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# Designing a helpdesk ticketing system to improve the efficiency of IT support services on an XYZ company-based website using the Laravel framework

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**Abstract:** PT XYZ company requires a Helpdesk Ticketing system that can enhance the efficiency of their IT support services. Hence, this study aims to design and implement a web-based Helpdesk Ticketing System using the Laravel framework. The system is designed to assist the IT department in efficiently responding to and addressing employee issues. The research methodology includes user requirement analysis, system design, and application development using the Laravel framework. During the requirement analysis phase, the author identifies user needs and determines the essential features that should be present in the system. Subsequently, the system is designed, considering efficient architecture and design principles. In the development stage, the author utilizes the Laravel framework to build the Helpdesk Ticketing System. The selection of this framework is based on its capability to expedite the development process and provide the required features for the system. Additionally, the author conducts testing using the Black Box Testing method to ensure the system's functionality. The outcome of this research is a web-based Helpdesk Ticketing System that efficiently assists the IT department in handling employee issues. The system allows employees to report problems through the website, and the IT team can easily respond to and manage incoming tickets. With the implementation of this system, it is expected that the efficiency of IT support services will increase at PT XYZ.

**Keywords:** helpdesk ticketing system, IT support, Laravel framework, service efficiency, website

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## Introduction

PT XYZ is a company operating in the household appliances industry, producing a variety of detergents and bathing equipment for all ages, and operating in the industrial sector. As a manufacturing company, they rely on information technology systems to support various operational aspects, including IT support services. However, in practice, companies often face challenges in dealing with IT service requests from departments or employees. Manual processes for recording requests, assigning tasks, and tracking completion status are often time-consuming, less efficient, and difficult to monitor [1], [2].

In order to improve the efficiency of IT support services, a website-based helpdesk ticketing system design can be an effective solution. The Helpdesk Ticketing System is a system that allows companies to manage and track IT service requests through the ticketing system [3]. The system provides a central platform that allows IT departments and other users to communicate, collaborate, and track ticket status in real-time [4], [5].

Laravel is a powerful and expressive PHP web framework designed to accelerate the process of web application development. With features such as a powerful routing system, easy database management, and built-in tools for user authentication, it allows developers to build web applications quickly and efficiently. It also offers integrated security, easy maintenance, and large and active community support.

By implementing the Laravel Website Framework-based Helpdesk Ticketing System, PT XYZ can optimize the process of handling its IT service requests. Some of the benefits that can be obtained include: (1) Increased efficiency, the ticket system will automate the assignment, and guarantee that the appropriate staff members are handling IT service requests. This saves time and improves demand-handling efficiency [6]. (2) Centralised tracking and reporting, with the ticket system, companies can track the status of IT service requests in real-time. This allows management to monitor progress in troubleshooting, identify potential bottlenecks, and take necessary action to improve efficiency [7].

## Methodology

This research is a quantitative study with methods to create a basic framework to solve problems with questions. This method is called a research and development method [8]. Based on the results of the observations by conducting a direct survey in the field or location of research, namely PT. XYZ and literature studies, the research aims to create a system implementation in the form of a projected build of the ticketing system Helpdesk Ticketing System to improve the efficiency of IT support services [9]. This system is expected to optimize the level of performance of IT support services in the company PT XYZ.

The method of data collection is one of the aspects that play a role in the smoothness and success of research. In this research, the methods used for data collection are as follows: (1) Observation, The researchers conduct direct embedding into the field to find out and study the processes that support the research, (2) Literature Studies, this method involves comparing the research being done with the research that has been done before. In the first phase of the observation and literary studies, the author performs observations directly in the field to obtain data and analyze the processes already running on the PT. XYZ and conduct a literary study related to the topic and formula of the problem in this research.

In Stage Two, Identification of Needs, the author performs the identification of needs that will be implemented into the system. Once the need is identified, the result will be converted to a diagram containing information about the application needs and how the helpdesk ticketing system application can be used in the XYZ PT system [10].

1) Usecase Diagram

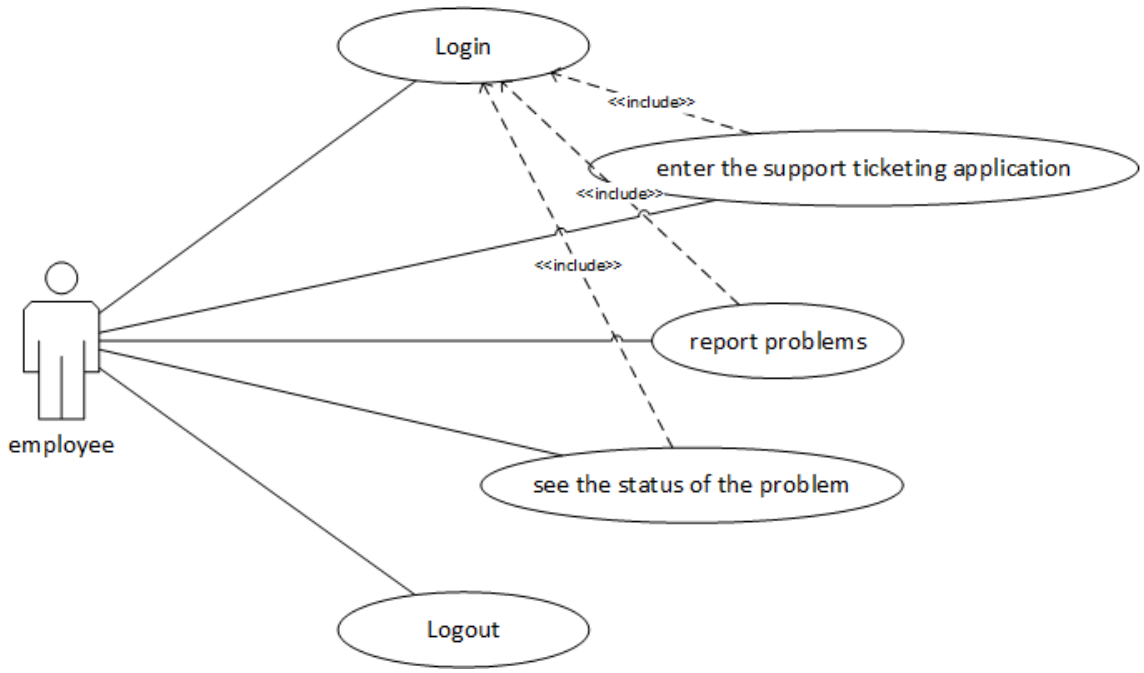


**Figure 1.** Usecase employee diagram

Figure 1 describes the use case of the user used by the employee.

