

Web-Based Human Resource Management System Using Laravel Framework

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Abstrak

Penelitian ini mengembangkan sistem manajemen sumber daya manusia berbasis web untuk mengatasi permasalahan pengelolaan SDM manual pada lembaga keuangan. Pengelolaan SDM secara manual menimbulkan kendala berupa sulitnya integrasi data, tingginya risiko kesalahan pencatatan, dan ketidakefisienan proses. Sistem dikembangkan menggunakan metode agile dengan basis data MySQL, framework Laravel, dan bahasa pemrograman PHP. Sistem ini mengintegrasikan modul manajemen pegawai, penilaian kinerja, penggajian, dan stress testing rekrutmen. Pengujian dilakukan menggunakan metode User Acceptance Testing (UAT) dan stress testing rekrutmen. Hasil penelitian menunjukkan bahwa sistem berhasil memenuhi kebutuhan pengguna dengan mengoptimalkan pengelolaan data kepegawaian secara digital dan terintegrasi. Sistem menyediakan akses informasi real-time, memfasilitasi penilaian kinerja, dan menghasilkan laporan SDM yang komprehensif. Implementasi sistem ini meningkatkan efisiensi operasional, akurasi data, dan kualitas pengambilan keputusan melalui integrasi proses pengelolaan SDM.

Kata kunci: Pegawai, Human Resource Management System, Web, Agile, Laravel.

Abstract

This research developed a web-based human resource management system to address manual HR management issues in a financial institution. Manual HR management created challenges including difficult data integration, high risk of recording errors, and inefficient processes. The system was developed using the agile method with MySQL database, Laravel framework, and PHP programming language. This system integrated employee management, performance assessment, payroll, and recruitment modules. Testing was conducted using User Acceptance Testing (UAT) and stress testing method. Research results showed that the system successfully met user needs by optimizing digital and integrated employee data management. The system provided real-time information access, facilitated performance evaluations, and generated comprehensive HR reports. The implementation of this system improved operational efficiency, data accuracy, and decision-making quality through integrated HR management processes.

Keywords : Employee, Human Resource Management System, Web, Agile, Laravel.

1. Introduction

Human Resource Management (HRM) is a specialized field of management that studies the relationship and role of humans in a work environment. Human Resource Management encompasses employee development, utilization, and protection, whether in employment relationships or self-employment. HRM involves activities related to human resource utilization, both employees and community members, to achieve goals maximally and effectively [1].

Human Resource Management plays a pivotal role in financial institutions, as organizational effectiveness is fundamentally dependent on the quality and management of human capital resources [2]. The transition from manual to digital HR systems represents a critical evolution in operational management for financial institutions seeking competitive advantage in an increasingly complex market environment [3]. Despite the recognized importance of integrated HR systems, numerous financial institutions continue to rely on rudimentary solutions like spreadsheet applications for personnel management, resulting in substantial operational inefficiencies, challenges in data integration, and elevated risks of documentation errors [4].

These limitations significantly constrain organizational capacity to leverage human capital as a strategic asset [5].

The implementation of a web-based Human Resource Management System (HRMS) offers a comprehensive solution to these challenges by automating HR processes, improving data accuracy, facilitating employee performance analysis, and supporting faster, more effective decision-making [6]. A well-designed HRMS integrates various HR functions including employee data management, performance evaluation, payroll processing, and recruitment into a cohesive digital ecosystem [7]. This integration eliminates data silos and provides real-time visibility into workforce metrics that are essential for strategic planning[8].

The Employee Self-Service (ESS) component represents a particularly innovative feature of modern HRMS platforms, empowering employees to independently manage various administrative HR requirements digitally [9]. This transformative approach not only generates significant time savings in completing administrative tasks but also creates space for employees to maximize their contributions to core responsibilities directly related to enhancing organizational productivity [10].

Choosing a web-based platform for HRMS development offers several advantages, including superior accessibility that allows users to access information from various devices and locations, easier system updates and maintenance compared to traditional desktop applications, and better integration capabilities with other organizational systems [11]. The Laravel framework provides an ideal technological foundation for web-based HRMS development due to its robust security features, scalability, and extensive community support that ensures long-term system sustainability [12].

This research focuses on designing and implementing a web-based Human Resource Management System with two primary innovations. First, a comprehensive performance evaluation system that integrates three assessment components: Key Performance Indicators (80%), Competencies (10%), and Core Values (10%), with structured calculation formulas and clear evaluation criteria. Second, an Employee Self-Service module enabling employees to manage personal data, submit leave requests online, access digital payslips, and view performance evaluation history independently [13]. The combination of these features creates an efficient and transparent HR system that helps the bank improve employee data management while addressing various other employee management needs.

