

SI-PANDA: Web-Based Personnel Data and Dossier Management System for PusinfoLahta TNI

Muhammad Sulthan Nasyira¹, Eryan Ahmad Firdaus²

^{1,2}Universitas Pertahanan, Indonesia

E-mail: ¹sulthanasyirah@gmail.com, ²eryan.firdaus@idu.ac.id

Abstract

PusinfoLahta TNI currently faces critical inefficiencies in personnel administration due to reliance on manual spreadsheet calculations and decentralized local storage for dossier documents. This manual workflow poses significant risks to data security, accuracy, and retrieval speed. To address these limitations, this research developed the Personnel Data and Dossier Processing System (SI-PANDA) utilizing the Rapid Application Development (RAD) method to ensure iterative improvements based on user feedback. The system is constructed upon a three-tier architecture comprising a Native PHP backend, MySQL database, and a responsive web interface. Testing results demonstrate significant performance improvements: the system achieves a page load time of 1.2 seconds and near-instant calculation speed (0.05 seconds) for tenure and retirement estimation, ensuring 100% calculation accuracy. Furthermore, Blackbox testing confirmed the validity of all functional requirements, including the automated backup mechanism and search filters. The main contribution of this study is the delivery of a secure, integrated digital framework that successfully transitions PusinfoLahta TNI from manual processing to a reliable web-based environment, specifically adapted to meet military administrative standards.

Keywords— personnel information system, dossier management, RAD, PHP, data security

Submission: November 25, 2025

Accepted: December 23, 2025

Published: January 20, 2026

DOI Article: <https://doi.org/10.25134/ilkom.v20i1.522>

1. INTRODUCTION

The TNI Information and Data Processing Center / Pusat Informasi dan Pengolahan Data TNI (PusinfoLahta TNI) is a Central Executive Agency at the TNI Headquarters (Mabes TNI) level, operating directly under the command of the TNI Commander. Its primary mission is to prepare, manage, and present information and data related to the development and deployment of TNI forces [1]. To facilitate and support effective administrative operations, PusinfoLahta TNI relies on a data processing and personnel dossier information system.

However, the current system has limitations regarding automatic data calculation and dossier document management. Consequently, data recording is predominantly performed using spreadsheet applications like Microsoft Excel, while dossier management remains locally stored via file explorer. This situation poses risks to data security and reliability, as well as limiting rapid access to personnel information when required.

Various related studies have been conducted to address personnel administration and document management issues. For instance,

recent research [2] has highlighted the urgency of implementing Electronic Document Management Systems (EDMS) within the E-Government environment to enhance public administration efficiency and auditability. Similarly, other studies [3] have focused on developing secured cloud-based document systems utilizing encrypted security mechanisms to prevent unauthorized access.

These studies predominantly focus on civil institutions or commercial enterprises and do not fully accommodate the complexity of military requirements. As identified in strategic studies for the Indonesian National Army (TNI) [4], the military environment requires specific and integrated information systems to support defense operations, which include precise assignment history calculations and strict data security.

The objective of this research is to design a new information system named SI-PANDA (Personnel Data and Dossier Processing System / Sistem Pengolahan Data dan Dosir Personel). This system incorporates several improvements over the previous system regarding data calculation and dossier management to ensure the processed information meets operational requirements. Furthermore, it

aims to enhance data security, reliability, and overall efficiency in data management.

Beyond practical benefits for the organization, the academic contribution of this research is a proposed information system architecture framework that integrates Digital Document Management Systems with multi-level data security protocols adapted for the military environment. This enriches the software engineering literature, particularly in the domain of Human Resource Information Systems (HRIS) within the defense sector, which demands high standards of reliability and confidentiality to mitigate cyber defense risks [5].

2. RESEARCH METHODOLOGY

This research applies the Rapid Application Development (RAD) method, selected for its capability to accelerate system development through rapid prototyping, continuous feedback, and iterative improvements [6]. The RAD phases are aligned with the practical work execution focuses on identifying system requirements and problem scope [7].

