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INITITIAL PROPOSAL DOCUMENT

A WEB - BASED ADMINISTRATIVE INFORMATION SYSTEM FOR BARANGAY 369 USING NODE.JS, REACT AND MYSQL

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1. Introduction

This project centers on the design and implementation of a Barangay Information System for Barangay 369, Zone 37 in Santa Cruz, Manila. It aims to address longstanding challenges in record management, particularly the incomplete documentation of residents, the continued reliance on manual and semi-digital methods, and the absence of a secure and efficient data management framework. Through the adoption of a fully digital system, the barangay seeks to enhance service delivery, promote transparency, and reinforce accountability in its governance.

The primary problem being addressed is the barangay's difficulty in maintaining accurate and consistent resident records. At present, data management relies heavily on manual and semi-digital approaches such as Excel files, family head lists, and residents to non-residents. These methods are not only labor-intensive but also vulnerable to errors, duplication, and inconsistencies. As a result, essential services such as permit issuance, and complaint resolution are frequently delayed. Furthermore, the lack of a structured and reliable system complicates the task of distinguishing between permanent residents and non-residents, thereby undermining fairness in the distribution of services.

The significance of this project lies in its provision of a comprehensive digital solution for barangay administration. By consolidating records into a unified system, the project ensures that resident information is accurate, secure, and readily accessible. This promotes greater efficiency in service delivery and fosters transparency in the handling of barangay funds, permits, and community programs. With access to reliable and verifiable data, officials will be better positioned to guarantee equal treatment and equitable services for all constituents, regardless of residency status. Moreover, the initiative aligns with broader national efforts to modernize governance through the advancement of e-governance systems.

From a system integration and architectural perspective, the project will unify various existing data sources including the Record of Barangay Inhabitants (RBI) from the Department of the Interior and Local Government (DILG), and family head databases into a single, centralized platform. The architecture will feature dedicated modules for resident profiling permit processing, and complaint management. To safeguard sensitive information, the system will employ robust data security measures such as encryption, access control mechanisms, and regular data backups. This integration and architectural approach provides not only a reliable and scalable solution but also ensures the long-term sustainability of the system. The project will be strengthened through collaboration with barangay officials, academic institutions, and IT professionals, ensuring that it is both technically sound and responsive to community needs. Ultimately, the Barangay Information System will serve as a modern governance tool that streamlines administrative processes, strengthens accountability, and improves the overall quality of life for the residents of Barangay 369.

2. System Integration

The proposed Barangay Information System will be developed using three core technological components: the React front-end, the Node.js with Express back-end, and the MySQL database. These elements will operate in an integrated manner to establish a seamless and efficient administrative information system for Barangay 369.

The React front-end will function as the graphical user interface, enabling barangay officials and staff to conveniently manage resident records, household profiles, and various administrative transactions. Inputs and requests generated from this interface will be transmitted to the Node.js with Express back-end, which will serve as the application's intermediary layer. This back-end will be responsible for executing business logic, managing routing processes, and ensuring that all data undergoes appropriate validation.

The MySQL database will serve as the central repository for all barangay-related information, including resident data, service requests, and records of transactions. Interaction between the back-end and the database will be facilitated through structured query operations, thereby ensuring data accuracy, integrity, and consistency.

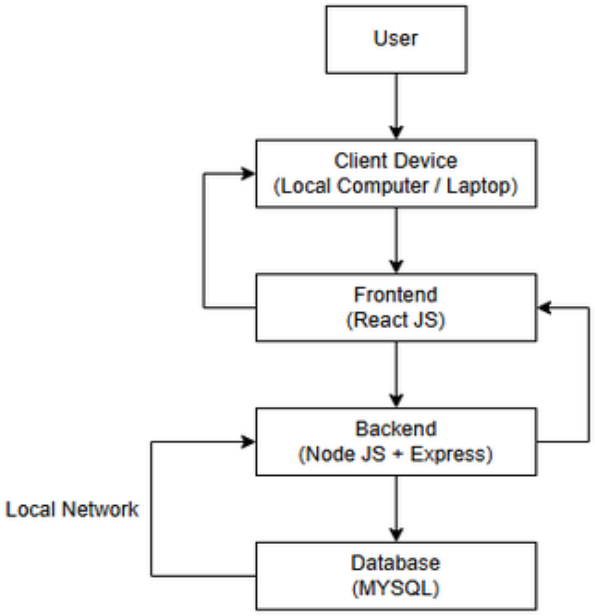
Through this systematic integration, the Barangay Information System will deliver a unified platform for the efficient access and management of records and processes. This not only reduces redundancy and minimizes errors inherent in manual procedures but also enhances the overall effectiveness, transparency, and accountability of administrative operations within Barangay 369.

3. System Architecture

The proposed Barangay Information System for Barangay 369, Zone 37 will be built using a simple yet organized structure that combines hardware, software, a database, and a local network.