2. Research Method / Proposed Method

This research uses the Agile Software Development Life Cycle (SDLC) model as the system development methodology [14]. The Agile model was chosen for its flexibility and iterative approach through six phases: Requirements, Design, Development, Testing, Deployment, and Review [14]. The development process involves requirements gathering through stakeholder collaboration, flexible architecture design, and feature development in short sprints using Laravel framework with PHP and MySQL [15]. In this HRMS development, these sprints were implemented in two-week cycles, focusing on specific modules from core features (authentication, master data) to HR automation (leave management, performance assessment) and advanced features (employee self-service, recruitment). Each sprint integrated continuous testing and stakeholder feedback, ensuring the system effectively met user requirements while maintaining development flexibility [16].



Figure 1 Research Flow Chart

Figure 1 is the stages of the Agile model in the development of a Web-based Human Resource Management System using the Laravel Framework. The following is an explanation of the stages of the Agile model development [14].

2.1. System Overview

Web-Based Human Resource Management System Using Laravel Framework has a general system overview aimed at modeling the system and facilitating an understanding of how the system will be structured. The general system overview for this research can be seen in the following diagram.

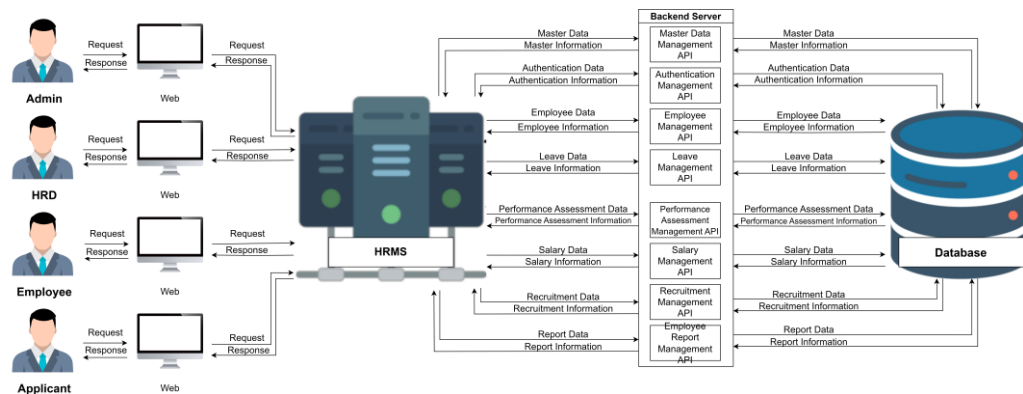


Figure 2 System Overview

Figure 2 illustrates the comprehensive architectural structure of the Web-Based Human Resource Management System Using Laravel Framework. This system involves four main entities: Admin, HRD, Employees, and Applicants, who interact through a web interface. The center of the system is the HRMS server that connects users to the backend server. This backend server consists of various APIs that manage functions such as master data management, authentication, employee management, leave management, performance assessment, payroll, recruitment, and HR reporting.

2.2. Context Diagram

A context diagram is a modeling tool used to represent the overall view of an information system. It depicts the entities involved, data flows, and processes within the system [17]. The context diagram for the Web-Based Human Resource Management System Using Laravel Framework illustrates these components.

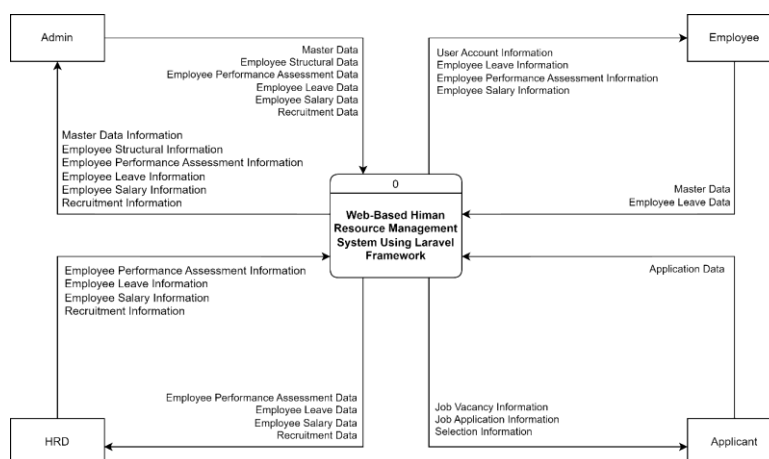


Figure 3 Context Diagram

Figure 3 shows the Context Diagram of the Web-Based Human Resource Management System Using Laravel Framework which illustrates the data flow between four main entities: Admin, HRD, Employees, and Applicants with the system. Admin can manage master data and employee structural data, HRD handles performance assessment data, leave, payroll, and recruitment, Employees can access their account information and personal data, while Applicants can view job vacancy information and submit application data through the system.