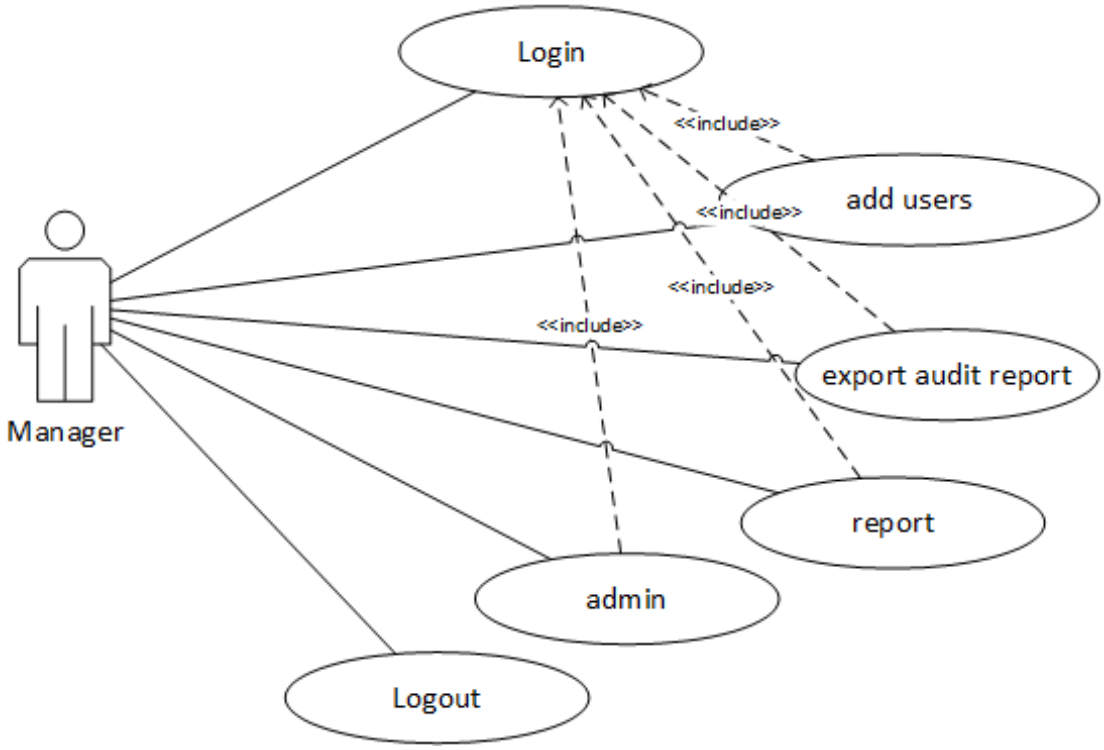


**Figure 2.** Usecase admin diagram

Figure 2 describes the use case of the admin that the manager uses.

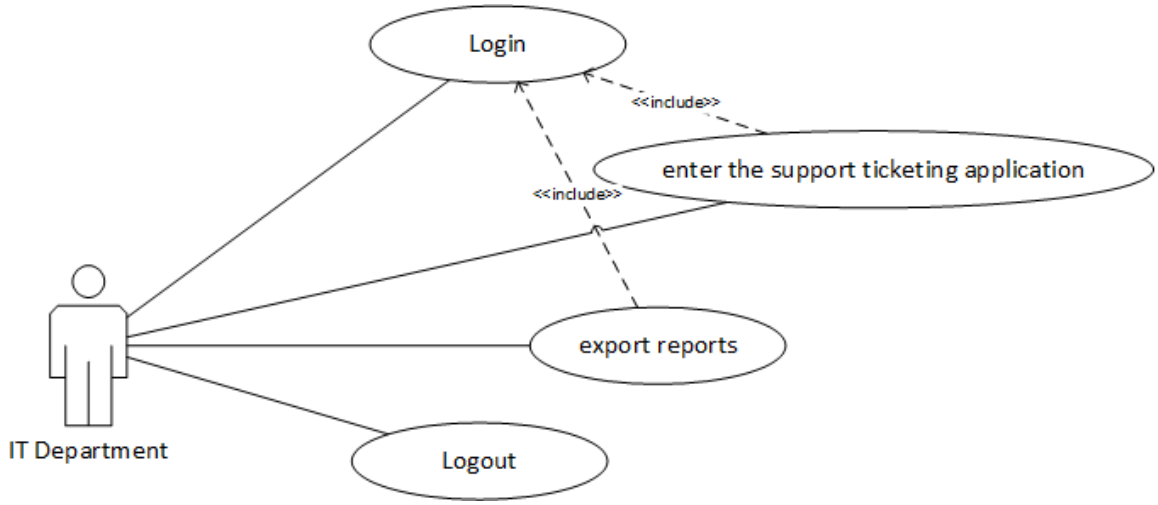


**Figure 3.** Usecase IT department diagram

Figure 3 describes the use case of the IT department that uses the IT network and IT software.

2) Activity Diagram

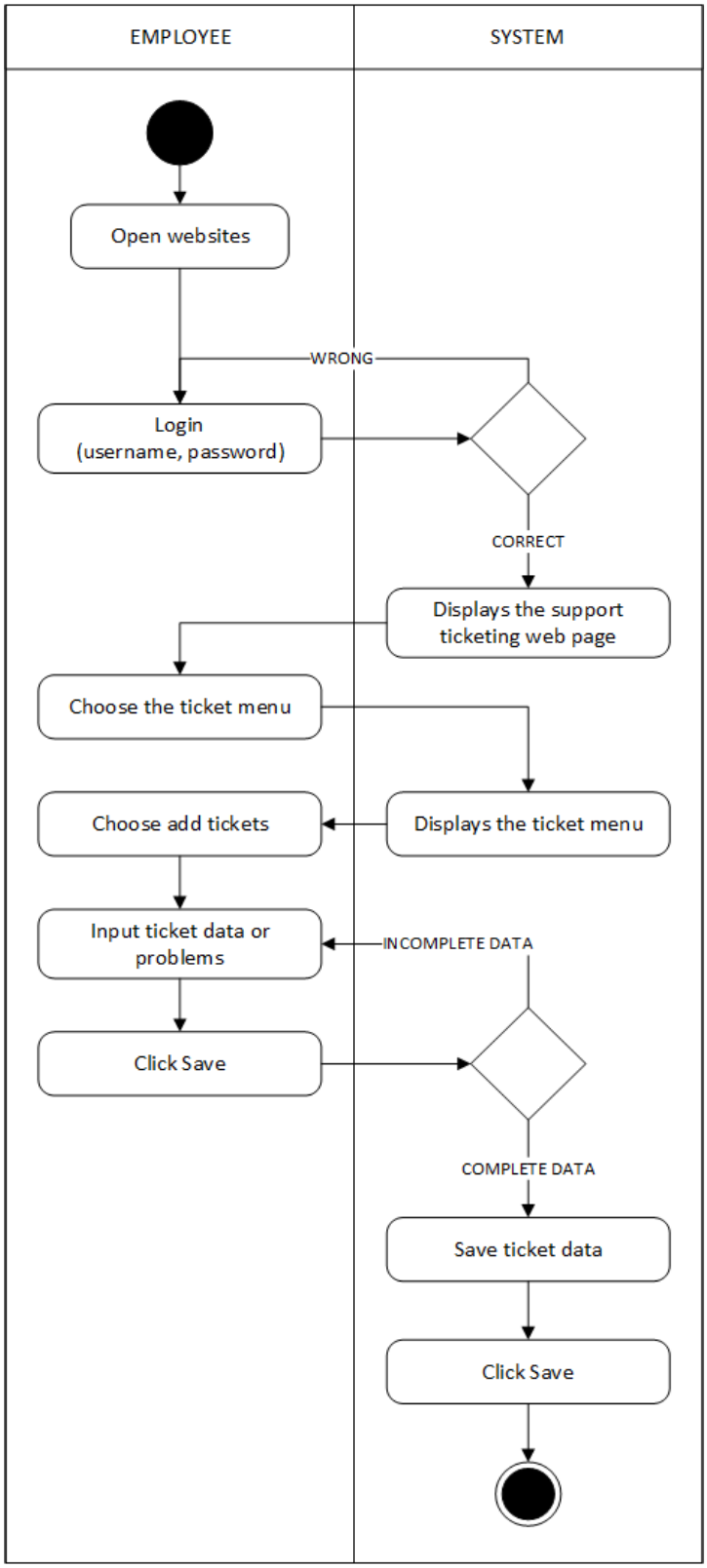


**Figure 4.** Activity diagram compliant input

Employees can access the support ticketing website page and do the login process. Once the login is successful, the system will display the main page. Next, the employee can choose a ticket menu that will display a list of existing tickets. Employees can enter the data of the problems they encounter and store it through the system.

