

Development and AWS Deployment of a Cloud-Based Barangay Asset and Equipment Management System for Barangay Dapdap

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ABSTRACT

Managing the assets and equipment is important for Barangay Dapdap, because these items are used for the daily work and services. The barangay may have computers, furniture, printers, rescue equipment, and other properties that needed to be recorded and managed properly. However, it can make it difficult to keep the information updated and organized using paper records or separate spreadsheets. This study proposed the development and AWS deployment of a Cloud-Based Barangay Asset and Equipment Management System for Barangay Dapdap. It will provide one place for recording asset information, checking the condition and status of equipment, assigning to staff, making reports, and recording repairs for the proposed system. To help protect the records and activity records to show changes made in the system it will also include a login system to use it. Using the Amazon Web Services (AWS) to support data storage, backup, and access for the system will be placed online. The study aims to give the Barangay Dapdap an easier, and more organized way to manage it's assets, and equipment while it's reducing the time and effort that is needed for manual record keeping.

Keywords: *Asset Management, Equipment Management, Cloud-Based System, AWS, Barangay Dapdap.*

SECTION I — INTRODUCTION (THE PROBLEM AND ITS SETTING)

1.1 Introduction

The continuous advancement of information technology has transformed how organizations manage resources and deliver services. Digital systems are increasingly adopted to improve efficiency, accuracy, and accountability in administrative processes. In local government units such as barangays, asset and equipment management is often handled through manual records or spreadsheets, which can lead to difficulties in monitoring asset condition, location, and assigned personnel. This reliance on traditional methods may result in errors, delays, and challenges in accountability, particularly when assets are numerous and widely distributed.

Cloud computing has emerged as a practical solution to these challenges. Bhat and Shabaraya (2022) reviewed the growing role of Amazon Web Services (AWS) in providing scalable and secure infrastructure for organizations, highlighting its potential to support digital transformation. Similarly, Ahmad (2022) developed a cloud-based electronic asset inventory system for schools, demonstrating how centralized systems can improve record keeping and resource optimization. These studies show that cloud-based platforms can enhance asset management by providing centralized access, automated tracking, and reliable data storage.

In the Philippine context, barangay-level systems have begun to adopt web-based solutions to improve governance. Gasmido et al. (2025) introduced a digital barangay management system to address fragmented data and inefficient manual processes, while Tosper et al. (2025) developed WebYu, a barangay information system that centralized records and reduced manual work. Tingson and Pomperada (2025) also emphasized the importance of digital property management systems in government-owned corporations, which included asset registration, monitoring, and reporting. These examples highlight the growing trend of digitalization in local governance but also reveal a gap in systems specifically designed for barangay asset and equipment management.

To address this gap, the researchers propose the Development and AWS Deployment of a Cloud-Based Barangay Asset and Equipment Management System for Barangay Dapdap. The system will integrate asset registration, assignment tracking, condition monitoring, maintenance records, audit logs, and reporting into one centralized platform. AWS services such as DynamoDB, Amazon EC2, API Gateway, S3, and Cognito will be used to ensure scalability, security, and role-based access control. By deploying the system through AWS, the project aims to provide Barangay Dapdap with a reliable, transparent, and efficient solution for managing its assets and equipment.

This study contributes to the modernization of barangay operations by introducing a secure and organized approach to asset management. It supports Sustainable Development Goals (SDG 9: Industry, Innovation, and Infrastructure; SDG 12: Responsible Consumption and Production; and SDG 16: Peace, Justice, and Strong Institutions) by promoting innovation, resource efficiency, and accountability in local governance.

1.2 Background of the Study

Barangays in the Philippines are tasked with managing a wide range of assets and equipment such as computers, printers, furniture, rescue tools, and communication devices. Traditionally, these resources are recorded using paper files or spreadsheets, which often results in fragmented data, inaccurate records, and difficulty in monitoring asset condition, location, and accountability. This manual approach can lead to inefficiencies, delays in maintenance, and challenges in ensuring transparency.

Recent studies have emphasized the importance of digital systems in improving asset and property management. Ahmad (2022) developed a cloud-based electronic asset inventory system for schools, showing how centralized platforms can optimize resource use and reduce errors. Tingson and Pomperada (2025) introduced a web-based property management system for a government-owned corporation, which supported asset registration, monitoring, and reporting. Tungcul and Kummer (2021) also identified the limitations of manual inventory systems, highlighting the need for automation in tracking and reporting.

