Journal of Artificial Intelligence and Engineering Applications

Website: https://ioinformatic.org/

15th October 2025. Vol. 5. No. 1; e-ISSN: 2808-4519

DESIGN AND CONSTRUCTION OF ADMINISTRATIVE SERVICES FOR THE VILLAGE OFFICE OF WATANG PULU DISTRICT, SIDRAP REGENCY

Aksan Rafi[1]*, Ade Hastuty[2], Andi Wafiah[3], Wahyuddin[4], Mughaffir Yunus[5]

[1,2,3,4,5]*Universitas Muhammadiyah Parepare, Parepare, Indonesia*

aksanti28@gmail.com [1*], adehastutyhasyim@iainpare.ac.id [2],andiwafiah01@gmail.com [3] wahyuddin081090@gmail.com [4], mughaffir@gmail.com [5]

Abstract

The Watang Pulu Subdistrict Village Office in Sidrap Regency still faces various obstacles in administrative services, such as long travel distances for residents, transportation costs, the accumulation of application files, and the uncertainty of officer presence. This makes the document processing process inefficient and uncomfortable. To address these issues, this study aims to design and build an Android-based village administration service application by implementing cloud computing technology, allowing residents to upload required files online for various types of certificates without having to come directly to the village office. The research method used is Research and Development (R&D), including needs analysis, design with UML, implementation using the Kotlin programming language, and testing using the black box method. The results show that the developed application is able to simplify and accelerate the process of processing cover letters, provide easy access, and reduce the time, costs, and effort required. This system is also able to overcome the accumulation of physical files, increase transparency, and improve the overall quality of village office administrative services, while enabling more effective long-distance communication between the community and village officials.

.

Keywords: *Administrative Services, Village Office, Android Application, Cloud Computing, Kotlin*

1. Introduction

The development of Information and Communication Technology (ICT) has brought significant changes in various fields. [1]. The use of digital technology allows for increased efficiency, transparency and speed of public services. [2]. One important aspect that needs to be considered is administrative services at the village level, because the village is the spearhead in providing direct services to the community. [3]. However, many village offices still use manual systems, hindering smooth service delivery. The village office in Watang Pulu District, Sidrap Regency, still faces several obstacles in administrative services. These include the long distances required for residents to visit the office in person, the high transportation costs, and the accumulation of physical documents that are often overlooked. This situation creates inconvenience and reduces the efficiency of administrative processes, especially when staff attendance is uncertain. Therefore, a technology-based solution is needed to address these issues.

One solution that can be implemented is an Android-based administrative service application connected to cloud computing technology. Android was chosen because it is the most widely used mobile operating system, making access to the application easier. [4]. Cloud computing allows people to upload required files online, without having to come directly to the village office. [5]. With the support of modern programming languages such as Kotlin, applications can be built more concisely, efficiently, and easily developed. [6].

Several previous studies have also discussed the use of technology in village administration services, such as the development of web-based applications or simple Android applications for population services. However, these studies are generally limited to on-premises systems or have not yet optimally utilized cloud technology.

Based on this, this research was conducted with the aim of designing and building an Android-based village office administration service application that implements cloud computing, so as to increase the efficiency, transparency, and quality of village administration services.

2. Literture Riview

Previous research conducted by Anggun Pertiwi, Herman Dema, Ahmad Mustanir, and Eka Anugrah entitled "Implementation of E-Government in Realizing Transparency in Village Governance (Study on the Bulo Timoreng Village Government)" focused on the implementation of e-government as an effort to increase transparency in village governance. The purpose of this study was to analyze how e-government can be implemented in village governance to realize openness and accountability. The research method used was a qualitative descriptive approach through interviews, observation, and documentation. The results showed that the implementation of e-government in Bulo Timoreng Village was carried out in coordination with the community to identify emerging problems and benefits. The implementation of this system has proven to be able to support transparency in village governance, although there are still several technical obstacles in its implementation [7].