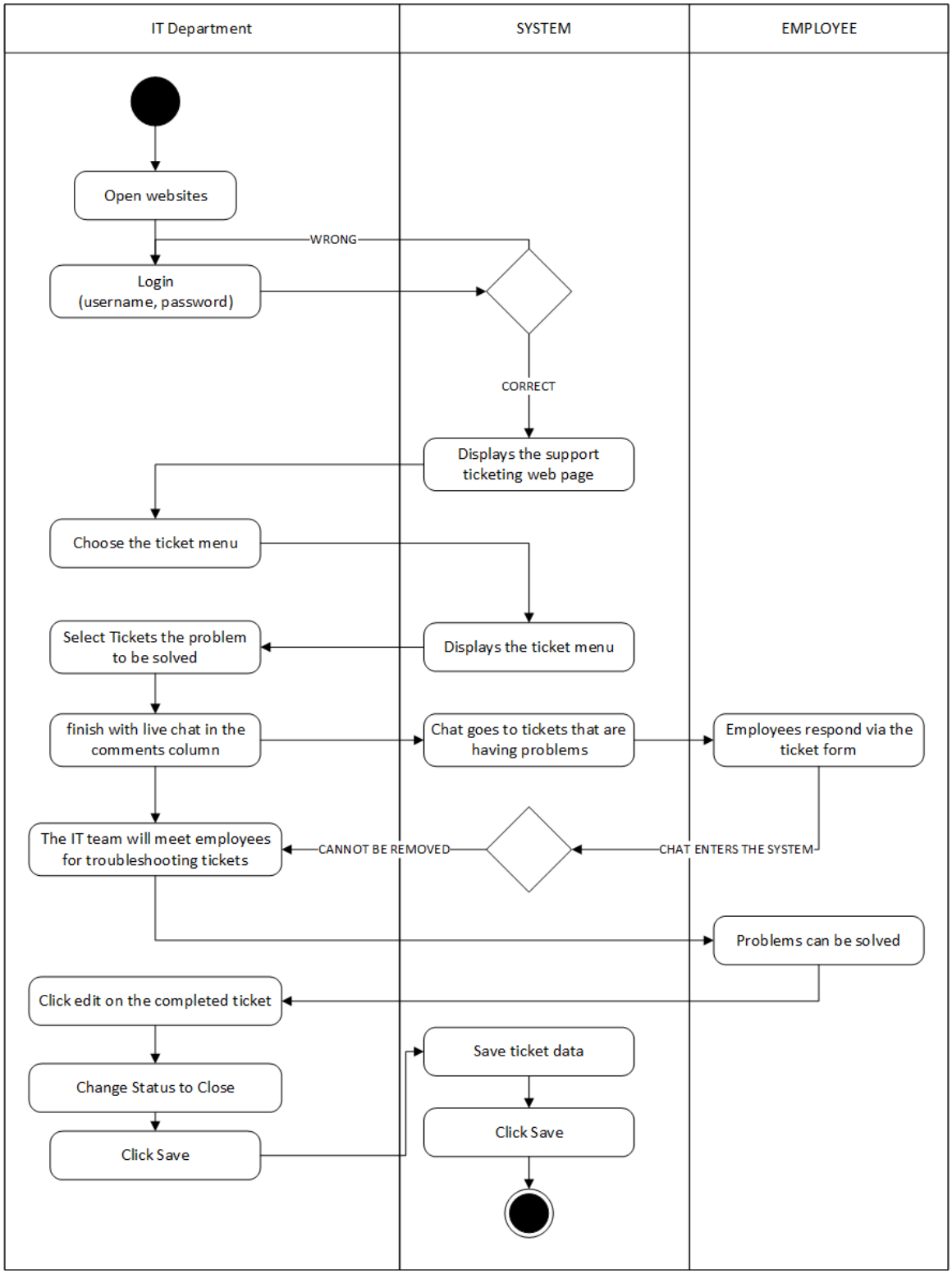


**Figure 5.** Activity diagram IT department completed tickets

Once the IT department logs in, the system will display the dashboard page. The IT team then chooses the ticket menu, which allows them to manage employee data and store it through the system.

