Local Data Solutions

Local focus global reach

AML Construction Management System (AML CMS)

Project Proposal

Local Data Solutions, LLC

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September 03, 2025

Solicitation No: CRFP 0313 DEP2600000001

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Date: 9/2/2025

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Contents

Executive Summary

This proposal presents a modern, unified Construction Management System (CMS) to replace AMLNET, overcoming its current limitations in project management, collaboration, document handling, and field operations.

The proposed solution leverages:

- **.NET MAUI**: Mobile-first, offline-capable applications for iOS, Android, and Windows.
- **Angular + .NET Core Web Platform**: Secure, scalable, and feature-rich web portal.
- **Azure Cloud**: Storage and hosting for large multimedia and data.

This approach ensures **real-time collaboration, integration with Oracle SE v19c, file servers, Google Workspace, Microsoft Office Suite, and ArcGIS**, while enabling **scalability across AML staff and 400+ external agency users**.

Key Benefits

- Unifies project management, document handling, GIS, and drone data into one platform.
- Eliminates AMLNET's limitations (manual uploads, poor collaboration, small file caps).
- Enables **field-first, mobile-friendly, offline-capable workflows**.
- Provides **scalable access** for AML staff, contractors, and external agencies.
- Ensures **compliance, security, and perpetual data retention**.

Company Overview

Local Data Solutions, LLC (LDS), is a software development company based in Morgantown, West Virginia, serving local, state, and federal agencies as well as West Virginia businesses. We provide cost-effective software design, development, and Microsoft Azure based cloud-hosting services. Our approach to software development ensures that businesses and institutions can leverage modern technologies to address everything from simple web presence to the most complicated business processes. Every application LDS develops is uniquely tailored to each customer's needs and business model.

Established in 2008 by Senior Software Developers Ty Petrice and Parmjit Singh, LDS has a strong foundation in software development and project management. Both Ty and Parmjit have worked on several major projects at LDS while simultaneously advancing their development skills through contracts with the Centers for Disease Control and Prevention's National Institute for Occupational Safety and Health (NIOSH). They have been involved in developing a wide range of software applications for public health and safety, covering areas from mining safety to publications and website control, to the health aftereffects from the collapse of the World Trade Center on 9/11. Over the last 15+ years, they have worked on dozens of small, medium, and large systems for the Health Effects Laboratory Division and the Division of Safety Research,

serving as project leads and managing numerous other software developers and supporting staff.

A custom application solution requires professional planning from the beginning, and our experienced analysts and programmers have a comprehensive understanding of the technical and personal aspects involved in software development, including requirements analysis, UX/UI design approaches, programming, system infrastructure, and more. Our highly trained team uses modern and proven technologies to determine and address your organization's needs. LDS maintains cyber liability insurance of at least $2,000,000 for hosting secure data in systems that we develop.

Technical Approach

Our project will utilize a modern, integrated technology stack to ensure scalability, high performance, maintainability, and seamless user interaction. This combination of frameworks, cloud infrastructure, and tools provides a comprehensive foundation to meet both current and future business needs. Below is an overview of the key technologies used:

Backend Technologies

- **ASP.NET Core**: ASP.NET Core will be the primary backend framework, providing a lightweight, modular, and high-performance environment for building scalable web applications and APIs. Its cross-platform support and integration with cloud services make it ideal for modern development.
- **C# Programming Language**: C# will be used for implementing business logic, API development, and backend services. Known for its strong typing, reliability, and extensive libraries, C# enables the development of efficient, maintainable, and robust software components that move data in and out of various data sources.
- **Web API with Application Insights**: The Web API, built with ASP.NET Core, will expose backend data and services through RESTful endpoints, facilitating communication between the frontend and backend, as well as external integrations. Azure Application Insights will be integrated into the Web API to provide real-time monitoring, performance tracking, and diagnostics. This helps identify bottlenecks, track API usage, detect issues, and improve the overall performance and reliability of the application.
- **SQL Server Database (Azure-hosted)**: Azure SQL Database will serve as the primary data storage for structured data, offering robust relational database features such as stored procedures, transactions, and query optimization. The database will be highly available, scalable, and secure, with automatic backups and disaster recovery provided by Azure.

Frontend Technologies

- **Angular**: Angular will be used for developing a responsive and dynamic frontend

interface. Its modular architecture, two-way data binding, and built-in dependency injection ensures high performance and maintainability.

