International Journal of Computer Sciences and Mathematics Engineering Vol. 3 No. 1 (2024)
Published by: CV. HAWARI
International Journal of Computer Sciences and Mathematics Engineering
Journal homepage: www.ijecom.org

Development of Web-Based Monitoring and Reporting Applications for Infrastructure and Network Disruptions at PT Pelindo Multi Terminal

Andika Sandy Sutiawan[1], UC Mariance[2], Fahmi Izhari[3]
[1,2,3] Faculty Of Science And Technology, Universitas Pembangunan Panca Budi, Indonesia

Article Info

Article history:

Received Jun 24, 2024
Revised Jun 27, 2024
Accepted Jun 30, 2024

Keywords:

Application
Monitoring
Infrastructure
Network
RAD
Web

ABSTRACT

PT Pelindo Multi Terminal (abbreviated as SPMT) is a subholding of PT Pelabuhan Indonesia (Persero), a state-owned company that manages port business entities in the field of multipurpose terminal operations in Indonesia. Infrastructure and network disruptions can disrupt SPMT operations so they must be handled quickly and recorded. Data processing for infrastructure and network disruption reports at SPMT Belawan still uses an online spreadsheet application from Google, resulting in slow handling of disruptions and inaccurate recapitulation of data for handling network infrastructure disruptions. The aim of this research is to develop a web-based computer application using the Rapid Application Development method to process data on infrastructure and network disturbances at SMPT Belawan. The results of the research are that the application has been running well and makes it easy for employees to make network disturbance reports with an application display that is easy to understand, use and informative.

Corresponding Author:

Andika Sandy Sutiawan,
Faculty Of Science And Technology,
Universitas Pembangunan Panca Budi, Medan, Indonesia.
Email: andikasandysutiawan@gmail.com

1. INTRODUCTION

Advances in technology, computers and telecommunications support the development of internet technology. With the internet, business people no longer experience difficulties in obtaining any information to support their business activities. The use of the internet in business has changed from its function as a tool for electronic exchange of information to a tool for business strategy applications, such as marketing, sales and customer service[1]. The development of computer network infrastructure is a substantial need to ensure that the information systems running on it can operate well. Infrastructure in data center terms includes networking, computing and storage resources used to run applications. Through network infrastructure, all computer systems can be connected individually to routers, cables, wireless, firewalls, switches, network protocols with various technologies and communications in them[2].

E-ISSN 2962-4274

PT Pelabuhan Indonesia (Pelindo) is an integrated company based on the government's strategic initiative to become a shareholder to realize national connectivity and a stronger logistics ecosystem network[3]. PT Pelindo Multi Terminal (abbreviated as SPMT) is a subholding of PT Pelabuhan Indonesia (Persero), a state-owned company that manages port business entities in the field of multipurpose terminal operations in Indonesia. Data processing for infrastructure and network disruption reports at SPMT Belawan still uses an online spreadsheet application from Google. Network infrastructure management employees at SPMT often forget to follow up on reports or update data on disturbance reports that have been handled. This results in slow handling of disturbances and inaccurate recapitulation of data on handling network infrastructure disturbances.

Information systems have a significant role and benefit between data processing facilities and employees as users, where the relationship between one unit and another unit will be integrated with each other in the process of data collection, data processing, data storage, data feedback, and data distribution internally and externally[4]. With the conditions of the problems being faced, SPMT Belawan needs an information system in the form of an application so that it can monitor and process data on infrastructure and network disturbances properly. The aim of this research is to develop a web-based computer application using the Rapid Application Development method to process data on infrastructure and network disturbances at SMPT Belawan.

2. RESEARCH METHOD

The Rapid Application Development (RAD) method is a linear sequential system development method that emphasizes a system development cycle in a relatively short time, so that it can save time and make the system development process faster[5][6].

Figure 1. RAD Method Stages[7]

RAD is divided into three structured and systematic stages where each stage is interrelated. The stages in the RAD method are as follows [7]:

1) Requirements Planning

At this stage, the author collects data to determine the needs for creating monitoring applications and reporting network infrastructure disruptions. This need is in accordance with the conditions that occur at SPMT Belawan. The author uses observation techniques, namely observing an object, condition, situation, process or behavior [8] which is related to reporting network infrastructure disruptions at SPMT Belawan. Apart from that, the author also used interview techniques with SPMT Belawan employees who handle network infrastructure to complete the required data. From the results of data collection, the functional requirements of the application are obtained according to table 1 below.