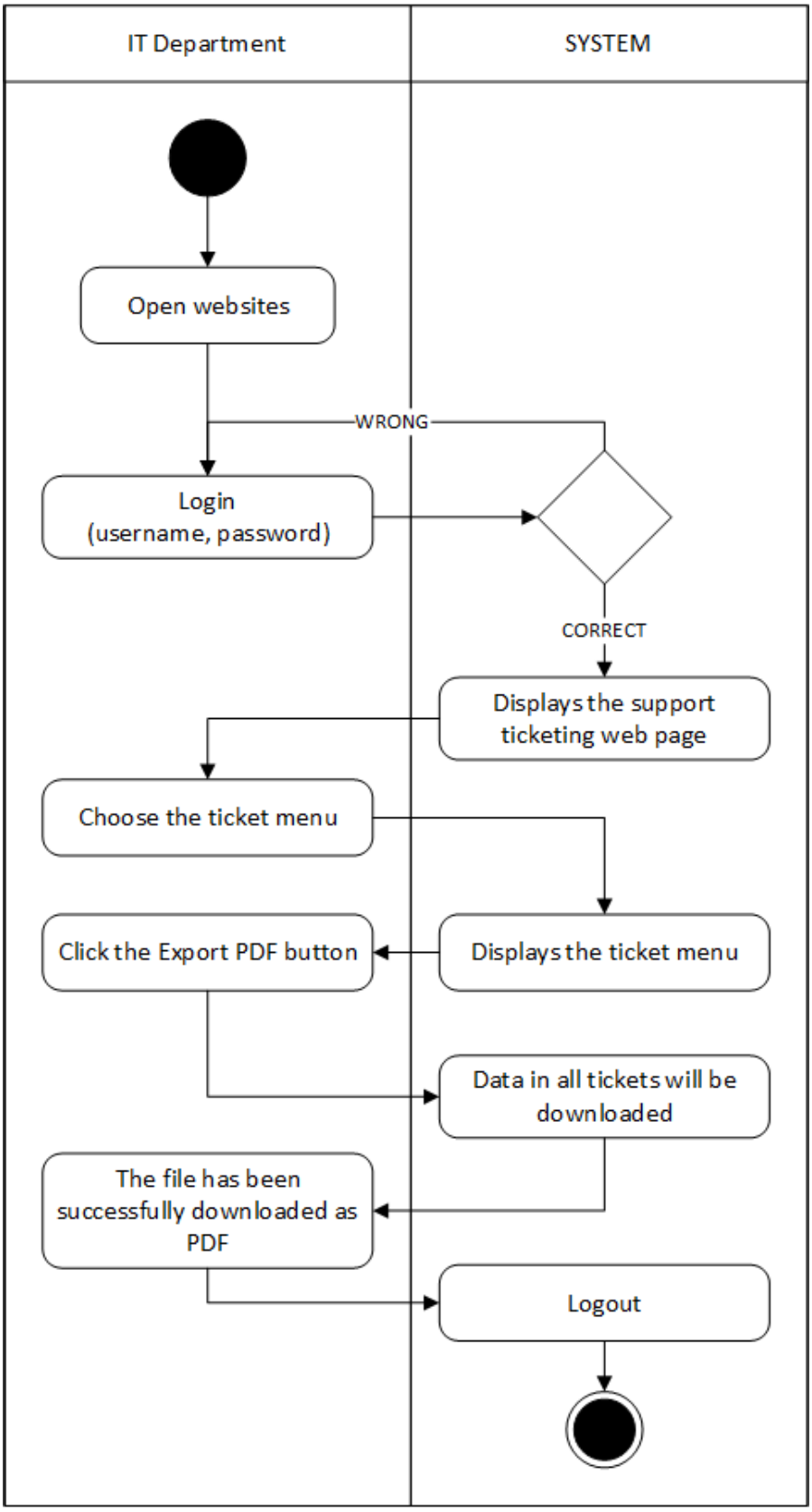


**Figure 6.** Activity diagram export tickets report

Once the IT department logs in, the system will display the dashboard page. The IT team then selects the ticket menu, then presses the PDF export button, and the IT department successfully downloads the PDF-format report.

The third stage is the installation of the Open-Source Helpdesk Ticketing System application using the Laragon web server and installed in the browser. The fourth phase simulates testing of the Helpdesk Ticketing System application. The fifth phase is the finalization phase of the use of the open-source helpdesk ticketing system application proposal. At this stage, conclusions will be obtained from this final task research, which has already been simulated, so that it can be proposed to be implemented on PT XYZ as a solution to the problem. In addition, the resulting output is documented as a report of recommendations using the Helpdesk Ticketing System suggestion.

## Results and Discussions

### *Application Architecture*

The application architecture has several sections, namely employees who use the Helpdesk Ticketing System application, where employees will access the server locally through the browser on their respective computers [11]. When an employee submits a complaint ticket, the problem will be handled by the IT department. The IT Department consists of IT networking and IT software. The IT team will access the application and resolve the employee's complaint ticket. If the complaint has been resolved, the application status will be changed from open to closed. Then comes the role of the manager as an admin, where this admin has full access rights to control the Helpdesk Ticketing System application [12].

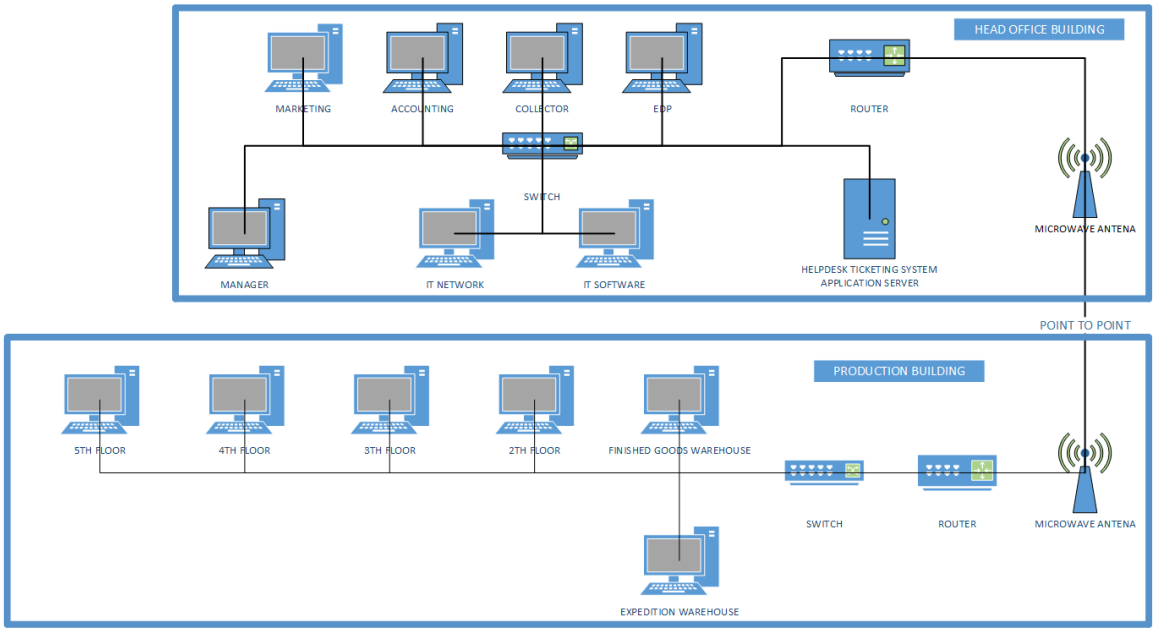


**Figure 7.** Application architecture

### *System Implementation*

Here's a view of some of the menus that have been created, which are the results of the identification of problems at the methodological stage.

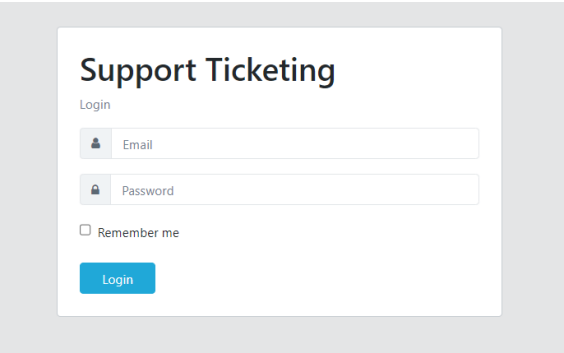

**Figure 8.** Page login

Figure 8 explains about the login appearance.