The main difference between previous research and my own lies in the approach and outcomes. Previous research focused more on analyzing e-government implementation from the perspective of village governance transparency using a qualitative approach, without producing a specific application. In contrast, my research not only analyzed village administrative service issues but also produced an Android-based application integrated with cloud computing to address the challenges of distance, cost, and file accumulation. Therefore, my research has the advantage of providing a practical solution in the form of a system/application that can be directly used by the community and village officials.

2.1. Android Aplication

Android is an open-source operating system developed by Google and widely used on mobile devices. Android's advantages include ease of application development, the availability of a wide variety of libraries, and extensive community support [8]. Android is widely used in application development due to its flexibility and compatibility with a wide range of devices. In the context of village administration services, Android applications make it easier for residents to access public services anytime and anywhere, without having to visit the village office in person.

2.2. Cloud Computing

Cloud computing is a computing model that provides computing resources (such as servers, storage, networks, software) over the internet on an on-demand basis [9]. Cloud computing has three main characteristics: on-demand self-service, broad network access, and resource pooling. This technology is highly relevant for developing administrative service applications because it enables centralized, secure data storage and management, easily accessible from multiple locations. With cloud computing, users can upload required documents online, making administrative processes faster and more efficient.

2.3. Kontlin

Kotlin is a modern programming language developed by JetBrains and officially supported by Google for Android app development since 2017 [6]. Compared to Java, Kotlin has a more concise syntax, is safe against null pointer exceptions, and supports both object-oriented and functional programming. Kotlin makes it easier for developers to write more efficient, readable, and bug-free code. In this study, Kotlin was chosen to develop a village administration service application due to its ability to build stable, fast, and maintainable Android applications.

3. Research Methods

The type of research used is Research and Development, which is research conducted to develop a specific application and test its effectiveness. The research stages used are Research Preparation, Data Collection, Analysis, Design, Testing, and Implementation, as shown in the diagram below:

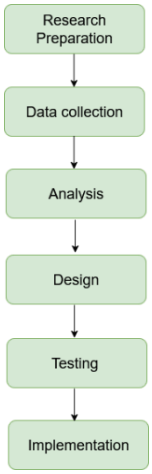


Fig 1: Research Stages

Research Preparation
At this stage, the researcher conducts research preparation. This preparation includes preparing books, articles on the research topic, and software used during the research.
Analysis
At the analysis stage, the researcher analyzes the existing systems and data at the Village Office and then formulates the problem that is the main focus of the research so that alternative solutions to the problem can be created.
Design
The researcher then designed a village service application by implementing Android-based cloud computing which he wanted to create based on problem solving.
Testing
After designing, researchers then test the application design results. If deficiencies or weaknesses are found in the design results, the process will return to the analysis phase.
Implementation
If the design is considered perfect or without flaws, then the application is ready for use.

3.1. Data Analysis

UML stands for Unified Modeling Language, a standard modeling language used to visualize, design, and document software systems. UML models include Use Case Diagrams, Activity Diagrams, and Sequence Diagrams [10].

3.2. System Design

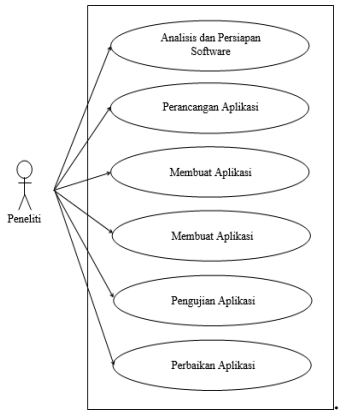


Fig 2: System Design

The diagram shown is a UML Use Case Diagram that shows the involvement of an actor, namely the researcher, in the application development process. The actor is depicted by the person symbol on the left side, who interacts directly with several key activities in the system indicated by the oval shapes. Activities carried out include software analysis and preparation, application design, application creation, application testing, and application improvements. The connecting lines between the actor and each oval indicate that all stages are carried out directly by the researcher. Thus, this diagram illustrates that the researcher plays a central role in the entire application development process, from the initial analysis stage to the final stage of system improvements after testing is carried out.

