



# Development of an Android-Based Application for Transparency and Accountability in Zakat Management at Baitul Mal, Aceh Province

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**Abstract.** The management of zakat in Aceh Province requires a transparent and accountable system to ensure the proper collection, distribution, and reporting of zakat funds. This research aims to develop an Android-based application for Baitul Mal, Aceh Province, that enhances transparency and accountability in zakat management. The application facilitates the collection of zakat data, calculation of zakat for muzakki (zakat payers), and provides real-time information on zakat allocation and disbursement. The system's core functionalities include user login for both administrators and muzakki, zakat calculation tools, and a comprehensive data management system for zakat types, monthly reports, and user information. Administrators can manage data related to zakat inflows and outflows, while muzakki can track their zakat payments and view detailed annual reports on zakat distribution. The design process follows structured software engineering methodologies, including context diagrams, data flow diagrams (DFD), and interface mockups to ensure user-friendly navigation. The proposed system was developed using Android Studio for the mobile interface, and PHP and MySQL for database management. The application provides a secure, efficient, and accessible platform for managing zakat, enabling stakeholders to better monitor and assess zakat management in Aceh Province.

**Keywords:** Zakat Management, Transparency, Accountability, Android Application.

## 1 Introduction

Baitul Mal plays a crucial role in collecting and managing public wealth in Aceh, as mandated by Law No. 11 of 2006. One of the key aspects it oversees is zakat, a mechanism for wealth distribution from the affluent to the poor and needy. The goal of zakat is to create social balance by preventing wealth accumulation in certain groups. To ensure the effective function of zakat, transparency and accountability are essential. Without proper governance, public trust in zakat institutions may diminish, negatively affecting zakat contributions [5].

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In digital era, access to information has become increasingly convenient through smartphones. Therefore, developing an Android-based application to enhance the transparency and accountability of zakat management is an urgent necessity. This application would enable the public, especially zakat payers (Muzakki), to monitor zakat management in real-time, thus fostering greater trust and encouraging participation in zakat payments [2].

This increased transparency not only strengthens trust between zakat institutions and the community but also directly impacts the efficiency of zakat collection. As more Muzakki feel confident in the management of their contributions, zakat receipts are likely to grow, helping to address poverty more effectively. Additionally, the ability to track zakat distribution through a user-friendly mobile application empowers donors with real-time updates on how their funds are being utilized, enhancing accountability. This technological integration, therefore, represents a vital step towards modernizing zakat management, ensuring that it remains relevant and impactful in the digital age.

Previous research on zakat management applications has been explored by Wandira Atmaja [1] from the State Islamic University of North Sumatra. While Atmaja's study focused on transparency and accountability in zakat management using a web-based programming language, the current research differentiates itself by adopting a hybrid Android programming language. This shift allows for quicker and more efficient access for users with Android smartphones, significantly enhancing the user experience.

Similarly, Dwi Andini [3] from STIMIK Nusa Mandiri conducted a study aimed at developing an online zakat payment application. The goal was to streamline the process of zakat payments and improve transparency in donor and recipient reporting. Andini utilized the waterfall SDLC model, which involves five stages: requirements analysis, design, coding, testing, and maintenance. The primary distinction between her research and the current study lies in the technology used. While the previous research was based on web programming, this study leverages hybrid Android programming, offering a more dynamic and accessible platform for users.

## **2 Method**

### **2.1 System Analysis**

The system to be developed was an application designed to ensure transparency and accountability in zakat management at Baitul Mal, Aceh Province. Several fundamental techniques were considered in the overall system design [8]:

1. Determine specific pages for admin use: Pages dedicated to system administrators for managing data, records, and user access.

2. Define pages for Muzakki or public use: Pages that allow Muzakki (zakat payers) or the public to interact with the system, access information, or make zakat contributions.
3. Choose the programming language: This system utilized a hybrid Android-based programming language for enhanced accessibility and ease of use on smartphones.
4. Define and create the database: A MySQL database was implemented to manage and store the system's data in a structured and efficient manner.
5. Select software for coding and application design: Macromedia Dreamweaver and Android Studio were used for coding and designing the application's user interface.

## **2.2 Database Analysis**

Database analysis involved examining the data that will be processed and stored within the system's database. The focus was on identifying the origin and attributes of the data that will be managed. An Entity-Relationship Diagram (ERD) was a technique used to visually represent the data needed for the system and the relationships between those data elements [4].

In the creation of the ERD, the following business rules are followed:

1. A level can have many users.
2. A type can have multiple zakat calculation records.
3. A user can perform many zakat calculations.
4. Each month has one zakat management record.