At the barangay level, Gasmido et al. (2025) and Tosper et al. (2025) demonstrated how web-based information systems can improve record keeping and reduce reliance on manual processes. However, these systems focused on general administrative functions rather than asset and equipment management. This reveals a gap in

barangay-specific solutions that integrate asset registration, assignment tracking, condition monitoring, maintenance records, audit logs, and reporting into one platform.

To address this gap, the researchers propose the Development and AWS Deployment of a Cloud-Based Barangay Asset and Equipment Management System for Barangay Dapdap. By using Amazon Web Services (AWS), the system will incorporate DynamoDB for database storage, Amazon EC2 for backend processing, API Gateway for communication, S3 for file storage, and Cognito for authentication and role-based access control. This project aims to modernize barangay operations, improve accountability, and support sustainable resource management.

1.3 Objectives of the Study

- **General Objective:** The main goal of this study is to create and put it online a cloud-based Asset and Equipment Management System for Barangay Dapdap using AWS to make managing barangay equipment easier and more organized.

- **Specific Objectives:**

The study aims to:

1. Create a system that can record the status, condition, and assigned person of each asset.
2. Add a login system so that only allowed staff can use and change the records.
3. Add features for recording repairs, assigning assets, making reports, and keeping activity records.
4. Put the system online using the AWS for security, data storage, and backup.
5. Help reduce the time and effort that is needed to manage the barangay equipment.

1.4 Scope and Limitation of the Study

This study focuses on the development and deployment of a cloud-based Asset and Equipment Management System for Barangay Dapdap using Amazon Web Services (AWS). The system is designed to provide a centralized platform for recording, managing, and tracking barangay-owned assets and equipment. It will include features for asset registration, assignment tracking, condition and status management, maintenance records, user authentication, role-based access control, audit logging, report generation, and data backup. The system will record relevant asset information such as asset name, category, location, condition, status, assigned personnel, and maintenance history. The AWS deployment will demonstrate the use of cloud infrastructure in providing accessible and reliable asset management services. These functions are consistent with the study's stated objectives and proposed system features.

The study will primarily serve authorized personnel of Barangay Dapdap who are responsible for managing and maintaining barangay-owned assets and equipment. The system will be intended to support the management of assets such as computers, printers, furniture, rescue equipment, and other barangay-owned properties.

However, the study has several limitations. First, the system will be specifically designed for the asset and equipment management needs of Barangay Dapdap and may require modifications before it can be implemented in other barangays with different procedures, organizational structures, or asset management requirements. Second, the system will depend on an available internet connection and the accessibility of the deployed AWS services. Third, the accuracy and completeness of information stored in the system will depend on the authorized personnel who enter and update asset records. Fourth, the study will focus on asset and equipment management and will not cover other barangay administrative services such as resident registration, community services, or other functions outside the project's defined scope. Finally, the study will demonstrate AWS-based deployment, security, backup, and infrastructure practices but will not attempt to implement every available AWS service or advanced cloud feature.

1.5 Significance of the Study

The proposed Cloud-Based Barangay Asset and Equipment Management System is significant because it provides Barangay Dapdap with a more organized approach to managing its physical assets and equipment. The system is expected to support better record keeping, accountability, maintenance management, and accessibility of asset information.

Barangay Dapdap. The system can help Barangay Dapdap maintain organized and up-to-date records of its assets and equipment. Through centralized asset registration, assignment tracking, condition monitoring, maintenance records, and reporting, barangay personnel can more efficiently manage information about barangay-owned properties. The system can also support accountability by documenting assigned personnel and maintaining audit records of system activities.

Barangay Personnel. Authorized personnel can use the system to record, update, retrieve, and manage asset information through a centralized platform. User authentication and role-based access control can help ensure that asset information is accessed or modified only by authorized users. **Barangay Officials and Administrators.** The system can provide organized reports and asset records that may assist officials and administrators in reviewing the status, condition, assignment, and maintenance history of barangay-owned equipment. These records can support more organized asset management and accountability.

The Community of Barangay Dapdap. Although the system is primarily intended for authorized barangay personnel, improved management of public assets can contribute to more organized use and maintenance of barangay-owned resources. Proper asset management may also help the barangay manage existing resources more efficiently.