3.2.1 Use Case Diagram

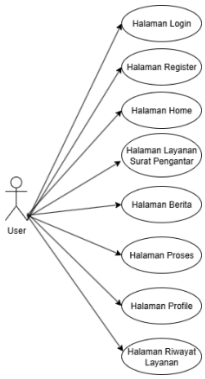


Fig 3: Use Case Diagram User

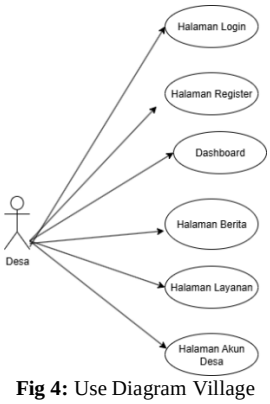


Fig 4: Use Diagram Village

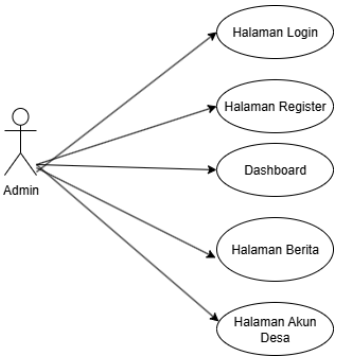


Fig 5: Use Case Diagram Admin

Diagram Use Case fig 3, Describes the user's interaction with the system, starting with login or registration, then moving to the Home screen as the access point. From the Home screen, users can access the Cover Letter, News, Process, Profile, and Service History services as needed.

Diagram Use Case fig 4, This section shows the Village Admin's interaction with the system. The Village Admin logs in or registers for authentication, then accesses the Dashboard, which serves as the control center. From the Dashboard, the Admin can manage News, process Services, and manage Village Accounts.

Diagram Use Case fig 5, This screen shows the admin's interaction with the system. The admin logs in or registers for authentication, then accesses the dashboard, which serves as the control center. From the dashboard, the admin can manage news and manage village accounts for all villages.

3.2.2 Activity Diagram

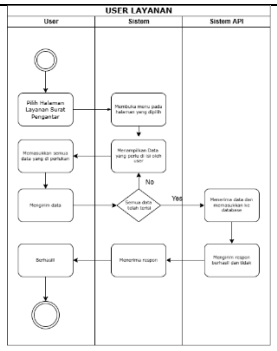


Fig 6: Activity Diagram User

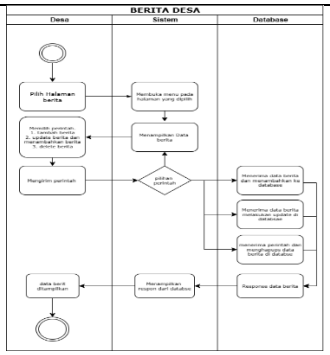


Fig 7: Activity Diagram Village

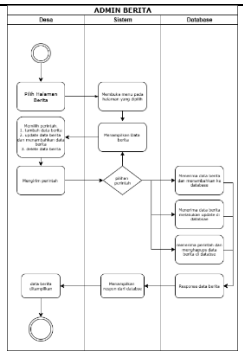


Fig 8: Activiy Diagram Admin

The flow in the activity diagram, Fig. 6, explains that the application process for a cover letter begins when the user selects the service page and opens the form menu. The user then fills in the required data and submits it to the system. The system validates the completeness of the data; if the data is incomplete, the user is prompted to complete it again. If it is complete, the system forwards the data to the API for storage in the database. The API then sends a response to the system, and the system displays a "Success" status to the user..

Activity diagram Fig. 7 explains the Village Admin's process for managing cover letter application document data. The process begins when the Admin opens the service page, where the system displays a list of documents along with management options. The Admin can choose to add, update, or delete data, which is then processed by the system through interaction with the database. Once the operation is complete, the database sends a response to the system, and the results are displayed back to the Admin, ensuring that the application status and data are always accurate and up-to-date.