- **TypeScript**: TypeScript, a typed superset of JavaScript, enhances developer productivity by enabling static type checking, better tooling support, and improved code maintainability. It integrates seamlessly with Angular, ensuring a stable and scalable frontend codebase.
- **Bootstrap**: Bootstrap will be used to develop a mobile-friendly and consistent user interface with pre-built components and responsive grid systems, speeding up development without compromising design.
- **.NET MAUI (Multi-platform App UI)** is Microsoft's modern, cross-platform framework designed to simplify building native applications for Android, iOS, macOS, and Windows with a single shared codebase.

    - It is the evolution of Xamarin.Forms, offering improved performance, a streamlined project structure, and deeper integration with the latest .NET ecosystem. Developers write application logic in C# and design interfaces with XAML, ensuring consistent UI experiences across platforms while still having the flexibility to incorporate platform-specific APIs and features when necessary.
    - MAUI introduces a unified project system, reducing the complexity of managing multiple platform-specific projects. It also enhances developer productivity with tools such as Hot Reload for quick UI and logic updates, dependency injection for modular architectures, and support for modern .NET patterns. Developers can choose from MVVM (Model-View-ViewModel) or MVU (Model-View-Update) patterns, depending on their preferred architectural approach.
    - By consolidating UI components, services, and business logic, .NET MAUI significantly reduces code duplication, making it easier to maintain and scale applications across devices. Its flexibility, performance optimizations, and close alignment with .NET 6 and later versions make it a powerful choice for organizations seeking to deliver consistent, native, multi-device applications faster and more efficiently.

Cloud Technologies

- Azure Cloud Hosting: The entire solution will be hosted on Azure Cloud, providing high availability, scalability, and security. Azure's load balancing, automated scaling, and disaster recovery features ensure consistent performance under varying workloads.
- Azure SQL Database: SQL Server on Azure will store and manage structured data for the application. This cloud-based database offers high availability, automatic backups, and built-in security features, making it a reliable solution for transactional data storage.
- Azure Cloud Storage: Azure Blob Storage will be used for managing unstructured data such as documents and media files. With built-in redundancy and seamless integration with other Azure services, it ensures data durability and availability.
- Azure Functions: Azure Functions will enable the development of event-driven, serverless

components to handle specific triggers, such as API calls or data changes. This ensures scalability and reduces infrastructure overhead by running code only when needed.

- Azure Logic Apps: Azure Logic Apps will automate workflows, enabling seamless integration between internal systems and third-party services. This improves efficiency and reduces manual effort by automating complex processes.

Functional Requirements

Project Management & Collaboration

- **Centralized platform**: Replaces fragmented AMLNET workflows, ensuring all documents, budgets, and schedules are managed in one system.
- **Real-time updates**: Project changes instantly available across departments, reducing delays from email/manual updates.
- **Automated notifications**: Alerts for approvals, task deadlines, and project risks prevent oversights.
- **Version control & audit trails**: Ensures document accuracy, transparency, and accountability.
- **External collaboration**: Secure role-based portals for contractors, agencies, and other stakeholders. This bridges communication gaps beyond AML staff.
- **Inline chat/discussions**: Real-time conversations linked directly to projects or documents.

Data Capture & Field Mobility

- **Real-time capture (office + field)**: Field inspectors no longer wait until returning to the office to upload data.
- **Native mobile support (iOS/Android/Windows)**: True mobile-first usability (not PC-dependent like AMLNET).
- **Offline-first sync**: Data captured in the field is stored locally and syncs automatically when internet is available.
- **Structured/unstructured entry**: Support both form-driven data and free-form notes for flexible field reporting.
- **GPS/location stamping**: Enhances accuracy of inspections by geotagging photos and field reports.

Document & Multimedia Management

- **Embedded multimedia**: Photos, videos, and drawings tied directly to reports rather than stored separately.
- **Unified storage**: Eliminates confusion of files stored across AMLNET folders, cloud drives, and email.
- **Preview without download**: Saves time by allowing in-browser/mobile previews for images, PDFs, and videos.
- **Advanced search**: Search within documents, metadata, and tags — overcoming AMLNET's tag-only limitations.
- **Standardized tagging/titling**: Enforces consistent naming for easy retrieval.
- **Duplicate/orphan file detection**: Automatically flags unlinked or redundant documents.
- **AI-powered tagging**: Uses ML to auto-classify uploaded documents and images, reducing manual effort.

