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# Design and Development of a Web-Based Village Information System for Desa Semangat Kecamatan Barusjahe

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**Article Info****Keywords:**

Village Information System,  
Web Administration,  
Rapid Application Development,  
Digitization

**ABSTRACT**

Desa semangat Barus Jahe still faces obstacles in data management and administrative services that are carried out manually, resulting in service delays and limited access to information for the community. This study aims to design and implement a web-based village information system to improve efficiency, transparency, and ease of access to services. The method used is Rapid Application Development (RAD) with stages of planning, design, development, and system implementation. The system provides features for managing population data, online letter submission services, and publishing village information. Test results show that the system built is capable of supporting more effective village administration management and providing broader access to information for the community.

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## INTRODUCTION

Villages are the smallest administrative units that play a crucial role in providing services to the community and managing various administrative aspects. In the digital age, web-based information systems have emerged as an effective solution to enhance transparency, efficiency, and accessibility of information for the community. Semangat Barus Jahe Village, one of the villages in Karo Regency, North Sumatra, faces challenges in managing information and administrative services, which are still conducted manually. This results in inefficiency in service delivery, delays in report generation, and limited access to information for the community.

The development of information and communication technology has had a significant impact on various aspects of life, including village management and promotion. In the context of villages, web-based information systems have become an indispensable tool for supporting public information disclosure and facilitating communication between village officials and the outside community. According to (Nggewa, M. Y., & Witi, 2021) Web-based information systems can improve transparency and effectiveness in village information management. In addition, information technology also facilitates the promotion of agricultural products, correspondence, and more efficient social communication, both for rural and urban communities (Asmara, 2019). In Semangat Barus Jahe Village, the development of a web-based information system is expected to provide a solution to the challenges of information management and promotion, as well as open access for villagers to connect with the outside world.

According to Isnaini, (Isnaini, N., Roemintoyo, R., & Sukmawati, 2023) the existence of village websites allows the community to independently access information related to the village and its development. This provides important support for various parties, including individuals, organizations, and the government, in presenting factual and accurate information in the digital age, thereby enhancing transparency and efficiency in the management of village information.

Data processing currently still uses manual recording on paper, which often results in errors and delays in the report generation process and also poses a high risk to data security, making it considered ineffective and inefficient in terms of time (Marisa, F., & Yuarita, 2019).

Based on interviews with the Semangat Barus Jahe village government, it was found that population data management and correspondence services are still carried out manually. This process causes long queues, delays in report generation, and difficulties for the community in accessing village information. Additionally, the dissemination of village information, such as announcements and news, is still limited to banners displayed at the village office, making it inaccessible to a wider audience.

Semangat Barus Jahe Village is one of the villages located in Barusjahe Subdistrict, Karo Regency, North Sumatra Province, Indonesia. This village has great potential in various aspects, such as natural resources, human resources, as well as economic development and infrastructure. However, based on observations and interviews, there are still various issues that pose challenges in the development and management of the village. The main issue in the governance of Semangat Barus Jahe Village is the manual administrative system, particularly in correspondence services, population data management, and other village information. This results in inefficiency in service delivery, delays in report preparation, and limited access to information for the community. Additionally, communication limitations make it difficult for residents to obtain the latest information about the village, including announcements and development programs. Based on interviews with village officials, they face challenges in improving transparency and the effectiveness of services to the community. Village information is currently only disseminated through banners displayed at the village office, which have limited reach. Residents who do not visit the village office directly often do not receive the information they need. Furthermore, manual record-keeping in correspondence services causes long queues and slows down administrative processes.

To address this issue, a web-based village information system was designed as a solution to help the community access village information and administrative services more easily. This system allows the community to obtain the latest information about the village, such as announcements, news, and development programs, without having to visit the village office. In addition, this system also makes it easier for the village government to manage population data and correspondence services digitally, thereby reducing waiting times and improving service efficiency.

With this system, Semangat Barus Jahe Village can improve the quality of public services, speed up administrative processes, and support more transparent and accountable village governance. The implementation of a web-based village information system is not only a modernization of village services. Based on the background of the problem described above, the author formulates the following questions:

1. How can a web-based information system help the community of Semangat Barus Jahe Village to obtain village information and submit commonly used administrative documents?
2. How can a web-based information system facilitate the Semangat Barus Jahe Village administration in managing population data, assisting the village administration in managing residents' document requests, and other village information?

## METHODS

In this study, the Rapid Application Development (RAD) method was used. According to (Putri et al., 2024) RAD (Rapid Application Development) is a method that combines several techniques and structured approaches. RAD utilizes prototyping methods and other structured techniques to identify user needs and design information systems. In addition, RAD focuses on a rapid development cycle, lasting between 60 and 90 days, using a component-based approach to accelerate system construction. Rapid Application Development (RAD) has stages as shown in Figure 1

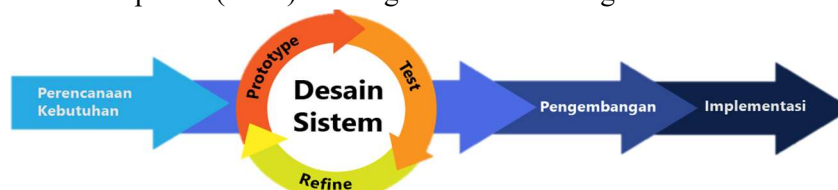


Figure 1. Stages of RAD Development

In this study, the RAD stages were applied to develop the Village Information System. The stages in the RAD method are as follows:

1. Needs Assessment: This stage is the first step in system development. Data was collected through observation and direct interviews in Semangat Barus Jahe Village. The data obtained is analyzed qualitatively to identify the village's needs related to administrative management, population data, public services, and communication between residents. The results of this needs analysis will form the basis for designing a system that meets user needs and the objectives of developing a village information system.
2. System Design: System design is carried out using the Unified Modeling Language (UML) method to visualize the system architecture. This process includes the creation of user interface designs, application workflows, and the selection of appropriate technologies and platforms. The system is designed to support village data management, online administrative services, and improved village operational efficiency.
3. Development and feedback collection: Once the system design is complete, the development phase is carried out by implementing the design using an appropriate web-based programming language. During development, preliminary testing of the system's features is conducted to ensure they meet the village's needs. Feedback from village officials and residents of Semangat Barus Jahe Village is collected to improve and refine the system before full implementation.
4. Implementation: The final stage is the implementation of the web-based information system in Semangat Barus Jahe Village. Before the system is fully operational, testing is conducted by village officials to ensure all features function properly. This new system is expected to support efficient and effective management of village administration and public services.

## RESULTS AND DISCUSSION

Implementation is the stage of applying and testing a new system, as well as the stage where the application is ready to be operated in real conditions. The effectiveness of the new system will be known for certain, as well as all the advantages and disadvantages of the system and application program. System implementation is a stage in the Web-Based Village Information System in Semangat Village, as follows:

### 1. Home Page

Displaying the Main Screen of the Web-Based Village Information System in Semangat Village. This page is designed to provide users with easy access to various village information and services, such as village profiles, the latest news, and contact details for the village administration. This main screen is the main entry point for users to explore all the features available in the system, as shown in Figure 2.

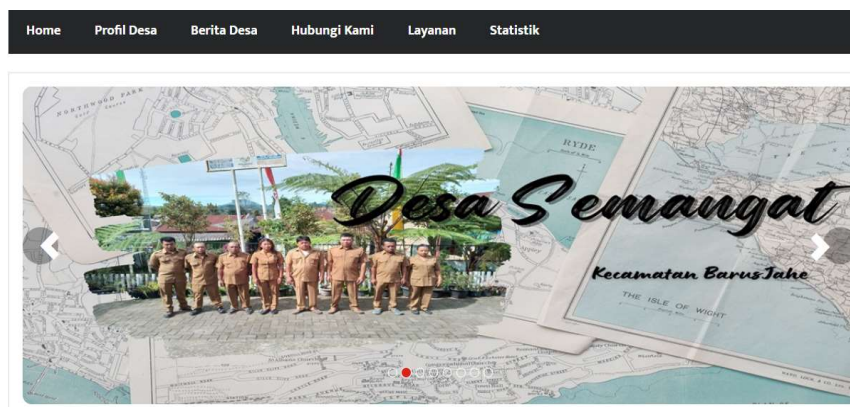


Figure 2. Home Page

## 2. Village Profile Page

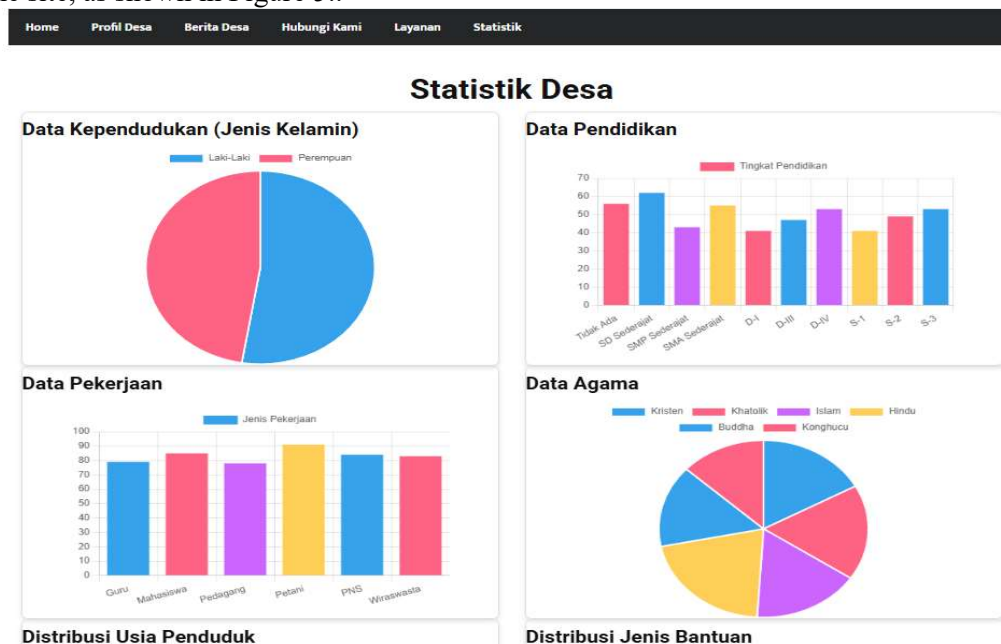
Displaying the Village Profile on the Web-Based Village Information System in Semangat Village. This page provides information about the history, geographical location, and development of Semangat Village. Users can understand the background and values upheld by the village community through the descriptions provided. This display is designed to provide a comprehensive overview of the identity and local potential of Semangat Village, as shown in Figure 3.



