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Web Design and Development of 'Peduli PMI' System for Managing Complaints and Protection of Indonesian Migrant Workers

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***Abstract*— Indonesian Migrant Workers (PMI) face high occupational risks, making it essential to provide them with appropriate attention to prevent and reduce unwanted incidents. A computerized system in the form of a web application can assist administrators in managing PMI complaints and protection more effectively. Through this system, administrators can handle PMI data, manage content such as news and announcements, monitor statistics related to users, complaints, and protection cases, and manage complaint and protection data submitted by PMI to ensure their safety. This study aims to design and develop a Complaint and Protection Management System Website for PMI in Malaysia. The system includes four main features: secure admin access with login, user registration, password recovery, and administrative capabilities. Administrators can manage user data, handle complaints, update report status, respond to complaints, view other administrators' lists, and modify personal data and password settings. Additionally, they can manage front-end content for the mobile application, including news and announcements. This system is designed to be efficient and responsive to the needs of PMI. The study conducted four tests—Functionality Testing, API Testing, Performance Testing, and Security Testing. Performance testing using GTMetrix showed optimal results, with scores reaching 96% in several test server locations. "Peduli PMI" has met the ISO/IEC 25010 standards in terms of functionality, performance, security, and integration, making it a ready and reliable system.**

***Index Terms*— Indonesian Migrant Worker (PMI); Admin; Website Management System, Web Design, Laravel.**

I. INTRODUCTION

Based on Law No. 18 of 2017 on the Protection of Indonesian Migrant Workers, Indonesian Migrant Workers (PMI) are individuals employed overseas under fixed-term agreements [1], [2]. Despite this legal recognition, PMIs face high occupational risks such as mistreatment, neglect, and unfair treatment. Issues like human rights violations, inadequate protection, and high unemployment rates or arbitrary dismissals create significant challenges for these workers [3], [4]. For example, the tragic abuse case of Adelina, a PMI from East Nusa Tenggara who suffered violence in Malaysia in 2018, reveals the vulnerabilities migrant workers face abroad and highlights the weaknesses in the protection system available to them [5]. These vulnerabilities are further exacerbated by various challenges in the complaint system, including the manual creation of complaint forms, inefficient data recapitulation, inconsistent data formats, data duplication, outdated data, and obstacles in accessing information to update ongoing case developments [4].

To address these issues, a structured and reliable system for managing PMI complaints and protection is essential. This solution is realized through the development of a web-based system designed to support the comprehensive administration of PMI data. This web application aims to simplify administrative tasks by enabling administrators to monitor complaint statistics, manage content on partnerships, news, and other important information. Additionally, the system facilitates real-time management of complaint and protection status reports, allowing administrators to respond promptly to incoming reports from PMIs working abroad.

Through the use of this complaint and protection management system—developed with the Laravel framework and MySQL database—this platform is expected to be an effective tool for enhancing PMI security and comfort. Following ISO/IEC 25010 testing standards for functionality, performance, and security, alongside API testing with ThunderClient, this system

aims to not only be reliable but also provide PMIs with a sense of security. The hope is that this system will serve as a dependable resource for PMIs, easing concerns over work environments far from home and allowing them to lead more secure and peaceful lives in their host countries.

II. LITERATURE REVIEW

A. PMI (Indonesian Migrant Workers)

Law No. 18/2017 on the Protection of Indonesian Migrant Workers defines Indonesian workers, now referred to as Indonesian Migrant Workers (PMI), as individuals who migrate abroad to fulfill work contracts for a specified period [1], [2].

Full attention should be given to Indonesian Migrant Workers to reduce and prevent unwanted incidents, as they face a high level of occupational risk, including mistreatment or violence by employers. Violence is a deliberate act intended to harm someone, affecting people indiscriminately, although women are particularly vulnerable. In addition to legal protection, a system is needed to address human rights violations against migrant workers, one of which is a monitoring system. In this regard, the government must prioritize addressing these issues [3], [4].

In Malaysia, around 2.5 million low-wage migrant workers are at risk of being laid off without pay, and sadly, 400,000 workers have been evicted from rented homes due to inability to pay rent. Concerns are growing about the economic well-being of families back home, as these workers have been unable to send money for several months. The case of abuse involving Adelina, an Indonesian migrant worker from East Nusa Tenggara, in Malaysia on February 10, 2018, became a tragic event that highlighted the vulnerability and insecurity of migrant workers abroad [5].