## **2.3 Functional Requirements Analysis**

Functional requirements analysis was an examination of the functional needs in terms of both data flow and information. A context diagram was a tool used for structured analysis. This structured approach attempts to describe the system in an overall, broad view. In this depiction, the system is considered an object that is not explained in detail, as the focus was on the system's interaction with the external entities that access it [6]. The context diagram for this application can be seen in Figure 1.

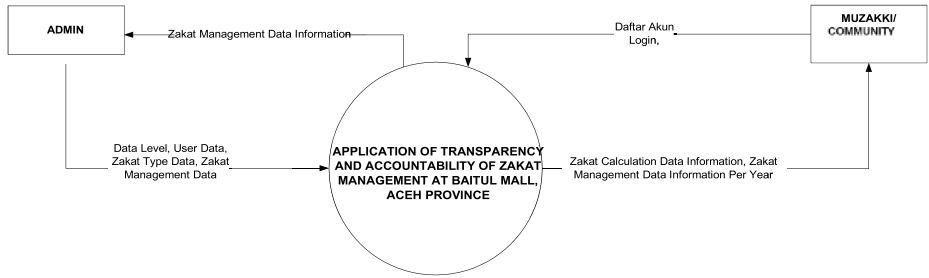


Fig. 1. Context Diagram

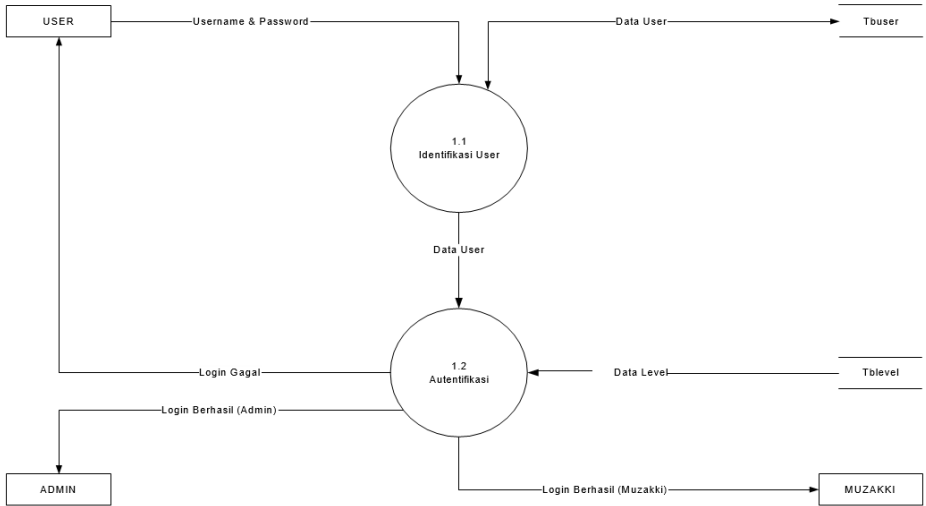
In this system, there were several key interactions between the application and its environment, particularly focusing on the roles of the admin, users (Muzakki), and external entities like the database and report generation modules. These interactions will highlight the main inputs, outputs, and the communication between the users and the system's core functionalities, including zakat calculation, information access, and data transparency for accountability.

A Data Flow Diagram (DFD) was a system diagram that illustrates how the application operates logically. It starts from the highest level down to the most detailed level. In this design, the process includes a preliminary design and a detailed design, following the phases of software engineering development. The DFD demonstrates how data moves within the system, showing the input and output flows as well as the processes that manipulate the data [9].

The preliminary design covers the overall system structure, showing the main modules like user input, zakat calculations, data storage, and report generation. The detailed design breaks down these components into more specific processes, such as how the user inputs are handled and how calculations are performed based on the zakat type and amount.

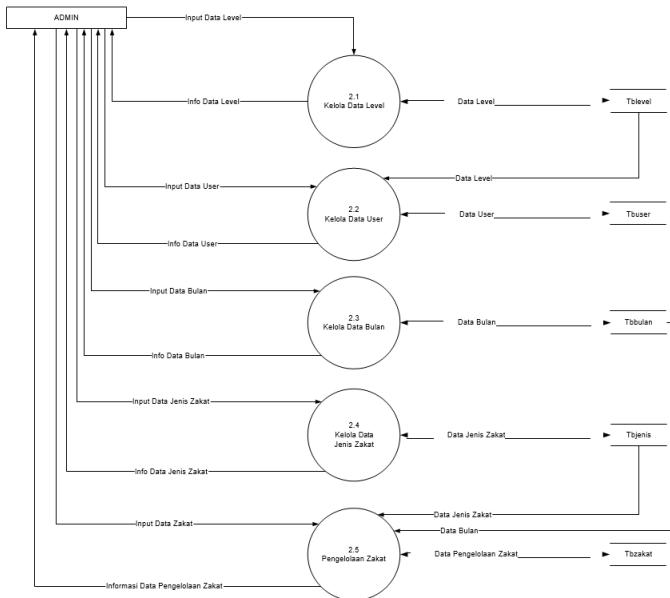
For more clarity, the Data Flow Diagram of this system can be seen in Figure 2, where interactions between entities, processes, and data stores are shown in different levels of abstraction