Reporting & Analytics

- **Configurable dashboards**: Real-time visibility into budgets, timelines, and compliance.
- **Integrated field data**: Inspection results flow directly into project reports without re-entry.
- **Export options (PDF, Excel)**: Supports reporting for both internal and external audiences.
- **Data validation & error-checking**: Automatically detects missing forms, signatures, or inconsistent records.
- **Predictive analytics**: Identifies risks like budget overruns or timeline delays before they occur.

Non-Functional Requirements

Performance & Scalability

- **Large file support (>25 MB)**: Critical for storing construction photos, videos, and 3D models.
- **Scalable multi-division support**: Handles concurrent projects across multiple AML divisions without performance issues.

Usability & Accessibility

- **Intuitive interface**: Reduces training needs; designed for quick adoption by both office and field staff.

- **Preview without distortion**: Eliminates issues seen in AMLNET's cropped/distorted image previews.
- **Accessibility compliance (WCAG/ADA)**: Ensures usability by staff and contractors with disabilities.

Reliability & Data Integrity

- **High uptime**: Ensures project-critical systems are always available.
- **Automated backups & recovery**: Protects data from accidental loss or corruption.
- **Validation checks**: Helps prevent incomplete records or incorrect uploads.

Security & Compliance

- **Role-based access**: Restricts sensitive data to appropriate personnel.
- **Data encryption**: Ensures security of project files in transit and at rest.
- **Stakeholder access**: Secure portals for contractors and agencies without compromising AML data.
- **Compliance with standards (ISO, FedRAMP, etc.)**: Meets government and industry expectations for handling sensitive data.

Integration & Extensibility

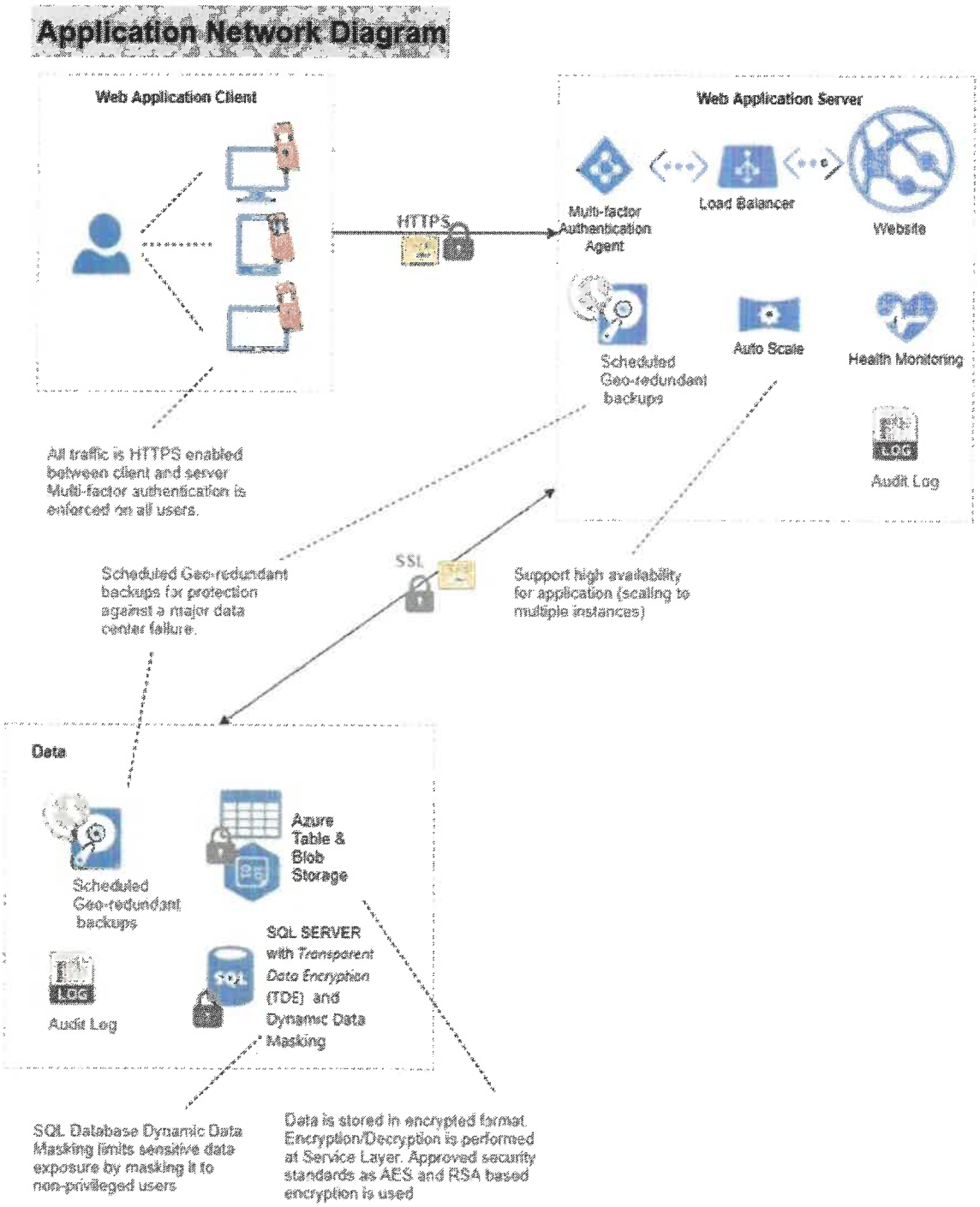
- **API support**: Enables integration with existing ERP, finance, and GIS systems.
- **Prebuilt ERP connectors**: Reduces custom development cost for linking financial systems.
- **Marketplace for extensions**: Provides future expansion options through add-ons.