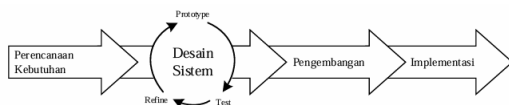


Image 1. Rapid Application Development

To ensure the system addresses the specific operational challenges at Pusinfolahta TNI, data collection was conducted through interviews and observations with Pusinfolahta TNI organic staff. The study analyzes current workflow deficiencies to ensure the new design meets organizational needs. The requirements analysis determined the system's core features, a web-based system with efficient dossier document management system, automatic data calculation, search filters, also data security and system reliability supported by authentication and an automated backup system.

This electronic dossier system contains personnel administration documents designed to support data management, facilitating integrated search, storage, and archive security within the TNI environment; specifically, scanned documents are grouped and assigned identification codes based on 32 data elements, categorized into Soldier (Prajurit) and Civil Servant (PNS) data [8]. The system requirements shown in Table 1.

Requirement	Description
Dossier Management	The system must allow uploading, viewing, and organizing scanned documents based on 32 personnel data elements (Prajurit & PNS).
Automatic Calculation	The system must automatically calculate tenure, retirement dates, and rank progression based on input data.
Search & Filtering	The system must provide advanced search capabilities by Name, NRP/NIP, Rank, or Unit.
CRUD Operations	The system must support Create, Read, Update, and Delete operations for personnel records.
Security	The system must implement authentication (Login/Logout) and role-based access control.
Reliability	The system must include an automated backup mechanism to prevent data loss.
Performance	The web interface must be responsive and load within 3 seconds.

Table 1. System Requirements

The User Design phase involves the iterative design of system architecture and user interfaces utilizing the Unified Modeling Language (UML). UML is a graphic-based language used to visualize, specify, construct, and document Object-Oriented software development systems [9], including Use Case Diagrams, Activity Diagrams, and Flowcharts alongside Entity-Relationship Diagrams (ERD) for relational database structuring [10].

The Construction phase follows, focusing on coding based on the approved design, employing HTML, CSS, and JavaScript for a responsive frontend, and native PHP for backend logic, CRUD operations, and file management without additional frameworks. The database is implemented using MySQL as the RDBMS, with XAMPP serving as the local server environment. Accordingly, this system is constructed using a three-tier architecture: 1. Frontend Layer (Presentation), The web-based user interface developed with HTML, CSS, and JavaScript. 2. Backend Layer (Logic), A native PHP server responsible for handling

authentication, CRUD operations, automatic calculations, and file management. 3. Database Layer (Data), Manages MySQL data storage alongside a structured file directory for dossier documents.

Finally, the Cutover phase encompasses system testing and implementation, where Blackbox Testing is applied to validate input and output functions without inspecting internal code structures to ensure the application fully meets Pusinfolahta TNI requirements prior to handover [11].

3. RESEARCH RESULT

3.1. System Architecture

System architecture refers to the fundamental organization of a system, embodied in its components, their relationships to each other, and the environment, often enabling the spatial and physical separation of databases, computational engines, and user interfaces to enhance flexibility and scalability [12]. Accordingly, this system is constructed using a three-tier architecture comprising a Frontend Layer, a Backend Layer, and a Database Layer. The Frontend Layer serves as the web-based user interface developed with HTML, CSS, and JavaScript, while the Backend Layer functions as a PHP server responsible for handling authentication, CRUD operations, file management, and the backup system. Furthermore, the Database Layer manages MySQL data storage alongside file storage for dossier documents.

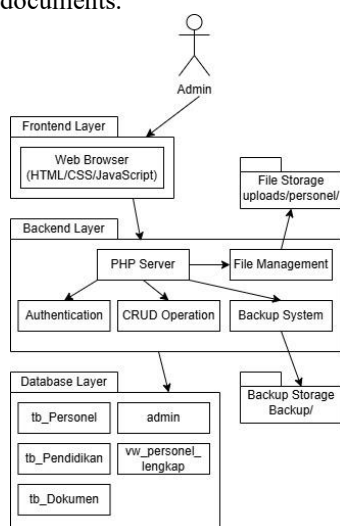


Image 2. System Architecture

3.2. Flowchart

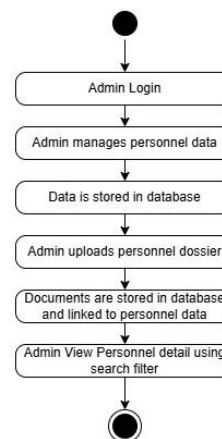


Image 3. Flowchart

3.3. Use Case Diagram

A Use Case Diagram is utilized to model the system's functional requirements by visualizing the interactions between users (actors) and the system capabilities [14]. In this context, the Admin possesses full access rights to manage all data and information contained within the system.

