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REVOLUTIONIZING USER EXPERIENCE: ARCHITECTURAL INNOVATIONS IN OVO PAYMENT APPLICATION

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ABSTRACT

In the era of digital transformation, mobile payment apps are becoming an essential element of everyday life, changing the way we transact and manage our finances. Online payment applications provide significant benefits by facilitating cashless financial transactions, providing flexibility in choosing brands and supporting the progress of fintech businesses and startups in the digital finance sector. Lippo Group, through OVO, brings innovation in the electronic money payment system. OVO's rapid growth lies not only in the ease of financial transactions but also in its mobile application which is designed to provide a better user experience. This research analyzes the architectural innovations in OVO's mobile application, aiming to revolutionize user experience and improve OVO's competitiveness in the mobile payment industry. Using the descriptive qualitative method, this research utilizes user cards, storyboards, and customer journey to analyze the implementation of Microservices Architecture and Load Balancing. The results show that these innovations provide significant benefits, improving scalability, reliability, and system maintenance efficiency. The use of Load Balancing effectively addresses balance and customer service response issues. This research provides deep insights into the evolution of financial applications in Indonesia.

I. INTRODUCTION

IN the era of digital transformation, mobile-based payment applications have become an important element in users' daily lives, bringing about fundamental changes in the way they transact and manage finances. Online payment applications provide significant benefits by making cashless financial transactions easier and faster, providing flexibility in choosing various brands according to needs, and supporting the progress of financial technology (fintech) businesses and startups in the digital financial sector, creating efficiency in purchases both online and offline [1]. Electronic payments refer to the electronic transfer of funds or payment for goods and services using digital platforms or technologies. It involves the use of online payment systems, mobile payment apps, or other electronic methods to facilitate secure and convenient transactions. Electronic payment systems provide benefits such as faster processing times, reduced reliance on physical cash, increased convenience for consumers, and improved efficiency for businesses [2]. Electronic payment is one of the fintech solutions that has gained users from different generations. This is unique as it is known that different generations may adopt technology differently [3]. The use of E-Payment has brought significant positive impacts in the business and economic world. Electronic or digital money transfer mechanisms between buyers and sellers [4].

One company that innovates in the development of electronic money payment systems is the Lippo Group. Innovation can be defined as the act of starting or introducing new things. The majority of researchers agree with the definition of innovation that involves the development of new products and processes. Innovation is a key factor in industrial competition and an effective tool in dealing with competition. The main focus of innovation lies in the creation of new ideas, which will then be applied in the creation of new products or processes. The main goal of the innovation process is to provide and deliver better value to customers [5]. Innovation is a new invention or idea that is different from what has existed or is known before [6]. Innovation is not just an event or activity. It is a concept, process, implementation, and capability that determines the success of an organization. Innovation has the potential to create value for society and can be a useful tool in helping the public sector [7]. Innovation for a public

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entity is a necessity. Even for the state, innovation is a must. According to the World Intellectual Property Organization (WIPO) report on the Global Innovation Index, Indonesia in 2021 is ranked 87 out of 132 countries. Innovation has been carried out by various parties, be it ministries, non-ministerial institutions, SOEs, provincial governments, district governments.

Lippo Group has launched a digital financial platform known as OVO. OVO is a digital wallet service or smart financial application that provides various types of transactions with a number of OVO partners. Facing intense competition in the digital payment system market, OVO adopts a strategy of cooperation with four major companies in Indonesia, including Bank Mandiri, Alfamart, Grab, and Moka [9]. The following is data on Payment Application users used in Indonesia.