Future Researchers and Developers. This study may serve as a reference for future researchers who plan to develop similar cloud-based asset and equipment management systems for barangays, local government offices, or other organizations. It may also provide a basis for further studies involving cloud computing, AWS deployment, information systems, and digital asset management.

BSIT Network Administration Students. The project can demonstrate the practical application of cloud computing and network administration concepts through AWS deployment, access control, security, data backup, and infrastructure management.

1.6 Definition of Terms

For clarity and consistency, the following terms are defined as they are used in this study:

Amazon Web Services (AWS). A cloud computing platform that will be used to deploy and support the Asset and Equipment Management System for Barangay Dapdap. **Asset.** Any barangay-owned property or resource that is recorded and managed through the proposed system, such as computers, printers, furniture, rescue equipment, and other properties.

Asset and Equipment Management System. The proposed cloud-based information system designed to record, manage, track, and maintain information about Barangay Dapdap's assets and equipment.

Asset Assignment. The process of recording the personnel or responsible user to whom a particular barangay asset or equipment has been assigned.

Asset Condition. The recorded physical or operational state of an asset, such as whether the equipment is in good condition, needs maintenance, is damaged, or is unserviceable.

Asset Registration. The process of entering and storing information about a barangay-owned asset in the system, including its identification, category, location, condition, status, and assigned personnel.

Audit Log. A record of activities performed within the system, such as changes or updates made to asset information, which can support accountability and tracking of system activities.

Cloud-Based System. An information system that uses cloud computing infrastructure to store, process, and provide access to system data and services through a network connection.

Data Backup. The process of creating and maintaining copies of system data to help protect asset records from data loss and support data recovery.

Equipment. Physical tools, devices, or machinery owned by Barangay Dapdap that are recorded and managed through the proposed system.

Maintenance History. A record of maintenance activities, repairs, or servicing performed on a particular asset or piece of equipment.

Role-Based Access Control (RBAC). A security mechanism that controls access to system functions and information based on the role or permissions assigned to an authorized user.

User Authentication. The process of verifying the identity of a person before allowing access to the system.

User Access Control. The management of permissions that determines which system features and asset information an authorized user can access or modify.

SECTION II — LITERATURE REVIEW

2.1 Introduction to the Review

This chapter presents the related literature and studies that provide the foundation for the development of the proposed Cloud-Based Barangay Asset and Equipment Management System for Barangay Dapdap. The review focuses on digital inventory and equipment management, cloud-based asset management, digital property management, barangay information management, and cloud-based system architecture.

The reviewed studies provide relevant information on the use of digital and centralized systems for managing assets, equipment, and organizational records. They also provide a basis for incorporating functions such as asset registration, condition and status management, assignment records, maintenance records, user access control, audit logging, reporting, and centralized data management into the proposed system.

The proposed study applies these concepts to the asset and equipment management needs of Barangay Dapdap. The system is designed to provide a centralized platform for recording, managing, and monitoring barangay-owned assets and equipment. Its deployment through AWS will support the proposed cloud-based architecture and the management of system data and user access.

2.2 Review of Related Literature and Studies

Tungcul and Kummer (2021) developed a Supplies and Equipment Inventory, Monitoring and Tracking Management System that addressed difficulties associated with manual inventory management. Their study emphasized the use of a computerized system for inventory record keeping, monitoring, and report generation. This study provides a basis for the proposed system's use of digital methods for organizing and managing asset and equipment records.

Ahmad (2022) developed the Electronic Asset Inventory and Management System in Schools (e-AIMSS), which focused on recording and managing government assets within educational institutions. The study demonstrates the application of a cloud-based approach to asset inventory and management and highlights the importance of centralized digital information in managing organizational resources.

Tingson and Pomperada (2025) developed a web-based property management system for a government-owned and controlled corporation. The system supports property registration, monitoring, maintenance scheduling, and inventory reporting. Their study demonstrates how digital property management can support the centralized management of government-owned resources.

Gasmido et al. (2025) developed Digital Barangay: Ayos Lomboy's Web-Based Management and Information System to address outdated manual processes, inefficient record keeping, and fragmented information management. The study demonstrates the application of a web-based system to improve the organization and centralization of barangay information. Tosper et al. (2025) developed WebYu: Barangay Yuson Web-Based Information

Management System, which focused on centralized information management and reducing manual processes within a barangay. The study provides a basis for applying centralized information management within a barangay setting.