3. Literature Study

The initial study published in TelKa Journal examines the creation of a web-based Human Resource Management (HRM) platform at Advent Hospital Bandar Lampung. The study aimed to replace the existing Microsoft Excel-based system with a more integrated solution using the CodeIgniter framework. The methodology used was SDLC (System Development Life Cycle), including requirements analysis, system design, implementation, and testing. The results showed that the system successfully improved the efficiency of attendance, payroll, and leave management, while facilitating better communication among hospital staff [18].

The second study from KomtekInfo Journal focuses on developing a web-based HRMS at PDAM Kabupaten Lingga. The research aimed to facilitate management in handling employee data, including attendance, payroll, transfers, and terminations. Using this system, human error risks in employee data management could be minimized while making processes more effective and efficient. The system also enables direct interaction between employees and management through features such as attendance submission and budget usage reporting [19].

The third research from Jurnal Elektronik Ilmu Komputer Udayana discusses the development of a Human Resources Management System (HRMS) application for PT. Omnia Media. The research was conducted because the company was still using a manual system for HR data management, making processes difficult. The result was a web-based HRMS application that could assist in HR management processes at PT. Omnia Media, from employee data collection, payroll, leave, to performance assessment, ultimately increasing the efficiency and effectiveness of HR management [20].

The fourth study from Jurnal Responsif discusses the implementation of the Laravel framework in developing an HRIS (Human Resource Information System) at PT Octagon Studio Ltd. The research was motivated by manual HR management issues, particularly in salary calculations and leave requests. The development method used was waterfall with PHP Laravel framework and MySQL database. The result was a web-based HRIS application that helps companies manage employee data, salary calculations, and leave requests more efficiently [21].

The fifth research from Jurnal Informatika dan Teknologi Komputer discusses the design of a web-based Human Resource Information System at PT The Master Steel. The study aimed to address issues with their manual HR system by implementing a waterfall method with black box testing, resulting in an accessible HRIS that effectively manages employee data, attendance, payroll, and performance evaluations [5].

3.1. Human Resource Management System

Human Resource Management System (HRMS) is an integrated software designed to automate and manage all human resource processes within an organization [22]. Building upon Human Resource Management, which is a specialized field of management that studies the relationship and role of humans in a work environment and encompasses employee development, utilization, and protection, this system encompasses various functions such as employee data management, payroll administration, performance management, recruitment, training, and employee development [23]. HRMS helps HR departments optimize workflows, improve data accuracy, and provide timely information access for strategic decision-making [24].

3.2. Employee Self Service (ESS)

Employee Self Service (ESS) is a module within human resource management systems that allows employees to access and manage their personal information and perform various HR activities independently [25]. Through the ESS platform, employees can view pay slips, apply for leave, update personal data, access company documents, and track their performance development without having to directly consult with the HR department [26].

3.3. Website

Website is a collection of interconnected web pages that can be accessed via the internet using a web browser. In the context of information system development, websites serve as the primary platform that allows users to interact with the system through an intuitive graphical interface [27]. Modern websites consist of three main components: domain (unique address), hosting (file storage), and content (presented information) [28]. Website development involves the use of various technologies such as HTML, CSS, JavaScript, and server-side programming languages to create applications that are responsive, secure, and user-friendly [29].

3.4. Agile

Agile methodology is an iterative software development approach that emphasizes flexibility and continuous improvement through short development cycles called sprints. This methodology focuses on delivering working software incrementally while adapting to changing requirements and maintaining close collaboration between developers and stakeholders [16]. Unlike traditional methods, Agile enables teams to respond quickly to changes, reduce development risks through regular feedback, and ensure high-quality deliverables through continuous testing and integration [14].