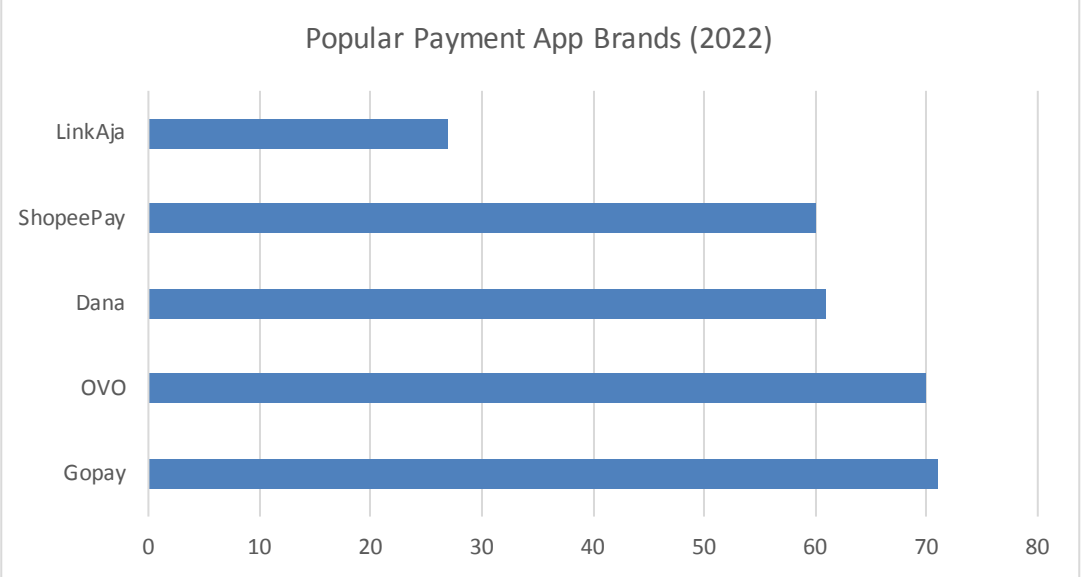

Figure 1 Popular Payment App Brands (2022)

While Figure 1 shows that by 2022, OVO users will reach 70%, this comparison is only marginally higher than Gopay users at 71%. This suggests intense competition between the two digital payment services, with an almost insignificant difference in user choice. The collaboration aims to build trust in cashless transactions and accelerate the expansion of OVO's network which plays a strategic role in delivering revolutionary user experiences through architectural innovations in its mobile applications.

Architectural innovation refers to the introduction of new and significant changes in the design, structure, or function of buildings or physical spaces. It involves the development and application of new architectural concepts, materials, technologies, or approaches that result in improved performance, aesthetics, sustainability, or user experience. It can have a significant impact on the function, efficiency, and cultural significance of buildings and spaces, and contribute to the development and transformation of society as a whole [10]. Architectural innovation refers to changes in the way product design is organized within and across enterprises, deviating from common practices in a particular sector. It involves changes in product design and organization that go beyond incremental improvements or technological advances [11]. Architectural innovation refers to the introduction of new and significant changes in the design, structure, or function of buildings or physical spaces. It involves the development and application of new architectural concepts, materials, technologies, or approaches that result in improved performance, aesthetics, sustainability, or user experience. Architectural innovation can cover various aspects, including the use of innovative construction techniques, the integration of smart technologies, the incorporation of sustainable design principles, and the creation of unique and iconic structures [12]. It can be concluded that architectural innovation is the concept of introducing new and significant changes in the design, structure, or function of buildings or physical spaces, involving the development and implementation of new architectural concepts, materials, technologies, or approaches that aim to improve performance, aesthetics, sustainability, and user experience.

OVO's rapid growth lies not only in the ease of financial transactions, but also in the way its mobile app is designed to deliver a better and more intuitive user experience. This research aims to detail and analyze the architectural innovations implemented in the OVO mobile app. These innovations are expected to revolutionize the user experience, creating an interface that is not only efficient but also pleasing to the eye. Through an in-depth study

of the architectural innovations in the OVO mobile app, this research seeks to uncover how these changes have contributed to creating a differentiated user experience and increasing OVO's competitiveness in the mobile payments industry. A deeper understanding of the role of architectural innovation in the OVO mobile app is expected to provide valuable insights into the evolution of financial apps in Indonesia.