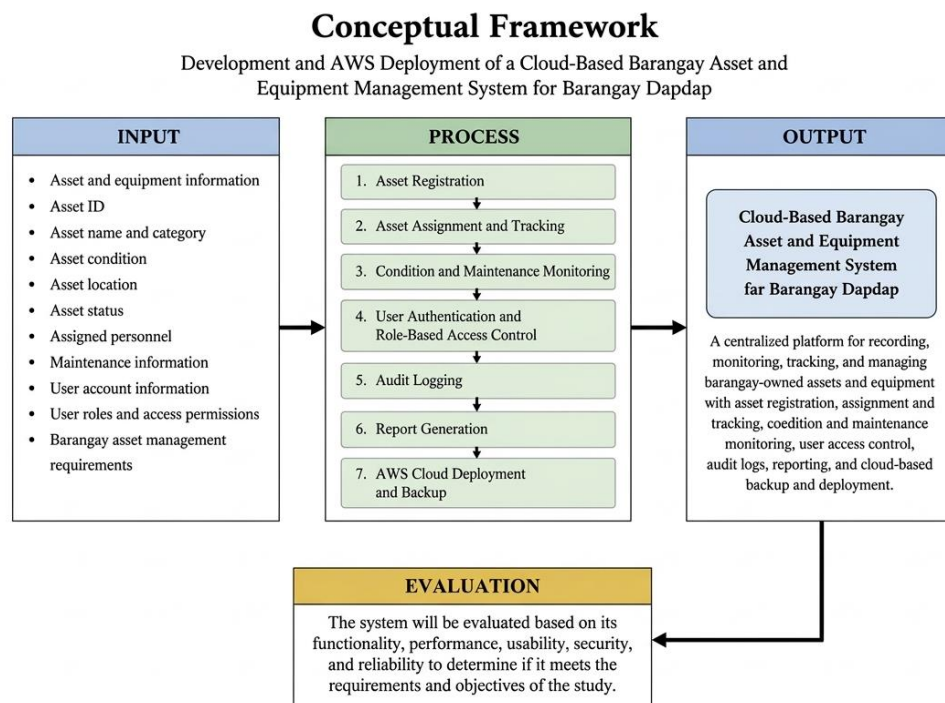
The proposed system will use AWS cloud services to support its development and deployment. Amazon RDS or DynamoDB will serve as the database component, depending on the final database implementation, while Amazon EC2 will handle backend processing. API Gateway will facilitate communication between the web application and backend services. Amazon S3 will provide storage for reports, asset images, backup files, and other required documents. AWS Cognito will support user authentication and access management through role-based access control.

The proposed AWS architecture will support the centralized operation of the system through the following flow:

User → Web Application → API Gateway → Amazon EC2 → Database

Amazon S3 will support file and backup storage, while AWS Cognito will support authentication and access management.

2.3 Conceptual Framework



The proposed study uses the Input-Process-Output (IPO) model as its conceptual framework. The framework presents the information and requirements needed for the development of the proposed Cloud-Based Barangay Asset and Equipment Management System for Barangay Dapdap, the processes involved in developing and operating the system, and the resulting system output.

The Input consists of asset and equipment information, Asset ID, asset name and category, asset condition, asset location, asset status, assigned personnel, maintenance information, user account information, user roles and

access permissions, and barangay asset management requirements. These inputs provide the necessary information for recording and managing barangay-owned assets and equipment.

The Process consists of seven major processes: Asset Registration; Asset Assignment and Management; Condition and Maintenance Monitoring; User Authentication and Role-Based Access Control; Audit Logging; Report Generation; and AWS Cloud Deployment and Backup. These processes organize asset information, record asset assignments, monitor asset condition and maintenance, control user access, record system activities, generate reports, and support the deployment and backup of the system through AWS.

The Output is the Cloud-Based Barangay Asset and Equipment Management System for Barangay Dapdap. The proposed system serves as a centralized platform for recording, monitoring, and managing barangay-owned assets and equipment. It incorporates asset registration, assignment management, condition and maintenance monitoring, user access control, audit logs, reporting, and cloud-based backup and deployment.

