



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

Andika Sandy Sutiawan¹, UC Marianne², Fahmi Izhari³

^{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 SPMT 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.

This is an open access article under the [CC BY-NC](https://creativecommons.org/licenses/by-nc/4.0/) license.



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].

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

	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.

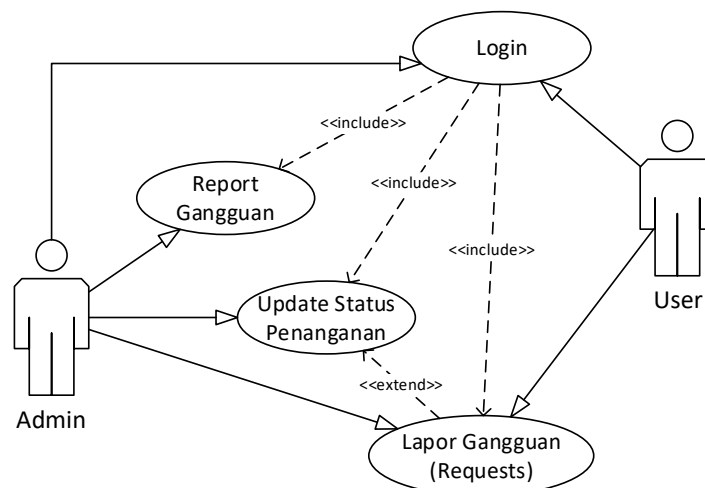


Figure 1. Designing Use Case Diagrams

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.