3.5. Laravel Framework

Laravel Framework represents an open-source web development platform built on PHP that implements the Model-View-Controller (MVC) architectural design methodology [30]. When compared to other PHP frameworks, Laravel was chosen for this HRMS development due to its significant advantages. Unlike CodeIgniter which offers basic MVC architecture, Laravel provides more sophisticated features including robust security systems and elegant syntax. Compared to Symfony's steep learning curve, Laravel offers better development speed and comprehensive documentation. While Yii framework excels in performance, Laravel's extensive ecosystem, modern development tools through Artisan CLI, and strong community support make it more suitable for rapid HRMS development where security, maintainability, and scalability are crucial factors. This framework was developed by Taylor Otwell and released under the MIT license [31]. Laravel offers expressive and elegant syntax, robust security features, and various tools that simplify common web development tasks such as authentication, routing, and database management [13]. The framework also comes with a command-line interface called Artisan that allows developers to automate various development processes.

4. Result and Discussion

This section discusses research findings related to the design process of the Web-Based Human Resource Management System Using Laravel Framework. The system testing stage involves the use of black box testing techniques and User Acceptance Testing (UAT) evaluation.

4.1. System Interface

The system interface of Web-Based Human Resource Management System Using Laravel Framework emphasizes user-friendliness and efficiency, featuring integrated modules for payroll, leave requests, and performance appraisals with real-time access through an informative dashboard and role-based security controls.

1) Dashboard Interface

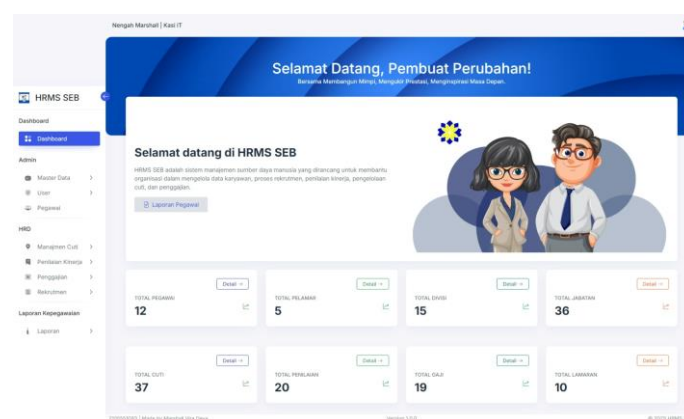


Figure 4 Dashboard Interface

Figure 4 is the implementation of the dashboard page interface. In this interface, users can see what features can be used based on the role they have. In the example figure 5 is a dashboard for the admin role.

2) Add Leave Request Interface

Figure 5 Add Leave Request Interface

Figure 5 is an implementation of the Add Leave Request Interface page. In this interface, users can fill out forms for leave requests such as leave type, start date, end date, and description.

3) Leave Approval Interface

Figure 6 Leave Approval Interface

Figure 6 is an implementation of the Leave Approval page interface. In this interface, the user can accept or reject the leave application by considering the type of leave, start date, end date, and description. This interface can only be opened by Admin or HRD.

4) View Leave Card Interface

Figure 7 View Leave Card Interface

Figure 7 is an implementation of the View Leave Card page interface. In this interface the user can view the leave application card along with all the information contained therein such as employee information, leave application information, leave period, and leave reason.

5) Add Employee Performance Appraisal Interface

Figure 8 Add Employee Performance Appraisal Interface

Figure 8 is an implementation of the Add Employee Performance Appraisal page interface. In this interface users can fill in the employee performance appraisal form, there are three aspects of assessment, namely key performance indicator assessment, competency assessment, and core values assessment. This interface can only be opened by Admin or HRD.

6) View Appraisal Report Card Interface

The screenshot shows the 'View Appraisal Report Card' interface. The header includes a welcome message and the system name 'HRMS SEB'. The main content area is titled 'Penilaian Kinerja' and displays the following information:

- Informasi Pegawai:**
 - Nama: Pulu Marshall
 - NPK: 123456789
 - Jabatan: Kabag Pengawasan Kredit
- Rincian Penilaian Kinerja:**

Aspek Penilaian	Nilai
KPI	5.00
Kompetensi	2.00
Core Values	2.00
Nilai Akhir	4.48
Produk	Buku
- Catatan:** (Empty text area for notes)

At the bottom, there are buttons for 'Kembali' (Back) and 'Cetak PDF' (Print PDF).

Figure 9 View Appraisal Report Card Interface

Figure 9 is an implementation of the View Appraisal Report Card page interface. In this interface, users can view their performance appraisal card along with all the information contained therein such as employee information, performance appraisal details and notes.