2.4 Synthesis

The reviewed literature and studies establish the importance of computerized and centralized systems in managing assets, equipment, and organizational records. Tungcul and Kummer (2021) demonstrated the value of computerized inventory management for supplies and equipment, particularly in record keeping, monitoring, and reporting. Ahmad (2022) demonstrated the application of a cloud-based approach to asset inventory and management within schools. Tingson and Pomperada (2025) presented the use of a web-based property management system for government-owned property, including property registration, maintenance, and reporting. Atilano-Tang and Damsani (2023) highlighted concerns related to documentation, standardization, and inventory management in a Philippine government office.

The reviewed barangay information-system studies also demonstrate the application of web-based systems to improve centralized information management and reduce manual processes. Gasmido et al. (2025) addressed outdated manual processes, inefficient record keeping, and fragmented information management, while Tosper et al. (2025) focused on centralized information management within Barangay Yuson.

Despite these developments, the reviewed studies primarily focus on schools, government offices, government-owned organizations, and broader barangay information management. The proposal identifies a specific need for a barangay-level system dedicated to asset and equipment management that integrates asset registration, assignment, condition and status management, maintenance records, user access control, audit logging, and reporting within one centralized platform.

The proposed study addresses this identified need through the development and AWS deployment of a Cloud-Based Barangay Asset and Equipment Management System for Barangay Dapdap. The system will centralize asset and equipment records and provide functions for asset registration, assignment recording, condition and status management, maintenance records, authentication, role-based access control, audit logging, reporting, and data backup. Its AWS-based architecture will utilize Amazon RDS or DynamoDB, Amazon EC2, API Gateway, Amazon S3, and AWS Cognito to support the system's database, backend processing, application communication, storage, authentication, and access management. Therefore, the reviewed literature and studies provide the foundation for the proposed system while establishing the context and identified need that the study intends to address within Barangay Dapdap.

SECTION III — METHODOLOGY

3.1 Research Design

This study will use an applied developmental research design. This means the researchers will build a working system and then test how well it works. This design fits the study because the main output is an actual system: a cloud-based Asset and Equipment Management System for Barangay Dapdap. A similar barangay system study used this same approach, where the web-based system was developed through Scrum and then rated by 75 participants using the ISO 25010 standard, earning an "Excellent" overall score.

The study has three phases. First is requirements gathering, where the researchers will talk to the barangay officials and staff, observe how they currently record their assets using papers and spreadsheets, and check their existing records. Second is development, where the system will be built step by step. Third is evaluation, where IT professionals and barangay users will rate the system using the ISO 25010 software quality standard, which checks functionality, usability, reliability, and security.

3.2 System Development Methodology

The system will be built using Agile Scrum. In this method, the work is divided into short cycles called sprints, and each sprint produces a working part of the system. This was chosen because the barangay's needs may change while the project is ongoing, and Scrum allows the researchers to adjust after every sprint based on user feedback. The Digital Barangay study followed the same Scrum phases of planning, requirements gathering, design, development, testing, deployment, and maintenance.

In this setup, the barangay officials act as the product owner who decides which features matter most, while the researchers act as the development team. The planned sprints are:

- **Sprint 1:** Requirements and design (interviews, database design, screen layouts)
- **Sprint 2:** Login and asset registration using AWS Cognito and DynamoDB
- **Sprint 3:** Assignment tracking, maintenance records, and audit logs
- **Sprint 4:** Reports and file storage using Amazon S3
- **Sprint 5:** AWS deployment using Amazon EC2, API Gateway, and S3
- **Sprint 6:** Testing and evaluation

Each sprint ends with a review where the barangay checks the finished part of the system.

For testing, the researchers will do three kinds of tests: unit and integration testing to check that the backend running on the EC2 server and the database work correctly, security testing to make sure users can only do what their role allows, and user acceptance testing where barangay staff will try real situations like adding a new laptop, assigning it to a person, recording its repair, and printing a report. Hosting a web application on Amazon EC2 together with S3 is a proven deployment approach that recent studies have used to run reliable and accessible cloud systems.

3.3 Requirement Specification and Analysis

The requirements below are based on the barangay's current problems: manual and spreadsheet-based records that are often outdated, and no centralized way to monitor the location, condition, assigned person, and status of each asset.