B. Management System

A Management System is a platform used to oversee various aspects of an organization, including risk management, employee productivity, and performance evaluation. This management system website enables users to manage processes, reduce risks, enhance employee productivity, and conduct evaluations. The system can store, retrieve, modify, process, and delete information or data received from other information systems or equipment [6].

C. Website

The World Wide Web (WWW), commonly known as a website, is a key facility on the vast internet, serving as an information medium and a promotional tool. According to Abdullah, a website is defined as a collection of pages containing digital information in the form of text, images, animations, sound, video, or a combination thereof, accessible via an internet connection to viewers worldwide. Web pages are created using a standard language, HTML, which is translated by a web browser to display information in a readable format for users [7].

D. Complaints and Protection

According to the Big Indonesian Dictionary (KBBI), a complaint is an expression of dissatisfaction regarding matters that may seem minor but still require attention, while public complaints reflect the community's aspiration to actively participate in monitoring an agency's performance. Presidential Regulation Number 76 of 2013 defines a complaint as a submission by the complainant to the public service complaint manager concerning services that do not meet established standards, neglect of duties, and/or violations by public service providers. Meanwhile, KBBI defines protection as the act of providing safety, and Article 1, Point 25 of the Criminal Procedure Code states that a complaint is a notification accompanied by a request from an interested party to an authorized official to take legal action against a person who has committed a criminal offense causing harm to the complainant [8].

E. Laravel

Laravel is an open-source, free PHP-based web framework created by Taylor Otwell, designed for developing web applications that use the MVC pattern [9]. The MVC structure in Laravel is slightly different from the traditional MVC pattern. In Laravel, routing bridges requests between the user and the controller, so the controller does not receive requests directly. Additionally, Laravel stands out for its expressive syntax, enabling developers to write code more easily and efficiently. The Blade templating engine, used to manage views, provides a clean and powerful way to generate dynamic views. The framework also includes various integrated features, such as an intuitive routing system, user authentication management, session handling, security, and ready-to-use cache management [10].

F. API

An Application Programming Interface, commonly known as an API, is a component of a software system that consists of a collection of functions, commands, and protocols that enable computer systems to interact with one another [11]. The purpose of using an API is to accelerate the process of building interactions between software by utilizing pre-existing or separately developed functions [12].

G. Functionality Testing

In the aspect of functionality testing, a research instrument in the form of test cases is used with a Guttman scale. The Guttman scale is employed to obtain definitive answers to the problems being addressed [13]. This type of measurement scale provides clear responses, namely “Yes” or “No,” where “Yes” is assigned a value of 1 and “No” a value of 0 for each item [13].

TABLE I. GUTTMAN SCALE CONVERSION [13]

Result	Score
Yes	1
No	0

The calculation is performed using the success percentage and the feasibility percentage table as follows:

$$percentage\ of\ success = \frac{1}{r} x100\% \quad (1)$$

Where:
i = number of functional requirements successfully implemented
r = total number of functional requirements

H. Perfomance Testing

Performance testing assesses the relative performance level of a system's resources under specific conditions [14] . It measures the time required to access various functionalities, the capacity needed during system access, and the resources utilized by the system. This stage of testing is conducted with the help of web tools. Among the performance tools available for search engines is GTMetrix. GTMetrix is used to determine performance scores, which include metrics such as page speed, fully loaded time, total page size, and the number of requests on the analyzed system. These scores help evaluate the system's performance efficiency [15]. For interpreting the GTMetrix score and the metrics LCP (Largest Contentful Paint), TBT (Total Blocking Time), and CLS (Cumulative Layout Shift), please refer to Tables 2 and 3.

TABLE II. GTMETRIX SCORE INTERPRETATION [15]

Score	Color Code	Adjective Rating
0-49	*Red*	*Poor*
0-89	*Orange*	*Needs Improvement*
90-100	*Green*	*Good*

TABLE III. INTERPRETATION OF LCP, TBT, AND CLS IN GTMETRIX [15]

Adjective Rating	CLS	TBT	LCP
Good	<0.1	<150	<1200
OK	0.1 – 0.15	150 – 224	1200 – 1666
Longer	0.15 –0.25	224 – 350	1666 – 2400
Much Longer	>0.25	>350	>2400

I. Security Testing

Security refers to the ability of a system to protect information and data from access by unauthorized parties, ensuring control over data access based on user permission levels [16]. Website testing concerning security utilizes Sucuri Online Web Vulnerability Scanner software. To evaluate the security of the "Peduli PMI" Management System Website, which serves as a platform for complaints and protection for Indonesian Migrant Workers in Malaysia, Sucuri software is employed.