**Figure 3.** Village Profile Page

## 3. Population Statistics

Population statistics display the Semangat Village Statistics page, which contains population information and social data. There are several main categories such as Population Data (gender), Education Data, Employment Data, and Religious Data. This display is designed to provide a brief overview of the demographic and social conditions of the village community, including age distribution and types of assistance received. The menu navigation at the top makes it easy for users to access various parts of the site, as shown in Figure 5..



**Figure 4.** Population Statistics Page

#### 4. Login & Registration Page

Displaying the Login and User Registration page interface. The Login section includes input fields for Username and Password, along with a Login button. There is also an option for users without an account via the “Don't Have an Account? Register” link, leading to the Home Page. The Registration section displays a registration form requesting NIK, Full Name, Username, and Password. The Register button is available to complete the registration process, along with the “Already Have an Account? Login” option for registered users. The design is simple and functional, making it easy for users to go through the authentication process, as shown in Figure 6..

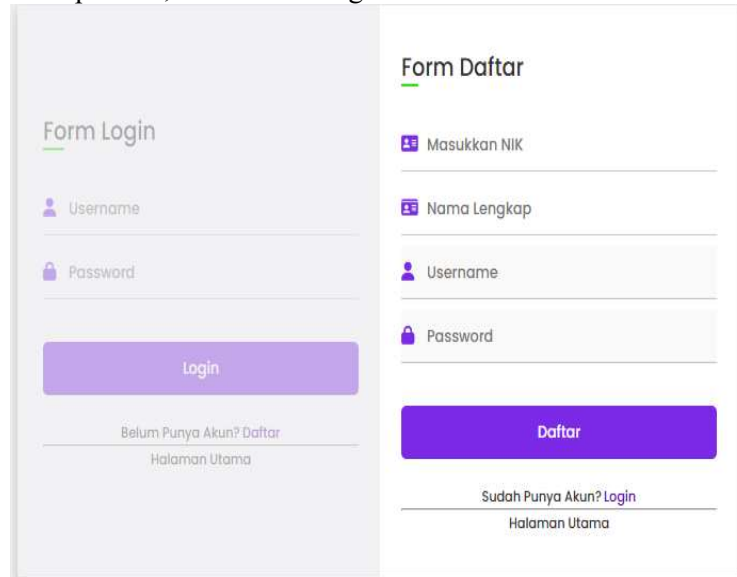


Figure 5. Login & Registration Page

#### 5. Manage Village Profile Page

Figure 8 shows the Manage Village Profile interface on the Desa Semangat system, which contains various important information about the village. This page includes several main sections, namely the History of Desa Semangat, Geographical Location, Meaning of the Logo, Vision and Mission, and Description of the duties of the village government structure. Each section provides a concise yet informative description, such as the village's history, geographical location, the meaning of the district logo, and the village's development objectives. This interface is designed to facilitate administrators in managing and updating village profile data in a structured manner. Clear navigation and an organized layout ensure that information is easily accessible and manageable.

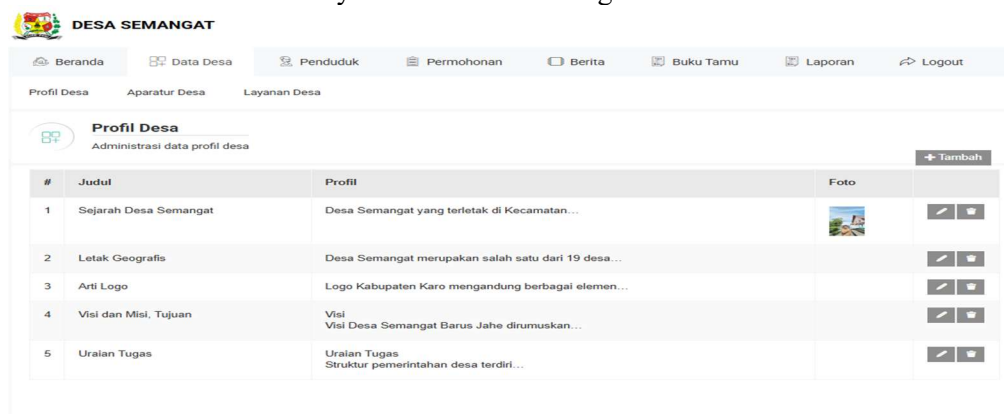
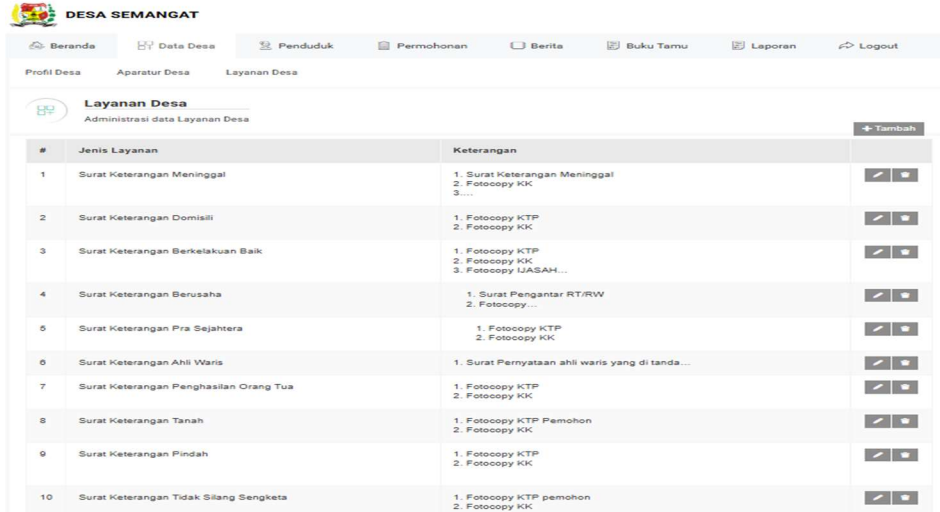