II. METHOD

This research is a qualitative research using a descriptive approach. Descriptive qualitative is a research method that uses a simple qualitative approach and follows an inductive flow. The inductive flow process in this research begins with an explanation of a particular event or process, which can then lead to the formation of generalizations or conclusions that cover more general aspects of the event or process [13]. Descriptive research is a research method that attempts to describe and interpret objects as they are [14]. Qualitative descriptive method is a research approach that aims to describe or explain a phenomenon or event in depth. In this method, research is conducted without involving statistical measurements or calculations, and the focus is on understanding and interpreting the context of the phenomenon. Qualitative descriptive methods often use techniques such as interviews, observation, and document analysis to collect data that is descriptive in nature, resulting in a rich and in-depth narrative about the research subject. Here is a more detailed explanation of the inductive process in this research.

1. Preliminary Explanation: The research began with an initial description of the events surrounding students' use of the OVO app. The initial description included the context of app use, student motivation, and other relevant aspects.
2. Interview: Interviews were conducted with university students as users of the OVO application. This method was chosen to obtain data directly from users. The purpose of the interview was to obtain very precise, in-depth, and contextual information about the experience of using the OVO application by students.
3. Document Study: Data was also collected through document study, which could include journals related to the use of OVO. Document study provides additional context and supports the information obtained through interviews.
4. In-depth Analysis: Data collected from interviews and document studies were analyzed in depth. The analysis is done without involving statistical calculations, and the focus is on understanding the context of the phenomenon under study. The analysis process may include identifying patterns, themes, and qualitative concepts that emerge from the data.
5. Formation of Conclusions: The results of the analysis were then used to make conclusions covering the aspects of OVO app usage by students.

As such, the inductive process in this research involves the collection of in-depth qualitative data through interviews and document studies, followed by analysis that forms conclusions relevant to the context of students' use of the OVO app. The types of approaches undertaken in this analysis include User Card Analysis which is used to analyze the user experience with the OVO mobile application, Storyboard Analysis which can be used to visually depict the user experience in using the application and Customer Journey Analysis which provides an in-depth understanding of the customer experience from start to finish in using the OVO application.

The purpose of the interviews in this study was to gain an in-depth understanding of users' experiences with the OVO mobile application, as well as to explore perceptions of the benefits and challenges that arise. The interview objectives included questions on respondents' opinions on new features, user experience of transactions, response to change, perceived benefits, challenges faced, and perceptions of system efficiency and reliability. The interviews are expected to provide rich qualitative data, enabling an in-depth understanding of how architectural innovations affect user interactions and user journeys with the OVO app. With these questions, the interviews will be an effective instrument to gather relevant information needed to answer the research questions regarding the evolution of financial applications in Indonesia, particularly regarding innovations in electronic payment systems. To ensure that the research is reliable and the results trustworthy, the researcher used the triangulation method by combining information from multiple data sources. The consistency between the results found through interviews and literature studies will make the research results more robust and reliable. To improve the accuracy of the interpretation, the researcher conducted member-checking, which is checking and confirming the initial findings by several respondents to make the results more reliable.

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III. RESULT

This research utilizes interview data obtained from interviewees who are active OVO users. The interviewees were selected based on the criteria of users who have been using OVO for a significant period of time, thus having a comprehensive understanding and knowledge of the platform. In addition, the interviewees were selected because they actively use OVO as the main payment method in their daily activities, making them users who can provide a strong representation of the experience and perspective of using OVO. From the results of the interviews, the author mapped into user cards which can be seen in Figure 2 below.