Table 1. Application Functional Requirements

Levels	Requirement
Administrator	1. Add or change request data to report disturbances
	2. Get request tickets

E-ISSN 2962-4274

	3.	Update the results of request handling
	4.	Get reports as required
User	1.	Add or change request data to report disturbances
	2.	Get request tickets
	3.	Get information on treatment results

2) Design Workshop

At this stage, the author designs the application usage flow and data flow in the application using the Unified Modeling Language (UML), namely use case diagrams, activity diagrams and sequence diagrams. UML is a form of visual modeling in the form of diagrams used for designing object-oriented systems[9]. A use case diagram is a modeling for the behavior of the information system that will be created. Use case describes an interaction between one or more actors and an information system that will be created to find out what functions are in a system and who has the right to use these functions[10]. The following are the results of the use case diagram design in this research.

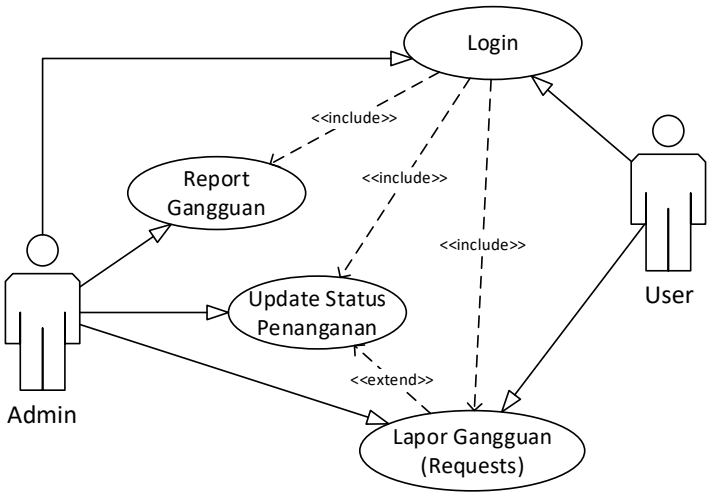

Figure 1. Designing Use Case Diagrams

Activity diagrams describe the various activity flows in the system being designed, how each flow begins, the decisions that may occur and how they end. Activity diagrams can also depict parallel processes that may occur in several executions[11]. Figures 2 and 3 below are the design of the activity diagram in this research. Sequence diagrams describe the behavior of objects in use cases by describing the life time of objects and the messages sent and received between objects. Therefore, to describe a sequence diagram, you must know the objects involved in a use case along with the methods belonging to the class that is the instance of that object.[12]. Figures 4 and 5 below are sequence diagram designs.