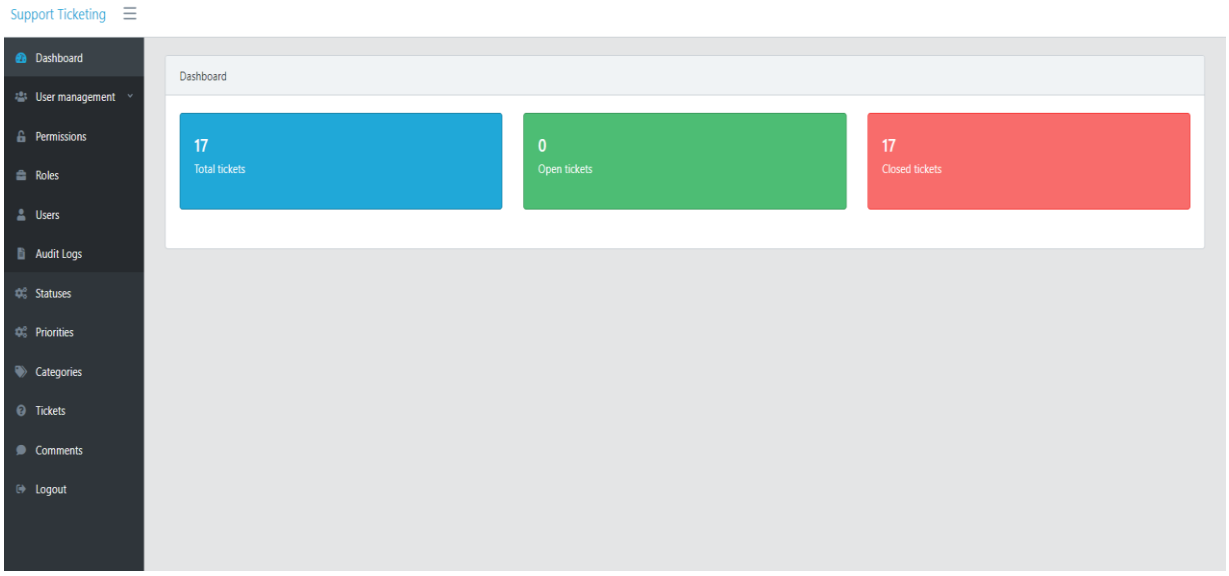


**Figure 9.** Dashboard

Figure 9 describes the main page view.

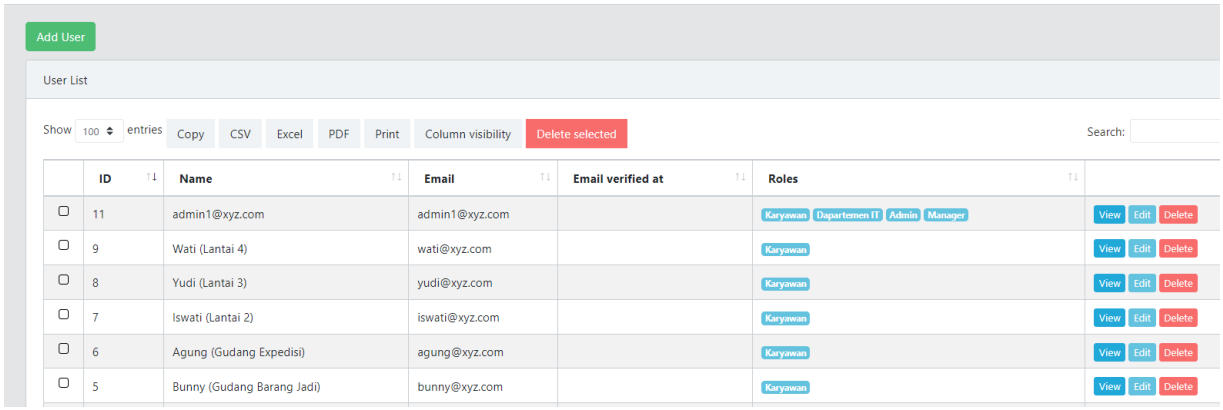


**Figure 10.** Add page to user

Figure 10 describes the view of adding user accounts.

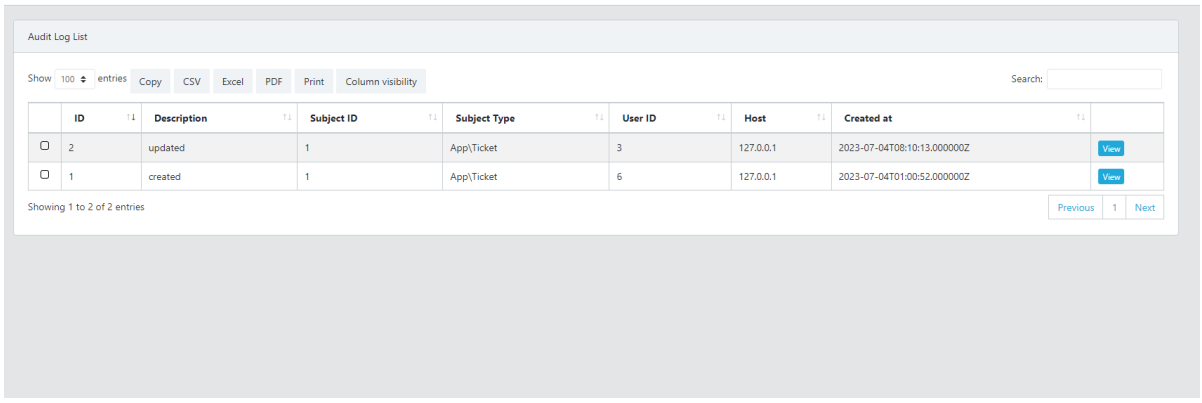

**Figure 11.** View the auditing print page

Figure 11 describes the view of the audit print page.

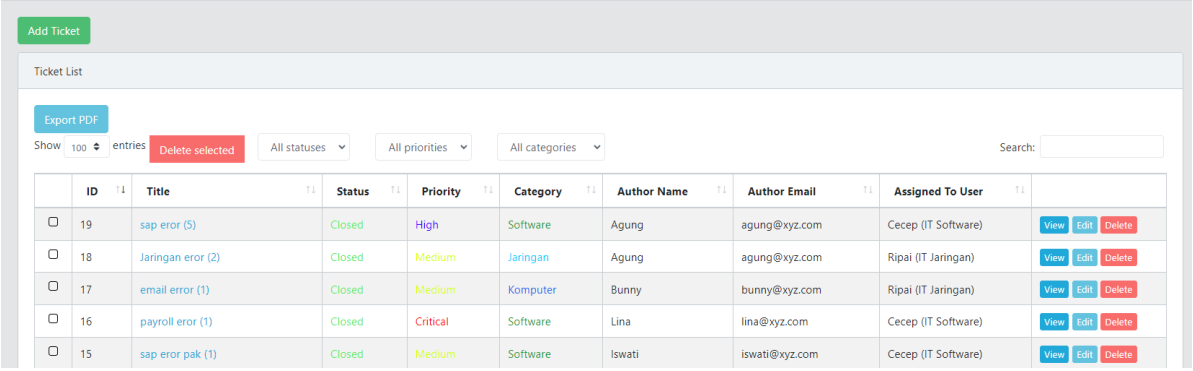


**Figure 12.** Page tickets

Figure 12 explains what the ticket looks like.

