International Journal of Computer and Information System (IJCIS)
Peer Reviewed – International Journal
Vol : Vol. 05, Issue 01, January 2024
e-ISSN : 2745-9659
https://ijcis.net/index.php/ijcis/index

Analysis and Design of Queue Service Information System Integrated with WhatsApp using UML Method

1st Ega Bagus Purnama, 2nd Nurul Azizah, 3rd M. Nuraminudin, 4th Melany Mustika Dewi
Informatics Management
University of Amikom Yogyakarta
Yogyakarta, Indonesia
1st egabagus@students.amikom.ac.id, 2nd nurulazizah@students.amikom.ac.id,
3rd adin.5829@amikom.ac.id, 4thmelany@amikom.ac.id

Abstract— In the rapidly developing digital era, information systems have become an important element in increasing efficiency and effectiveness in various activities. As an important part of public services, queuing services withstand significant challenges in managing rapid population growth. Long waiting times and inefficient queue management can result in user dissatisfaction, increased workload for service providers, and potentially harm productivity. This research aims to overcome these challenges by identifying, pivoting, and creating an innovative information system integrated with the popular cross-platform application, WhatsApp. The main focus is automating queue service management to increase efficiency and user convenience. The resulting system is expected to provide significant changes in public services, reduce waiting times, and make queue management easier. The Unified Modeling Language (UML) methodology is used in the design of this system, providing systematic guidance to achieve these goals. In this research, we identify problems, user needs, functional requirements, and non-functional systems, including queue registration, queue management, user management, and service management. The results include use case diagrams, activity diagrams, sequence diagrams, and class diagrams, which provide a detailed overview of various aspects of the system. The results of this research can serve as a guide for application developers and demonstrate the benefits of UML in designing complex information systems.

Keywords: Efficiency, Information system, Queuing service, UML, WhatsApp

I. INTRODUCTION

As the population increases in an area, efficient and organized public services are in demand. Increasing population density tends to create more complex problems in management efforts[1]. One aspect that is most felt by the public is queuing activities, which are often considered tiring and boring. The problem is compounded by waiting times and the need to physically show up and sign up in line. The importance of efficient and organized public services requires innovative solutions, and hindering the role of information systems becomes crucial. Information systems are considered tools that are capable of presenting data or information that is useful for users[2]. Advances in information systems technology will be a valuable asset in improving the quality of service in public facilities. The implementation of online queue registration not only provides flexibility, but also eliminates the need to face long queues, and makes it possible to easily track the order of their arrival according to predetermined times[3].

With an information system, queuing services will be much more profitable for the public. But do people have to be on standby to open the information system? The answer is no. The Information System must be integrated with WhatsApp. WhatsApp is a cross-platform application that allows users to send and receive messages. With WhatsApp, people don't need to be on standby to open the information system. But just wait for the message when the queue is approaching.

This research aims to identify, evaluate, and create an innovative information system that can be integrated with WhatsApp. It is hoped that this information system can bring important changes by improving public services, reducing waiting times, and making it easier to manage queues better. The method applied in this research is the use of the UML approach. UML (Unified Modeling Language) is a method in the field of software engineering that is used to illustrate how a system operates, including its flow, function, objectives, and control mechanisms[4]. By utilizing the unified modeling language (UML) methodology in designing the system, this research will outline systematic design steps to achieve this goal. One potential drawback that some developers face when implementing UML is the time required to manage and maintain UML diagrams. To maintain consistency and optimal functionality,

UML diagrams must always be aligned with the software code, which requires a significant investment of time for preparation and maintenance, and potentially increases workload in the context of a software development project. The UML used in this research consists of Use Case Diagrams, Activity Diagrams, Sequence Diagrams, and Class Diagrams. Using web-based technology makes designing and creating applications simpler because users only need an internet browser, and are not tied to a special operating system[5].

In previous research[6], an online queuing system was explained. However, this research has not succeeded in achieving integration with WhatsApp. Based on these problems and supported by advances in technology and information systems, researchers will create a UML modeling design for an online queuing system integrated with WhatsApp. Designing an online queuing system modeling using UML will make it easier for developers or programmers to create programs for online queuing systems[6].