J. API Testing using ThunderClient

API testing using ThunderClient aims to ensure that all requests and responses between the website (acting as a server) and the "Peduli PMI" mobile application (acting as a client) function correctly and efficiently. This test will evaluate the API integrated with the "Peduli PMI" application to observe how data is sent, received, and processed. ThunderClient provides the necessary tools to conduct thorough API testing.

III. METHODOLOGY

This study aims to design and develop a Complaint and Protection Management System Website for Indonesian Migrant Workers (PMI) in Malaysia. The primary objectives are to enhance the management of PMI complaints and protection cases, ensure secure access for administrators, and provide effective data handling.

A. System Design and Development

The development process involves several stages:

- Requirements Analysis: Identify the specific needs of PMI and administrators regarding complaint management and protection services.
- System Design: Create a detailed design of the web application, including user interface (UI) mockups and database schema.
- Development: Use appropriate programming languages and frameworks to build the system, ensuring it includes the following key features:
  - Secure admin access with login functionality.
  - User registration and password recovery options.
  - Administrative capabilities for managing user data, complaints, and report statuses.
  - Content management for news and announcements relevant to PMI.

B. Testing Methods

Four types of testing will be conducted to ensure the system meets required standards:

- Functionality Testing: Verify that all features work as intended, including user registration, complaint submission, and administrative functions.
- Performance Testing: Assess the system's response times and load handling capabilities to ensure it can support multiple users simultaneously.
- API Testing: Use ThunderClient to ensure correct and efficient communication between the web application and the "Peduli PMI" mobile application.
- Security Testing: Implement Sucuri Online Web Vulnerability Scanner to identify potential security risks and ensure data protection for PMI.

C. *Use Case Diagram*

To visualize the interaction between users and the system, a use case diagram is needed to describe the functionality. The following is a use case diagram for the "Peduli PMI" Management System Website, as shown in Figure 1.

Based on Figure 1, users can perform the following activities using the "Peduli PMI" Management System Website:

1. Reset their password if they forget it.
2. Register through the registration form.
3. Log in to access the website.
4. Manage announcements and news for the "Peduli PMI" Mobile App.
5. Manage all data and activities related to Registrant Data.
6. Manage all data and activities related to User Data.
7. Manage all data and activities related to Complaint Data reported by Indonesian Migrant Workers, either by themselves or others.
8. Manage all data and activities related to Protection Data reported by Indonesian Migrant Workers, both self-reported and reported by others.
9. Change the admin's personal data, including email, name, NIK, mobile number, and password as needed.

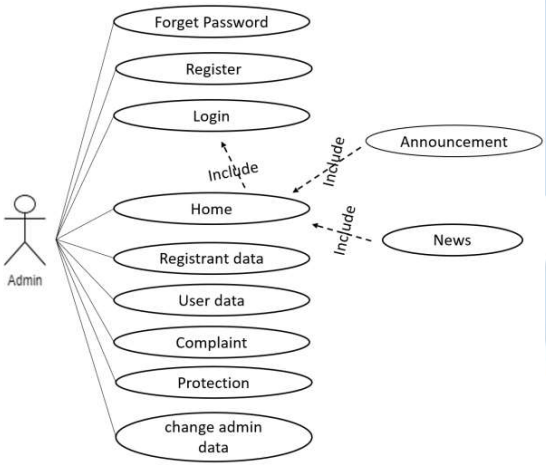


Fig. 1. Use case diagram

D. *Architecture Diagram*

The following is PMI care system architecture diagram, on the "Peduli PMI" Management System Website as follows in Figure 2.