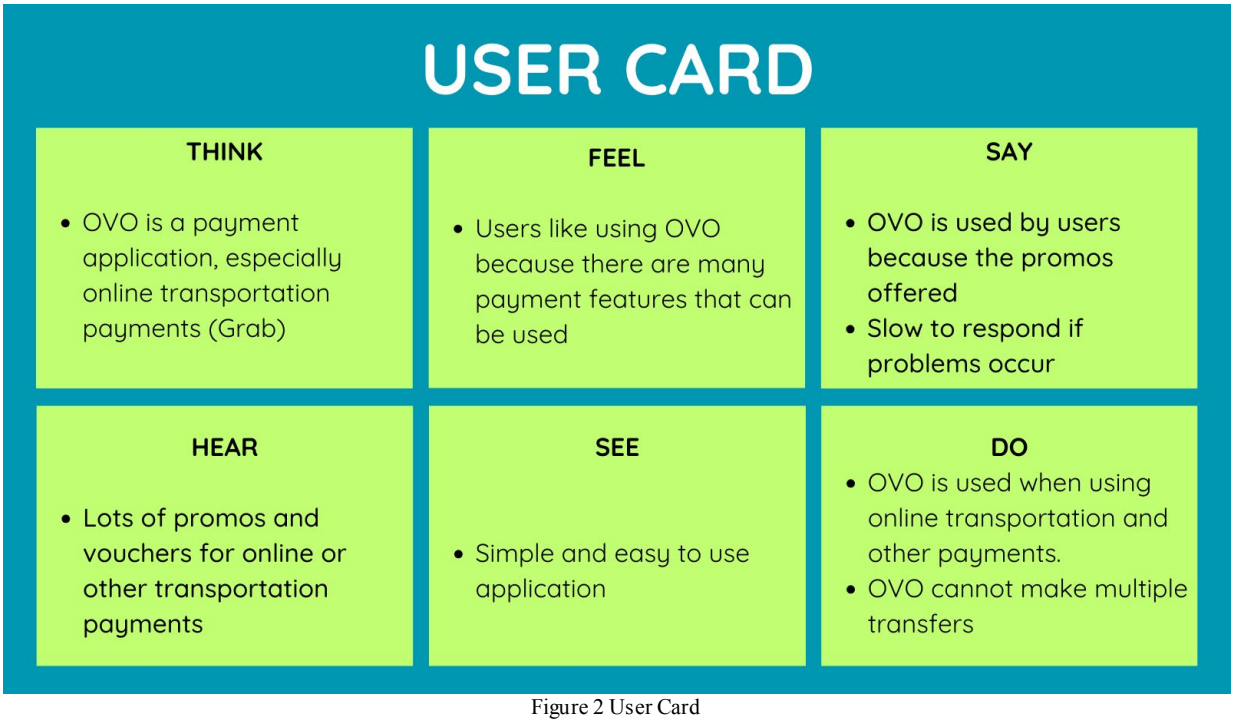

Figure 2 User Card

Based on the results of interviews with users regarding the use of OVO, it can be concluded that OVO has a significant role in facilitating payments, especially for online motorcycle taxi services such as Grab. Users expressed their happiness in using OVO, reinforced by the diversity of payment features available. The existence of promos and vouchers often offered by OVO is also one of the main motivations for users to choose this application. While the user experience was generally positive, it was noted that there was a slow response in case of problems, suggesting that there are aspects of customer service that could be improved. User listening indicated that OVO does often offer promos and vouchers for online motorcycle taxi payments or other transactions. In terms of appearance and usage, the OVO application is considered simple and easy to use by users. Users actively use OVO when using online motorcycle taxi services and making other payments, but there are limitations, namely the application does not support multiple transfers. This conclusion can serve as a foundation for further development and improvement in order to enhance user experience as well as response to problems that may arise.

From the results of the interview, the author also created a story board that is used in representing the user journey or customer experience in using the OVO application. A storyboard is a communication tool that describes a narrative through a series of images presented in a sequence of panels, creating a visual map of the main events of the story in sequence [15]. Storyboards help researchers to understand how users will interact with the solution they are developing at various stages. The following is the designed story board.