II. RESEARCH METHODS

In this research, researchers used 4 methods. These include problem identification, user needs analysis, functional needs analysis, and non-functional needs analysis. The research method chart can be seen in the Figure 1.

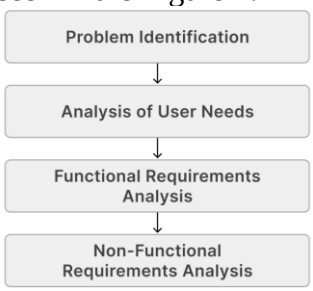

Figure 1. Research Methods

2.1. Problem Identification

Problem identification is the process of recognizing and understanding the issue being faced[7]. The main problem experienced in this research is the inefficiency of the queuing system currently used. The queuing process takes a long time, resulting in inefficient service. Customers also often don't get enough information regarding estimated waiting times. There is a need for a system that can be integrated with WhatsApp to increase efficiency and effectiveness when queuing.

2.2. Analysis of User Needs

User needs are identified through collaboration between users and researchers, to determine the expected features in the system. The results of this analysis aim to ensure that the system can meet these needs[8]. The results of the user needs analysis can be seen in Table 1.

Table 1. Analysis of User Needs.

ID	User Needs	Description
KP.1	Queue Registration	Create a system that can register queues remotely or on location and users get queue numbers automatically.
KP.2	Queue Management	Create a system that can manage queues according to service status.
KP.3	WhastApp Integration	Create an integrated system with WhatsApp.

2.3. Functional Requirements Analysis

Functional requirements refer to the types of requirements that involve operations or steps that the system must carry out, as well as information that must be managed and produced by the system[9]. In this research, functional requirements are a step to identify requirements that must exist in a system. In this Queue Service Information System, functional requirements can be seen in Table 2.

Table 2. Functional Requirements Analysis

ID	Functional Requirements	User Needs ID
KF.1	Create a queue registration feature according to the service.	KP.1
KF.2	Create a function to automatically generate queue numbers according to the service and sequence.	KP.1
KF.3	Create a queue calling feature on the officer side.	KP.2
KF.4	The queue status update feature becomes "served" or "skipped".	KP.2
KF.5	Using WhatsApp API in the system.	KP.3
KF.6	Create a feature to send queue numbers via WhatsApp automatically when registering in a queue.	KP.3

2.4. Non-Functional Requirements Analysis

Non-functional requirements are a description of how the system will operate in the future[10]. In this research, functional requirements are a process carried out to identify needs outside the specific function of the system, but still related to the system to improve security, reliability, and user experience.

a. System Characteristics

1) Limiting access rights by logging in,
2) System security includes authentication, authorization, data encryption, and protection against cyber-attacks,
3) WhatsApp integration,
4) Database synchronization.

b. Software Requirements

1) Use Windows 10 or higher,
2) PostgreSQL,
3) WhatsApp API,
4) Database Management System (DBMS),
5) Message processing,
6) Browser Google Chrome.

c. Hardware Requirements

1) Network device,
2) Computer or laptop,
3) The minimum storage is 10GB,
4) Minimum server RAM 1GB.

III. RESULT AND ANALYSIS

UML can be used to describe, describe, build, and document various system components in software[11]. Unified Modeling Language (UML) is recognized as the gold standard in the practical application of object-oriented modeling. UML was developed to support Object Orientation principles and is seen as the main visual language in system development that adopts an object-oriented approach[12]. The UML used in this research are Use Case Diagrams, Activity Diagrams, Sequence Diagrams, and Class Diagrams.

3.1 USE CASE DIAGRAM

Use Case Diagram (use case) is a visual tool that illustrates the functional requirements of the software. This diagram plays a role in helping us understand how the system is expected to operate[13].

a. Administrator Use Case

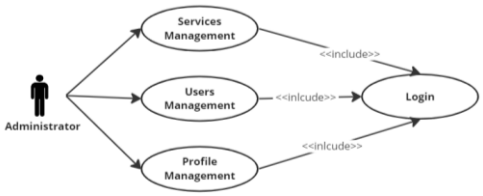

Figure 2. Use Case Administrator

Figure 2, the Administrator is the user with the highest level. Administrators get access to service management (add, change, and delete), user management (add, change, and delete), and profile management (change and delete) features. To access this feature, Administrators are required to go through the login process first.