7) Add Salary Interface

The screenshot shows the 'Add Salary' interface. The header includes a welcome message and the system name 'HRMS SEB'. The main content area is titled 'Manajemen Penggajian' and displays the following information:

- Informasi Pegawai:**
 - Nama: Pulu Marshall
 - NPK: 123456789
 - Jabatan: Kabag Pengawasan Kredit
- Form Tambah Gaji:**
 - Periode Gaji: (Dropdown menu)
 - Pada Tanggal: (Date input)
 - Jumlah Hari Kerja: (Number input)
 - Jumlah Hari Lembur: (Number input)
- Preview Gaji:**

Penghasilan	Potongan
Gaji Pokok: Rp 10.000.000	Potongan Pajak: Rp 3.000.000
Insentif: Rp 1.000.000	Potongan BPJS: Rp 200.000
Bonus Karyawan: Rp 500.000	Gaji Bersih: Rp 10.300.000
Tunjangan Keluarga: Rp 2.000.000	
Total Penghasilan: Rp 13.500.000	
- Ketentuan Penggajian:**
 - Kategori Gaji:
 - Gaji Pokok: Berdasarkan jabatan
 - Insentif: Berdasarkan pencapaian kinerja
 - Bonus Karyawan: Rp 25.000.000
 - Potongan:
 - Pajak: 30% dari total penghasilan
 - BPJS: Rp 200.000/bulan

At the bottom, there are buttons for 'Simpan' (Save) and 'Batal' (Cancel).

Figure 10 Add Salary Interface

Figure 10 is an implementation of the Add Salary page interface. In this interface the user can fill in the payroll form, there are two things that must be inputted, namely the number of working days and the amount of overtime. Then the salary will be automatically calculated by the system. This interface can only be opened by Admin or HRD.

8) View Salary Slip Interface

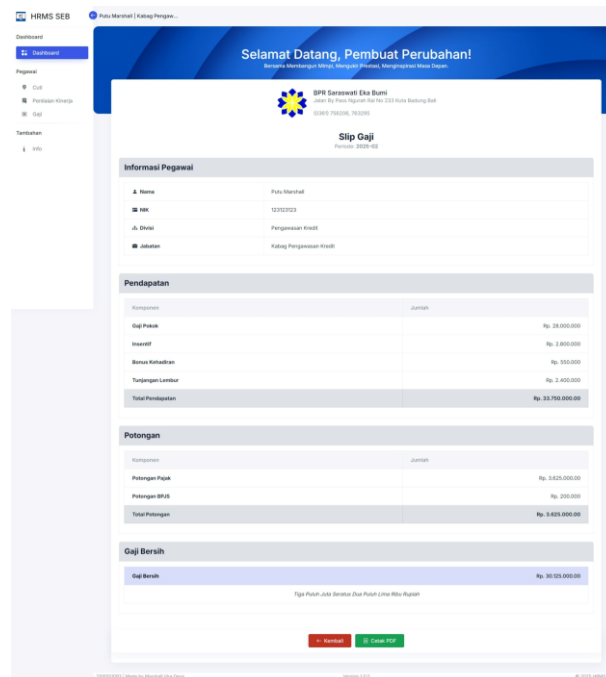


Figure 11 View Salary Slip Interface

Figure 11 is an implementation of the View Salary Slip page interface. In this interface the user can view the salary slip along with all the information contained therein such as employee information, income details, deduction details, and net salary.

4.2. Testing Result

System testing for the development of Web-Based Human Resource Management System Using Laravel Framework uses two methods: User Acceptance Testing (UAT) and Stress Testing. The following is an explanation and results of testing the Web-Based Human Resource Management System Using Laravel Framework.

1) User Acceptance Testing (UAT)

User Acceptance Testing (UAT) results were obtained from data collected through Google Forms. A total of 30 respondents participated in this study, including 15 people identified as employees and 15 people from the general public. These respondents evaluated 18 scenarios described in the user evaluation questionnaire. The UAT results are presented graphically in the following figures and tables.

Table 1 UAT Questionnaire Results

No	Question	Rating Scale					Total	Average	Percentage
		SA	A	N	D	SD			
1	Do all features function properly based on user access?	18	12	0	0	0	138	4,60	92%
2	Do the main processes run smoothly?	13	17	0	0	0	133	4,44	89%
3	Does the system provide clear confirmation after you take an action?	17	13	0	0	0	137	4,57	91%
4	Does the system respond quickly to user actions?	12	18	0	0	0	132	4,40	88%
5	Does the system remain stable when used for extended periods?	13	17	0	0	0	133	4,43	89%
6	Can the system be accessed well from various devices and browsers?	15	15	0	0	0	135	4,50	90%