E-ISSN 2962-4274

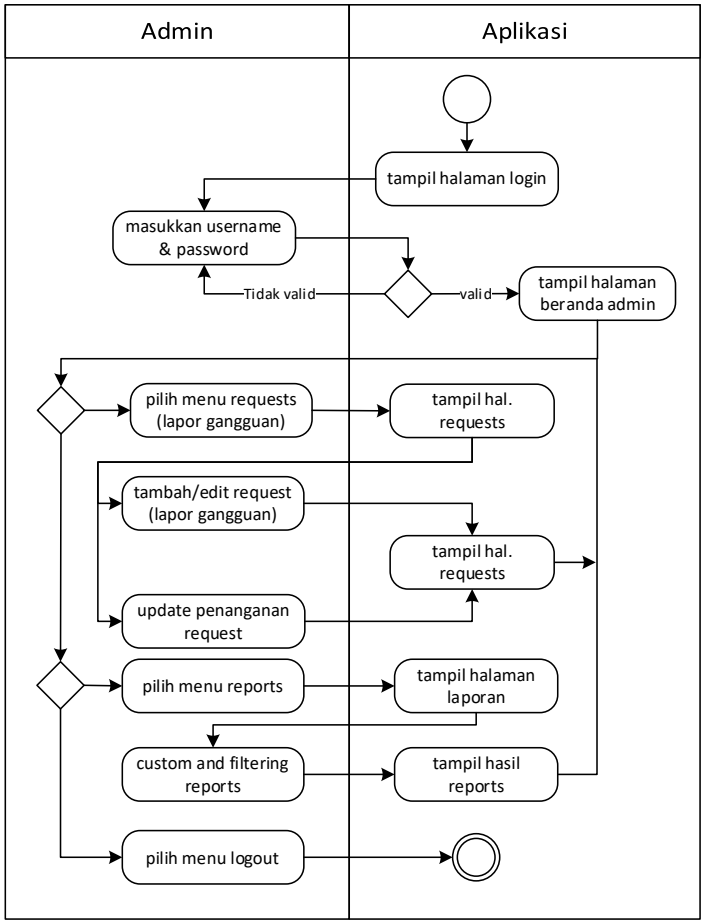

Figure 2. Designing Activity Diagrams for Admins

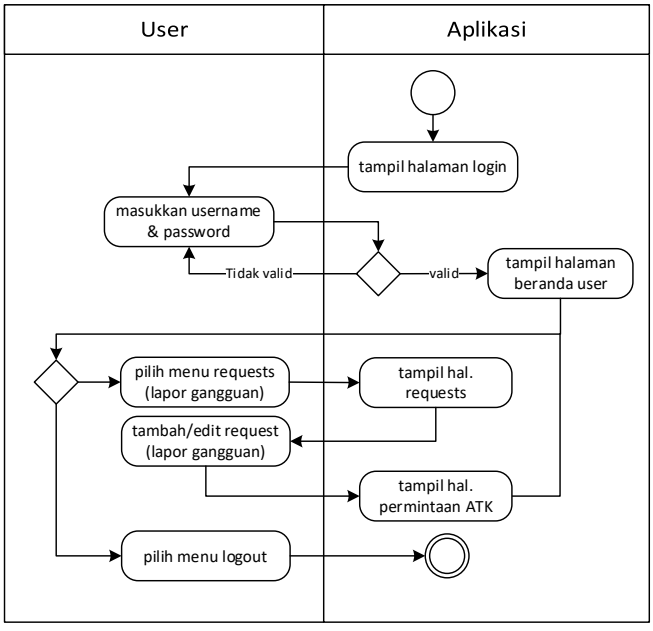

Figure 3. Designing Activity Diagrams for Users

E-ISSN 2962-4274

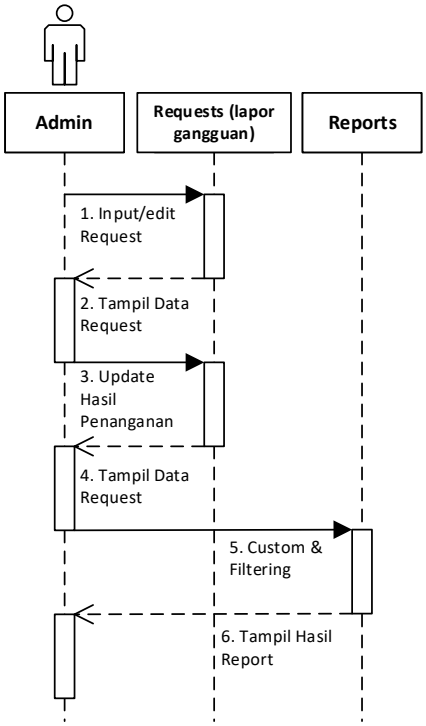

Figure 4. Sequence Diagram Design for Admin

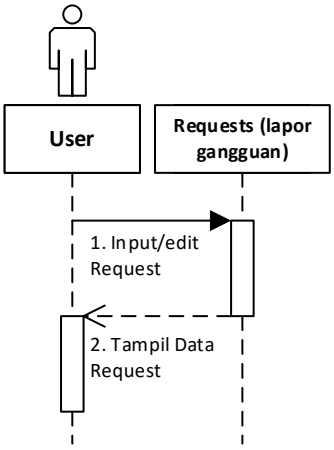

Figure 5. Sequence Diagram Design for Users

3) Implementation
At this stage, the author tests the application and applies the application to users. Application testing is carried out to ensure that the application created functions properly and is ready for use.

3. RESULTS AND DISCUSSIONS

3.1. Login Page

The results of designing the application login page can be seen in Figure 6 below. The login page is used to identify the user level who uses this application. This application has 2 levels, namely administrator and user.

E-ISSN 2962-4274

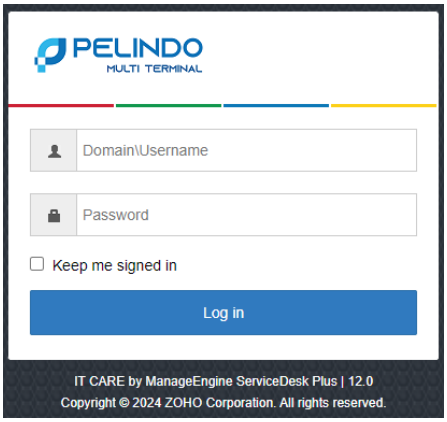

Figure 6. Login Page

3.2. Home Page

The results of designing the application home page can be seen in pictures 7 and 8 below. Figure 7 is the home page for administrators which displays various disturbance reporting information such as information on disturbance reports that have been closed in the previous 20 days, disturbance reports received in the previous 20 days and so on. Figure 8 is the home page for users which displays information about the disturbance reports they have submitted.