**Fig. 3.** Data Flow Diagram Level 2 for Process 1

The Data Flow Diagram Level 2 for Process 2, which involves the master data admin, illustrates the flow of data when the admin manages initial essential data as well as zakat management processes. This diagram details how the admin interacts with the system to input, update, and maintain key information regarding zakat administration. For a clearer understanding, refer to Figure 4.



**Fig. 4.** Data Flow Diagram Level 2 for Process 2

The Data Flow Diagram Level 2 for Process 3, which focuses on the master data of Muzakki, illustrates the data flow when a Muzakki registers an account and performs zakat calculations. This diagram provides a detailed view of how the Muzakki interacts with the system for account registration and zakat-related processes. For further clarification, refer to Figure 5.

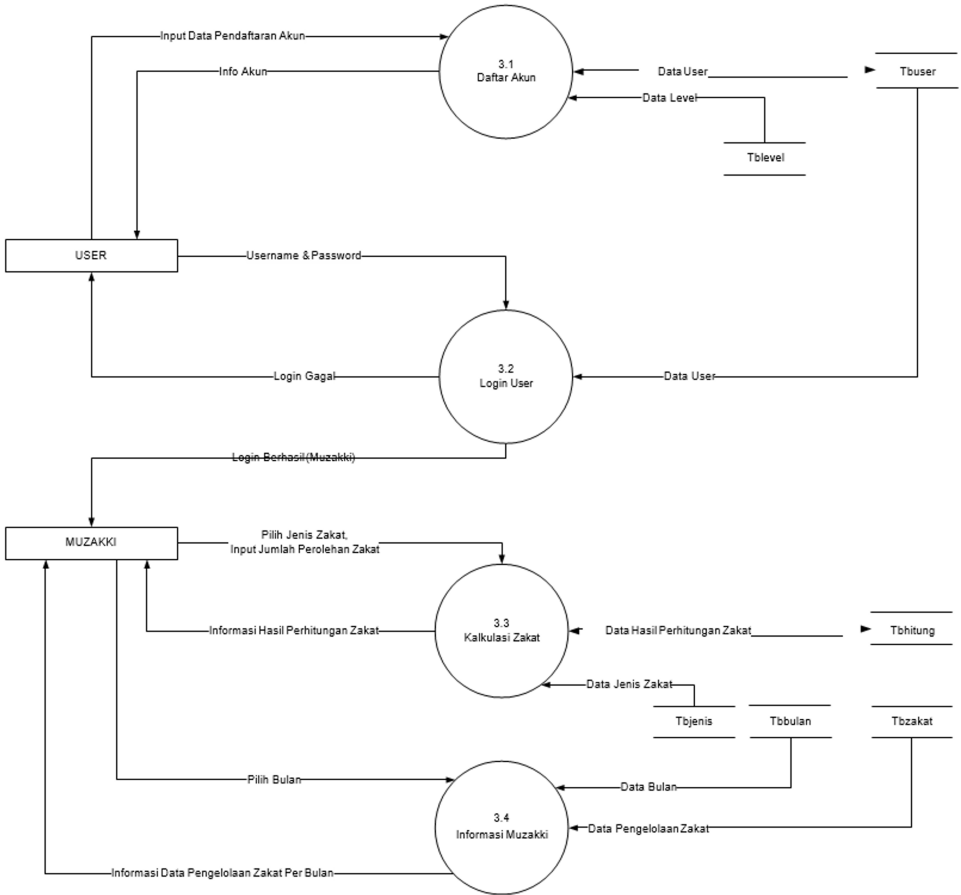


Fig. 5. Data Flow Diagram Level 2 for Process 3

### 2.4 User Interface Design

The user interface design aims to provide a visual representation of the application being developed. This approach helps streamline the system's implementation and ensures the creation of a user-friendly application. In this research, two types of pages are designed: one for the admin and another for Muzakki or the general public [10].