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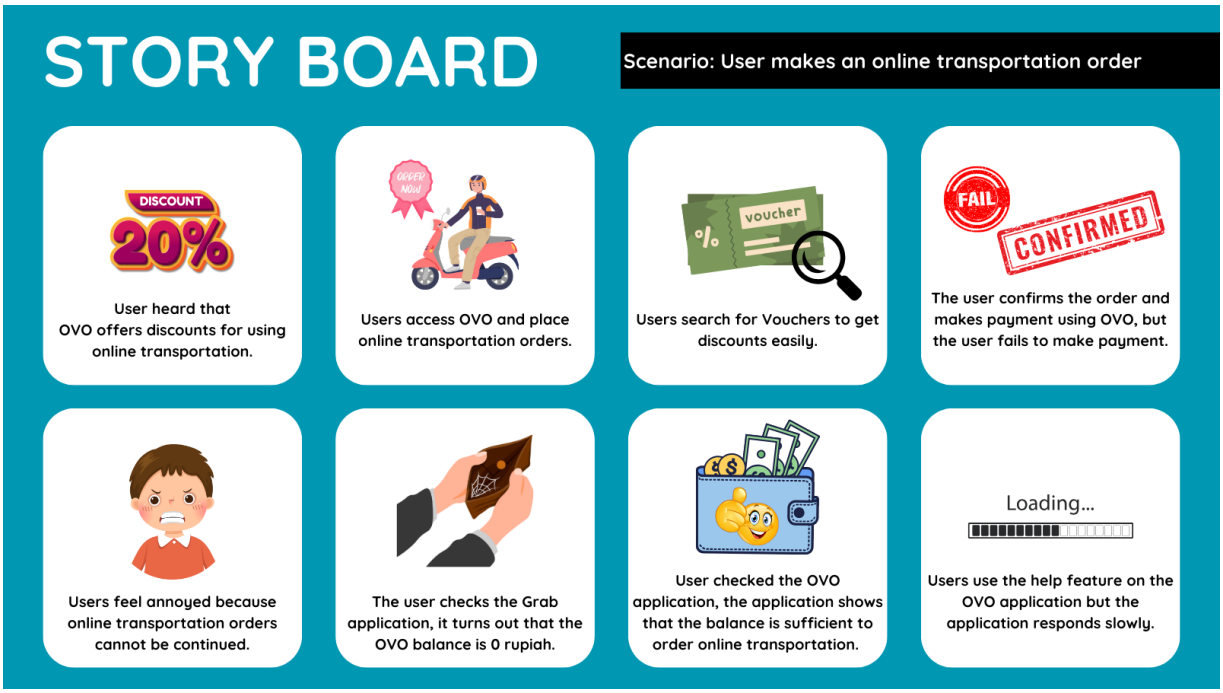

Figure 3 Story Board

The core of the story board above covers the user experience of using the OVO application to make payments for online transportation. The user was initially attracted by the discount and placed an order in the hope of getting the benefit. However, the process was halted due to payment failure, which then resulted in user frustration. From the story board above, the author uses the customer journey to identify critical points where the customer experience can be improved, as well as to provide better solutions that are more focused on customer needs. Customer Journey is a design tool to create a visual presentation that describes the relationship, interaction and journey of users while using and interacting with both the product/service and the company itself [16].

CUSTOMER JOURNEY

Phase / Element	Awareness (Mengetahui Diskon OVO)	Exploration (Order Transportasi Online)	Confirmation and Payment	Double-checking OVO and GRAB App	Slow Respons
USER NEEDS	Save costs for using online transportation.	find and take advantage of online transportation discounts	pay for online transportation orders quickly and without obstacles.	ensure that the OVO balance is sufficient	Get help and solutions to transaction problems
TOUCH POINTS	OVO advertisements on social media or direct recommendations from friends.	Voucher menu in the application	OVO payment feature	Balance Check Feature	help feature in the OVO application
EMOTION	interested	Enthusiastic	worried	Confused	frustrated and disappointed
PAIN POINTS	The information spread may not be clear	difficulty in finding relevant discount information	transaction failure	feel annoyed and confused that the previous transaction failed	Delay in getting a response
SOLUTION	Provide information that is clearer and easier to understand	ensuring users can easily find discounts	Provide clear notifications	Notification of reasons for failed transactions	Increase the speed of response from the customer support team

Figure 4 Customer Journey

The OVO user experience faces several issues that can affect customer satisfaction. One of the main issues is transaction failures when users try to make payments using OVO, which can lead to frustration and concerns over

security and balance availability. In addition, the delayed response from the help feature on the OVO app is also an issue, creating a negative experience and increasing user frustration levels. There are also errors in displaying balance information at the balance inquiry stage, which can create uncertainty and confusion among users. To improve customer experience, there is a need for technical improvements that ensure transaction reliability, increased responsiveness of the help feature, and improved accuracy of balance information on the OVO platform.