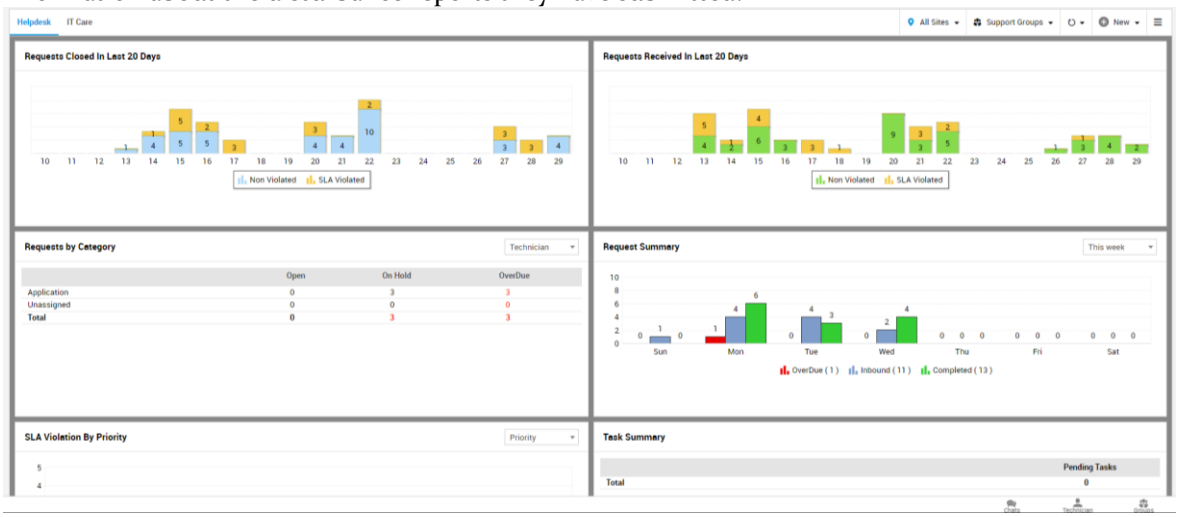

Figure 7. Administrator Home Page

E-ISSN 2962-4274

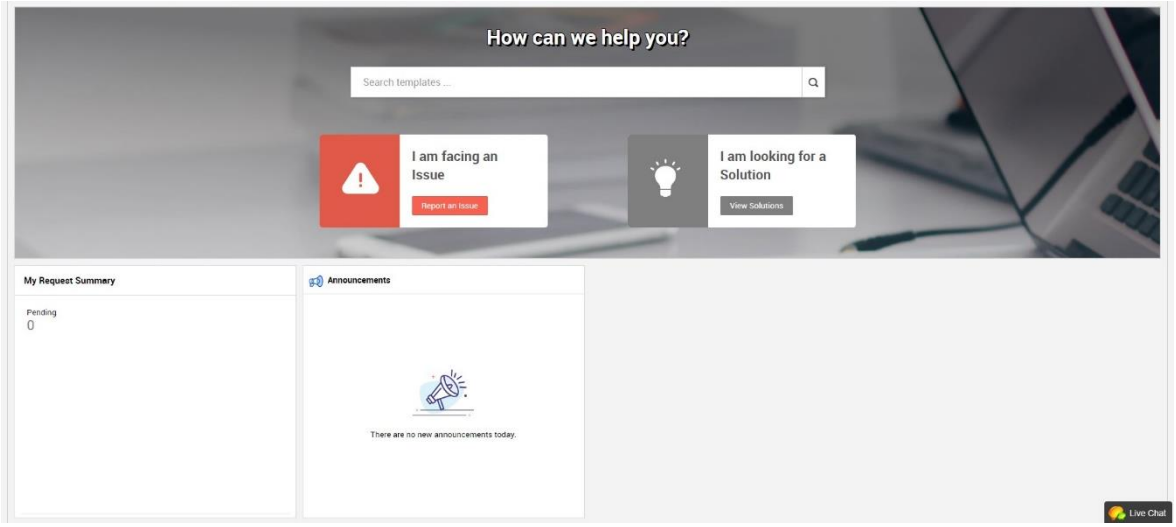

Figure 8. User Home Page

3.3. Request Page (Disruption Reporting)

The request page (reporting disturbances) consists of 2 forms, namely a form for viewing stored data and a form for adding/editing disturbance data. Figure 9 below is the result of designing a request page to view disturbance data for administrators, while Figure 10 is the result of designing a request page to view disturbance data for users. On this page, administrators and users can view network disruption data that has been submitted. Especially for administrators, they can see data on disturbances from all users that have been submitted along with the results of handling these disturbances.