### 3 Result and Discussion

#### 3.1 3.1. Front Page Display

The front page was the first screen that appears when a user accesses the application. This page serves as the initial interface for user interaction with the system. The design of this page is shown in Figure 6.

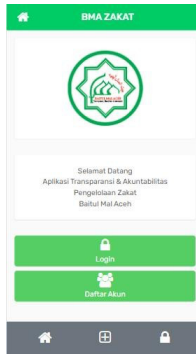


Fig. 6. Front Page Display

#### 3.2 User Login Page

This page was designed to identify users who are accessing either the admin-specific section or the Muzakki/community section of the application. The design of this page is shown in Figure 7.

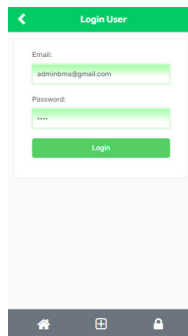


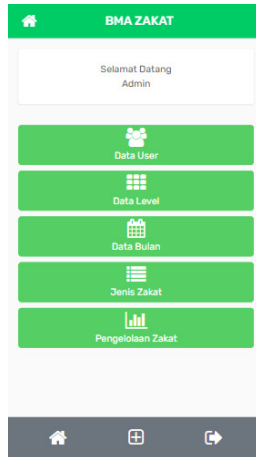
Fig. 7. User Login Page



### 3.3 Admin Interface Implementation

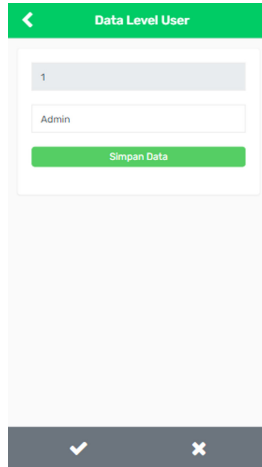
Admins were users with full rights to manage the system's data requirements.

**Admin Dashboard.** This page was displayed immediately after a user successfully logs in as an admin. The design of this dashboard can be seen in Figure 8.



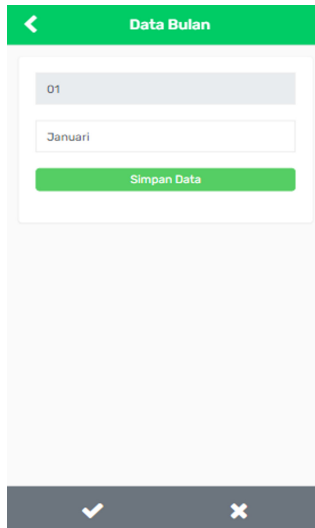
**Fig. 8.** Admin Dashboard

**User Level Data Page.** This page was used by the admin to manage user level data. The design of this page is shown in Figure 9.



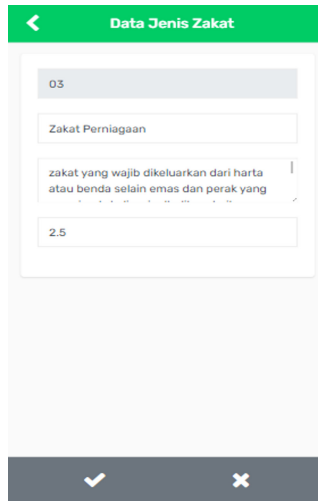
**Fig. 9.** User Level Data Page

**Monthly Data Page.** This page was used by the admin to manage monthly data. The design of this page is shown in Figure 10.



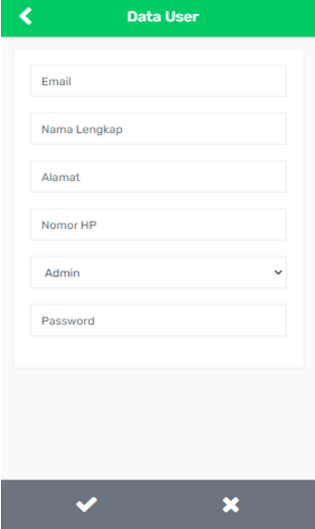
**Fig. 10.** Monthly Data Page

**Zakat Type Data Page.** This page was used by the admin to manage zakat type data. The design of this page is shown in Figure 11.



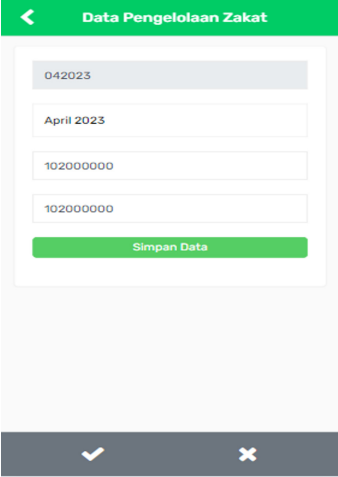
**Fig. 11.** Monthly Data Page

**User Data Page.** This page was used by the admin to manage the data of users registered in the application. The design of this page is shown in Figure 12.