b. Officer Use Case

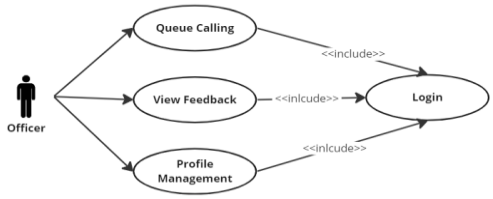

Figure 3. Use Case Officer

Figure 3 explains the officer use case. Officer is a user level with a level below Administrator. Officers get access to the queue call feature, view feedback (view), and profile management (change and delete). To access this feature, officers are required to go through a login process first.

c. Visitors Use Case

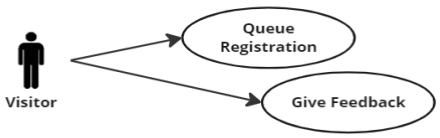

Figure 4. Visitor Use Case

Figure 4 explains the visitor use case. Visitors in this queue service information system get access to the queue registration feature and enter feedback.

3.2 Activity Diagram

Activity diagrams contain the development of the processes contained in the use case. In contrast to use cases, activity diagrams do not describe actor behavior, but instead focus on modeling the activity flow itself. This activity flow can include a sequence of menus or business processes in a system[14].

a. Activity Diagram of Login

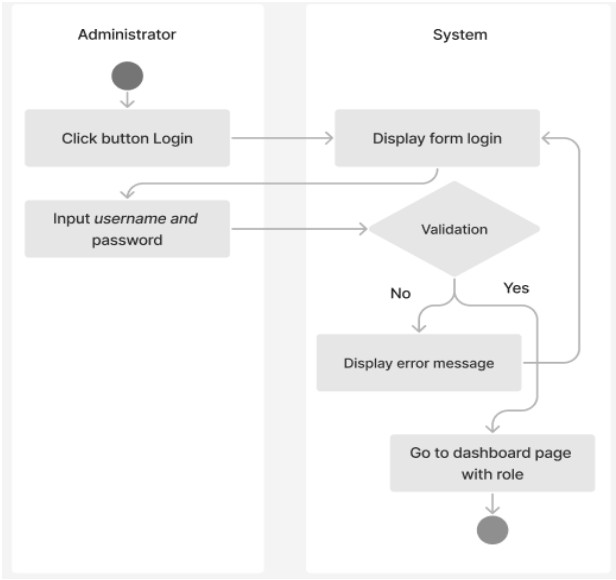

Figure 5. Activity Diagram of Login

Figure 5 is a login activity diagram that represents a visual of the flow of the login process to a system or application. Admins and officers are asked to enter their username/email and password to access the system. If the username/email and password entered are correct, the user will go to the dashboard page. But if the username/email and password are incorrect, the user will still be on the login page.

b. Activity Diagram of Queue Registration

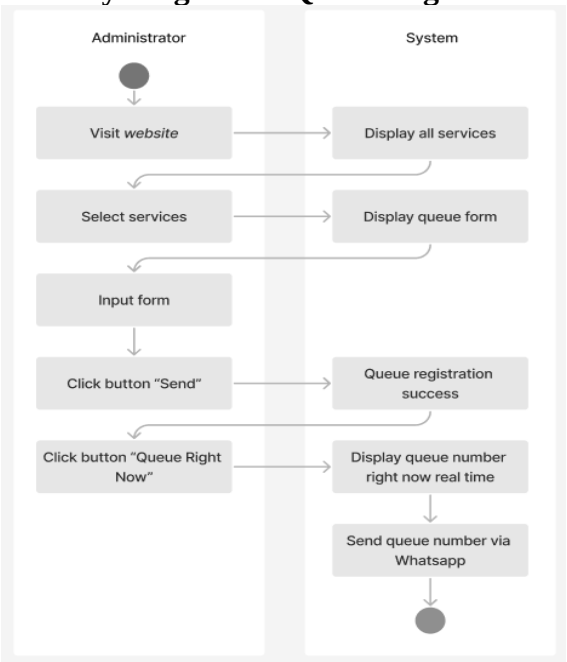

Figure 6. Activity Diagram of Queue Registration

Figure 6 shows the queue registration activity diagram, which is a graphical representation of a series of activities involved in the queue registration process. The goal is to depict a clear workflow and provide a more detailed view of the queue registration process.