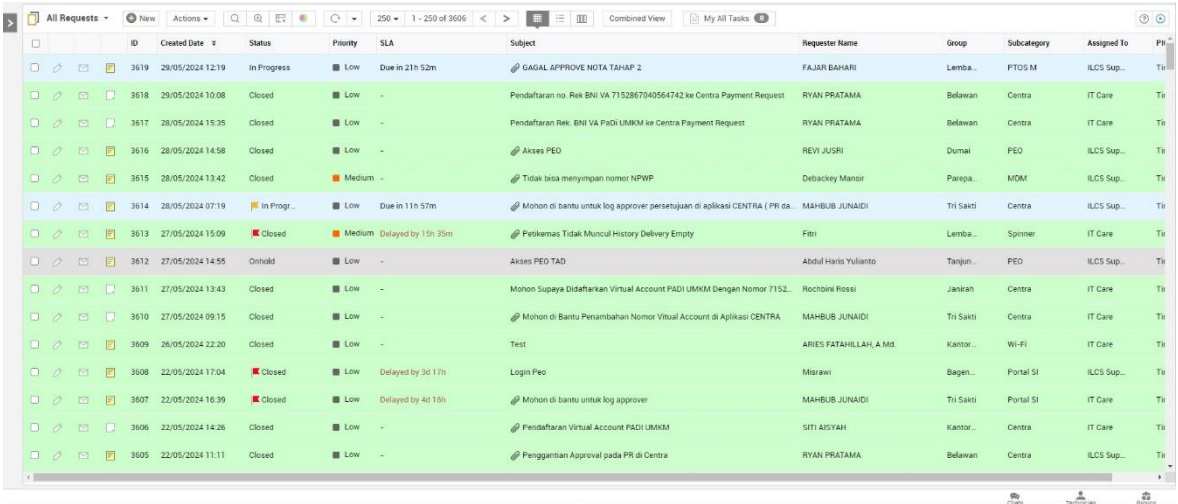

Figure 9. View Request (Disruption Reporting) page for Administrators

E-ISSN 2962-4274

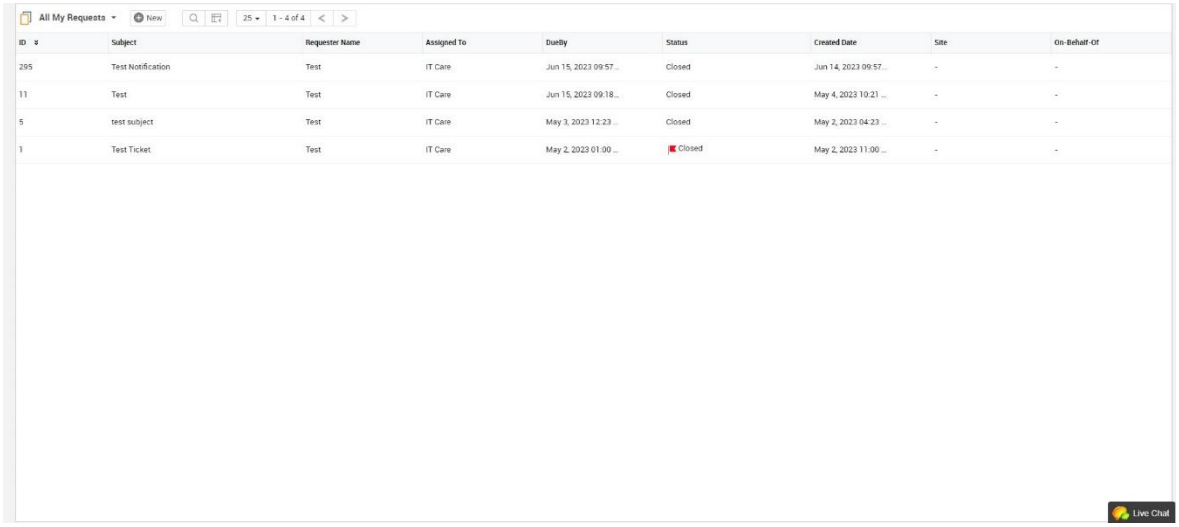

Figure 10. View Request (Disruption Reporting) page for Users

Figure 11 is the result of designing a request page to add/edit disturbance data for administrators, while figure 12 is the result of designing a request page to add/edit disturbance data for users.