Design Overview

The proposed system is a web-based solution hosted on Azure Cloud that leverages a robust, modern technology stack to deliver a secure, scalable, and role-based operational platform. It ensures seamless integration with existing State Employee accounts, flexible access across devices, and comprehensive role-based modules tailored to specific operational needs. Below is a detailed breakdown of the key design elements.

System Architecture

The system will be a web-based application hosted on Azure Cloud with a SQL Server database to ensure high availability, scalability, and security.



- **Login Integration**:
  - Single Sign-On (SSO) integration with existing **State Employee accounts**, ensuring seamless access using existing credentials.
  - **Multifactor Authentication (MFA)** to enhance security, protecting sensitive operations and data.
- **Accessibility**:
  - The system will be accessible through any web browser via a dedicated URL.
  - It will support access from any device with an internet connection, including desktops, tablets, and mobile devices.

Project Timeline

Our software development process begins with a comprehensive understanding of the customer's existing processes and data structures. This crucial step involves close collaboration with stakeholders to gain insight into their operations, challenges, and goals. Through interviews, workshops, and documentation reviews, we identify inefficiencies in the current system and potential areas for improvement.

Requirement Gathering and Scope Definition (1 month)

From the insights gained, we work with stakeholders to define the functional and non-functional requirements of the new system. These requirements encompass both the business needs, and the technical specifications required to ensure the system aligns with the customer's objectives. We also define the project scope by setting boundaries for what will and will not be included in the system. This step ensures clarity, prevents scope creep, and establishes a shared understanding among all parties.

Deliverables:

- Requirement Specification Document
- Project Scope Statement

System Design: Data Structures and Project Architecture (1 month)

Once the requirements are solidified, we proceed with developing the data structure and a project shell. This involves creating:

- Database models and schemas to organize and store data efficiently.
- Class diagrams, API structures, and business logic models to define how different components will interact within the system.
- A high-level project architecture, including the selection of frameworks, tools, and technologies best suited for scalability, security, and performance.

At this stage, we create mockups or wireframes to visualize the user interface (UI) and ensure the design aligns with customer expectations.

Deliverables:

- Entity Relationship Diagrams (ERDs)
- Data Dictionary
- System Architecture Blueprint
- UI Mockups

Data Import Process (1 month)

The data import process plays a vital role in ensuring a smooth transition from legacy systems to the proposed platform. It involves carefully planned steps to extract, transform, and load (ETL) data into the new system while preserving accuracy, integrity, and consistency. The goal is to seamlessly integrate existing data into the Azure SQL Database. This provides the iterative development foundational data that can be reviewed in the new system structure.

Data Assessment and Planning

- **Data Inventory and Mapping**: Identify all relevant datasets from the legacy system and map data fields to align with the new data structure.
- **Stakeholder Collaboration**: Work closely with stakeholders to confirm required datasets, dependencies, and business rules.
- **Gap Analysis**: Identify missing or redundant data elements and document any discrepancies to ensure data consistency.