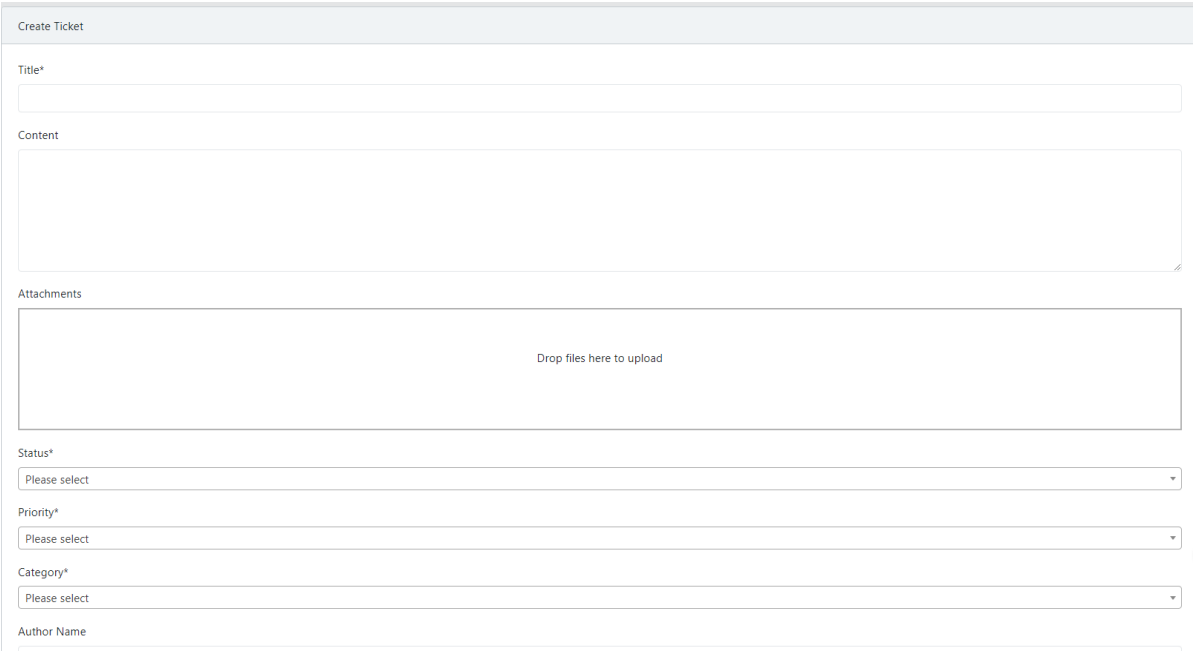


**Figure 13.** Page input tickets

Figure 13 explains the view of adding tickets.

| | |
|---|---|
| **Author Name** | Agung |
| **Author Email** | agung@yuri-dee.com |
| **Assigned To User** | Cecep (IT Software) |
| **Comments** | **Cecep (IT Software) (2023-07-19 17:04:56)**<br>I'm gonna restart the server's computer. Please wait 10 minutes.<br><br>**Agung (Expedisi) (2023-07-19 17:05:26)**<br>Well, I'll wait.<br><br>**Cecep (IT Software) (2023-07-19 17:05:57)**<br>I've restarted the computer server please try<br><br>**Agung (Expedisi) (2023-07-19 17:06:15)**<br>It's done.<br><br>**Cecep (IT Software) (2023-07-19 17:06:30)**<br>It's closed. |

**Figure 14.** Page comment

Figure 14 describes the blatant appearance of the problem on the ticket.

Show Tickets

| | |
|---|---|
| **ID** | 19 |
| **Created at** | 2023-07-19 17:02:48 |
| **Title** | sap eror |
| **Content** | sap eror |
| **Attachments** | |
| **Status** | Closed |
| **Priority** | High |
| **Category** | Software |
| **Author Name** | Agung |
| **Author Email** | agung@yuri-dee.com |
| **Assigned To User** | Cecep (IT Software) |

**Figure 15.** Close when tickets are finished

Figure 15 explains that the ticket view has been completed and then changes the status to closed.

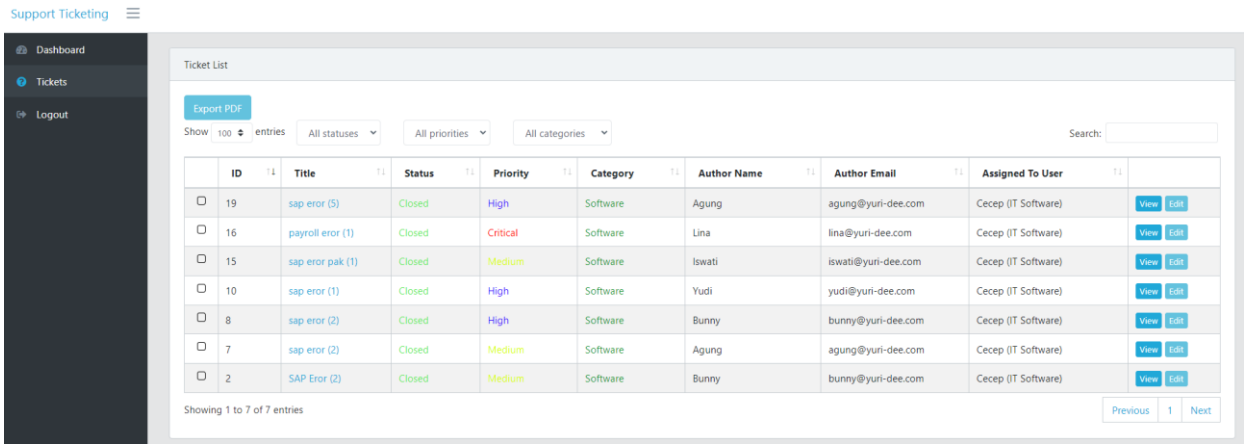


**Figure 16.** Check out the ticket on IT software

Figure 16 describes how the ticket page looks on the IT Software.

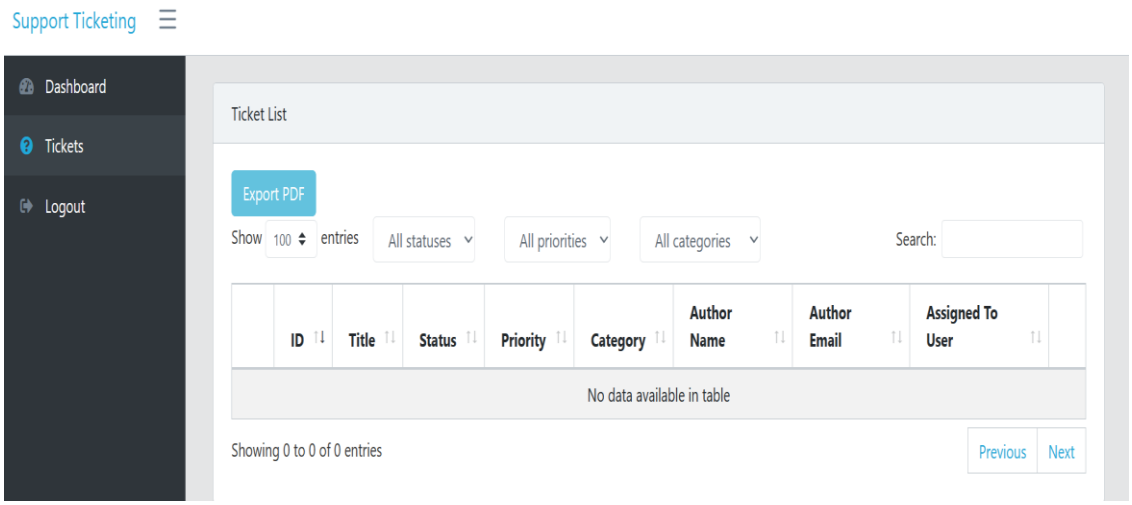


**Figure 17.** Look at the ticket on the network.

Figure 17 describes the appearance of the ticket page on the IT Network.

## *Testing Applications to Users*

After the implementation phase, the next step is testing the system. This is done to ensure that the result of the system meets the needs of the employees. The researchers used Blackbox testing to test the Helpdesk Ticketing System application at PT XYZ [13], [14]. This test method is performed by testing the application based on its functionality. The purpose of this test is to find possible errors that remain in the application and to make sure that the program has been created in accordance with the intended purpose [15].