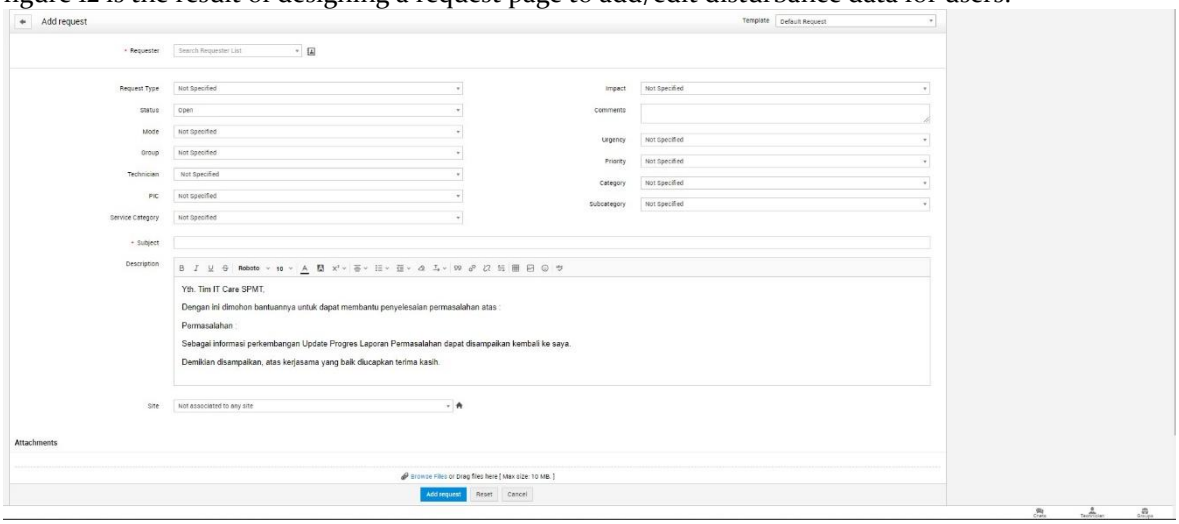

Figure 11. Disruption Data Entry Page For Administrators

E-ISSN 2962-4274

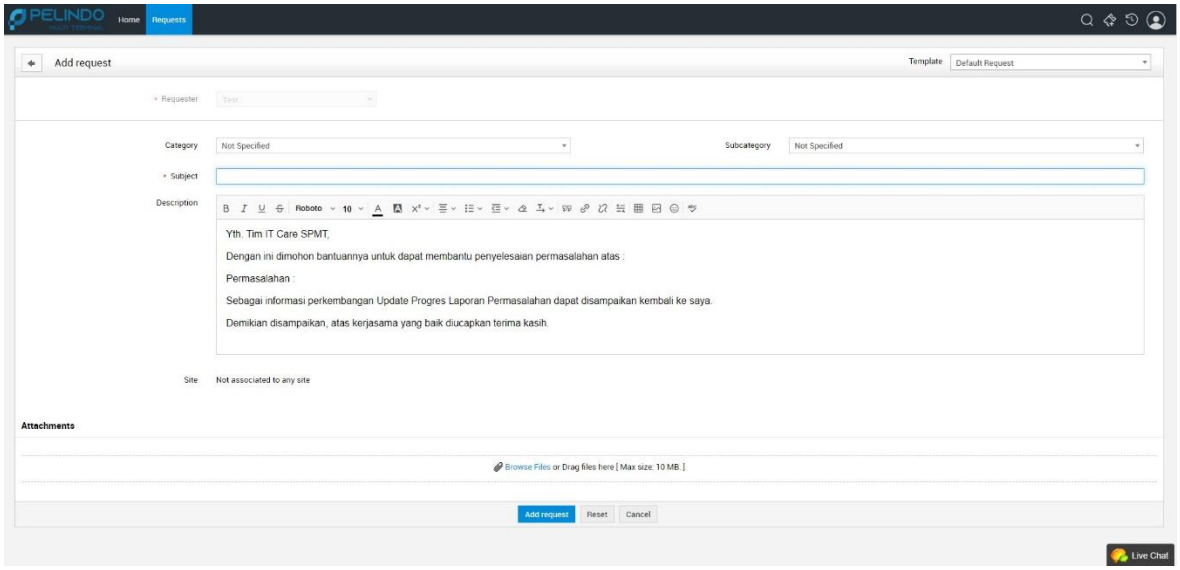

Figure 12. Disruption Data Entry Page For Users

3.4. Reports page

The results of the report page design can be seen in Figure 13 below. The report page can only be accessed by administrators. On this page, administrators can set the columns and data filters they want to display. Data is filtered based on the date of submission of disturbance data and also based on other things. Figure 14 is the data that appears from the report and can be exported as a PDF or Excel file.