The activity diagram in Figure 8 shows the Village Admin's workflow for managing news information. The process begins when the Admin opens the news page, then the system displays a list of news items along with management options. The Admin can add, update, or delete news items, and each action is processed by the system through interaction with the database. Once the operation is complete, the database sends a response to the system, which is then displayed back to the Admin, allowing for efficient and accurate news management.

3.2.3 Sequence Diagram

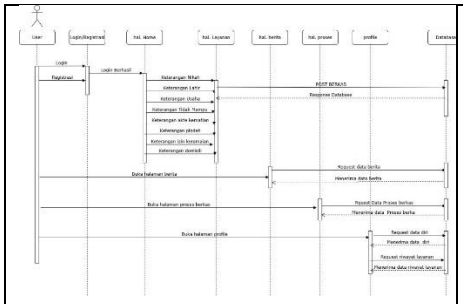


Fig 10: Sequence Diagram User

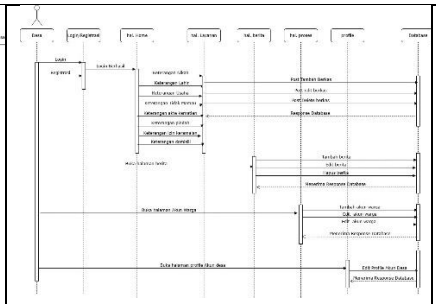


Fig 11: Sequence Diagram Village

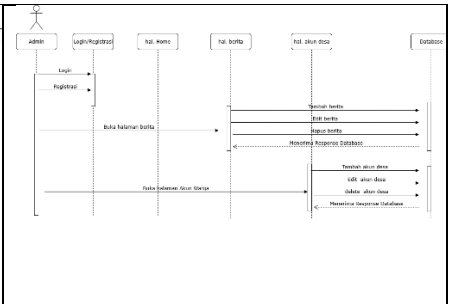


Fig 12: Sequence Diagram Admin

4. Results and Discussion

4.1 Home User View



Fig 13: Home User View

The home page contains information about the types of cover letters that can be submitted as well as the latest news from the village.

4.2 Village Dashboard View

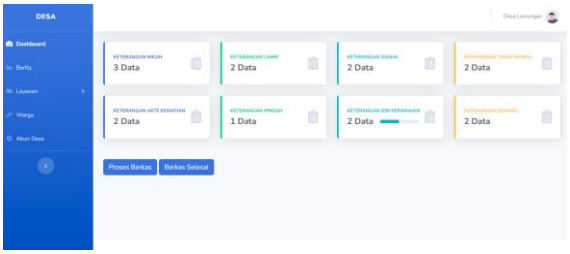


Fig 14: Village Dashboard View

The display shown in the image represents the dashboard of the village administration service application. On the left side is a navigation menu consisting of the dashboard, news, services, residents, and village account, which serves as the main access to the various features available in the system. The main section of the screen displays a summary of data from various types of certificates submitted by the community, including marriage certificates, birth certificates, business certificates, disability certificates, death certificates, relocation certificates, public gathering permits, and domicile certificates. Each service type is displayed as a card showing the number of data entered, allowing village officials to directly monitor the number of applications being processed. At the bottom are buttons for processing files and completing files, allowing village officials to manage the status of documents, whether they are still being processed or have been completed. This overall display is designed to facilitate monitoring, managing, and expediting village administration services while increasing transparency and efficiency.

4.3 Village Service Display

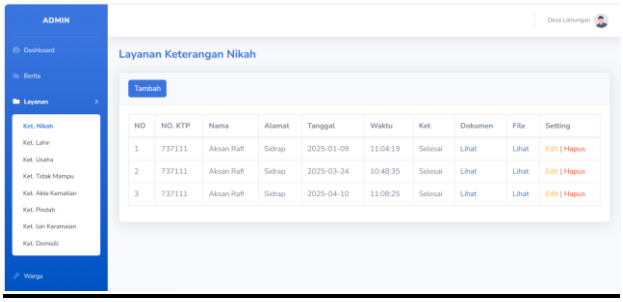


Fig 15: Village Service Display

This screen displays the marriage certificate service page in the village administration application. The main section contains a table of applicant data, displaying ID card number, name, address, date, time, status, and documents available for viewing. Admins can also add new data, edit, or delete existing data. This feature makes it easier for village officials to manage marriage certificate services quickly and in an organized manner.