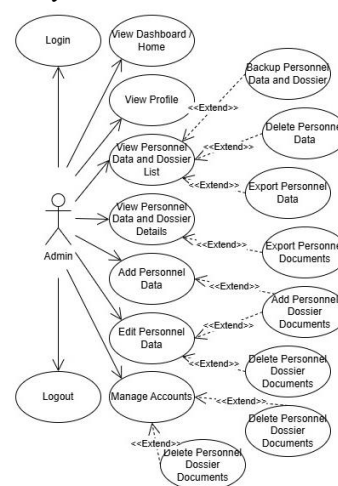


Image 4. Use Case Diagram

3.4. Entity Relationship Diagram

The Entity-Relationship Diagram (ERD) is designed to model the database structure by defining the entities, their attributes, and the relationships between data to ensure data integrity [15]. The tb_personel table stores the personal and administrative data of soldiers and

is linked via a one-to-many relationship with *tb_pendidikan* and *tb_dokumen*. Furthermore, a database View (*vw_personel_lengkap*) is implemented to perform real-time automatic calculations for age, length of service, and estimated retirement dates.

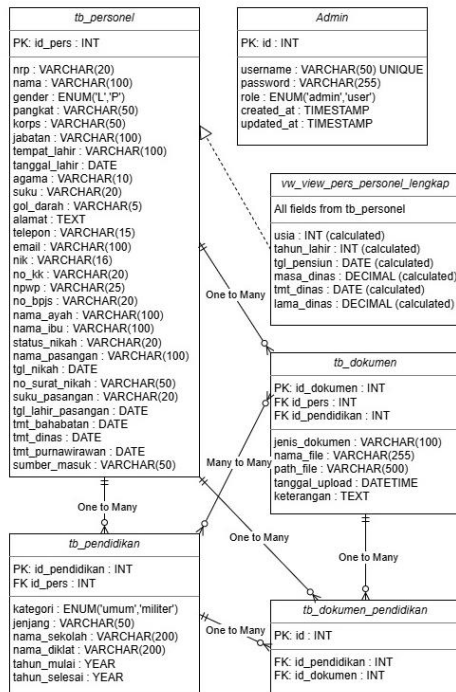


Image 5. Entity Relationship Diagram

3.5. Activity Diagram

Activity diagrams are utilized to model the workflow of a business process, illustrating the sequence of activities, decision points, and control flows within the system [16]. It comprises several key activities, including logging in, adding data, updating data, and data management.