The "Peduli PMI" Management System website serves as a server that interacts with the application through the Hypertext Transfer Protocol (HTTP) to facilitate communication between the client and the server. This website is responsible for managing all existing REST APIs, which include News, Announcements, Registration Forms, Complaint Data, and Protection in the "Peduli PMI" Mobile application. The REST API data will be processed and forwarded to the "Peduli PMI" Mobile application using a MySQL database. This database stores data that is input and received on the user side. On the client side, the application will send and receive the REST APIs that have been created on the "Peduli PMI" Management System Website. The application receives news and announcement data through the existing API. The process of sending the REST API occurs when applying for protection or submitting data, which will be stored in the database via the existing API POST method.

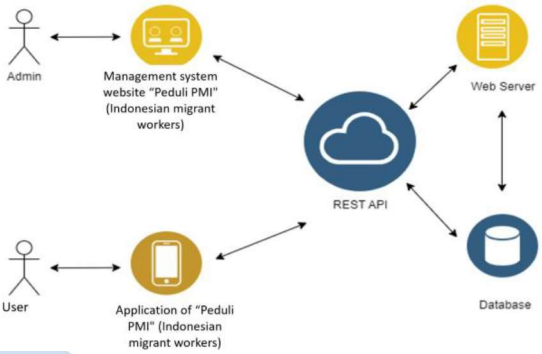


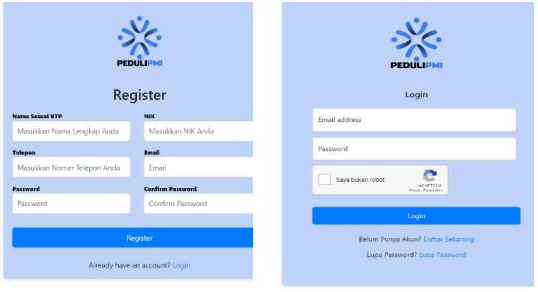
Fig. 2. PMI care system architecture diagram

The admin workflow in the management system begins with selecting a menu based on needs, such as "Complaint Data" to add, view, and manage complaint statuses, "News" and "Announcements" to manage related content, as well as "Registrant Data" and "User Data" to manage registrant and user information. Admins can also view admin and writer data, update their personal profiles, and change passwords. Once all tasks are completed, admins can log out to end the session, ensuring efficiency and order in the administrative process.

IV. Results and Discussion

A. *Website Realization*

The "Peduli PMI" Management System website was realized using the PHP programming language using the Laravel framework, and using bootsrap 5 styling. The following are some views of the website.



(A) (B)

Fig 3. (A) Register Page and (B) Login Page

Figures 3 depict the Register and Login pages of the "Peduli PMI" Management System Website; Figure 3a depict the Register page allows admins without an account to create one, while Figure 3b the Login page enables admins to access the system by entering their email, password, and Google Captcha confirmation to prevent database attacks.

Fig 4. Forgot Password Page

In Figure 4 is the Forgot Password page, users can change their password by sending an email address on the forgot password page. Then a link will be sent to reset the password via email. Creating a forgotpassword() function, this function functions for the process when resetting the password to the website, the process of resetting the password by entering the admin email in the tb_admin table data. The system will send an email to reset the password.

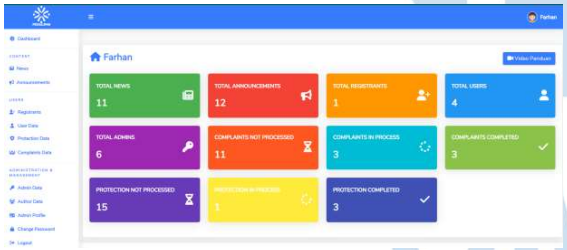


Fig 5. Dashboard Page

In Figure 5 is the dashboard page, it will display all the features contained on the website, and display the total count of data in that feature.

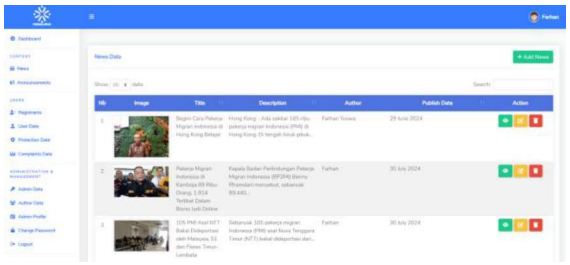


Fig 6. News And Annoucement Page

In Figure 6 is the News and Announcement page, these two pages have the same features, there is a CRUD feature for news and announcements that functions to manage all news and announcement content that will be displayed on the mobile application.