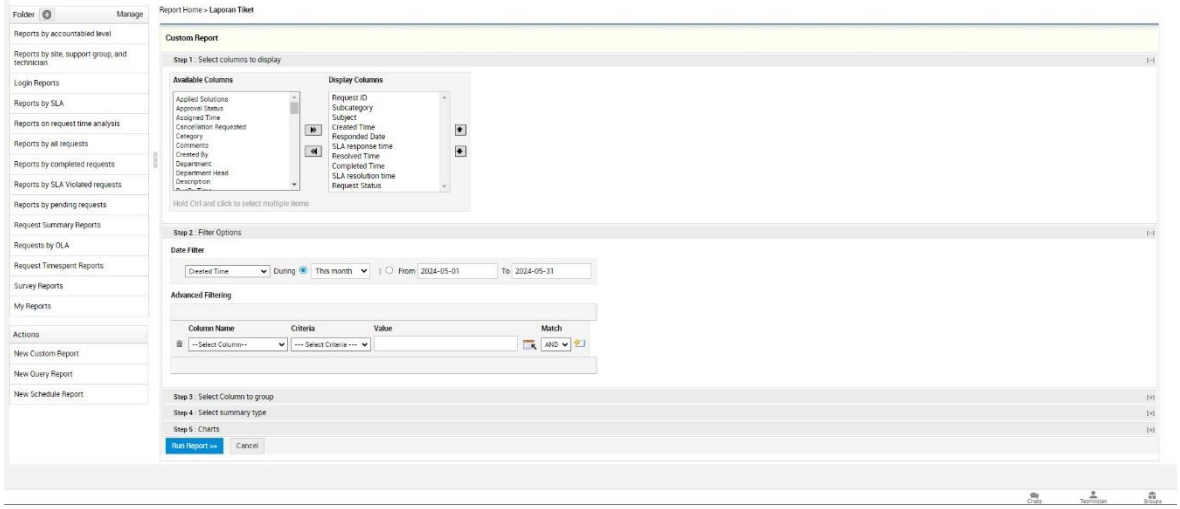

Figure 13. Reports page

E-ISSN 2962-4274

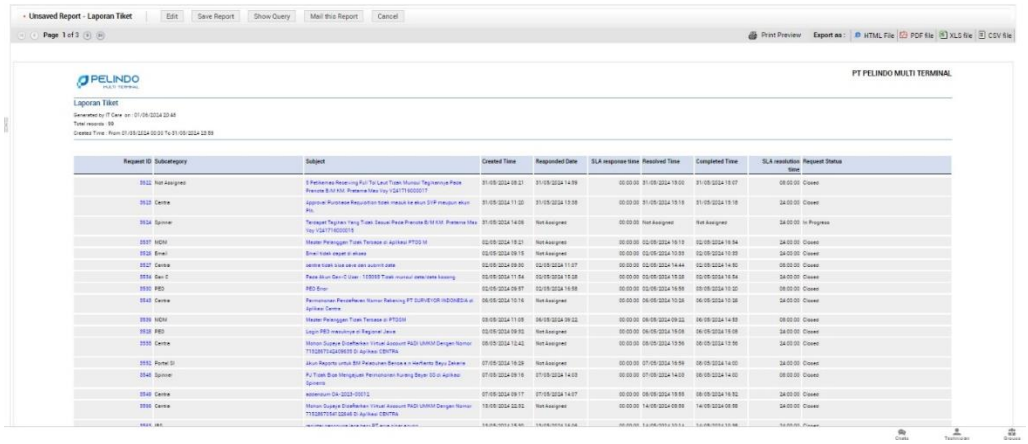

Figure 14. View Report page

4. CONCLUSION

The conclusions that the author can make in this research are as follows:

1. The Rapid Application Development method makes it easy for writers to develop this application.
2. This application has been running well and makes it easy for employees to report network disruptions.
3. The appearance of this application is easy to understand and use and is informative.

ACKNOWLEDGEMENTS

Penulis mengucapkan terima kasih kepada Bapak UC Mariance sebagai dosen pembimbing yang memberikan arahan dan Ibu Winda Erika sebagai dosen pembanding sehingga penulis dapat menyelesaikan penelitian ini.