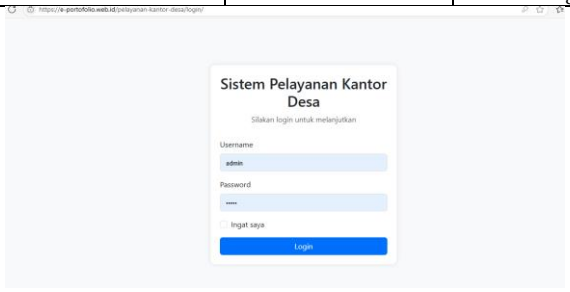
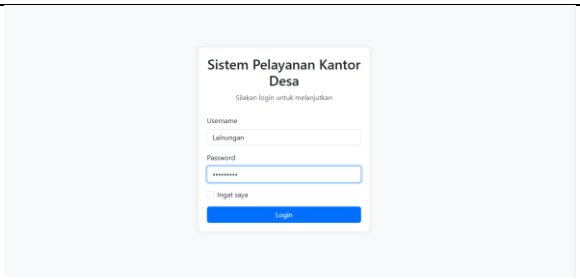
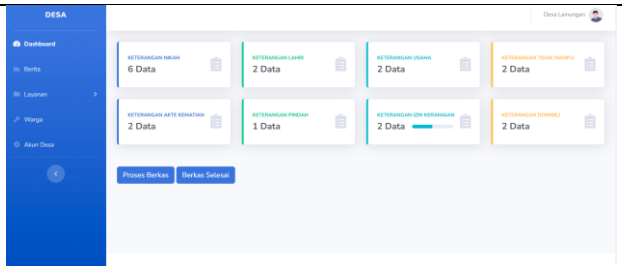
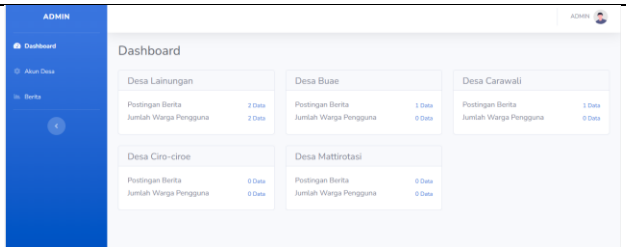
4.4 Testing

Black Box testing is a software evaluation method that focuses on application details, available functionality, and the suitability of functional flow to user needs. This testing does not involve reviewing or testing the program's source code[11].

Tabel I: User home page testing

Test Factor	Results	Information
The user enters valid login data (correct username and password) on the login page, then presses the "Login" button.	Succeed	Success, because the user was successfully directed to the main page (home) of the application after the data was properly verified.
		

Tabel II: Pengujian berhasil *login* desa/admin

Test Factor	Result	Information
If the village/admin username and password entered are correct	Success	Success, because it can display the main village/admin page
		
		
		
		

5. Conclusion

Based on the implementation and testing results, it can be concluded that the application functions well according to its initial purpose. This application, which runs on Android-based smartphones, is a village office administration service system for Watang Pulu District, Sidrap Regency. The application significantly simplifies the process for residents and village officials in processing cover letters and the suggestions given as a form of reference for the development of the system that has been built are that for further research it is hoped that the Android-based system can be further developed by adding the latest features such as a queue number list, a service for writing incoming and outgoing letter diaries, dispositions and public complaints that can help improve the quality of village office services.