Fig 7. Registrant Data Page

In Figure 7 is Registrant Data Page, for this page serves to manage all data on Prospective Indonesian Migrant Workers who have registered on the Mobile Applicatio. Admin can view the complete data of Prospective Indonesian Migrant Workers (CPMI), can approve if the complete data matches the requirements or reject if the data does not match the requirements.

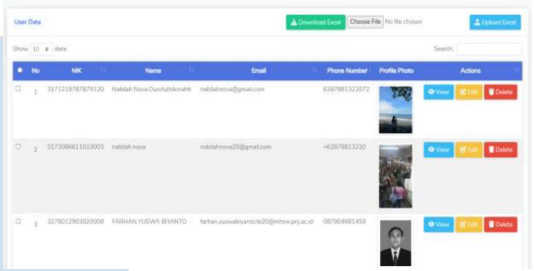


Fig 8. User Data Page

In Figure 8 is the User Data page, this page serves to manage all active user data that has passed the requirements. In this feature the admin can view the complete data of Indonesian Migrant Workers (PMI), can edit user data if there is inappropriate data, there is also a delete user feature, namely if the user is no longer a PMI, and in this feature there is also an export of all user data and import all user data into excel format (xls).

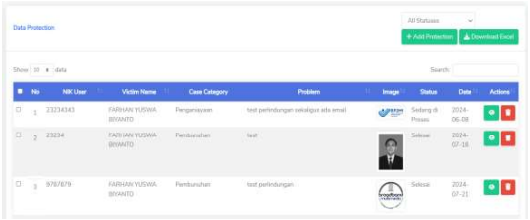


Fig 9. Protection Data Page

Figure 9 shows the Protection Data page, which functions to manage all protection data reported by PMI. This page allows for reporting of personal cases or cases on behalf of others if there are any law violations or activities posing a threat to Indonesian Migrant Workers. It contains a comprehensive collection of cases and issues that endanger their lives. In this feature, detailed protection data is displayed: if you report a case for yourself, it will show the victim's name, NIK, phone number, email, incident location,

date of incident, issue, photo evidence, and assistance request. If you report a case on behalf of someone else, it will display the reporter's and victim's details, including names, NIK, phone numbers, emails, incident location, date, issue, photo and audio evidence, and assistance request. Additionally, there is an option to export the data to PDF, as well as features for adding responses and updating the protection status. If the admin changes the status, the email associated with the report will receive an update. Lastly, there is an option to add new Protection cases, allowing PMI to directly contact the admin if they cannot make a report through the mobile application.

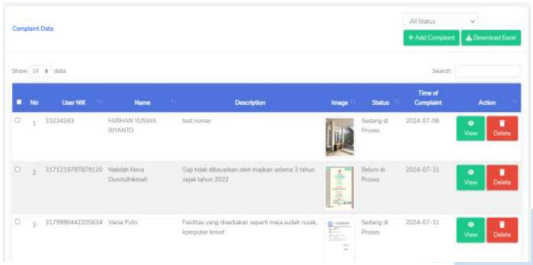


Fig 10. Complaint Data Page

Figure 10 displays the Complaint Data page, which manages all complaint data reported by PMI. This page allows users to report complaints for themselves or on behalf of others regarding issues encountered at work or concerning infrastructure for Indonesian Migrant Workers, such as unpaid wages, excessive work hours, inadequate workplace facilities, or garbage buildup. This feature presents detailed complaint data: if you report a complaint for yourself, it will show the victim's name, NIK, phone number, email, complaint location, date, description, and both photo and audio evidence. If reporting on behalf of someone else, it will display both the complainant's and victim's details, including names, NIK, phone numbers, emails, complaint location, date, description, and evidence. Additionally, the feature includes options to export data to PDF, add responses, and update the complaint status. If the admin updates the status, the email associated with the complaint will receive a notification. There is also an option to add a complaint, allowing PMI to contact the admin directly if they are unable to submit a report through the mobile application.

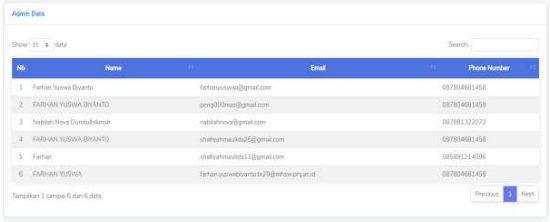


Fig 11. Admin Data Page

In Figure 11 is the Admin Data Page, for this page serves to display all admins who have registered.