c. Activity Diagram of Queue Calling

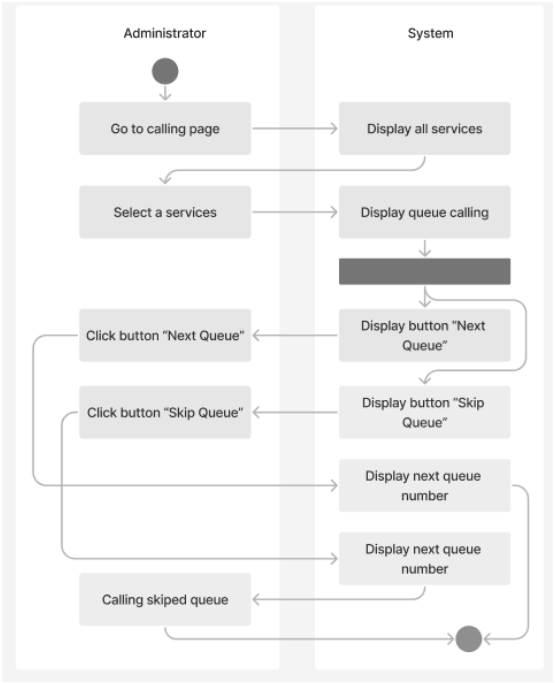

Figure 7. Activity Diagram of Queue Calling

Figure 7 shows the activity diagram of queue calls by officers. In this process, the officer calls all registered queues. If the visitor is not present when the queue is called, the officer can skip the queue, and then call him again until the entire queue has been called.

3.3 Sequence Diagram

a. Sequence Diagram Login

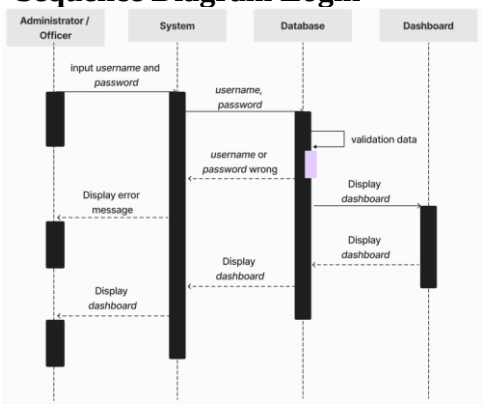

Figure 8. Login Sequence Diagram.

Figure 8, explains the login process. Starting from the Administrator or Officer entering the username/email and password and continuing to the database for the validation process. If the data is invalid, the system will display an error notification indicating that the username/email or password is incorrect. However, if the data entered is valid, the system will display a dashboard page.

b. Sequence Diagram for Queue Registration

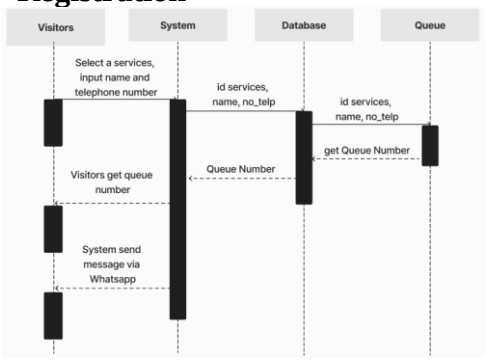

Figure 9. Sequence Diagram for Queue Registration

Figure 9 is a sequence diagram for the queue registration process. The process begins with the visitor selecting a service, then entering a name and phone number, and being forwarded to the database. The Queue Class will generate a queue number and pass it on to visitors in the form of a queue number. In this process, the system will send a message via WhatsApp containing the queue number.

c. Queue Call Sequence Diagram

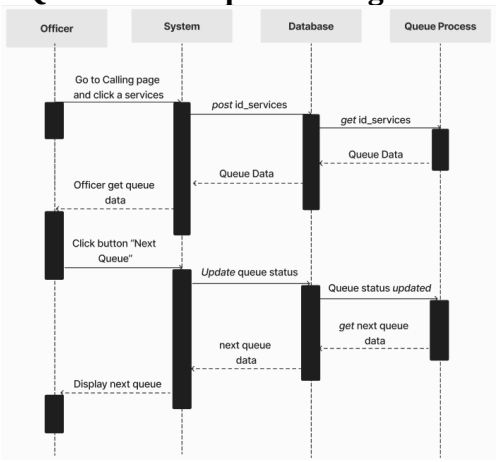

Figure 10. Queue Call Sequence Diagram.