**Table 1.** Testing to send complaints

| Type of request | Type of User | Input | Expected out-put | The output produced | Concluded |
|---|---|---|---|---|---|
| **Login Ap-plications** | User | Email and Password | Showing dash-board | Showing dash-board | Succeeded |
| **Make a new ticket.** | | | Showing a new ticket form | Showing a new ticket form | Succeeded |

| | | | | |
|---|---|---|---|---|
| **Send a ticket problem.** | The entire column on the ticket form is filled. | Showing a review of the tickets that have been sent | Showing a review of the tickets that have been sent | Succeeded |

The test result in Table 1 is a complaint-sending test to the department's IT and the employee will make the complaints ticket.

**Table 2.** The testing process of the IT department receives complaints

| Type of request | Type of User | Input | Expected output | The output produced | Concluded |
|---|---|---|---|---|---|
| **Login Applications** | IT Department | Email and Password | Showing dashboard | Showing dashboard | Succeeded |
| **Go to the ticket menu** | | | Showing all complaints sent by employees | Showing all complaints sent by employees | Succeeded |
| **When you click on the ticket, all the details will appear.** | | | Detailed Tickets from Employees | Detailed Tickets from Employees | Succeeded |

The test results in Table 2 are testing the process of the IT department receiving complaints from employees.

**Table 3.** Testing the printing process report on the IT department

| Type of request | Type of User | Input | Expected output | The output produced | Concluded |
|---|---|---|---|---|---|
| **Login Applications** | IT Department | Email and Password | Showing dashboard | Showing dashboard | Succeeded |
| **Go to the ticket menu** | | | Showing all complaints sent by employees | Showing all complaints sent by employees | Succeeded |
| **Click to export PDF** | | | Download the PDF file | Download the PDF file | Succeeded |

The test results in Table 3 are testing the report printing process in the IT directory.

**Table 4.** Process testing to solve problems through tickets

| Type of request | Type of User | Input | Expected output | The output produced | Concluded |
|---|---|---|---|---|---|
| **Login Applications** | IT Department | Email and Password | Showing dashboard | Showing dashboard | Succeeded |
| **Go to the ticket menu** | | | Showing all complaints sent by employees | Showing all complaints sent by employees | Succeeded |
| **Click the ticket and click the comment column to resolve the problem.** | | | The message will be sent to the employee through the ticket. | The message will be sent to the employee through the ticket. | Succeeded |

The test results in Table 4 are testing the process of solving problems through tickets.

**Table 5.** Additional user testing

| Type of request | Type of User | Input | Expected output | The output produced | Concluded |
|---|---|---|---|---|---|
| **Login Applications** | Admin | Email and Password | Showing dashboard | Showing dashboard | Succeeded |
| **Go to User Management and select Users.** | | | Add all users who are already registered on the support ticketing app | Add all users who are already registered on the support ticketing app | Succeeded |
| **Click Add User** | | | Showing forms for creating new users | Showing forms for creating new users | Succeeded |
| **Click Save** | | | The new account will appear in the user column. | The new account will appear in the user column. | Succeeded |

The results of the test in Table 5 are testing the process of adding a user and who can add a user who has admin access.

**Table 6.** Testing of an edit user

| Type of request | Type of User | Input | Expected output | The output produced | Concluded |
|---|---|---|---|---|---|
| **Login Applications** | Admin | Email and Password | Showing dashboard | Showing dashboard | Succeeded |
| **Go to User Management and select Users.** | | | Add all users who are already registered on the support ticketing app | Add all users who are already registered on the support ticketing app | Succeeded |
| **Click edit on the user you want to change.** | | | Showing Forms for Edit Users | Showing Forms for Edit Users | Succeeded |
| **Click Save** | | | The user that has been edited will appear in the user column. | The user that has been edited will appear in the user column. | Succeeded |

The test results in Table 6 test the editing process of the user and who can edit the user who has admin access.

**Table 7.** Delete the user test

| Type of request | Type of User | Input | Expected output | The output produced | Concluded |
|---|---|---|---|---|---|
| **Login Applications** | Admin | Email and Password | Showing dashboard | Showing dashboard | Succeeded |
| **Go to User Management and select Users.** | | | Add all users who are already registered on the support ticketing app | Add all users who are already registered on the support ticketing app | Succeeded |

| | | | |
|---|---|---|---|
| **Select the user you want to be removed.** | The successfully deleted user is not in the user column. | The successfully deleted user is not in the user column. | Succeeded |

The result of the test in Table 7 is a test of the user deletion process that can delete users who have admin access.

**Table 8.** Printed audit process

| Type of request | Type of User | Input | Expected output | The output produced | Concluded |
|---|---|---|---|---|---|
| **Login Applications** | Admin | Email and Password | Showing dashboard | Showing dashboard | Succeeded |
| **Select User Management and go to Audit Logs.** | | | View all audits in the support ticketing app | View all audits in the support ticketing app | Succeeded |
| **Click PDF** | | | Download the file in PDF format | Download the file in PDF format | Succeeded |
| **Click CSV** | | | Download files in Excel format | Download files in Excel format | Succeeded |

The test results in Table 8 are auditing printing processes that can perform auditing prints that have admin access.

From the experimental test table of some user test cases above, the features of the application or the type of service in the application object are already tested for all its functions, and the results show that the process has been successful. The author managed to add up to 15 pieces of data. Later, this application will be used in PT XYZ to help the IT team deal with complaints from employees related to IT affairs, including systems, networks, and applications

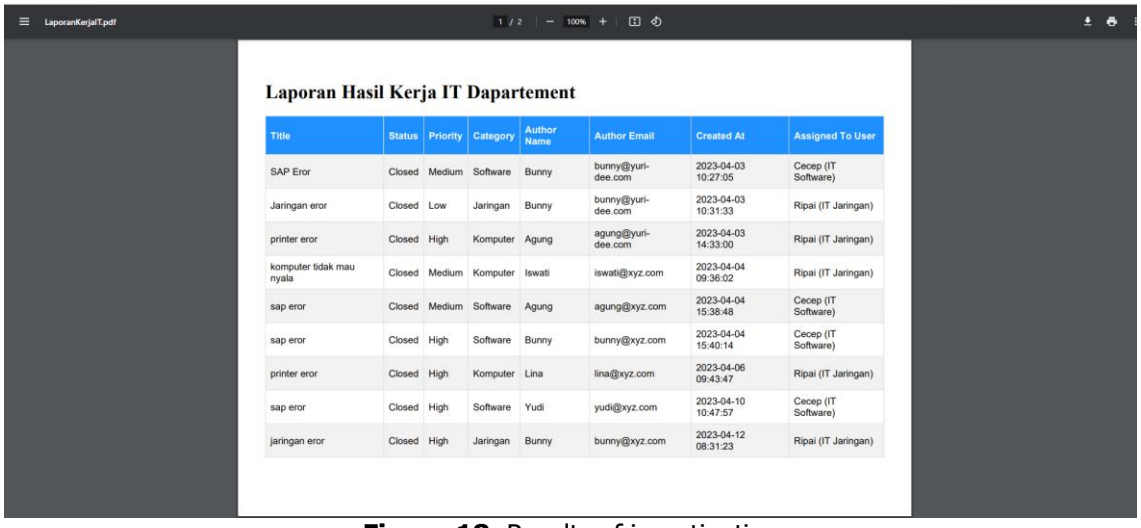


**Figure 18.** Results of investigation

## *Increased efficiency*

With the implementation of ticketing support applications,

IT Department can solve problems more easily and efficiently. This improvement has been shown to increase problem-solving time.