Data Transformation and Cleansing

- **Schema Transformation**: Convert legacy data to match the new Azure SQL Database schema, including data type conversions and normalization.
- **Data Cleansing**: Apply automated rules to remove duplicates, correct inconsistencies, and format data according to business rules.
- **Validation and Enrichment**: Use validation scripts to ensure completeness, and where necessary, enrich data with missing values.

Data Import into Azure SQL Database

- **Import Process**: Import data in a repeatable process to allow refining the import process as legacy data issues are identified.

- **Functional Testing**: Ensure workflows, reporting, and search capabilities function correctly with the imported data.
  Deliverables:
- SQL Server database containing legacy data loaded into new data structure.

Development and Iterative Prototyping (5-8 months)

Once the system design is in place, we start to develop a functional project shell as the foundation of the software. Development follows an Agile approach, allowing for flexibility and collaboration throughout the process. We break the project into smaller, manageable modules or sprints, focusing on developing, testing, and refining features iteratively.

Phase 1 (3–4 months):

- Core web + mobile apps
- Document repository (>25MB upload support)
- Offline sync engine
- Basic dashboards

Phase 2 (1–2 months):

- Budget/cost tracking integration
- Gantt charts & scheduling
- ArcGIS & AutoCAD integrations
- External stakeholder portal

Phase 3 (1–2 months):

- Drone SDK integrations (Pix4Dmatic, DJI, LiDAR)
- Predictive analytics & AI tagging
- FedRAMP-aligned security option

During each sprint, we prioritize:

- Frontend and backend development to ensure seamless integration.
- Regular code reviews to maintain code quality and consistency.

Deliverables:

- Functional Prototype
- Sprint Backlogs and Burn-Down Charts
- Code Repository and Documentation

Testing and Quality Assurance (QA) (1 month)

After development, the system undergoes rigorous testing and quality assurance. This step ensures the software performs as expected in different environments and scenarios. We conduct:

- System testing to identify and resolve bugs.
- Performance testing to ensure the system can handle the required load.
- User acceptance testing (UAT) to confirm the software meets the customer's expectations and requirements.

Deliverables:

- Test Cases and Results
- UAT Feedback Reports

Deployment and Go-Live (2 weeks)

Once testing is complete, we proceed with deployment. This includes:

- Setting up production environments and databases.
- Migrating any existing data to the new system.
- Ensuring integration with other systems if required.

We monitor the system during the go-live phase to resolve any issues promptly and ensure a smooth transition. Training sessions are conducted to familiarize end-users with the system.
Deliverables:

- Deployed Software in Production
- Data Migration Reports
- User Training Materials

Maintenance and Continuous Improvement

Our commitment does not end with deployment. We offer ongoing support and maintenance to address issues, apply updates, and implement new features as needed. Through continuous feedback loops, we ensure the software evolves with the customers' needs and remain aligned with their business objectives.

Deliverables:

- Maintenance Plan and Service-Level Agreements (SLA)
- Change Logs for Updates and Patches
- Feedback Loop Reports

Support & Maintenance Plan

MAUI Mobile + Angular/.NET Web Solution

Support Model

Support Tiers

- **Tier 1 – End User Help Desk (24/7/365)**
  - Handles user issues (login, password resets, basic troubleshooting).
  - Available via phone, email, and ticketing system.
- **Tier 2 – Application Support**
  - Technical staff to resolve application-related issues (errors, failed uploads, offline sync issues).
  - Root-cause analysis and bug fixes.
- **Tier 3 – Development & Vendor Support**
  - Advanced issues require software patching, integrations, or new features.
  - Escalated to engineering team for resolution.

Response & Resolution SLAs

- **Critical (System Down):** Response within 1 hour, resolution within 4 hours.
- **High (Major Function Impact):** Response within 2 hours, resolution within 8 hours.
- **Medium (Single Feature Issue):** Response within 4 hours, resolution within 2 business days.
- **Low (Minor/Non-Blocking):** Response within 1 business day, resolution within next scheduled release.