Figure 10, the sequence diagram explains the queue calling process. The initial process is that the officer visits the call menu, and then selects a service. The system will search for service data based on the selected service_id. After that, the database will send queue data to the system and the system will display the queue data to the officer. Officers can choose between the Next Queue or the skipped queue.

3.4 Class Diagram

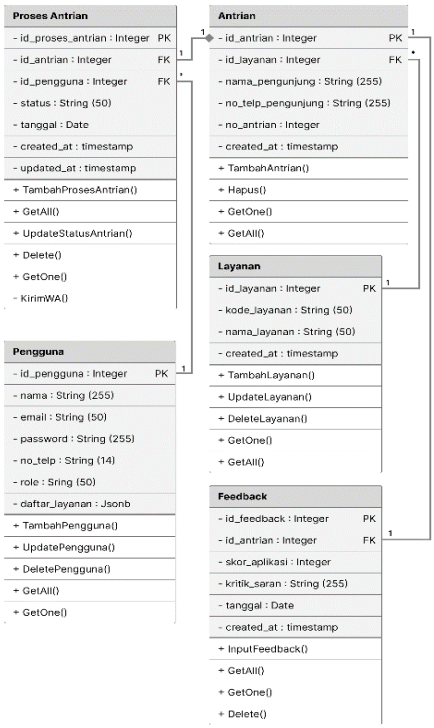

Figure 11. Class Diagram

Class diagrams are a type of UML (Unified Modeling Language) that describes the structure and characteristics of classes and describes the relationships between classes contained in the system. The Class Diagram explains the model used in designing the attributes and functions required for the construction of this Queuing Service Information System[2].

Figure 11 is a class diagram in this Queue Service Information System, there is a Queue Process class that has a relationship with the Queue class, User class, Feedback class, and Service class. This type of relationship can be seen in the image above.

VI. CONCLUSION

By identifying problems, evaluating user needs, analyzing functional and non-functional requirements, and using various tools such as use case diagrams, activity diagrams, sequence diagrams, and class diagrams, this research was successful in analyzing and designing a system that can increase efficiency in the system. queue that is currently in use. This system provides effective solutions for queue registration, queue management, and user management.

Overall, this research contributes to the development of a service information system that is integrated with WhatsApp, which is expected to help improve services and efficiency of the registration process. This research also provides useful guidance for programmers in developing applications and shows the capabilities of UML in designing complex information systems.

THANK YOU NOTE

Researchers would like to express their deep appreciation to all individuals and entities who have provided support and contributed to this research. Support and cooperation from various parties and resources have become a strong basis for developing this WhatsApp integrated queue information system. It is hoped that the results of this research will bring significant benefits and pave the way for improving public services in the future. We thank you for your dedication and joint efforts in achieving this goal.

REFERENCES

[1] Badan Pusat Statistik, *Analisis Profil Penduduk Indonesia*. 2022.

[2] Y. Anggraini, D. Pasha, D. Damayanti, and A. Setiawan, "Sistem Informasi Penjualan Sepeda Berbasis Web Menggunakan Framework Codeigniter," *J. Teknol. dan Sist. Inf.*, vol. 1, no. 2, pp. 64–70, 2020, doi: 10.33365/jtsi.v1i2.236.

[3] M. M. Fajar, L. R. Ilmi, I. Sevtiyani, B. Wicaksono, and D. Mardiyanti, "Optimalisasi Layanan Rawat Jalan: Desain User Interface Aplikasi Pendaftaran Online Berbasis Mobile," *Indones. Heal. Inf. Manag. J.*, vol. 11, no. 1, pp. 29–36, 2023, doi: 10.47007/inohim.v11i1.494.