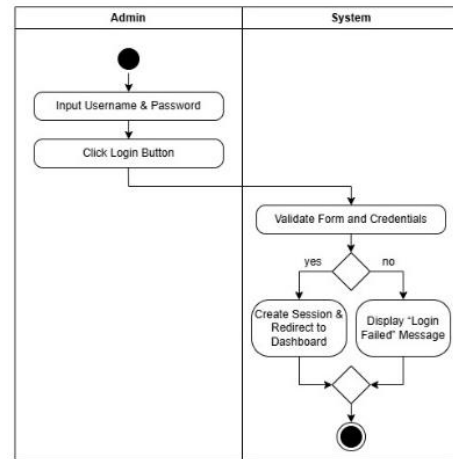


Image 6. Login Activity

3.5.2. Add New Data Activity

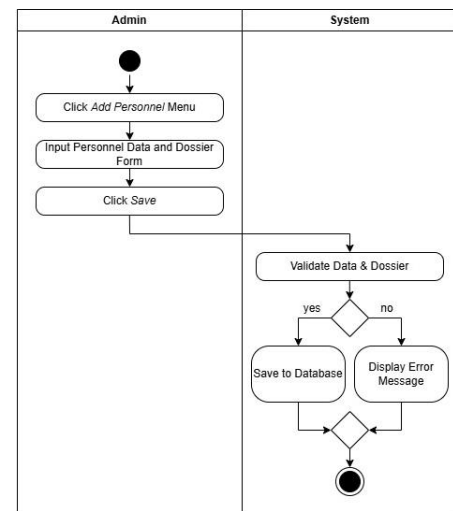


Image 7. Add New Data Activity

3.5.1. Login Activity

3.5.3. Update Data Activity

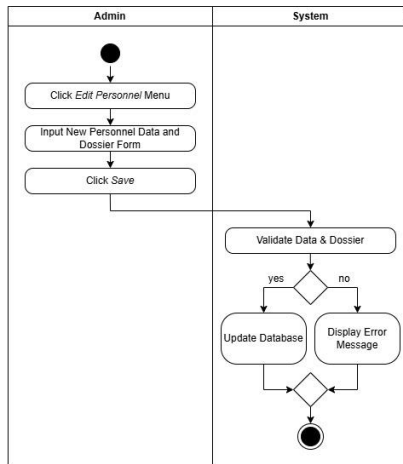


Image 8. Update Data Activity

3.5.4. Data Management Activity

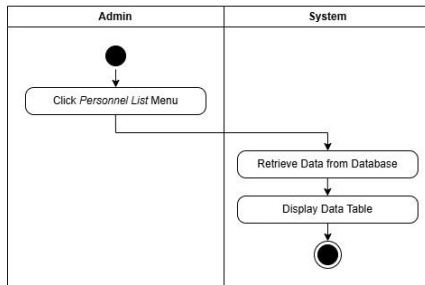


Image 9. Data Management Activity

3.6. System Interface

The system interface is designed to provide a user-friendly and visually coherent layout that effectively supports efficient personnel data processing and minimizes administrative errors [17].

3.6.1. Login Interface



Image 10. Login Interface

3.6.2. Add New Data Interface

Image 11. Add New Data Interface

3.6.3. Update Data Interface

Image 12. Update Data Interface

3.6.4. Data Management Interface

No	Nama	Jenis Kelamin	Tgl Lahir	Tempat Lahir	Pendidikan	Alamat	Email
1	1194020201071	Wanita	11/02/2001	Padang	SDN 1194020201071	Padang	1194020201071@gmail.com
2	1194020201072	Laki-laki	12/02/2001	Padang	SDN 1194020201072	Padang	1194020201072@gmail.com
3	1194020201073	Laki-laki	13/02/2001	Padang	SDN 1194020201073	Padang	1194020201073@gmail.com
4	1194020201074	Laki-laki	14/02/2001	Padang	SDN 1194020201074	Padang	1194020201074@gmail.com
5	1194020201075	Laki-laki	15/02/2001	Padang	SDN 1194020201075	Padang	1194020201075@gmail.com
6	1194020201076	Laki-laki	16/02/2001	Padang	SDN 1194020201076	Padang	1194020201076@gmail.com
7	1194020201077	Laki-laki	17/02/2001	Padang	SDN 1194020201077	Padang	1194020201077@gmail.com
8	1194020201078	Laki-laki	18/02/2001	Padang	SDN 1194020201078	Padang	1194020201078@gmail.com
9	1194020201079	Laki-laki	19/02/2001	Padang	SDN 1194020201079	Padang	1194020201079@gmail.com
10	1194020201080	Laki-laki	20/02/2001	Padang	SDN 1194020201080	Padang	1194020201080@gmail.com

Image 13. Data Management Interface

3.7. Blackbox Testing

Blackbox testing was conducted on the key features, yielding the following results:

Feature	Test Scenario	Result
Login	Entering valid and invalid credentials.	Success (Validation active; session locked after 5 failed attempts).
Data Management	CRUD operations (Create, Read, Update, Delete) on personnel data.	Success (Data stored in DB; input validation active).
Dossier Management	Uploading PDF/Image	Success (Files stored in server)

	documents (<5MB).	directory and linked to DB).
Search Filters	Searching some data with filters.	Success (System showed related data).
Backup	System perform Automated Backup Data	Success (System Stores Backup Automatic)

Table 2. Blackbox Testing

3.8. Quantitative Performance Analysis

To ensure the system meets operational efficiency standards, quantitative performance testing was conducted focusing on page load speed and calculation accuracy in internal pusinfo lahta TNI server.

