**LIS Management Portal** - Version 1.0

**Project Portfolio:** Land Information System (LIS) Management API and APP Project

**Project Manager:** Kantha Ridler
Project Agreement with M.Toteng (Software Developer) FYI: Tutorial + Project(LIS enhancement related with design idea based research)

Developed by Mogakolodi Tlotlang at ENKON Technologies Botswana, this proof-of-concept prototype delivers a web portal for managing and auditing Botswana's Land Information System (LIS) transactions. LIS systems maintain transaction related to land parcels "lot", ownership, surveys information, and associated land transaction.

The Land Information System (LIS) project presents a cutting-edge digital platform focused on managing, auditing, and streamlining land-related transactions. Designed to bridge technology with intricate business needs, the portal enhances the processes around land transactions, deed conveyancing, registration, and printing status for every land parcel.

**Purpose & aim:**

The LIS system is architected to:

Decode and cater to diverse business needs and detailed requirements.
Streamline business rules, outlining clear entities, and establishing relationships.
Represent data logically and physically, culminating in a clear Entity Relationship (ER) diagram.
Ensure data quality checks, from defining data integrity constraints to unit testing, ensuring compliance with business specifications.
Perform ETL-related tasks efficiently, from checking key constraints to handling errors with automation.

This portal focuses on addressing common data and process challenges that reduce the ***accuracy and reliability of LIS*** systems, such as:

- Incomplete or duplicate records
- Poor data validation and constraints
- Difficulty auditing workflow status
- Inability to reconcile transactions with source data
- Lack of monitoring for transaction sequence gaps

**Technical Details:**

Backend: ASP. Net Core 7.0.

Frontend: Angular 16.

Database: SQL Server integrated with Padman Microservice.

Authentication: JWT token-based authentication segregating users based on roles.

Setup: Visual Studio 2022, Vs Code, IIS, installing Libraries via NuGet and NPM Node Package Manager

Git - Version Control for deployment using Jenkins (Continuous Integration and Continuous Delivery (*CICD*).

**Development Insights:**

**Duration:** 2 weeks.

**Team Composition**: Spearheaded by Mogakolodi Tlotlang with C Sharp .Net Interactive Notebooks and resources from the research.

**Technologies & Experience:** Developed using ENKON's Tech Stack. The developer brought in prior experience with PHP, Python, and basic JavaScript. The project served as a transition to C# and ASP.Net Angular TypeScript.

**Key Features:**

User Management: Ensures secure registration, authentication, and role-centric access.

LIS Transactions: Allows users to view, add, update, delete, and delve deep into transactions. It also facilitates the monitoring and auditing of each transaction.

Data Integrity: Ensures impeccable data quality, avoids duplicate entries, mitigates system anomalies, and ensures unbroken referential integrity.

To showcase core ***software engineering skills***, the developer-built functionality around:

- User authentication via JWT tokens and role-based access control
- CRUD operations on LIS transactions, users, and groups
- Searching records by land parcel lot number
- Data integrity checks and duplicate detection
- Parent-child relationship audits
- Aggregate analysis for data completeness
- Reconciling records with source information and documents

The portal provides a working demonstration of applying programming best practices in ***ASP.NET Core and Angular*** to improve reliability of LIS systems.

While an initial prototype, the application demonstrates a practical understanding of full stack development using ENKON Technologies tech stack and delivers core functionality for improving LIS systems. The version two v2 would involve expanded reporting, automation and enhancing production-readiness and more features depending on the business requirements deliverables, scope and timelines.

**Impact & Value:**

The project is a testament to the capability of integrating intricate land transaction systems into a ASP.NET and Angular framework. By aligning tech solutions with the practical needs of the Ministry of Lands and Deeds, the project serves as an demonstration of innovation meeting challenges which triggers bug fixes, new features and enhancement development.

Deep Dive:
For our non-tech audience, this project is for simplifying land transactions. Imagine all land-related processes being handled efficiently in one place, from the moment a deed is conveyed to its final registration and print status for each land parcel. Each transaction is scrutinized for accuracy, and errors, if any, are swiftly managed. This solution ensures no two parcels of land are mistakenly recorded as one due to network issues or any other reason, no deed goes unregistered, and every detail is audited and reconciled seamlessly.