Figure 6. Manage Village Profile Page

#### 6. Manage Services Page

Figure 9 shows the Village Service Management interface on the Desa Semangat system, which contains a complete list of available administrative services. This page is divided into two main sections: Service Types, which lists various certificates such as Death Certificates, Residence Certificates, Good Conduct Certificates, and Moving Certificates; and Notes, which explains the supporting document requirements for each service, such as photocopies of ID cards, family cards, RT/RW referral letters, and others. This interface is designed systematically to facilitate administrators in managing service information and assist residents in understanding the required procedures. The table layout and bullet points make information navigation clear and structured.

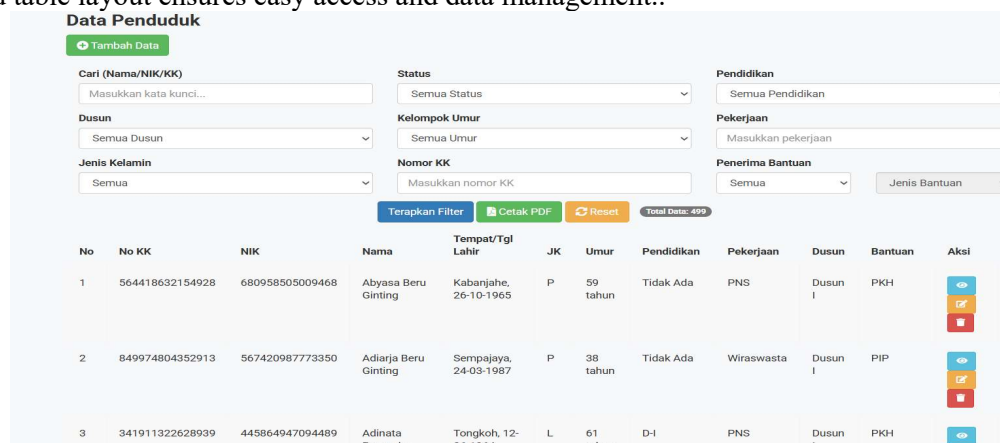


#	Jenis Layanan	Keterangan
1	Surat Keterangan Meninggal	1. Surat Keterangan Meninggal 2. Fotocopy KK 3....
2	Surat Keterangan Domisili	1. Fotocopy KTP 2. Fotocopy KK
3	Surat Keterangan Berkelakuan Baik	1. Fotocopy KTP 2. Fotocopy KK 3. Fotocopy IJASAH...
4	Surat Keterangan Berusaha	1. Surat Pengantar RT/RW 2. Fotocopy...
5	Surat Keterangan Pra Sejahtera	1. Fotocopy KTP 2. Fotocopy KK
6	Surat Keterangan Ahli Waris	1. Surat Pernyataan ahli waris yang di tanda...
7	Surat Keterangan Penghasilan Orang Tua	1. Fotocopy KTP 2. Fotocopy KK
8	Surat Keterangan Tanah	1. Fotocopy KTP Pemohon 2. Fotocopy KK
9	Surat Keterangan Pindah	1. Fotocopy KTP 2. Fotocopy KK
10	Surat Keterangan Tidak Silang Sengketa	1. Fotocopy KTP pemohon 2. Fotocopy KK

**Figure 7. Manage Services Page**

### 7. Manage Population Data Page

Figure 10 shows the Manage Population Data interface on the Desa Semangat system, which contains detailed information about village residents. This page displays a table with columns such as Family Card Number, National Identification Number, Name, Place of Birth, Date of Birth, Status, Gender, Religion, and Education. Population data is presented in a structured manner, covering various demographic information such as place of birth (Sampajaya, Lau Cih, Berastagi), marital status (Married, Unmarried), religion (Christian, Confucian, Hindu, Buddhist), and education level (Elementary School, High School, Bachelor's Degree, Doctorate). This interface is designed to facilitate administrators in efficiently managing, monitoring, and updating population data. The clear and organized table layout ensures easy access and data management..