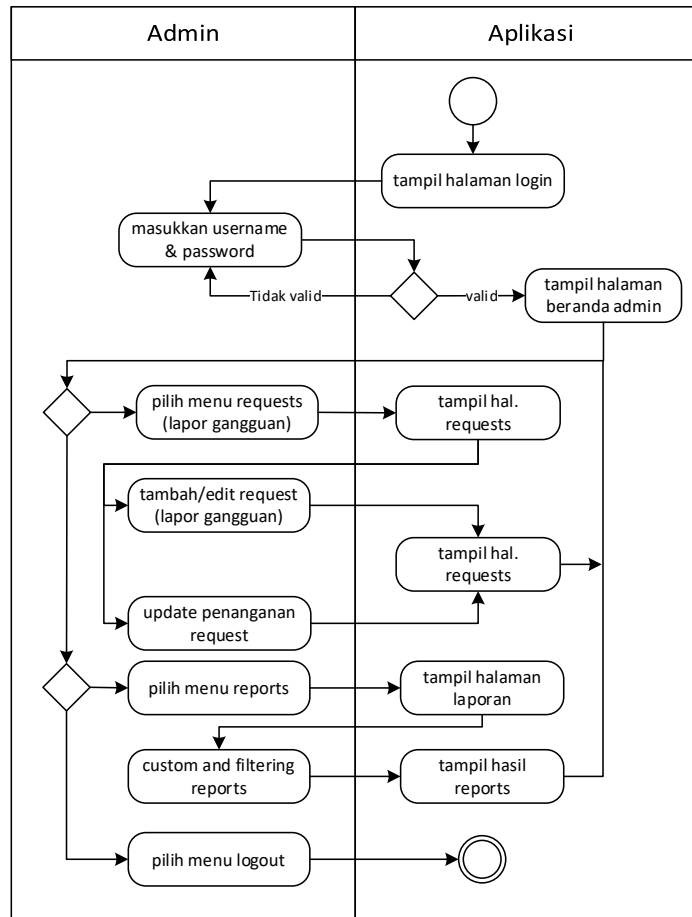


Figure 2. Designing Activity Diagrams for Admins

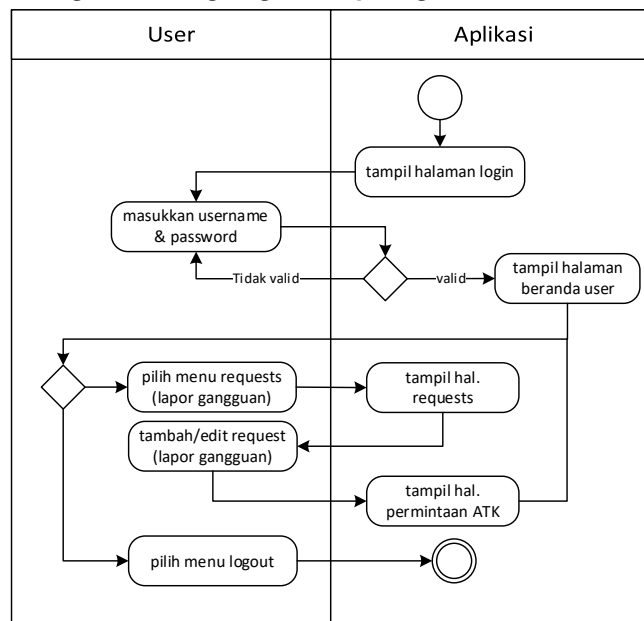


Figure 3. Designing Activity Diagrams for Users

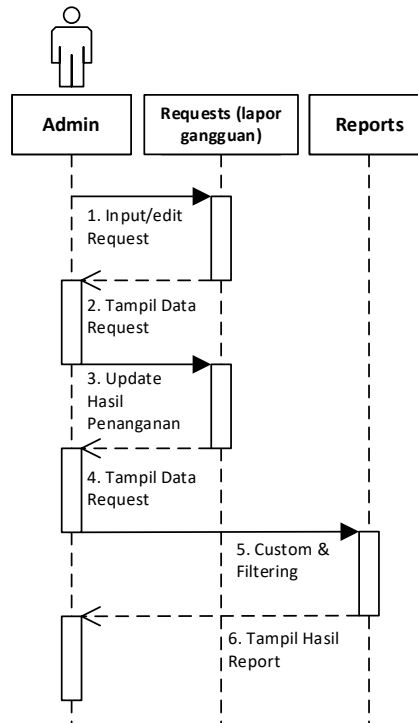


Figure 4. Sequence Diagram Design for Admin

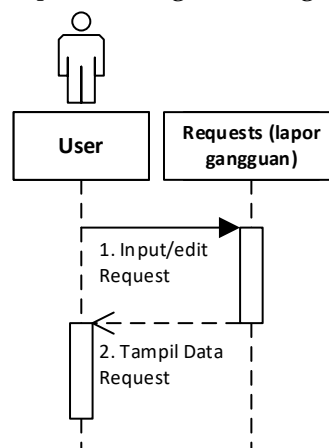


Figure 5. Sequence Diagram Design for Users

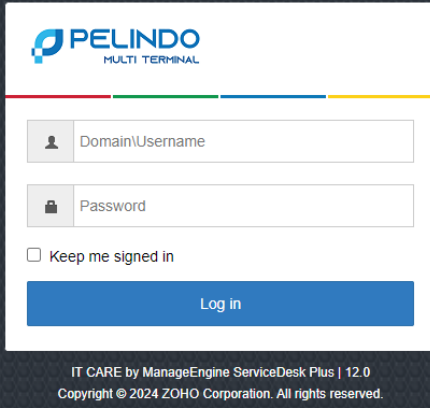
3) Implementation

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.



PELINDO
MULTI TERMINAL

Domain\Username

Password

☐ Keep me signed in

Log in

IT CARE by ManageEngine ServiceDesk Plus | 12.0
Copyright © 2024 ZOHO Corporation. All rights reserved.

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.