7	Is the system responsive across different devices?	15	7	8	0	0	127	4,23	85%
8	Is the system's interface easy to understand and consistent?	20	10	0	0	0	140	4,67	93%
9	Are the visual elements in the HRMS comfortable to view and easy to read?	13	17	0	0	0	133	4,43	89%
10	Are features easily accessible based on user roles?	15	15	0	0	0	135	4,50	90%
11	Do the login and logout processes work well?	17	13	0	0	0	137	4,57	91%
12	Do you feel your personal data is secure in the system?	21	9	0	0	0	141	4,70	94%
13	Do you trust the system's data confidentiality?	20	10	0	0	0	140	4,67	93%
14	Is the system reliable in maintaining user data?	13	17	0	0	0	133	4,44	89%
15	Is the system structure easy to understand?	16	14	0	0	0	136	4,54	91%
16	Can the HRMS be easily modified for upgrades?	20	10	0	0	0	140	4,67	93%
17	Is the HRMS compatible across platforms?	12	18	0	0	0	132	4,40	88%
18	Is the system easily upgradeable?	19	11	0	0	0	139	4,64	93%
Total		289	243	8	0	0	2441	4,52	90%

Table 1 is the UAT Testing Results show a very good level of acceptance from users, with respondents giving an average percentage of 90%, which indicates that the system has met the needs and expectations of users, has an easy-to-use interface, functionality that suits the operational needs of the company, and overall can be accepted and implemented very well.

2) Stress Test

Stress Testing is a non-functional testing method that aims to evaluate system stability and reliability by providing workloads that exceed normal usage limits, where in testing the Web-Based Human Resource Management System Using Laravel Framework, it is carried out using Grafana k6 which allows simulating large amounts of user traffic programmatically through four different scenarios: `warm_up` for 5 minute with 0-30 Virtual Users (VUs), `load_test` for 18 minutes with 30-45 VUs, `stress_test` for 17 minutes with 45-80 VUs, and `spike_test` for 10 minutes with a rapid spike of up to 100 VUs, which aims to evaluate system response from normal load conditions to extreme traffic spikes.

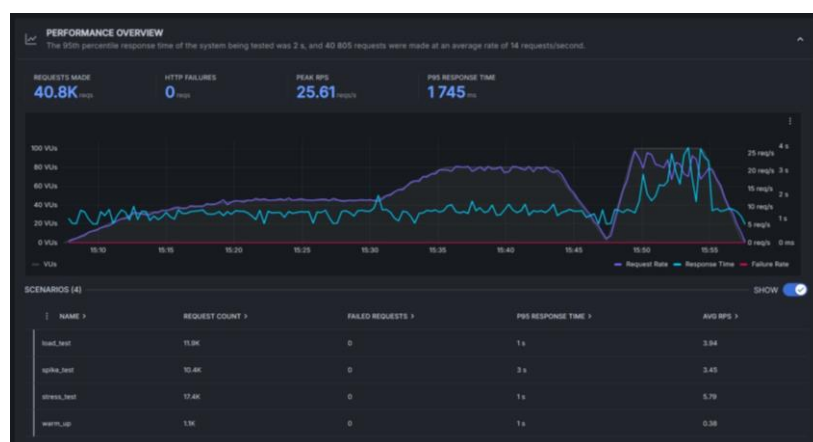


Figure 13 Stress Testing Result

Figure 13 shows the Stress Test results indicating that the Human Resource Management System was able to handle 40.805 requests with 0 failures (0%), an average of 14 requests per second and 95% of requests were processed in less than 1.745 ms, with a peak capability of 25.61 requests per second, where the system performed well under normal load and remained stable during the spike_test phase, demonstrating good resilience in handling sudden traffic spikes without requiring additional optimization.

5. Conclusion

The Web-Based Human Resource Management System has been successfully implemented with excellent results. Stress testing demonstrates robust performance handling 40,805 requests with 0 HTTP failures, averaging 14 requests per second with peak capability of 25.61 requests per second. While all HTTP requests succeeded, 11.67% exceeded the 2000ms response time threshold during spike testing. The system shows strong stability under normal loads and good resilience during traffic spikes, though response time optimization during peak loads presents an opportunity for improvement.

User Acceptance Testing (UAT) conducted with 30 respondents, consisting of 15 employees and 15 people from the general public, produced an average acceptance percentage of 90%. This indicates that the system has met user needs, features an easy-to-use interface, and functionality that aligns with the company's operational requirements to improve the efficiency of human resource management in the company.

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