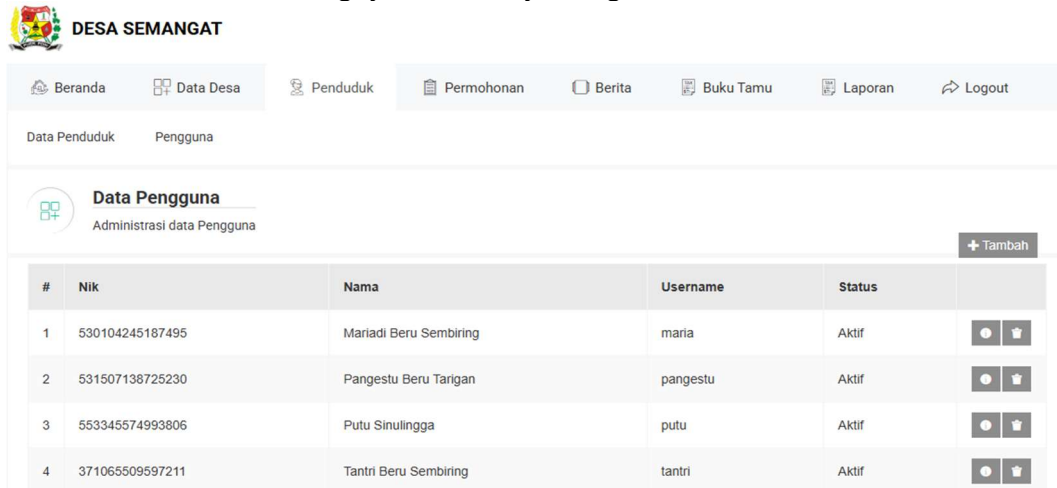
No	No KK	NIK	Nama	Tempat/Tgl Lahir	JK	Umur	Pendidikan	Pekerjaan	Dusun	Bantuan	Aksi
1	564418632154928	680958505009468	Abyasa Beru Ginting	Kabanjahe, 26-10-1965	P	59 tahun	Tidak Ada	PNS	Dusun I	PKH	[Edit] [Hapus]
2	849974804352913	567420987773350	Adiarja Beru Ginting	Sempajaya, 24-03-1987	P	38 tahun	Tidak Ada	Wiraswasta	Dusun I	PIP	[Edit] [Hapus]
3	341911322628939	445864947094489	Adinata Perangin-	Tongkol, 12-06-1964	L	61 tahun	D-I	PNS	Dusun I	PKH	[Edit] [Hapus]

**Figure 8. Manage Population Data Page**

### 8. Manage User Data Interface Page

Figure 11 shows the Manage User Data interface on the Desa Semangat system, which contains information on registered users. The table includes columns for NIK, Name, Username, and Status (all

listed as “Active”), with sample data such as Mariadi Beru Sembiring (NIK, username) and three other users. The navigation menu on the left side provides quick access to various administrative features. This interface is designed to simplify admin tasks such as managing user accounts, monitoring active/inactive status, and maintaining system security through a structured and informative table layout

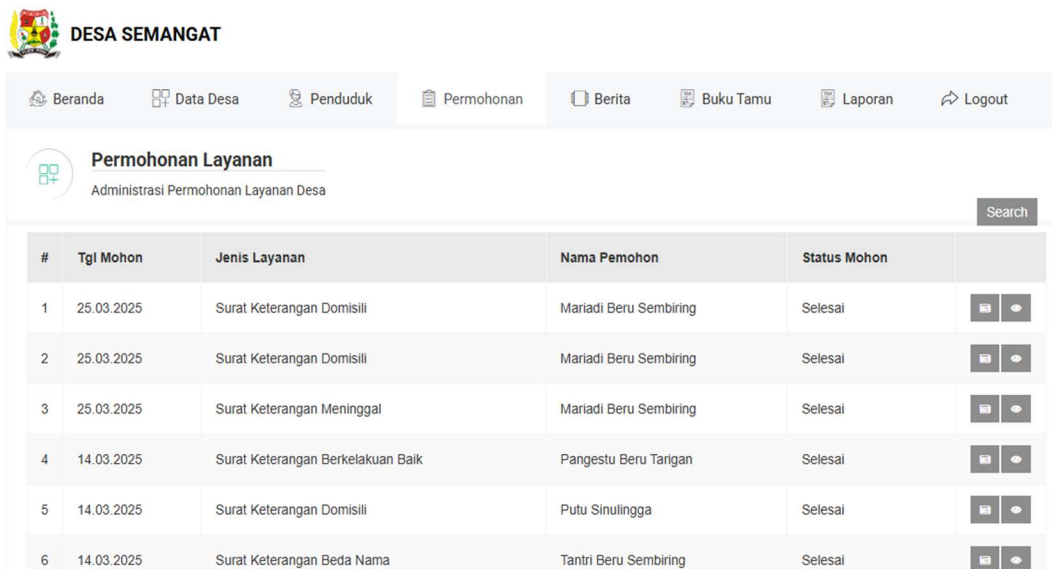


#	Nik	Nama	Username	Status
1	530104245187495	Mariadi Beru Sembiring	maria	Aktif
2	531507138725230	Pangestu Beru Tarigan	pangestu	Aktif
3	553345574993806	Putu Sinulingga	putu	Aktif
4	371065509597211	Tantri Beru Sembiring	tantri	Aktif

**Figure 9.** Mange User Interface Data

### 9. Manage Requests Page

Figure 12 shows the Manage Service Requests interface on the Desa Semangat system, which contains a list of service requests from residents. The table records important information such as the Date of Request, Type of Service (Certificate of Residence, Death, Good Conduct, and Name Change), Name of Applicant, and Request Status, all of which are recorded as “Completed.” The data shows several requests from the same name (Marladi Beru Sembiring) on different dates.