3.3.1 Functional Requirements

Code	Requirement	Description
FR1	User login	Only registered barangay personnel can log in through AWS Cognito
FR2	Role-based access	Admins manage everything; Staff update asset status and encode maintenance; Viewers can only see reports
FR3	Asset registration	Each asset gets a unique Asset ID (like DAP-PC-001) with its name, serial number, location, condition, status, assigned person, and purchase/date
FR4	Search and monitoring	Users can search an asset and see its live condition, location, and status
FR5	Assignment tracking	Assets can be assigned to a specific person to make them responsible for it

FR6	Maintenance tracking	Broken assets can be marked "under maintenance" with the problem,date, and action taken
FR7	Audit logs	The system records who added, changed, or assigned an asset, and when
FR8	jReports	The system can generate inventory reports by status and category
FR9	Backup	Records and files are backed up automatically through AWS

3.3.2 Non-Functional Requirements

Code	Requirement	Description
NFR1	Security	Login, role-based access, and audit logs prevent unauthorized changes,following the "least privilege" principle of RBAC
NFR2	Reliability	The system runs on managed AWS services with automatic backup
NFR3	Scalability	The EC2 instance can be upgraded or expanded if the number of users grows
NFR4	Usability	The website is simple enough for non-technical barangay staff
NFR5	Accountability	Every action is traceable to a specific user through the audit logs

3.3.3 System Architecture

The system works like this: the user opens the website, and their request passes through Amazon API Gateway, which sends it to the right place. Amazon EC2 is a virtual server in the cloud where the backend application runs, such as saving a new asset or generating a report. DynamoDB stores all the asset records, while Amazon S3 stores reports, backups, and asset photos. AWS Cognito handles logins and makes sure each user can only do what their role allows. Deploying applications this way on AWS (EC2, S3, and related services) lets the system stay online and accessible without the barangay buying its own physical server.

3.3.4 Hardware and Software Requirements

Development only needs a regular computer with internet access and an AWS account. Since the system is fully cloud-based, barangay users only need a device with a browser to use it.

3.4 System Design Specification

The system design specification contains the architecture and the physical infrastructure needed to build and run the cloud-based management system for Barangay Dapdap. It shows how the cloud-based management system will function and lists the hardware and software parts that are required. The system design specification helps developers and IT teams build a web application that's scalable, safe, and specifically structured to assist Barangay Dapdap in carrying out its everyday asset tracking and administrative tasks efficiently.

3.4.1 Logical Specification

The logical architecture outlines the software processes, data workflows, and user interface models without depending on physical hardware. The logical specifications are organized into functional modules designed to streamline local asset management for Barangay Dapdap.

- **User Authentication and Role-Based Access Control (RBAC):** The system checks user identities. Controls what each person can do within the system. This means regular barangay workers get the access they need to do their tasks. At the time high-level administrators like the Barangay Chairman or Secretary are given higher privileges to manage the system. This setup helps protect Barangay Dapdap's records. It stops people who should not have access, from viewing or changing inventory data.
- **Asset Registration and Inventory Management:** Provides admin screens and digital tools to keep track of every public asset in Barangay Dapdap. It replaces manual paper logbooks with forms that capture each

item's profile, serial number, acquisition cost, and working condition. Automated data checks prevent errors, ensuring Barangay Dapdap maintains an accurate, organized record of its community equipment.

- **Assignment and Custody Tracking:** Keeps track of when items (such as computers, printer, or rescue equipment) are issued, how they move from one person to another, who is currently in charge, and where they are located. It ensures that Barangay Dapdap property is fully accounted for by recording every custody transfer, establishing clear personal accountability among staff and residents.
- **Maintenance and Audit Logging:** Sets up repair schedules and maintains detailed records of all maintenance work performed on community equipment. It automatically generates a system log recording every action taken, helping Barangay Dapdap extend the operational lifespan of its public assets and maintain complete transparency for municipal audits.

3.4.2 Physical Specification

The physical architecture describes the hardware setup, technology stack, server environments, and cloud infrastructure hosted on Amazon Web Services (AWS). It details the network layouts, private server settings, managed database instances, and storage buckets needed to guarantee high availability, reliable operations, and secure data transfers for Barangay Dapdap.