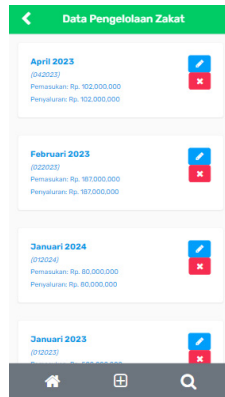
**Fig. 12.** Monthly Data Page

**Zakat Management Data Page.** This page was used by the admin to manage the data on zakat received and zakat distributed per month. The design of this page is shown in Figure 13.



**Fig. 13.** Zakat Management Data Page

**Information on Zakat Management Data Page.** This page was used by the admin to view comprehensive information on zakat management data. The design of this page can be seen in Figure 14.



**Fig. 14.** Information on Zakat Management Data Page

### 3.4 User Interface Implementation for Muzakki/Public

Muzakki/public users were responsible for calculating zakat, viewing zakat calculation history, and accessing yearly zakat management information.

**Account Registration Page.** This page allows users to register an account, which was necessary for calculating zakat and accessing zakat management information. The design of this page can be seen in Figure 15.

Daftar Akun

Email:  
Email Anda

Nama Lengkap:  
Masukkan Nama Lengkap

Alamat :

Nomor HP:  
Masukkan Nomor HP

Password:  
Password here

Buat Akun

Fig. 15. Account Registration Page

**Muzzaki-Specific Page.** This page was displayed when a Muzakki first accesses their dedicated section within the application. The design of this page can be seen in Figure 16.

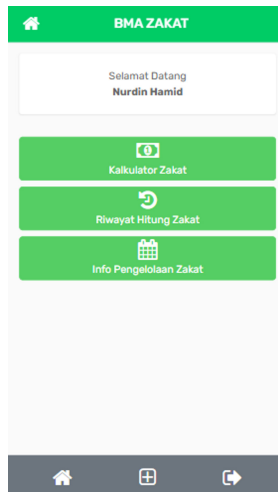
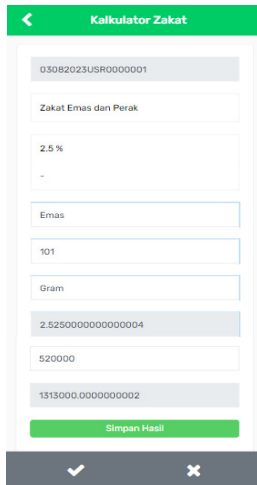


Fig. 16. Muzzaki-Specific Page

**Zakat Calculator Page.** This page allows Muzakki to perform the zakat calculation process. The design of this page can be viewed in Figure 17.



**Fig. 17.** Zakat Calculator Page

**Zakat Calculation History Page.** This page allows Muzakki to view the history of previously performed zakat calculations. The design of this page can be seen in Figure 18.

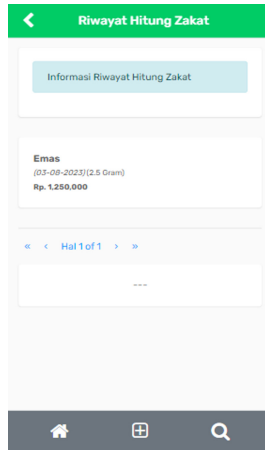


Fig. 18. Zakat Calculation History Page

**Annual Zakat Management Data Page.** This page allows Muzakki to view annual zakat management data. The design of this page can be seen in Figure 19.

Info Pengelolaan Zakat

Tahun	2023	
Bulan	Pemasukan	Penyaluran
Januari	500.000.000	500.000.000
Februari	187.000.000	187.000.000
Maret	0	0
April	102.000.000	102.000.000
Mai	0	0
Juni	0	0
Juli	0	0
Agustus	0	0
September	0	0

Fig. 19. Annual Zakat Management Data Page



## 4 Conclusion

The development of an Android-based application for zakat management in Aceh Province significantly enhances transparency and accountability in the collection, distribution, and reporting of zakat funds. By incorporating structured software engineering methodologies and leveraging secure mobile and database technologies, the system enables both administrators and muzakki to efficiently manage and monitor zakat transactions. This application provides real-time access to zakat data, facilitates accurate zakat calculations, and supports comprehensive reporting, fostering greater trust and efficiency in zakat management.

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