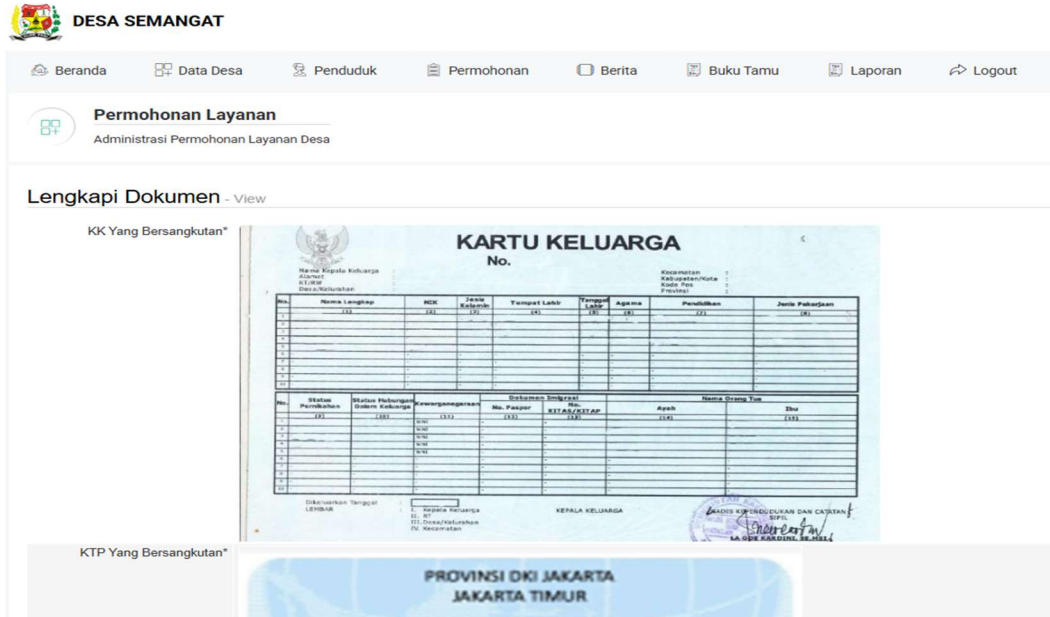
#	Tgl Mohon	Jenis Layanan	Nama Pemohon	Status Mohon
1	25.03.2025	Surat Keterangan Domisili	Mariadi Beru Sembiring	Selesai
2	25.03.2025	Surat Keterangan Domisili	Mariadi Beru Sembiring	Selesai
3	25.03.2025	Surat Keterangan Meninggal	Mariadi Beru Sembiring	Selesai
4	14.03.2025	Surat Keterangan Berkelakuan Baik	Pangestu Beru Tarigan	Selesai
5	14.03.2025	Surat Keterangan Domisili	Putu Sinulingga	Selesai
6	14.03.2025	Surat Keterangan Beda Nama	Tantri Beru Sembiring	Selesai

**Figure 10.** Manage Request Page

### 10. View Document Page

Figure 13 shows the View Document interface on the Desa Semangat system used by administrators to verify the completeness of the required documents in a service application. This page displays the documents uploaded by the applicant, such as copies of ID cards, family cards, letters of introduction from the neighborhood association, or other supporting documents depending on the type of letter submitted (e.g., Certificate of Residence or Death Certificate). This interface is designed with a clear layout to facilitate admins in checking the validity of documents, ensuring the completeness of

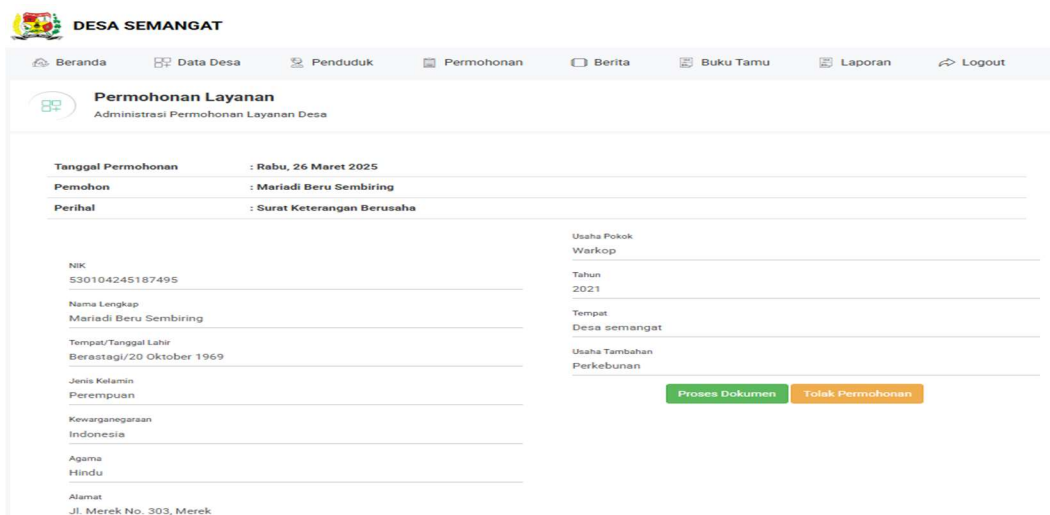
requirements, and providing approval or revisions if necessary. This feature enhances the efficiency of the document verification process while maintaining transparency in village administrative services..