- **Client Interface Layer:** The web application is designed to be accessed smoothly from standard web browsers on desktop computers and mobile phones used inside the Barangay Dapdap hall, eliminating the need for expensive specialized hardware.
- **Compute Services:** Amazon Elastic Compute Cloud (EC2) instances are configured with a Linux runtime to run application logic and provide backend API endpoints, ensuring fast transaction processing for barangay staff during peak hours.
- **Database Infrastructure:** Amazon Relational Database Service (RDS) hosts a structured relational database that safely stores Barangay Dapdap's system credentials, asset profiles, and transaction histories with high availability.
- **Storage Layer:** Simple Storage Service (S3) buckets are used to store files, including equipment condition photos purchase invoices and signed Property Acknowledgment Receipts (PAR). This helps free up space in the barangay office by turning paper files into digital ones.
- **Network & Security Layer:** Amazon Virtual Private Cloud (VPC) defines network boundaries to keep database traffic isolated. HTTPS encryption protects data in transit, while automated AWS Backup rules secure offsite disaster recovery, protecting Barangay Dapdap against local data loss from power outages or hardware damage.

3.5 Implementation

The implementation stage outlines how the software code is put together, how the relational database is built, how system components communicate, and how the entire application is deployed to the cloud. This phase converts architectural designs into a working software solution tailored to Barangay Dapdap's daily needs by defining RESTful API structures, database schemas, and cloud hosting parameters

- **Software Architecture & API Integration:** Software development strictly follows RESTful API standards, keeping client-side interface components separate from backend application logic. This separation allows data to move smoothly and quickly for barangay personnel navigating the platform.
- **Database Setup & Schema Migration:** Structured SQL migration scripts create normalized tables for assets, users, roles, assignments, maintenance histories, and audit logs. Sample data from Barangay Dapdap is imported to test database behavior, verify relationship integrity, and optimize search performance for local asset categories.
- **Cloud Infrastructure & Security Configuration:** Network policies inside Amazon VPC isolate database traffic so that only authorized application instances can connect. SSL/TLS certificates ensure all network communication is encrypted through HTTPS, safeguarding Barangay Dapdap's operational records across public networks.

- Automated Data Protection Rules: System durability is made safe by setting up scheduled AWS Backup jobs. These jobs take snapshots of database states. This makes sure data is always protected. It works for Barangay Dapdap. No need for staff to do anything manually.

3.6 Testing and Evaluation

The Testing and Evaluation framework details the step-by-step verification protocols and quality assessment rules used to examine system reliability, performance, security, and ease of use. Through structured testing methodologies, this stage ensures the system operates correctly under real-world conditions and satisfies all practical requirements of Barangay Dapdap.

3.6.1 Testing Protocols

To ensure the system works properly and remains stable under everyday operational stress, a layered testing process is executed:

- Unit Testing: Every individual piece of code including API actions, route parameters, and input validations is tested separately to confirm that core tasks (such as saving a new asset entry) function accurately.
- Integration Testing: Checks interactions across integrated components, examining data movement between the web interface, API controllers, the Amazon RDS database, and Amazon S3 file storage to ensure smooth end-to-end processing for barangay workflows.
- User Acceptance Testing (UAT): Conducted directly with the Barangay Dapdap staff and workers. The evaluators used the platform while doing asset management tasks. They wanted to check that the system makes their daily work easier. They also wanted to make sure that the system meets the expectations for operations.

3.6.2 Evaluation Metrics (ISO/IEC 25010)

System quality is measured with software engineering standards that come from the ISO/IEC 25010 quality model. This framework gives a benchmark to check important system qualities and make sure the platform works well for Barangay Dapdap.

- Functional Suitability: The system is evaluated for how it manages Barangay Dapdap responsibilities, such as asset registration, transfer monitoring, maintenance scheduling and keeping administrative audit records. The evaluation also looks at how complete and precise the automation is in all these areas.
- Performance Efficiency: The system's speed is examined. It covers the time needed to load applications, how fast database queries run and how quickly files upload to the cloud. The goal is to make sure employees can manage inventory without any delays or slow responses.
- Security: Security are verified, such as role-based user access controls, HTTPS encryption for data in transit and regular database backups. These steps protect Barangay Dapdap records from users and accidental data loss.
- Usability: The user-friendliness of the system, for individuals, is evaluated. It includes how clear the interface is, how simple navigation is and how easy it is for new users to learn the platform. The aim is to ensure Barangay Dapdap staff can use the system without any training.

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