Fig 12. Author Data Page

In Figure 12 is the Author Data page, for the author data page functions to add authors and emails that will be displayed on news and announcements.

Fig 13. Admin Profile Page

In Figure 13 is the Admin Profile Page, on this page it functions to manage the admin profile that is currently logged in. In this feature, the admin can update his/her own data such as name, NIK, mobile number and email.

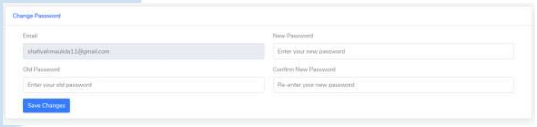


Fig 14. Change Password Page

In Figure 14 is the Change Password Page, on this page it functions to reset the admin password, by entering the old password, new password, and confirming the new password. To realize the process of changing the password page using the resetPassword() function on the AdminController. Then create a view for the change Password page in the peduli-pmi/resources/views/backend directory with the file name change-password.blade.php. Furthermore, creating a route to display and process the controller so that all functions can be called, is in the peduli-pmi/routes/web.php directory.

B. Website Testing

Website testing of the "Peduli PMI" Management System, which serves as a platform for complaints and protection for Indonesian Migrant Workers (PMI) in Malaysia, follows the ISO/IEC 25010 testing standard. The types of testing conducted include functional testing, performance testing, security testing, and API testing using Thunder Client.

B.1 Functionality Testing

The purpose of this functional testing is to ensure that all features of the "Peduli PMI" Management System Website, which serves as a platform for complaints and protection for Indonesian Migrant Workers in Malaysia, operate correctly and align with the intended design and implementation. Table 4 shows the test results from testing the “Peduli PMI” Management System Website as a platform for complaints and protection for Indonesian Migrant Workers in Malaysia.

The testing results in Tabel 4 indicate that the "Peduli PMI" Management System Website operates effectively in all scenarios tested. Each feature functions as intended, with the system properly handling both successful operations and errors. The successful registration and verification processes, as well as the functionality for adding and managing news data, reflect a well-designed user experience. The system also demonstrates its ability to guide users in case of input errors, ensuring reliability and usability.

Overall, these results affirm that the website meets the expected functionality criteria and can serve its intended purpose of providing a platform for complaints and protection for Indonesian Migrant Workers in Malaysia. Further testing could focus on more complex scenarios or edge cases to ensure robustness under varied conditions

TABLE IV. RESULT OF FUNCTIONALITY TESTING

Case	Testing Scenario	Expected Result	Test Result	Conclusion
Successfully registered an admin account	Admin completes registration by filling in the form fields according to the required format, including Name as per ID, NIK, Phone Number, Email, Password, and Confirm Password	Admin successfully registers an account	Success	Valid
Successfully received an email for account verification	Admin receives an email containing the account verification process to enable login	Admin successfully receives the verification email	Success	Valid
Failed to register an admin account	Admin attempts registration without following the required form format or leaves fields incomplete	Admin fails to register an account	Success	Valid
Click "Add News"	Admin clicks "Add News" and is directed to the Add News page	Add News page opens successfully	Success	Valid
Successfully filtered news data and sorted news data	Admin filters news data according to preferences of 10, 25, 50, and 100 entries, and can sort announcement data as desired	Admin successfully filters and sorts news data as intended	Success	Valid

B.2 Performance Testing

Performance testing is done to test the time required when accessing a condition on the system, the capacity required when the system is accessed, and the resources used by the system. At this stage, testing is done using the help of a web-tool, namely GTMetrix. From the performance testing conducted using GTmetrix software, the test results are shown in Table 5.