Maintenance Services

- **Preventive Maintenance**
  - Proactive monitoring of servers, APIs, and databases.
  - Regular patching of security vulnerabilities.
  - Cloud resource optimization (storage scaling, cost monitoring).
  -
- **Corrective Maintenance**
  Bug fixes and defect resolution reported by users.
  Quick recovery from unexpected system downtime.

- **Adaptive Maintenance**
  Updates for compatibility with:
  - New versions of .NET, Angular, MAUI.
  - Operating systems (iOS, Android, Windows).
  - External integrations (Oracle, ArcGIS, AutoCAD, Google/Microsoft APIs).

- **Perfective Maintenance**
  - Continuous enhancements based on user feedback.
  - Addition of new dashboards, reporting features, or data integrations.

Monitoring & Reporting

- **System Health Dashboard** with uptime, API response times, error logs.
- **Monthly Support Reports**: incidents logged, resolved, SLA compliance.
- **Quarterly Performance Reviews** with AML leadership for continuous improvement.

Training & Knowledge Transfer

- **End-User Training** at rollout (field staff, AML staff, external agency users).
- **Train-the-Trainer Program** for internal AML staff.
- **Knowledge Base & Documentation** (FAQs, how-to guides, video tutorials).

Upgrade & Release Management

- **Planned Releases**:
  - Quarterly feature releases.
  - Monthly bug fix/patch updates.
- **Staging & Testing**:
  - All updates are deployed in a test environment before production rollout.
- **Backward Compatibility**:
  - Ensures mobile apps and integrations continue functioning after upgrades.

Disaster Recovery & Business Continuity

- Automated **daily backups** with 30-day retention.
- **Geo-redundant cloud hosting** (Azure).
- **RTO (Recovery Time Objective):** 8 hours.
- **RPO (Recovery Point Objective):** 4 hour.

Professional History

LDS has developed multiple significant projects for West Virginia University (WVU) and WVDHHR:

WVU Birth Score Database (WVU & WV DHHR)

Dashboard and Client Application (**2015 – present)**

LDS is hosting and implementing new features for the Birth Score database system for the WVU Research Corporation and the **West Virginia Department of Health and Human Resources (WVDHHR)**. This system collects childbirth information from more than 35 hospitals and clinics across the state of West Virginia. The collected data are used to identify and track infants who are at the highest risk for health and developmental problems, to ensure these children have access to appropriate health and special-care systems. The hospital uses a screening checklist to identify babies with a greater likelihood of health problems in the first year of life. The families of at-risk children residing in West Virginia will be referred to doctors of their choice, as well as to **Office of Maternal, Child, and Family Health (OMCFH)** Health Check Program Specialists, or Right From The Start Program nurses or social workers (called Designated Care Coordinators), who are available to offer information and support services.

LDS significantly expanded this system's capabilities and functionality, while ensuring it also complies with HIPAA and meets or exceeds federal information-technology security requirements.

West Virginia Foster Care Ombudsman System (FCO, OIG)

Landing Page and Assistance Request Application (**2023 – present)**

The West Virginia Foster Care Ombudsman System (FCO, Office of Inspector General) is a newly established service dedicated to child welfare, specifically focused on advocating for the rights of foster children and foster parents. Its core responsibilities include investigating and resolving complaints on behalf of foster children or foster parents, monitoring the development and implementation of federal, state, and local policies related to foster care, and ensuring a consistent statewide reporting system that collects and analyzes data on these complaints. This data-driven approach aims to identify and address systemic issues that impact foster children and foster parents as a group.

The system supports Foster Care Ombudsman (FCO) investigators by providing the tools needed to generate and distribute both standard and customized reports to meet the needs of diverse stakeholders. It allows FCO investigators to efficiently receive, evaluate, refer, assign, monitor, investigate, and document child welfare concerns, complaints, and other systemic issues as identified by the FCO or recommended by stakeholders within and outside state

government. This comprehensive approach enhances transparency, accountability, and effectiveness in addressing the challenges faced by the foster care community.

West Virginia Newborn Hearing Screening (NHS)

Dashboard and Client Application (**2016 – present)**

In 1998, the **West Virginia state legislature amended Chapter Sixteen of the Code of West Virginia by adding Articles 22A and 22B**. Article 22A requires the testing of newborn infants for hearing loss and requires that physicians or midwives attending a live birth ensure that a test for hearing loss is performed. Article 22B authorizes the Bureau for Public Health to establish and implement the Birth Score program and requires that hospitals, birthing facilities, attending physicians, and other persons attending a birth determine a birth score.