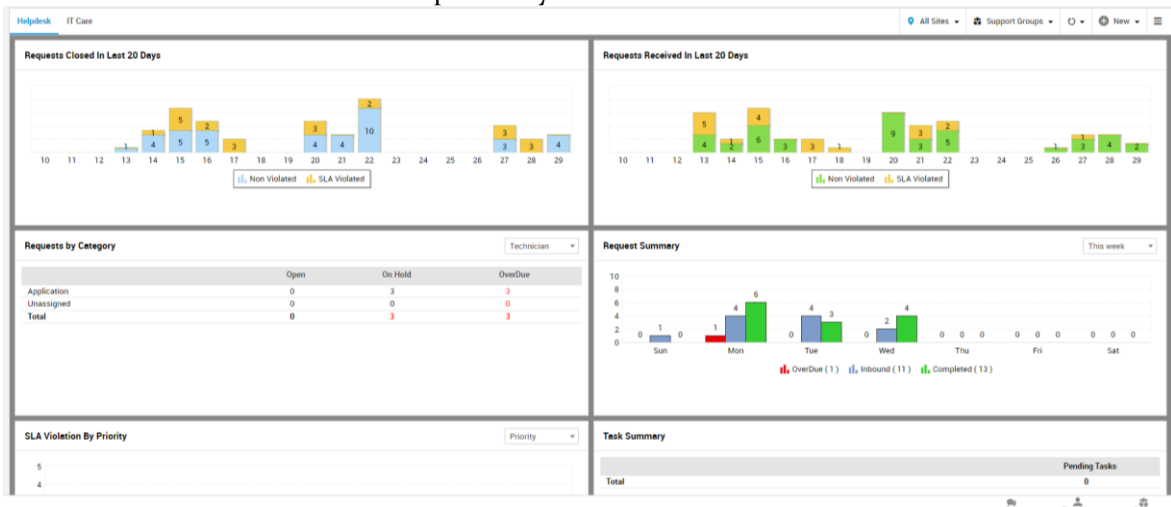


Figure 7. Administrator Home Page

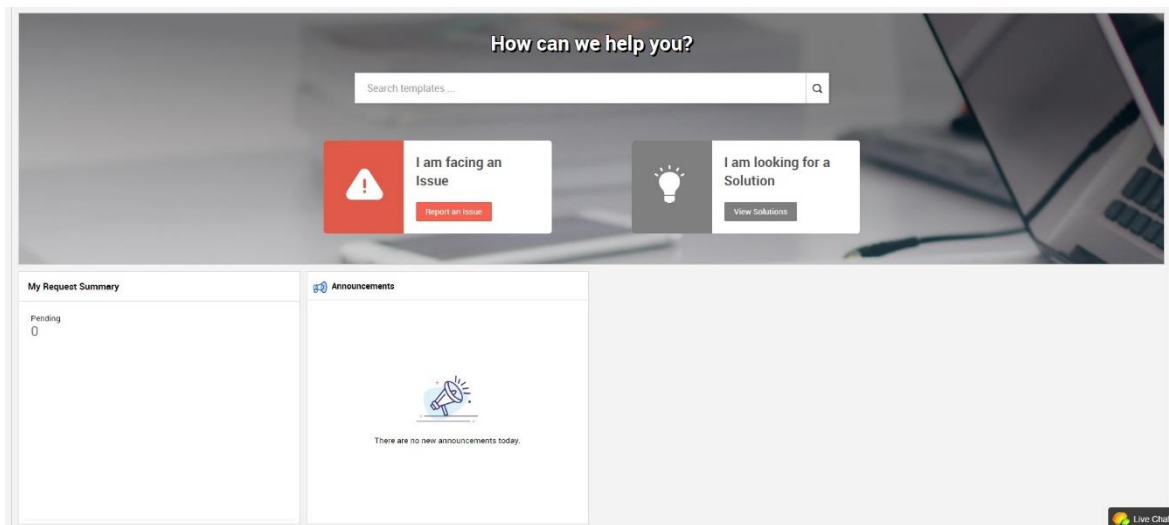


Figure 8. User Home Page

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.