TABLE V. RESULT OF PERFORMANCE TESTING

Testing Server Location	Result				
	Performance (%)	Structure (%)	LCP (s)	TBT (ms)	CCS
Sao Paulo, Brazil	74	97	2.8	0	0,04
Hongkong, China	96	97	1.1	0	0
Sydney, Australia	96	97	1.2	76	0,04
Vancouver, Canada	88	97	1,8	0	0,04

The server performance test results based on location show variations in performance across different regions. In São Paulo, Brazil, the performance scored 74% with a structure rating of 97%, a Largest Contentful Paint (LCP) of 2.8 seconds, a Total Blocking Time (TBT) of 0 ms, and a Cumulative Layout Shift (CLS) of 0.04. In Hong Kong, China, the performance achieved its highest score of 96% with a structure rating of 97%, an LCP of 1.1 seconds, TBT of 0 ms, and CLS of 0. Similarly, Sydney, Australia, also recorded a performance score of 96% with a structure rating of 97%, an LCP of 1.2 seconds, TBT of 76 ms, and CLS of 0.04. Finally, in Vancouver, Canada, the performance reached 88% with a structure rating of 97%, an LCP of 1.8 seconds, TBT of 0 ms, and CLS of 0.04. These results indicate consistent structural integrity across locations, though performance and LCP vary slightly depending on the testing region.

B.3 Security Testing

To perform website security testing using Sucuri SiteCheck, visit the Sucuri SiteCheck homepage at https://sitecheck.sucuri.net/. Enter the complete URL of the website you wish to test in the provided text box, including "http://" or "https://". Click "Scan Website" to initiate the scanning process, which may take a few seconds to minutes depending on the site’s size and complexity. Once the scan is complete, review the results, which will indicate any detected malware, the site's blacklist status, outdated software, and security recommendations. If issues are found, follow Sucuri's guidelines for remediation or consult a web security professional for further assistance. Finally, you can save or print the scan results for future reference or to

share with your technical team. Figure 15 shows the result of security testing.

Fig 15. Result of Security Testing

Based on the test results from the Sucuri website (Figure 15), no malware was found, and this website is not blacklisted by security services such as Google Safe Browsing. This means there is no indication that the website is dangerous to users or likely to spread malware. Additionally, there is no evidence of SEO spam, such as the use of hidden keywords or links typically used for browser manipulation.

B.4 API Testing using Thunder Client

To conduct API testing with ThunderClient, start by downloading the ThunderClient extension for Visual Studio Code. Open the extension and click on "New Request." In the "Define API Call" section, enter the API call name, select the desired method type, and input the API URL. Next, fill in the required parameters in the "Body" tab and create any necessary variables in the "Variables" tab. Once everything is configured, click "Send" to view the API response. A status of 401 indicates a failure, while a status of 200 signifies success, with the JSON response depending on the API input.

TABLE VI. RESULT OF API TESTING USING THUNDER CLIENT

API Name	API URL	Method	Result
PengaduanStore	https://foruminiujian.my.id/api/v9/396d6585-16ae-4d04-9549-c499e52b75ea/pengaduan/store	POST	Success
Perlindungan Store	https://foruminiujian.my.id/api/v9/396d6585-16ae-4d04-9549-c499e52b75ea/perlindungan/store	POST	Success
GetAllDataNews	https://foruminiujian.my.id/api/v3/98765432-1abc-0fed-cba9-87643210fed/news	GET	Success
GetAllDataPerlindungn	https://foruminiujian.my.id/api/v9/396d6585-16ae-4d04-9549-c499e52b75ea/perlindungan	GET	Success

The successful results for all APIs suggest robust functionality and reliable integration within the "Peduli PMI" Management System, ensuring that users can effectively access and manage complaint and protection data.

V. CONCLUSION

This article evaluates the development of a web-based system, "Peduli PMI," aimed at enhancing protection for Indonesian Migrant Workers (PMI) in Malaysia. With key features such as secure administrator access, user registration, password recovery, and content management, the system enables PMIs to report complaints and receive assistance more safely and quickly. Functionality testing shows that each feature operates as expected, while security testing confirms that the system is free from malware and is not blacklisted. These results support the system's success in providing a safe and efficient platform for PMI protection. Quantitatively based on table 5, performance testing using GTMetrix demonstrated optimal results, with scores reaching up to 96% in testing server locations in Hongkong and Sydney, although there was a slight drop in performance in certain locations. API testing also confirmed that all APIs for managing complaint and protection data functioned smoothly without errors. Based on these results, "Peduli PMI" meets ISO/IEC 25010 standards in terms of functionality, performance, security, and integration, making it a ready and reliable system to support the safety and comfort of PMIs in their host country.

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