LDS has recently developed and is hosting the Newborn Hearing Screening system, a case-management system for the **WVDHHR**. This system is designed to automate and simplify many of the tasks related to managing infants with hearing loss or impairment. In addition, the system produces annual reports that will be submitted to the CDC. This system is **HIPAA-compliant** and meets or exceeds federal information-technology security requirements.

West Virginia Prenatal Risk Screening Instrument (PRSI)

Dashboard and Client Application **2019-present**

The **West Virginia Prenatal Risk Screening Instrument (WV PRSI)** is the tool REQUIRED by WV law to be submitted by every maternity provider of care for women in West Virginia. The PRSI is required for all West Virginia women on their initial obstetrical visit regardless of payment source. Providers shall notify the woman of any identified high-risk conditions and provide referrals as necessary. All information is used only for data analysis of at-risk/high-risk pregnancies and planning purposes by public health officials.

LDS is in process of developing and is hosting the WV PRSI system, **a case-management system** for the **WVDHHR**. This system is designed to automate and simplify many of the tasks related to managing PRSI instrument data. In addition, the system will produce annual reports that will be submitted to the CDC. The application will be composed of two separate interfaces. The first interface is for internal administrators of the system. The administrators be able to manage all user roles, approve/deny medical provider registration upon their own internal verification process, manage medical provider password resets, and review/report on submissions. The second interface is for the medical providers. Medical providers be able to apply for an account, manage their account information, request a password reset, create, edit, manage and submit PRSI forms. This system is **HIPAA-compliant** and meets or exceeds federal information-technology security requirements.

WVU Center for Excellence in Disabilities (CED, WVU)

Dashboard Application **2017 - present**

Established in 1978, the **Center for Excellence in Disabilities (CED)** is in Morgantown, West Virginia and has a satellite office in Big Chimney, West Virginia with staff located in offices across the state to better serve clients in their communities. CED serves as a resource to the community in the areas of education, research and service as it relates to the needs of people with disabilities.

WVU Center of Excellence for Disabilities web-based system consolidates the current databases supporting 20+ programs under one unified umbrella. This consolidation leads to a unified view of the member/client medical data records across different programs.

Faculty And Compensation Tracking System (FACTS, WVU)

Dashboard Application **2019 - present**

The **West Virginia University School of Medicine** tool to manage faculty compensation tracking. The application migrated and duplicated the legacy MS Access database functionality, added role-based access, and provide additional functionality such as tracking history of changes. This system is designed to automate and simplify many of the tasks related to faculty, residents and courtesy members onboarding, contracts documentation, management, and reporting requirements. The system integrates with Multi-factor Authentication implemented and used by HSC Information Technology Services seamlessly. This system is also **HIPAA-compliant** and meets or exceeds federal information-technology security requirements.

West Virginia Center for End-of-Life Care (WV End-of-Life, WVU)

Dashboard Application **2018 - present**

The WV e-Directive Registry, established by the WV Center for End-of-Life Care, allows patients to securely store their advance care planning forms and have them readily available for treating health care providers. The e-Directive Registry is the nation's most comprehensive database of its kind. LDS has developed and hosting e-Directory Registry management system for WV EoL, WVU that simplifies, organize, and manages data workflows for patient documents and information. This Registry management system houses and makes available to treating health care providers West Virginians' advance directive forms, do not resuscitate (DNR) cards, and POST forms. The e-Directive Registry allows these forms to be available 24/7 in the event of an emergency.

Why we choose Microsoft Azure Secure Applications Platform

Historically, businesses have struggled to provide fully regulated or standard-compliant system solutions due to significant investment and resource requirements. LDS staff will leverage their enterprise-level expertise to address this challenge by creating a Secure Application Platform on the Microsoft Azure cloud platform, meeting the highest security standards. This platform will securely host applications handling highly sensitive data, including Personally Identifiable Information (PII) and Protected Health Information (PHI).