[4] R. Abdillah, A. Kuncoro, and I. Kurniawan, "Analisis Aplikasi Pembelajaran Matematika Berbasis Analysis Mathematics Learning Apps Android Base," *J. Theorems*, vol. 4, no. 1, pp. 138–146, 2019, [Online]. Available: https://www.researchgate.net/profile/Rahman-Abdillah/publication/335062845_Analysis_Mathematics_Learning_Apps_Android_Base_and_Designing_System_using_UML_20/links/5d4d5694299bf1995b711038/Analysis-Mathematics-Learning-Apps-Android-Base-and-Designing-Syste.

[5] S. Handayani, "Sistem Informasi Administrasi Data Kemahasiswaan Berbasis Web Pada Universitas Lancang Kuning," *JOISIE (Journal Inf. Syst. Informatics Eng.*, vol. 1, no. 2, p. 124, 2019, doi: 10.35145/joisie.v1i2.214.

[6] J. Friadi, D. P. Yani, M. Zaid, A. Sikumbang, S. Informasi, and U. Batam, "Perancangan Pemodelan Unified Modeling Language Sistem Antrian Online Kunjungan Pasien Rawat Jalan pada Puskesmas (Designing the Unified Modeling Language Modeling System for Online Queuing Outpatient Visits a.pdf," vol. 1, no. 2, pp. 125–133, 2023.

[7] F. Yudianto, M. A. Firdaus, F. A. Susanto, and T. Herlambang, "Perancangan Sistem Informasi Penjualan Toko Online Galeri Nada Berbasis Website," *Remik Ris. dan E-Jurnal Manaj. Inform. Komput.*, vol. 6, no. 3, pp. 575–585, 2022, [Online]. Available: http://doi.org/10.33395/remik.v6i3.11586.

[8] H. Sabila, B. Praptono, and I. Yuli Arini, "Perancangan Aplikasi Pencatatan Laporan Keuangan Dengan Menggunakan Metode Agile Development Scrum," *JOISIE (Journal Inf. Syst. Informatics Eng.*, vol. 5, no. 2, pp. 67–74, 2021, doi: 10.35145/joisie.v5i2.1406.

[9] L. Setiyani and E. Tjandra, "Analisis Kebutuhan Fungsional Aplikasi

Penanganan Keluhan Mahasiswa Studi Kasus: Stmik Rosma Karawang," *J. Inov. Pendidik. dan Teknol. Inf.*, vol. 2, no. 1, pp. 8–17, 2021, doi: 10.52060/pti.v2i01.465.

[10] A. Aulia Aziiza and A. Nur Fadhilah, "Analisis Metode Identifikasi dan Verifikasi Kebutuhan Non Fungsional," *Appl. Technol. Comput. Sci. J.*, vol. 3, no. 1, pp. 13–21, 2020, doi: 10.33086/atcsj.v3i1.1623.

[11] R. Abdillah, "Pemodelan Uml Untuk Sistem Informasi Persewaan Alat Pesta," *J. Fasilkom*, vol. 11, no. 2, pp. 79–86, 2021, doi: 10.37859/jf.v11i2.2673.

[12] E. A. Kalinga, "Learning software development through modeling using object oriented approach with unified modeling language: A case of an online interview system," *J. Learn. Dev.*, vol. 8, no. 1, pp. 74–92, 2021, doi: 10.56059/jl4d.v8i1.401.

[13] R. Fauzan, D. Siahaan, S. Rochimah, and E. Triandini, "A Different Approach on Automated Use Case Diagram Semantic Assessment," *Int. J. Intell. Eng. Syst.*, vol. 14, no. 1, pp. 496–505, 2021, doi: 10.22266/IJIES2021.0228.46.

[14] R. Kurniawaty, I. Irvanizam, dan Viska Mutiawani, and K. Saputr, "Sistem Penyewaan Ruang dan Fasilitas Gedung Academic Activity Center (AAC) Dayan Dawood berbasis Web," *J-SIGN (Journal Informatics, Inf. Syst. Artif. Intell.*, vol. 1, no. 01, pp. 13–32, 2023, [Online]. Available: https://jurnal.usk.ac.id/J-SIGN/article/view/31794.