses, etc. for the proposed solution?

The instance sizing, storage, and disk capacity were all determined from the existing EC2 instances for MEDSIS. Number of windows and SQL server licenses for infrastructure is dependent on the number of instances. Production requires more instances for higher availability and scalability than the other environments.

8.13 Does the proposed solution and associated costs reflect any assumptions regarding projected growth, e.g., more users over time, increases in the amount of data to be stored over 5 years?

Yes

8.14 Does the proposed solution and associated costs include failover and disaster recovery contingencies?

Yes

8.14a Please select why failover and disaster recovery is not included in the proposed solution.

8.15 Will the vendor need to configure the proposed solution for use by your agency?

Yes

8.15a Are the costs associated with that configuration included in the PIJ financials?

Yes

8.16 Will any app dev or customization of the proposed solution be required for the agency to use the project in the current/planned tech environment, e.g. a COTS app that will req custom programming, an agency app that will be entirely custom developed?

Yes

8.16a Will the customizations inhibit the ability to implement regular product updates, or to move to future versions?

No

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8.16b Describe who will be customizing the solution below:

Slalom - This vendor will install, configure and develop the solution.

8.16c Do the resources that will be customizing the application have experience with the technology platform being used, e.g., .NET, Java, Drupal?

Yes

8.16d Please select the application development methodology that will be used:

Agile/Scrum

8.16e Provide an estimate of the amount of customized development required, e.g., 25% for a COTS application, 100% for pure custom development, and describe how that estimate was determined below:

100% custom development, however, using a best of breed full stack commercial development solution

8.16f Are any/all Professional & Outside Services costs associated with the customized development included in the PIJ financials?

Yes

8.17 Have you determined that this project is in compliance with all applicable statutes, regulations, policies, standards & procedures, incl. those for network, security, platform, software/application &/or data/info found at aset.az.gov/resources/psp?

Yes

8.17a Describe below the compliance issues that were identified and how they have been/will be resolved, or whether an ADOA-ASET representative should contact you:

8.18 Are there other high risk project issues that have not been identified as part of this PIJ?

No

8.18a Please explain all unidentified high risk project issues below:

9. SECURITY

9.1 Will the proposed solution be vendor-hosted?

No

9.1a Please select from the following vendor-hosted options:

Commercial data center environment, e.g AWS, Azure

9.1b Describe the rationale for selecting the vendor-hosted option below:

The AWS platform is the State standard and ADHS standard for cloud hosting services.

9.1c Has the agency been able to confirm the long-term viability of the vendor hosted environment?

Yes

9.1d Has the agency addressed contract termination contingencies, e.g., solution ownership, data ownership, application portability, migration plans upon contract/support termination?

Yes

9.1e Has a Conceptual Design/Network Diagram been provided and reviewed by ASET-SPR?

Yes

9.1f Has the spreadsheet located at <https://aset.az.gov/arizona-baseline-security-controls-excel> already been completed by the vendor and approved by ASET-SPR?

Yes

9.2 Will the proposed solution be hosted on-premise in a state agency?

Yes

9.2a Where will the on-premise solution be located:

Other

9.2b Were vendor-hosted options available and reviewed?

9.2c Describe the rationale for selecting an on-premise option below:

9.2d Will any data be transmitted into or out of the agency's on-premise environment or the State Data Center?

9.3 Will any PII, PHI, CGIS, or other Protected Information as defined in the 8110 Statewide Data Classification Policy be transmitted, stored, or processed with this project?

Yes

9.3a Describe below what security infrastructure/controls are/will be put in place to safeguard this data:

Access to the system requires a user log in identification and password.

10. AREAS OF IMPACT

Application Systems

New Application Development

Database Systems

MS SQL Server

Software

Other

Custom .net full stack solution

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Hardware

Hosted Solution (Cloud Implementation)

AWS (non-government) cloud

Security

Telecommunications

Enterprise Solutions

Solution will use the statewide enterprise AWS Platform

The application development will be 100% custom

Contract Services/Procurements

11. FINANCIALS

Description	PIJ Category	Cost Type	Fiscal Year Spend	Quantity	Unit Cost	Extended Cost	Tax Rate	Tax	Total Cost
Shared Services	License & Maintenance Fees	Development	1	12	\$6,325	\$75,902	860.00 %	\$6,528	\$82,429
Cloud Native - Containers - Windows	License & Maintenance Fees	Development	1	12	\$858	\$10,298	860.00 %	\$886	\$11,184
ElastiCache for Redis	License & Maintenance Fees	Development	1	12	\$412	\$4,948	860.00 %	\$426	\$5,373
X-Ray AWS Tracing Service	License & Maintenance Fees	Development	1	12	\$31	\$376	860.00 %	\$32	\$409
Slalom/Carahsoft	Professional & Outside Services	Development	1	1	\$4,581,458	\$4,581,458	0.00 %	\$0	\$4,581,458

Microsoft Visual Studio Test Professional with MSDN	Software	Development	1	15	\$1,965	\$29,475	860.00 %	\$2,535	\$32,010
Shared Services	License & Maintenance Fees	Operational	2	12	\$6,325	\$75,902	860.00 %	\$6,528	\$82,429
ElastiCache for Redis	License & Maintenance Fees	Operational	2	12	\$412	\$4,948	860.00 %	\$426	\$5,373
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Shared Services	License & Maintenance Fees	Operational	4	12	\$6,325	\$75,902	860.00 %	\$6,528	\$82,429
X-Ray AWS Tracing Service	License & Maintenance Fees	Operational	4	12	\$31	\$376	860.00 %	\$32	\$409
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