Once established, the Secure Application Platform will serve as the core of a secure and accredited environment, offering a flexible solution for the Department's current system and future applications. Designed to comply with internal agency policies, state and federal laws, and healthcare standards, the environment can co-locate similar applications with equal or lower data classification. This co-location can leverage certified servers, provided a full integration assessment by LDS identifies no system conflicts or competing needs with existing applications. LDS has chosen to utilize Microsoft Azure because it offers the following advantages (cited from http://azure.microsoft.com/en-us/support/trust-center):

Design and Operational Security

- **Security Centers of Excellence.** The Microsoft Digital Crimes Unit, Microsoft Cybercrime Center, and Microsoft Malware Protection Center provide insight into evolving global security threats.
- **Security Development Lifecycle (SDL).** Since 2004, all Microsoft products and services have been designed and built from the ground up using its Security Development Lifecycle - a comprehensive approach for writing more secure, reliable and privacy-enhanced code.
- **Operational Security Assurance (OSA).** The Microsoft OSA program provides an operational security baseline across all major cloud services, helping ensure key risks are consistently mitigated.
- **Assume Breach.** Specialized teams of Microsoft security engineers use pioneering security practices and operate with an "assume breach" mindset to identify potential vulnerabilities and proactively eliminate threats before they become risks to customers.
- **Incident Response.** Microsoft operates a global 24x7 event and incident response team to help mitigate threats from attacks and malicious activity.

Security Controls and Capabilities

- **24-hour monitored physical security.** Datacenters are physically constructed, managed, and monitored to shelter data and services from unauthorized access as well as environmental threats.
- **Monitoring and logging.** Security is monitored with the aid of centralized monitoring, correlation, and analysis systems that manage the large amount of information generated by devices within the environment and provide timely alerts. In addition, multiple levels of monitoring, logging, and reporting are available to provide visibility to customers.
- **Patching.** Integrated deployment systems manage the distribution and installation of security patches. Customers can apply similar patch management processes for Virtual Machines deployed in Azure.
- **Antivirus/Antimalware protection.** Microsoft Antimalware is built into Cloud Services and can be enabled for Virtual Machines to help identify and remove viruses, spyware and other malicious software and provide real time protection. Customers can also run antimalware solutions from partners on their Virtual Machines.
- **Intrusion detection and DDoS.** Intrusion detection and prevention systems, denial-of-service attack prevention, regular penetration testing, and forensic tools help identify and mitigate threats from both outside and inside of Azure.
- **Zero standing privileges.** Access to customer data by Microsoft operations and support personnel is denied by default. When granted, access is carefully managed and logged. Data center access to the systems that store customer data is strictly controlled via lock box processes.
- **Isolation.** Azure uses network isolation to prevent unwanted communications between deployments, and access controls block unauthorized users. Virtual Machines do not receive inbound traffic from the Internet unless customers configure them to do so.
- **Azure Virtual Networks.** Customers can choose to assign multiple deployments to an isolated Virtual Network and allow those deployments to communicate with each other through private IP addresses.
- **Encrypted communications.** Built-in SSL and TLS cryptography enables customers to encrypt communications within and between deployments, from Azure to on-premises datacenters, and from Azure to administrators and users.

- **Private connection.** Customers can use ExpressRoute to establish a private connection to Azure datacenters, keeping their traffic off the Internet.
- **Data encryption.** Azure offers a wide range of encryption capabilities up to AES-256, giving customers the flexibility to implement the methods that best meet their needs.
- **Identity and access.** Azure Active Directory enables customers to manage access to Azure, Office 365 and a world of other cloud apps. Multi-Factor Authentication and access monitoring offer enhanced security.

Independent Verification

By providing customers with compliant, independently verified cloud services, LDS and Microsoft make it easier for customers to achieve compliance for the infrastructure and applications they run in Azure. Microsoft provides Azure customers with detailed information about security and compliance programs, including audit reports and compliance packages, to help customers assess Azure services against their own legal and regulatory requirements.

In addition, Microsoft has developed an extensible compliance framework that LDS utilizes to enable us to design and build services using a single set of controls, to speed up and simplify compliance across a diverse set of regulations and rapidly adapt to changes in the regulatory landscape. More information on specific compliance programs is available here:

https://www.microsoft.com/en-us/TrustCenter/Compliance/default.aspx.

- ISO 27001/27002
- SOC 1/SSAE 6/ISAE 3402 SOC 2
- Cloud Security Alliance CCM
- FedRAMP
- FISMA
- FBI CJIS (Azure Government)
- PCI DSS Level 1
- HIPAA
- CDSA
- Food and Drug Administration 21 CFR Part 11
- FERPA
- FIPS 140-2
- CCCPPF

Contact Information and Staffing

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