**Table 9.** Efficiency results

| Problems | Before the application. | After the application. | Efficiency |
|---|---|---|---|
| **Complaints about SAP Errors** | 40 minutes | 20 minutes | ⇧ 2x and faster |
| **The Network Complaints** | 60 minutes | 20 minutes | ⇧ 3x and faster |
| **Application complaints** | 40 minutes | 20 minutes | ⇧ 2x and faster |
| **complaints Printer** | 60 minutes | 30 minutes | ⇧ 2x and faster |
| **complaints computer** | 60 minutes | 20 minutes | ⇧ 3x and faster |

From Table 9, it can be concluded that there is an increase in efficiency, i.e., a measure of success assessed in terms of the size of resources for the achievement of the results of the activities carried out, which in this case is faster than the time side of solving the problem. Without this system, the IT department can't record its work, which leads to neglect. However, with the helpdesk ticketing system, a manager or a big boss can oversee the IT department's work. With the direct supervision of a manager or a big boss, the IT department can solve PT.XYZ problems quickly.

## Conclusion

In the face of the current situation at PT XYZ, where the troubleshooting process of computers, networks, and software is still done manually, it is recommended to implement a website-based Helpdesk Ticketing System application using the Laravel Framework, called Support Ticketing. The designation of the Helpdesk Ticketing System application as Support Ticketing aims to facilitate its use and facilitate employees in referring to the system. Based on the discussions that have been done regarding Support Ticketing, some conclusions can be drawn as follows:

1. The application of Support Ticketing will benefit PT XYZ in accelerating and improving the efficiency of the Troubleshooting process by the IT department. In addition, it will also save quotas and pulses used when communicating with employees. By using the comment feature on the ticket related to the problem, the IT department can immediately respond and perform Troubleshooting quickly.
2. All reports from the IT department will be comprehensively recorded and accessible through the ticketing page. The reports can be downloaded in PDF file format, allowing you to save and share the reports easily. Thus, PT XYZ can have a complete record of the activities and performance of the IT department in a structured and easily accessible form.
3. After implementing the support ticketing app, there was an improvement in efficiency compared to previous performance comparisons that still rely on manual methods such as making phone calls to employees. The IT department can save costs previously spent on phone pulses and internet quota use. With the presence of support ticketing applications, the interaction between IT departments and employees becomes more efficient, fast, and well-recorded, which ultimately results in significant cost savings for PT XYZ.
4. The ticketing support app is very easy to operate by all groups.
5. The role of admin as add user and creator of audit reports.

## References

[1] R. N. Wardhani, M. C. Utami, and I. Y. Saputra, "Sistem Informasi Helpdesk Ticketing pada PT. Bank Mega TBK," *J. Ilm. Matrik*, vol. 22, no. 2, pp. 201–207, 2020, doi: 10.33557/jurnalmatrik.v22i2.868.

[2] H. Artikel, D. Cube, and D. Mart, "Perancangan Dashboard IT Helpdesk pada PT . XYZ," vol. 2, no. 11, pp. 2557–2567, 2023.

[3] R. M. Bahrudin, M. Ridwan, and H. S. Darmojo, "Penerapan Helpdesk Ticketing System Dalam Penanganan Keluhan Penggunaan Sistem Informasi Berbasis Web," *J. Tek. Inform.*, vol. 7, no. 1, pp. 71–82, 2019.

[4] M. Fauzi, Masrizal, and V. Sihombing, "Sistem Informasi IT-Helpdesk Universitas Labuhan Batu Berbasis Web," *JURTEKSI (Jurnal Teknol. dan Sist. Informasi)*, vol. 7, no. 3, pp. 259–266, 2021, [Online]. Available: https://jurnal.stmikroyal.ac.id/index.php/jurteksi/article/view/1187
[5] M. Saepuloh, "Perancangan Sistem Informasi Manajemen Helpdesk Berbasis Web dengan Framework Codeigniter dan Mysql," *JATISI (Jurnal Tek. Inform. dan Sist. Informasi)*, vol. 8, no. 4, pp. 2261–2276, 2021, doi: 10.35957/jatisi.v8i4.1245.
[6] U. A. Rachmawati, S. Adam, and S. H. Alwi, "Pembangunan Helpdesk Ticketing System Berbasis Web (Studi Kasus: Universitas Yarsi)," *J. Teknol. Inf. Yars.*, vol. 6, no. 1, pp. 19–24, 2019, doi: 10.33476/jtiy.v6i1.597.
[7] A. Alfian, Y. N. Dewi, F. W. Fibriany, H. Rianto, and A. M. Sari, "Rancang Bangun Sistem Informasi Ticketing Helpdesk pada DPMPTS Pemprov DKI Jakarta," *JURIKOM (Jurnal Ris. Komputer)*, vol. 7, no. 2, 2020, doi: 10.30865/jurikom.v7i2.2114.
[8] Sugiyono, *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. Bandung: Alfabeta, 2018.
[9] A. M. Olsi, P. A. Telnon, and W. Hidayat, *Aplikasi Asrama Telkom University Pada Modul Helpdesk*. Bandung: Universitas Telkom, 2021.
[10] S. Shofiyyah, *Penerapan Helpdesk Ticketing System Untuk Mengelola Data Keluhan Pelanggan Menggunakan Metodologi Pdca ( Plan-Do-Check-Action ) Dan Algoritma Naïve Bayes Classifier*. Bandung: Universitas Widyatama, 2020, [Online]. Available: http://repository.widyatama.ac.id/xmlui/handle/123456789/13034
[11] T. Ananda Putra and S. Dwiasnati, "Rancang Bangun Aplikasi Investasi UKM Berbasis WEB Dengan Fitur Penentuan Resiko Bisnis," *CSRID (Computer Sci. Res. Its Dev. Journal)*, vol. 12, no. 2, 2021, doi: 10.22303/csrid.12.2.2020.117-128.
[12] W. Witono, "Aplikasi Berbasis Website Untuk Booking Hotel Surya Andesa Klaten Menggunakan Framework Laravel Dengan Metode Waterfall," pp. 3–6, 2023.
[13] Tri Snadhika Jaya, "Pengujian Aplikasi dengan Metode Blackbox Testing Boundary Value Analysis," *J. Inform. Pengemb. IT*, vol. 3, no. 2, pp. 45–46, 2018, [Online]. Available: http://www.ejournal.poltektegal.ac.id/index.php/informatika/article/view/647/640
[14] N. L. G. P. Suwirmayanti, I. K. A. A. Aryanto, I. G. A. N. W. Putra, N. K. Sukerti, and R. Hadi, "Penerapan Helpdesk System dengan Pengujian Blackbox Testing," *J. Ilm. Intech Inf. Technol. J. UMUS*, vol. 2, no. 02, 2020, doi: 10.46772/intech.v2i02.290.
[15] R. Amperawansyah and D. P. Putri, "Pemilihan Jenis Smartphone Sesuai dengan Kebutuhan Menggunakan Metode Forward Chaining dan Decicion Tree," *INOVTEK Polbeng - Seri Inform.*, vol. 7, no. 1, p. 156, 2022, doi: 10.35314/isi.v7i1.2402.