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Nuka Project Proposal

**Introduction**

In today’s business space, many Zambian enterprises are struggling with unreliable Point of Sale (POS) systems that are either overpriced, unreliable, lack necessary features and or fail to follow tax regulations. These inefficiencies lead to financial issues, double entry, and challenges in managing something important to many businesses SALES. Nuka, meaning “river” in Lozi, is designed to control the flow of transactions in a business, ensuring good sales processing, automated tax returns, and overall financial transparency.

By integrating with the Zambia Revenue Authority (ZRA) Smart Invoicing API, Nuka will allow businesses to generate tax-compliant invoices in real time, reducing errors and improving tax reporting. Built for small businesses needing an off the shelf solution and larger companies that may need system integration, Nuka will feature barcode scanning via phone cameras, mobile and bank payment support, real-time sales analytics, and offline functionality.

This project aims to simplify financial management, enable businesses, and transform the POS experience, making sales tracking and tax compliance better than ever.

**Literature Review**

The Point of Sale (POS) system has evolved significantly over the past few decades, moving from traditional cash registers to more sophisticated, software-based solutions. These systems are designed to facilitate transaction processing, inventory management, and financial reporting, making them essential tools for businesses, particularly small and medium-sized enterprises (SMEs). As businesses strive for efficiency, the integration of POS systems with government tax systems has emerged as a critical factor in ensuring tax compliance and financial transparency.

A study by Muhammad et al. (2020) highlights that traditional POS systems often suffer from inefficiencies such as manual double-entry and errors in tax reporting, which can lead to financial discrepancies and compliance issues. With the integration of tax APIs like the Zambia Revenue Authority (ZRA) Smart Invoicing, POS systems can help automate tax compliance by generating invoices that are automatically aligned with local tax laws, reducing the chances of human error and ensuring accurate tax returns (Zambia Revenue Authority, 2021).

In the context of Zambia, Nchito and Mumba (2021) argue that the lack of affordable and reliable POS systems is a significant barrier for SMEs. Many businesses still rely on manual methods for sales tracking and tax reporting, resulting in inefficiency and increased risk of tax evasion. The integration of digital tools with the ZRA’s Smart Invoicing system has been suggested as a viable solution for improving tax compliance among SMEs (Mumba, 2020). The Nuka POS system, which integrates seamlessly with the ZRA Smart Invoicing API, offers a promising solution to address these challenges by providing an affordable, scalable, and tax-compliant POS system that enhances financial transparency and minimizes manual errors.

Furthermore, the inclusion of mobile payment solutions and barcode scanning in POS systems has become increasingly important in today's digital economy. Studies by Ochieng et al. (2020) suggest that the ability to support mobile money, bank transfers, and e-wallet payments enhances the accessibility of POS systems for a wider range of users, particularly in developing countries like Zambia. By enabling businesses to accept various forms of payment, these features cater to the needs of SMEs while ensuring efficient financial tracking.

In conclusion, the integration of POS systems with tax authorities and payment solutions offers a powerful approach to improving business operations in developing countries. The Nuka POS system’s focus on affordability, ease of use, and integration with the ZRA Smart Invoicing API provides an innovative solution that could significantly enhance financial management and tax compliance for SMEs in Zambia.

**Requirements Analysis & Specification**

The primary goal of the project is to develop a Point of Sale (POS) system designed to automate and simplify sales processing for businesses in Zambia, with special focus on tax compliance through integration with the Zambia Revenue Authority (ZRA) Smart Invoicing API.

Methodology

The Waterfall methodology will be used for the development of the Nuka POS system. This methodology is well-suited for projects with a defined scope, such as this one, and allows for sequential development and validation. The following steps will be followed:

1. Requirements Gathering
2. System Design
3. Implementation
4. Testing
5. Deployment
6. Maintenance

This approach ensures that each phase is completed before moving on to the next, which allows for easier tracking of progress and debugging.

Key Components and Methodology Usage

1. Data Reading and Writing

The Nuka POS system will interact with external data sources, such as the ZRA Smart Invoicing API, and local databases to read and write transaction data. The following will be implemented:

* + Reading Data: The system will read from the MySQL database to retrieve product information, sales data, and customer records.
  + Writing Data: After each transaction, the system will write sales records and tax information back into the database. The communication with external systems (ZRA API) will also involve reading and sending data.

Diagram Needed: Data Flow Diagram (DFD) to represent the flow of data between the system and external entities like ZRA API and MySQL database.

1. Data Storage

Data will be stored in a MySQL database for persistence. The following data will be managed:

* + Product Information
  + Transaction Data
  + Payment Information

The database will be designed with normalized tables to minimize redundancy and ensure consistency.

1. Processing

The system will process several tasks, including:

* + Calculating Sales Totals: Calculating the total amount for each transaction.
  + Tax Calculation: Integrating with the ZRA Smart Invoicing API to generate tax-compliant invoices.
  + Sorting and Searching: Searching for products in the system by barcode or name, and sorting transaction history by date or amount.

Processing will also include user authentication, receipt generation, and the calculation of sales statistics.

1. Communication

The system will communicate with external systems using HTTP protocols to interact with the ZRA Smart Invoicing API. Communication between the frontend (Flutter app) and the backend (Spring Boot API) will be handled through RESTful API calls.

The POS system will also support mobile money and other digital payment methods (e.g., bank transfers, e-wallets), ensuring that communication is facilitated via secure APIs for processing payments.

1. APIs

The system will rely on several APIs:

* + ZRA Smart Invoicing API: For generating tax-compliant invoices and sending tax data to the ZRA.
  + Payment APIs: For processing mobile money and other payment methods.

The backend (written in Java with Spring Boot) will expose APIs to handle requests from the frontend (built in Flutter).

1. Programming Language

The Nuka POS system will use two primary programming languages:

* + Java: For backend development, where the core logic for handling transactions, tax calculations, and database operations will reside. Spring Boot will be used for the backend framework.
  + Dart (Flutter): For the frontend, providing a cross-platform mobile application that runs on both Android and iOS. The frontend will handle the user interface (UI), barcode scanning, and interactions with the backend.

1. User Interface

The user interface will be developed as a mobile application using Flutter. The interface will be simple and intuitive to accommodate business owners and staff with varying levels of technical expertise. The system will provide features such as:

* + Sales Entry Screen: To scan barcodes and add products to the transaction.
  + Payment Screen: To select and process different payment methods.
  + Sales Reports: To view sales summaries and tax reports.

The UI will be designed for ease of use with minimal steps to complete a sale.

1. Interface with Other Systems

The Nuka POS system will interface with external systems:

* + ZRA Smart Invoicing API: For generating tax-compliant invoices and submitting tax data.
  + Payment Systems: For processing digital payments such as mobile money and bank transfers.
  + MySQL Database: For storing sales and product information.

Conclusion

This Requirements Analysis and Specification outlines the key components of the Nuka POS system and how they align with the chosen methodology. By following the structured phases of development, the project ensures that each aspect of the system is well-defined and can be developed efficiently. The diagrams and specifications provided will guide the development and implementation of the system, ensuring that it meets the needs of small businesses in Zambia while ensuring tax compliance and financial transparency.

**References**

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