References

[1] Indriati Amirullah, "Pengaruh Teknologi Informasi Dan Komunikasi (TIK) Dalam Administrasi Publik," *Sammajiva: Jurnal Penelitian Bisnis dan Manajemen*, vol. 1, no. 4, pp. 383–391, Dec. 2023, doi: 10.47861/sammajiva.v1i4.905.

[2] Muhammad Jafar AW, "Dampak E-Government dalam Meningkatkan Efisiensi dan Efektivitas Tata Kelola Pemerintahan," *Politika Progresif : Jurnal Hukum, Politik dan Humaniora*, vol. 1, no. 4, pp. 204–226, Dec. 2024, doi: 10.62383/progres.v1i4.1303.

[3] E. Noviyanti and R. Nawawi, "Analisis Peran Pelayanan Pemerintahan Desa terhadap Perkembangan Desa Mekarwangi Kecamatan Cisauk," *Sosial Simbiosis : Jurnal Integrasi Ilmu Sosial dan Politik*, vol. 2, no. 3, 2025, doi: 10.62383/sosial.v2i3.1820.

[4] M. Paramita and Y. Pernando, "Optimalisasi Pelayanan Laundry: Perancangan dan Pengembangan Aplikasi Mobile Android Easy Wash," *KLIK: Kajian Ilmiah Informatika dan Komputer*, vol. 4, no. 3, pp. 1888–1897, 2023, doi: 10.30865/klik.v4i3.1384.

[5] H. Pratama Ginanjar and A. Setiyadi, "Penerapan Teknologi Cloud Computing Pada katalog Produk Di Balaktop Jawa Barat," *Jurnal Ilmiah Komputer dan Informatika (KOMPUTA)*, vol. 9, no. 1, pp. 2715–7849, 2020, Accessed: Aug. 17, 2025. [Online]. Available: DOI: https://doi.org/10.34010/komputa.v9i1.3722

[6] J. J. Sanjaya and J. Susilo, "Perbandingan Performa Kotlin vs Java dalam Pengembangan Android dengan Metode Iterasi While," *bit-Tech*, vol. 7, no. 2, pp. 545–553, Dec. 2024, doi: 10.32877/bt.v7i2.1898.

[7] A. Pertiwi, H. Dema, A. Mustanir, E. Anugrah, and) Fakultas, "Penerapan E-goverment Dalam Mewujudkan Transparansi Tata Kelola Pemerintahan Desa (Studi pada Pemerintahan Desa Bulo Timoreng)," *PRAJA*, vol. 9, no. 3, 2021, Accessed: Aug. 17, 2025. [Online]. Available: DOI: https://doi.org/10.55678/prj.v9i3.508

[8] H. Matlubah and A. Anekawati, "Aplikasi Mobile Learning Berbasis Smartphone Android Sebagai Sumber Belajar Mahasiswa Program Studi Pendidikan IPA Universitas Wiraraja Sumenep," *Jurnal Lentera Sains (Lensa) Jurnal Lensa*, vol. 6, no. 2, 2016, Accessed: Aug. 16, 2025. [Online]. Available: DOI: https://doi.org/10.24929/lensa.v6i2.290

[9] Ahmad Syaikhu, "Komputasi Awan (Cloud Computing) Perpustkaan Pertanian," *Jurnal Perpustakaan Indonesia*, vol. 10, no. 1, 2016, Accessed: Jul. 06, 2025. [Online]. Available: https://repository.ipb.ac.id/handle/123456789/43015

[10] M. Syarif and W. Nugraha, "Pemodelan diagram uml sistem pembayaran tunai pada transaksi e-commerce," *Jurnal Teknik Informatika Kaputama (JTIK)*, vol. 4, no. 1, 2020.

[11] S. Anardani and A. R. Putera, "Analisis Pengujian Sistem Informasi Website E - Commerce Manies Group Menggunakan Metode Blackbox Function," *eminar Nasional Hasil Penelitian dan Pengabdian kepada Masyarakat UNIPMA*, 2019, Accessed: Jul. 19, 2025. [Online]. Available: https://prosiding.unipma.ac.id/index.php/SNHP/article/view/768/0