**Figure 11.** View Document Page

## 11. Application Process Page

Figure 14 shows the Service Application Process interface on the Desa Semangat system, which contains complete details of a Business Certificate application by a resident. This page displays the applicant's personal information (place/date of birth, gender, nationality, religion, address), business data, and action buttons “Process Document” and “Reject Application.” This structured display facilitates admins in verifying data, evaluating the completeness of requirements, and making accurate and efficient decisions regarding the status of the application.



**Figure 12.** Customer Reports, Transactions, Withdrawals

## CONCLUSION

Based on the results of the design and implementation of the Web-Based Village Information System in Semangat Baru Jahe Village using a case study approach, the conclusions that can be drawn as answers to the problem formulation are as follows:

1. This web-based village information system can help the people of Semangat Baru Jahe Village obtain information related to the village, such as news and announcements, and facilitate the online submission of 12 types of commonly used letters. Residents can also independently monitor the status of their applications through the system, thereby improving the convenience and transparency of services.
2. This system makes it easier for the village government to manage population data and letter requests from residents digitally. The verification, archiving, and printing processes for letters become more structured and efficient, while also accelerating the dissemination of village information to residents through the web.
3. The system design was carried out using the Rapid Application Development (RAD) method, which includes the stages of needs planning, system design, development, and implementation. The final result of this design is a village information system website that can be used by village officials and the community as a digital platform for administrative services and village information.

## REFERENCE

- Binus University. (2023). *Jenis-Jenis Bahasa Pemrograman dan Penjelasannya*. News.
- Dedy Rahman Prehanto, S. K. M. K., I Kadek Dwi Nuryana, S. T. M. K., & Pustaka, S. M. (2020). *BUKU AJAR KONSEP SISTEM INFORMASI*. SCOPINDO MEDIA PUSTAKA. <https://books.google.co.id/books?id=0OriDwAAQBAJ>
- Elgamar (Ed.). (2020). *BUKU AJAR KONSEP DASAR PEMROGRAMAN WEBSITE DENGAN PHP*. Ahlimedia Book. <https://books.google.co.id/books?id=sgLyDwAAQBAJ>
- Fathoni, A., Raharjo, T., & Septyanto, D. (2020). Analisis Komponen Sistem Informasi dalam Mendukung Efektivitas Organisasi. *Jurnal Sistem Informasi (JUSIM)*, 8(2), 120–135.
- Fathurohman, F., & Erdi, E. (2022). Sistem Informasi Desa untuk Komunikasi Pembangunan yang Lebih Baik. *DST*, 2(2), 126–133. <https://doi.org/10.47709/dst.v2i2.1575>
- Firman. (2022). *Pengertian Html, Css,Php,Mysql*. If.Unpas.Ac.Id. <https://if.unpas.ac.id/berita/apa-itu-html-pengertian-sejarah-dan-bagaimana-cara-kerjanya/>
- Hadiluwarsa, F. A., Audela, K., & Kristianti, I. (2021). Analisis Sistem Pengendalian Internal Pengembangan Sistem Informasi Desa. *Magistrorum et Scholarium: Jurnal Pengabdian Masyarakat*, 2(1), 88–101. <https://doi.org/10.24246/jms.v2i12021p88-101>
- Informatika, B. S. (2022). Pengertian Sistem Informasi, Ciri, Fungsi dan Komponennya. *Pengertian Sistem Informasi*, 2(1), 20. <https://bsi.today/pengertian-sistem-informasi/>
- Isnaini, N., Roemintoyo, R., & Sukmawati, F. (2023). Implementasi Sistem Informasi Desa Berbasis Website Sebagai Media Informasi Desa. *JIM: Jurnal Ilmiah Mahasiswa Pendidikan Sejarah*, 8(4), 5908–5912.
- Juliarto, R. (2021). Apa itu UML? Beserta Pengertian dan Contohnya - Dicoding Blog. In *Www.Dicoding.Com* (pp. 1–13). <https://www.dicoding.com/blog/apa-itu-uml/>
- Kom, D. A. M., Emi Sita Eriana S. Kom., M. K., Arief Budi Pratomo, S. K. M., Chrisantus Trisianto, S. T. M. K., Ade Suparman, S. S. I. M. K., Kom, D. F. S. K. M., Habibi Azka Nasution, S. S. M. S., Eng, S. S. T. M., Erna Juniasti Malaikosa, S. K. M. K., & Arief Hidayat, M. K. (2023). *Konsep Dasar Pengenalan Database Rumpun Ilmu Komputer*. Cendikia Mulia Mandiri. <https://books.google.co.id/books?id=2pu-EAAAQBAJ>
- Kurnia Azizah. (2021). Pengertian HTML Lengkap dengan Fungsi dan Sejarah Kemunculannya. In *Merdeka*.
- Kurniawan, H., Syafa'at, F., Budihartono, E., Lorosae, T. A., Apriana, D., Marisa, M., Carudin, C., Adhichandra, I., Syaddad, H. N., & Ikhsan, M. (2023). *BELAJAR WEB PROGRAMMING : Referensi Pengenalan Dasar Tahapan Belajar Pemrograman Web Untuk Pemula*. <https://books.google.co.id/books?id=gs3OEAAAQBAJ>