ID	Created Date	Status	Priority	SLA	Subject	Requester Name	Group	Subcategory	Assigned To	Pr
3619	29/05/2024 12:19	In Progress	Low	Due in 21h 52m	GAGAL APPROVE NOTA TAHAP 2	FAJAR BAHARI	Lemba...	PTOS M	ILCS Sup...	Ti
3618	29/05/2024 10:08	Closed	Low	-	Pendaftaran no. Rek BNI VA 7152867040564742 ke Centra Payment Request	RYAN PRATAMA	Belawan	Centra	IT Care	Ti
3617	28/05/2024 15:35	Closed	Low	-	Pendaftaran Rek. BNI VA PADI UMKM ke Centra Payment Request	RYAN PRATAMA	Belawan	Centra	IT Care	Ti
3616	28/05/2024 14:58	Closed	Low	-	Akses PEO	REVI JUSRI	Dumai	PEO	ILCS Sup...	Ti
3615	28/05/2024 13:42	Closed	Medium	-	Tidak bisa menyimpan nomor NPWP	Debackey Mansir	Parepa...	MDM	ILCS Sup...	Ti
3614	28/05/2024 07:19	In Progr...	Low	Due in 11h 57m	Mohon di bantu untuk log approver persetujuan di aplikasi CENTRA (PIR da	MAHBUB JUNAIDI	Tri Sakti	Centra	ILCS Sup...	Ti
3613	27/05/2024 15:09	Closed	Medium	Delayed by 15h 35m	Penikemas Tidak Muncul History Delivery Empty	Fitri	Lemba...	Spinner	IT Care	Ti
3612	27/05/2024 14:55	Onhold	Low	-	Akses PEO TAD	Abdul Haris Yulianto	Tanjung...	PEO	ILCS Sup...	Ti
3611	27/05/2024 13:43	Closed	Low	-	Mohon Supaya Didaftarkan Virtual Account PADI UMKM Dengan Nomor 7152...	Rochbini Rossi	Janirah	Centra	IT Care	Ti
3610	27/05/2024 09:15	Closed	Low	-	Mohon di Bantu Penambahan Nomor Virtual Account di Aplikasi CENTRA	MAHBUB JUNAIDI	Tri Sakti	Centra	IT Care	Ti
3609	26/05/2024 22:20	Closed	Low	-	Test	ARIES FATAHILLAH A.Md.	Kantor...	Wi-Fi	IT Care	Ti
3608	22/05/2024 17:04	Closed	Low	Delayed by 3d 17h	Login PEO	Misrawi	Bagen...	Portal SI	ILCS Sup...	Ti
3607	22/05/2024 16:39	Closed	Low	Delayed by 4d 16h	Mohon di bantu untuk log approver	MAHBUB JUNAIDI	Tri Sakti	Portal SI	IT Care	Ti
3606	22/05/2024 14:26	Closed	Low	-	Pendaftaran Virtual Account PADI UMKM	SITI AISYAH	Kantor...	Centra	IT Care	Ti
3605	22/05/2024 11:11	Closed	Low	-	Penggantian Approval pada PIR di Centra	RYAN PRATAMA	Belawan	Centra	ILCS Sup...	Ti

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

ID	Subject	Requester Name	Assigned To	Dueby	Status	Created Date	Site	On Behalf Of
295	Test Notification	Test	IT Care	Jun 15, 2023 09:57	Closed	Jun 14, 2023 09:57	-	-
11	Test	Test	IT Care	Jun 15, 2023 09:18	Closed	May 4, 2023 10:21	-	-
5	test subject	Test	IT Care	May 3, 2023 12:23	Closed	May 2, 2023 04:23	-	-
1	Test Ticket	Test	IT Care	May 2, 2023 01:00	Closed	May 2, 2023 11:00	-	-

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

PELINDO Home Requests

Template: Default Request

Requester: [Text]

Category: Not Specified Subcategory: Not Specified

Subject: [Text]

Description:

Yth. Tim IT Care SPMT,

Dengan ini dimohon bantuannya untuk dapat membantu penyelesaian permasalahan atas :

Permasalahan :

Sebagai informasi perkembangan Update Progres Laporan Permasalahan dapat disampaikan kembali ke saya.

Demikian disampaikan, atas kerjasama yang baik diucapkan terima kasih.

Site: Not associated to any site

Attachments: [Browse Files or Drag files here | Max size: 10 MB]

Add request Reset Cancel

Live Chat

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.

Folder Manage

Reports by accountable level

Reports by site, support group, and technician

Logfile Reports

Reports by SLA

Reports on request time analysis

Reports by all requests

Reports by completed requests

Reports by SLA Violated requests

Reports by pending requests

Request Summary Reports

Requests by OLA

Request Timespent Reports

Survey Reports

My Reports

Actions

New Custom Report

New Query Report

New Schedule Report

Report Home - Laporan Tiket

Custom Report

Step 1: Select columns to display

Available Columns: Applied Solutions, Approval Status, Assigned Time, Cancellation Requested, Category, Comments, Created By, Department, Department Head, Description

Display Columns: Request ID, Subcategory, Subject, Created Time, Responded Date, SLA response time, Resolved Time, Completed Time, SLA resolution time, Request Status