For the hardware, the system will run on a local computer that will act as both the server and the database host. This machine will store all system components and manage the operations. Barangay officials will access the system through client devices such as desktop computers or laptops, which will serve as their workstations. On the software side, the system will use React.js as the frontend framework to provide an easy-to-use interface where officials can input, retrieve, and navigate data. The backend will be developed using Node.js with Express.js, which will handle all business logic, process user requests, and connect the frontend to the database. The database will be powered by MySQL, which will store and manage all records, including residents' information, barangay officials, and various transactions such as permits, complaints, and service records. The database will operate locally using MySQL, with a defined schema that includes tables for residents, officials, and transactions. This ensures that information is well-structured, secure, and easily accessible when needed.

In terms of the network, the system will run on a localhost setup, meaning that all operations are confined to a single computer within the barangay hall. Internet connection is required, making the system secure and accessible only to authorized officials. When a user interacts with the system through the React-based frontend, the request is sent to the backend API powered by Node.js and Express.js. The backend then communicates with the MySQL database to fetch or update records, and the results are displayed back on the user's screen through the frontend interface.



4. Integration + Architecture Relationship

In designing the system, we adopted a client–server architecture where React serves as the frontend interface, Express with Node.js manages the business logic, and MySQL stores all persistent data. This separation of responsibilities ensures that the frontend and backend communicate only through well-defined RESTful APIs. Since our system relies on these APIs, the React application does not need to directly interact with the database, which reduces compatibility issues and makes the entire setup easier to maintain.

Furthermore, the use of JSON as the standard data exchange format allows seamless communication between different components. This means that not only the React frontend but also any future application, such as a mobile app or an external barangay system, can interact with the backend as long as it follows the API specifications. By using standard HTTP methods like GET, POST, PUT, and DELETE, the system maintains consistency and predictability in its operations.

The architecture also supports scalability and future integration. Even though the system is currently deployed on a local server, the same design can easily be extended to a cloud or municipal network without changing the way clients communicate with the backend. Because the API layer shields clients from the internal database structure, the database schema can evolve without breaking existing integrations.

Lastly, by enforcing authentication and validation at the API level, the system guarantees that any external integration follows the same rules and security protocols. This not only makes the system easier to integrate with but also ensures that all connected applications maintain data integrity and consistency.

5. Importance of IT Solution

The proposed Barangay Information System will significantly improve the management of records in Barangay 369 by saving time and increasing efficiency. Unlike manual or Excel-based methods, which are often slow and tedious, the digital system will automate important tasks such as tracking residents, issuing permits, and monitoring data. By reducing the manual workload of barangay staff, officials can provide services more quickly and focus on addressing the needs of the community, thereby improving overall productivity.

In addition to saving time and increases efficiency, the system also reduces errors that are common in manual record-keeping. Paper-based and semi-digital records often result in duplication, missing entries, or inconsistencies that affect the accuracy of information. Through the use of a centralized and real-time database, the system ensures that resident information is consistent, accurate, and up to date. This accuracy is especially important in distinguishing permanent residents from non-residents, which allows barangay officials to deliver services more fairly and efficiently.

6. System Components

a. Hardware (devices you need)

- Personal Computer (server and database host)
- Client devices (desktop computers or laptops for barangay officials)
- Printer (for generating barangay documents and certificates)
- Scanner (for digitizing resident records and documents)

b. Software (programs you will use)

- Windows OS (operating system)
- MySQL (database management system)
- React.js (frontend user interface)
- Node.js + Express.js (backend server)
- Visual Studio Code (development environment)

c. Network (how devices will connect)

- Local Area Network (LAN) for connecting server and client devices
- Localhost setup (system runs on one computer without internet access)
- Option for Wi-Fi connection within barangay office (for client devices)

d. Interfaces (how systems talk to each other)

- Graphical User Interface (GUI) for user interaction
- Application Programming Interface (API) for frontend–backend communication
- USB ports for uploading ID pictures or transferring files
- Printer/Scanner interfaces for document handling

7. Proposed System Overview

The primary users of the Barangay Information System are the Barangay Secretary and the Barangay Kagawads. The Barangay Secretary serves as the system administrator and is responsible for managing the overall system. This includes approving and processing requests, maintaining resident and non-resident records, and ensuring the accuracy and reliability of the information stored in the database. On the other hand, the Barangay Kagawads act as regular users of the system. They are able to access resident information, request or print official documents, and monitor transactions, which promotes transparency and accountability in barangay operations..

The system is designed with several key functions to improve efficiency and transparency in barangay operations. First, it features a secure login and authentication process to ensure that only authorized users can access the system, with added security through multi-factor authentication. Second, it supports resident and non-resident management, allowing the addition, importing, and updating of personal information records. Third, it streamlines document requests and processing, enabling officials to upload ID pictures, generate, and print official barangay documents. In addition, the system includes transaction logging, which automatically records all user activities to ensure accountability. Finally, it offers an information search function, providing quick and reliable access to resident data needed for verification and service transactions.

Despite its benefits, the Barangay Information System has several limitations in its current stage. At present, it is restricted to Barangay 369 and is not yet integrated with higher-level government agencies, which limits data sharing beyond the local scope. The system's accuracy also depends heavily on the quality of the initial data input; incomplete or inaccurate records may affect results and reliability. Furthermore, the system can only be accessed through a local hosting setup, which restricts usage to client devices within the barangay's local network. Finally, there is no mobile application available yet, meaning that the system can only be accessed using desktop or laptop devices, which may limit convenience for some users.

Initial Flowchart of the System