- LamanIT. (2022). 13 Pengertian UML Menurut Para Ahli dan Jenisnya. In *Lamanit.Com*.
- Marisa, F., & Yuarita, T. G. (2018). Perancangan Aplikasi Point of Sales (Pos) Berbasis Web Menggunakan Metode Siklus Hidup Pengembangan Sistem. *Jurnal Teknologi Dan Manajemen Informatika*, 3(2).
- Maulana, R., & Kusuma, D. (2019). Pengembangan Sistem Informasi Akademik Berbasis Web Menggunakan Framework CodeIgniter. *Jurnal Teknik Informatika*, 12(2), 159–168.
- Muhamad Mu'iz Raharjo, S. S. T. P. M. S. (2021). *Tata Kelola Pemerintahan Desa*. Bumi Aksara. <https://books.google.co.id/books?id=sZ9OEAAAQBAJ>
- Mulyadi, A. (2022). *Dasar-Dasar Sistem Informasi*. Surabaya: Penerbit Ilmu.
- Nggewa, M. Y., & Witi, F. L. (2021). Rancang bangun sistem informasi Desa Manulondo berbasis web. *SATESI: Jurnal Sains Teknologi Dan Sistem Informasi*, 1(2), 75–78.
- Nofri Yudi Arifin, S. K. M. K., Rohmat Indra Borman, S. K. M. K., Imam Ahmad, S. K. M. K., Sari Setyaning Tyas, S. K. M. T. I., Heni Sulistiani, M. K., Alim Hardiansyah, S. T. M. K., & Ghea Paulina Suri, S. P. M. K. (2022). *Analisa Perancangan Sistem Informasi*. Cendikia Mulia Mandiri. <https://books.google.co.id/books?id=LDxZEAAAQBAJ>
- Pangemanan, J. I. H. (2023). *Sistem Informasi Adalah: Ciri, Fungsi, Tujuan, Komponen, dan Contoh*. Media Indonesia.
- Prameswari, I. A., Noviyanti, Y., & Susilowati, T. (2024). *Pengantar Sistem Informasi*. Penerbit NEM. <https://books.google.co.id/books?id=2FX7EAAAQBAJ>
- Primakara University. (2023). *Jenis Bahasa Pemrograman dan Contohnya*. Info Teknologi.
- Putri, R. E., Tasril, V., & Lestari, A. N. (2024). *Pengembangan Sistem Bimbingan Dan Konseling*. Serasi Media Teknologi. <https://books.google.co.id/books?id=b-MxEQAAQBAJ>
- Sari, R. P., & Prasetyo, B. (2021). Peran Sistem Informasi Berbasis Komputer dalam Pengelolaan Sumber Daya Organisasi. *Jurnal Teknik Informatika (JUTI)*, 15(3), 45–58.
- Setiawan, B. (2021). *Analisis Sistem dalam Organisasi Modern*. Bandung: Penerbit Remaja Rosdakarya.
- Sihombing, V., & Pakpahan, S. (2020). Implementasi Aplikasi E-Commerce Berbasis PHP dan MySQL. *Jurnal SITECH*, 3(1), 31–40.
- Tri Rachmadi, S. K. (2020). *Sistem Basis Data*. TIGA Ebook. [https://books.google.co.id/books?id=b7\\_dDwAAQBAJ](https://books.google.co.id/books?id=b7_dDwAAQBAJ)
- Utami raffi, M. (2020). Sistem Manajemen Basis Data. *Sistem Informasi & Manajemen Basis Data*, April, 18. [https://www.researchgate.net/publication/344662419\\_ARTIKEL\\_SISTEM\\_MANAJEMEN\\_BASIS\\_DATA](https://www.researchgate.net/publication/344662419_ARTIKEL_SISTEM_MANAJEMEN_BASIS_DATA)
- Wanusmawatie, I., & Ulum, M. C. (2021). *Dinamika Per(desaan): Isu Strategis dan Rekomendasi Kebijakan*. Universitas Brawijaya Press. <https://books.google.co.id/books?id=jtIVeAAAQBAJ>
- Wartekonomi. (2021). Apa Itu CSS? In *Kamis*, 04 November.
- Widarti, E., Joosten, J., Pratiwi, P. Y., Pradnyana, G. A., Indradewi, I. G. A. A. D., Kamilah, N., Bahtiar, A. R., Maysanjaya, I. M. D., Sepriano, S., & Efitra, E. (2024). *BUKU AJAR PENGANTAR SISTEM INFORMASI*. PT. Sonpedia Publishing Indonesia. <https://books.google.co.id/books?id=4kLsEAAAQBAJ>
- Yusron Arif, A. (2019). Pengertian MySQL, Kelebihan Dan Kekurangan. 2019.