Step 2: Filter Options

Date Filter: Created Time During This month From 2024-05-01 To 2024-05-31

Advanced Filtering

Column Name	Criteria	Value	Match
--Select Column--	--Select Criteria--		AND

Step 3: Select Column to group

Step 4: Select summary type

Step 5: Charts

Run Report Cancel

Figure 13. Reports page

Unsaved Report - Laporan Tiket

Save Report

Show Query

Mail this Report

Cancel

Page 3 of 3

Print Preview

Export as: HTML File PDF file XLS file CSV file

PELINDO

PT PELINDO MULTI TERMINAL

Laporan Tiket

Generated by IT Core on: 01-05-2024 03:46

User: admin_08

Created Time: Run 01-05-2024 03:07 to 01-05-2024 03:59

Request ID	Subcategory	Subject	Created Time	Responded Time	SLA response time	Resolved Time	Completed Time	SLA resolution time	Request Status
3932	Not Assigned	8 Petanahan Reaching Fuel To Last Tank Monitor (Petanahan Reaching 84 Kilo Petanahan Time 19:13:40:00:17)	01-05-2024 03:07	01-05-2024 14:39	00:00:00	01-05-2024 14:00	01-05-2024 15:07	00:00:00	Closed
3933	Critical	Aggrigate Pooling Regulation Issue: Inactive Sensor DPM (Petanahan 84 Kilo)	01-05-2024 11:00	01-05-2024 13:00	00:00:00	01-05-2024 10:10	01-05-2024 14:10	00:00:00	Closed
3934	Normal	Tekanan Tekanan Tinggi Tanki Gas: Petanahan 84 Kilo (Petanahan 84 Kilo 19:13:40:00:17)	01-05-2024 14:00	Not Assigned	00:00:00	Not Assigned	Not Assigned	00:00:00	In Progress
3935	High	Master Peringatan Tanki Terapan di Aplikasi PTO 3d	02-05-2024 10:07	Not Assigned	00:00:00	02-05-2024 10:10	02-05-2024 10:30	00:00:00	Closed
3936	Low	Baca Tanki Input di Aplikasi	02-05-2024 04:10	Not Assigned	00:00:00	02-05-2024 10:30	02-05-2024 10:30	00:00:00	Closed
3937	Critical	Aggrigate Pooling Regulation Issue: Inactive Sensor DPM (Petanahan 84 Kilo)	02-05-2024 04:10	Not Assigned	00:00:00	02-05-2024 10:30	02-05-2024 10:30	00:00:00	Closed
3938	Low	Pesan Mail di Aplikasi (10000 Tanki monitor data data tanki)	02-05-2024 10:30	Not Assigned	00:00:00	02-05-2024 10:30	02-05-2024 10:30	00:00:00	Closed
3939	Low	RED Error	02-05-2024 04:10	Not Assigned	00:00:00	02-05-2024 10:30	02-05-2024 10:30	00:00:00	Closed
3940	Critical	Revisi Petanahan Petanahan: Petanahan 84 Kilo (Petanahan 84 Kilo 19:13:40:00:17)	02-05-2024 10:10	Not Assigned	00:00:00	02-05-2024 10:30	02-05-2024 10:30	00:00:00	Closed
3941	High	Master Peringatan Tanki Terapan di Aplikasi PTO 3d	02-05-2024 11:00	Not Assigned	00:00:00	02-05-2024 10:30	02-05-2024 10:30	00:00:00	Closed
3942	Low	Log PTO 3d (Petanahan 84 Kilo)	02-05-2024 04:10	Not Assigned	00:00:00	02-05-2024 10:30	02-05-2024 10:30	00:00:00	Closed
3943	Critical	Master Peringatan Tanki Terapan di Aplikasi PTO 3d (Petanahan 84 Kilo)	02-05-2024 12:40	Not Assigned	00:00:00	02-05-2024 10:30	02-05-2024 10:30	00:00:00	Closed
3944	Normal (3)	Aggrigate Pooling Regulation Issue: Inactive Sensor DPM (Petanahan 84 Kilo)	02-05-2024 10:30	Not Assigned	00:00:00	02-05-2024 10:30	02-05-2024 10:30	00:00:00	Closed
3945	Critical	Pesan Mail di Aplikasi (10000 Tanki monitor data data tanki)	02-05-2024 10:30	Not Assigned	00:00:00	02-05-2024 10:30	02-05-2024 10:30	00:00:00	Closed
3946	Low	Log PTO 3d (Petanahan 84 Kilo)	02-05-2024 12:40	Not Assigned	00:00:00	02-05-2024 10:30	02-05-2024 10:30	00:00:00	Closed
3947	Low	Log PTO 3d (Petanahan 84 Kilo)	02-05-2024 12:40	Not Assigned	00:00:00	02-05-2024 10:30	02-05-2024 10:30	00:00:00	Closed

-
- [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 Persediaan 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 Cafeteria 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.