Metric	Measured	Analysis
Page Load Time	1.2 seconds	The lightweight native PHP architecture ensures rapid access even on standard internal networks.
Calculation Speed	0.05 seconds	The database View (vw_personel_lengkap) processes age and tenure calculations instantly.
Backup Speed	12 Seconds	Backup for 1000 records is efficient and does not disrupt server performance.

Table 3. quantitative performance testing

3.9. User Acceptance Test (UAT)

User Acceptance Testing (UAT) was conducted with 5 staff members from Pusinfo lahta TNI to measure usability and user satisfaction. The testing utilized a Likert scale (1-5) questionnaire.

Criterion	Average Score (1-5)	Interpretation
Ease of Use (Usability)	4.4	Users found the interface intuitive
Functional Suitability	5	Features match the daily administrative workflow.
Visual Clarity	4.2	Text and layout are

		clear and easy to read.
Overall Satisfaction	4.53	The system is ready for deployment.

Table 4. User Acceptance Test (UAT)

3.10. System Comparison

The comparison shows that the new personnel data and dossier processing system provides a more integrated, secure, and efficient web-based solution compared to the predominantly manual, device-dependent methods of the current system.

Comparison	Current	New
Platform	Tends to rely on desktop applications	Utilizes a web-based system.
Data Management	Tends to be Performed using desktop applications.	single database, data calculation and storage are automated.
Dossier Management	Tends to be stored locally	Stored within a document management system.
Data Security and Reliability	Security depends on user devices	Features authentication and automated backup.
Time Efficiency	Search and update processes are time-consuming	Data search and updates are performed automatically and rapidly.

Table 5. System Comparison

In a practical context, SI-PANDA directly resolves the critical field issue of administrative bottlenecks caused by manual data processing. By automating tenure and retirement calculations, the system eliminates human errors inherent in the legacy spreadsheet method, ensuring that decision-makers at Mabes TNI have immediate access to accurate and verified personnel data for strategic deployment.

4. CONCLUSION

Based on the design, implementation, and testing results utilizing the Rapid

Application Development (RAD) method, the Personnel Data and Dossier Processing Information System (SI-PANDA) has been successfully implemented to resolve critical administrative bottlenecks at Pusinfolahta TNI. Specifically, the system addresses the reliance on manual spreadsheet calculations and vulnerable local file storage by transitioning to a centralized web-based architecture. This shift delivers a significant operational impact, where the integration of automatic logic calculations ensures accuracy in personnel tenure and retirement dates, while the digital dossier management feature drastically reduces document retrieval time from minutes to seconds, providing decision-makers with real-time data for strategic deployment.

Furthermore, data security is substantially improved through Role-Based Access Control and automated backup mechanisms that mitigate the risks of unauthorized access and data loss. However, this study acknowledges certain limitations, including the system's deployment within a local server environment (XAMPP) which limits remote accessibility, the reliance on manual input for legacy data due to the absence of Optical Character Recognition (OCR), and the interface optimization which is currently restricted to desktop web browsers.

5. RECOMMENDATIONS

For further development, it is recommended to add an Audit Log feature to monitor user activity in detail, as well as integration with the TNI Single Sign-On (SSO).