REFERENCES

[1] O. Y. Yuliana, "Penggunaan Teknologi Internet," *Jurnal Akuntansi Dan Keuangan*, vol. 2, no. 1, pp. 36–52, 2000.

[2] A. Lubis, I. Iskandar, and R. Septian, "Pengembangan Aplikasi Troubleshooting Jaringan Melalui Sistem Notifikasi dengan Integrasi Cacti dan Telegram," *Brahmana : Jurnal Penerapan Kecerdasan Buatan*, vol. 4, no. 1A, pp. 104–109, 2022, [Online]. Available: https://www.pkm.tunasbangsa.ac.id/index.php/brahmana/article/view/155%0Ahttps://www.pkm.tunasbangsa.ac.id/index.php/brahmana/article/viewFile/155/154

[3] N. Nuralamsyah, A. Nasser, and M. A. Patunggu, "Analisa Dampak Kinerja Pt Pelindo Pasca Di-Merger," *Riset Sains dan Teknologi Kelautan*, vol. 5, no. 2, pp. 91–95, 2022, doi: 10.62012/sensistek.v5i2.24237.

[4] E. Purba, "Peranan Sistem Informasi Manajemen Dalam Meningkatkan Kinerja Karyawan Pada Tirta Bina Labuhanbatu," *ARBITRASE: Journal of Economics and Accounting*, vol. 2, no. 1, pp. 34–39, 2021, doi: 10.47065/arbitrase.v2i1.254.

[5] E. Sutinah, I. Alfarobi, and A. Setiawan, "Metode Rapid Application Development Dalam Pembuatan Sistem Informasi Pemenuhan SDM pada Perusahaan Outsourcing," *InfoTekJar : Jurnal Nasional Informatika dan Teknologi Jaringan*, vol. 5, no. 2, pp. 246–253, 2021, [Online]. Available: https://jurnal.uisu.ac.id/index.php/infotekjar/article/view/3528/pdf

E-ISSN 2962-4274

[6] Y. D. Wijaya, "Penerapan Metode Rapid Application Development (RAD) Dalam Pengembangan Sistem Informasi Data Toko," *Jurnal SITECH : Sistem Informasi dan Teknologi*, vol. 3, no. 2, pp. 95–102, 2020, doi: 10.24176/sitech.v3i2.5141.

[7] D. Hariyanto, R. Sastra, and F. E. Putri, "Implementasi Metode Rapid Application Development Pada Sistem Informasi Perpustakaan," *Jurnal Penelitian Ilmu dan Teknologi Komputer (Jupiter)*, vol. 13, no. 1, pp. 110–117, 2021.

[8] Z. Yusra, R. Zulkarnain, and S. Sofino, "Pengelolaan LKP Pada Masa Pendmik Covid-19," *Journal Of Lifelong Learning*, vol. 4, no. 1, pp. 15–22, 2021, doi: 10.33369/joll.4.1.15-22.

[9] W. Widyatmoko and N. Pamungkas, "Pemodelan Unified Modeling Language pada Sistem Aplikasi Pariwisata (SiAP)," *Jurnal Bumigora Information Technology (BITe)*, vol. 4, no. 1, pp. 73–84, 2022, doi: 10.30812/bite.v4i1.1871.

[10] E. Sopriani and H. Purwanto, "Perancangan Sistem Informasi Persedian Barang Berbasis Web Pada PT. XYZ (Department IT Infrastructure)," *JSI (Jurnal sistem Informasi) Universitas Suryadarma*, vol. 10, no. 1, pp. 127–138, 2023, doi: 10.35968/jsi.v10i1.993.

[11] T. B. Kurniawan and S. Syarifuddin, "Perancangan Sistem Aplikasi Pemesanan Makanan dan Minuman Pada Cafetaria NO Caffe di Tanjung Balai Karimun Menggunakan Bahasa Pemrograman PHP dan MySQL," *Jurnal Teknik Informatika Karimun (TIKAR)*, vol. 1, no. 2, pp. 192–206, 2020, [Online]. Available: https://ejurnal.universitaskarimun.ac.id/index.php/teknik_informatika/article/download/153/121

[12] S. Sandfreni, M. B. Ulum, and A. H. Azizah, "Analisis Perancangan Sistem Informasi Pusat Studi Pada Fakultas Ilmu Komputer Universitas Esa Unggul," *Sebatik*, vol. 25, no. 2, pp. 345–356, 2021, doi: 10.46984/sebatik.v25i2.1587.