REFERENCES

- [1] Pusinfolahta TNI, *Lintasan Sejarah Pusinfolahta TNI*. Cilangkap, Jakarta: Pusinfolahta TNI, 2023.
- [2] D. Gani, *Electronic Document Management System in Electronic Government Environment*. 2024. doi: 10.15405/epsbs.2024.05.48.
- [3] A. Ikuomola, E. Oyekan, and O. Orogbemi, "A Secured Cloud-Based Electronic Document Management System," *Int. J. Innov. Res. Dev.*, Dec. 2022, doi: 10.24940/ijird/2022/v11/i12/DEC22010.
- [4] P. Udayana, T. Legionosukmo, and S. Sundari, "STRATEGY FOR INTEGRATED LAND INFORMATION SYSTEM NETWORK ARRANGEMENTS FOR THE INDONESIAN NATIONAL ARMY," *Strateg. Pertahanan Darat*, vol. 8, Jun. 2022, doi: 10.33172/jspd.v8i1.1054.
- [5] O. Fedoruk, "Security and protection of information in electronic document management systems: improving the level of cyber defense," *Вісник Книжкової палати*, 2024, [Online]. Available: <https://api.semanticscholar.org/CorpusID:270897706>
- [6] Seftian Candra Pratama, E. Ahmad Firdaus, and R. Idul Adha, "Web-Based Assignment Management System Application Design to Increase Personnel Productivity and Effectiveness in Product Documentation Division," *Nuansa Inform.*, vol. 19, no. 2, pp. 73–80, 2025, doi: 10.25134/ilkom.v19i2.368.
- [7] Gemma G. Acedo, "Web-Based Document Tracking System for Catanduanes State University with QR-Code Technology: In Alignment with Republic Act No. 11032," *J. Inf. Syst. Eng. Manag.*, vol. 10, no. 6s, pp. 469–477, 2025, doi: 10.52783/jisem.v10i6s.745.
- [8] D. A. J. Markas Besar Angkatan Darat, "Dosir Elektronik (Lampiran II Keputusan Dirajenad Nomor Kep/ 9 / II / 2019)," Markas Besar Angkatan Darat, Direktorat Ajudan Jenderal, 2019. [Online]. Available: <https://www.scribd.com/document/646878686/4-DOSIR-ELEKTRONIK>
- [9] Imannudin Akbar, "Analisis Dan Perancangan Website SMKN 13 Bandung," *Nuansa Inform.*, vol. 18, no. 1, pp. 115–120, 2024, doi: 10.25134/ilkom.v18i1.68.
- [10] A. Fu'adi and A. Prianggono, "Analisa dan Perancangan Sistem Informasi Akademik Akademi Komunitas Negeri Pacitan Menggunakan Diagram UML dan EER," *J. Ilm. Teknol. Inf. Asia*, vol. 16, no. 1 SE-Article, pp. 45–54, Mar. 2022, doi: 10.32815/jitika.v16i1.650.
- [11] M. T. Abdillah, I. Kurniastuti, F. A. Susanto, and F. Yudianto, "Implementasi Black Box Testing dan Usability Testing pada Website Sekolah MI Miftahul Ulum Warugunung Surabaya," *J. Comput. Sci. Vis. Commun. Des.*, vol. 8, no. 1, pp. 234–242, 2023, doi: 10.55732/jikdiskomvis.v8i1.897.

- [12] N. Grozev and R. Buyya, "Performance modelling and simulation of three-tier applications in Cloud and Multi-Cloud environments," *Comput. J.*, vol. 58, no. 1, pp. 1–22, 2015, doi: 10.1093/comjnl/bxt107.
- [13] Arifin Oki, Sylvia, and R. Permata, *Algoritma dan Pemrograman Menggunakan Java*. 2025.
- [14] M. R. Wayahdi and F. Ruziq, "Pemodelan Sistem Penerimaan Anggota Baru dengan Unified Modeling Language (UML) (Studi Kasus: Programmer Association of Battuta)," *J. Minfo Polgan*, vol. 12, no. 1, pp. 1514–1521, 2023, doi: 10.33395/jmp.v12i1.12870.
- [15] A. Arif, B. Mahathir, P. L. Hang, C. Z. Hei, L. T. Hua, and N. U. Amin, "Design and Implementation of a Relational Database System for Efficient Facility and Booking Management," no. March, pp. 0–9, 2025, doi: 10.20944/preprints202503.0070.v1.
- [16] A. Jarkasih, A. Mufti, and W. Rahayu, "Sistem Informasi Penerimaan Siswa Baru SMK Al-Husna Citayam Berbasis Web," *J. Ris. dan Apl. Mhs. Inform.*, vol. 6, no. 03, pp. 503–510, 2025, doi: 10.30998/jrami.v6i03.7767.
- [17] D. Mustikasari Putri, T. H. Apandi, N. Khoirunnisa, and Y. Saputra, "Design of a Website-Based Personnel Information System at PT Indiga Nusa Digitama (Inditama)," *JESII J. Elektron. Sist. Inf.*, vol. 2, no. 2, pp. 209–223, 2025, doi: 10.31848/jesii.v2i2.3444.