Architectural innovation can be an effective solution to overcome the problems faced by OVO user experience. One that can be used is Microservices Architecture. Adopting microservices architecture can break down the OVO application into independent components. This can improve scalability, reliability, and simplify maintenance. According to [17], adopting microservices architecture allows companies to break down their systems into small, independent services, which can be developed, tested, and upgraded separately. Microservices enable teams to work on multiple services simultaneously, encourage faster development cycles, and facilitate easier maintenance and updates [18]. One of the challenges in implementing microservices is the increased complexity of managing distributed systems, as each microservice operates independently and may have its own technology stack and data storage requirements. Another challenge is ensuring effective communication and coordination between microservices, as they need to interact with each other to fulfill business processes. This requires careful design of APIs and messaging protocols [19].

The implementation of microservices brings a number of challenges, including managing the complexity of distributed systems, ensuring efficient communication and coordination between services, managing scaling and load balancing, monitoring and debugging, addressing security aspects, and implementing and integrating continuous development processes [20]. The application of microservices architecture to OVO applications can yield a number of benefits. In the context of OVO, which is a digital payment application, the use of micro-services architecture allows the breakdown of the system into a variety of small, self-contained services. Each service can focus on a specific function, such as balance management, transaction processing, account management or promotional services. The main advantage of this approach is increased flexibility and scalability. Each service can be upgraded or modified separately without affecting the entire application. Also, if one part experiences a problem, it will not have a major impact on the entire system. Thus, the microservices architecture in OVO can improve the efficiency of development, maintenance, and increase the overall responsiveness of the application.

Inaccurate OVO balances and unresponsive OVO customer service responses can be resolved by implementing Load Balancing. Load balancing is an effective solution because it allows for an even distribution of traffic load to various servers, preventing overload on one particular server which can be the cause of transaction failures. Load balancing refers to the process of redistributing incoming network traffic to various microservices, aiming to ensure optimal resource utilization and performance [21]. Load balancing helps achieve high availability, fault tolerance, and scalability in microservice environments [22]. By leveling the workload, load balancing improves application availability and responsiveness, minimizes the risk of downtime, and enables horizontal scalability to respond to spikes in the number of users. Thus, load balancing plays a key role in creating a stable and optimized system environment, which can improve user experience by ensuring the reliability of OVO services. In addition, OVO can make improvements to the Responsiveness of the Help Feature. In this case, the improvement can reduce the delay in providing responses to users.

Adopting a microservices architecture in the context of OVO can have a significant positive impact. Breaking the application down into small, self-contained services can improve scalability, reliability and make maintenance easier. With each service focusing on specific functions such as balance management, transaction processing and account management, the main benefits involve increased flexibility and scalability. Upgrades or improvements can be made to each service separately without affecting the overall application, thus speeding up the development and renewal cycle. Nonetheless, the adoption of microservices also brings a number of risks. The challenges of managing the complexity of distributed systems, ensuring efficient communication and coordination between services, and system reliability are potential issues that need to be considered. However, with careful implementation and attention to API design and accurate messaging protocols, OVO is able to maximize the positive benefits of microservices while addressing the potential risks that may arise. In addition, the use of Load Balancing can also be an effective solution to address the issues of inaccurate balances and unresponsive customer service responses, improving the availability, responsiveness and reliability of OVO services.

Based on the research findings, OVO can improve responsiveness, reliability and user satisfaction by taking specific steps. First, OVO can strengthen the management of distributed system complexity faced by microservices architecture by implementing advanced monitoring tools and more efficient debugging processes. Furthermore, improved communication and coordination between microservices can be achieved by refining API design and messaging protocols, as well as adopting clear guidelines for service integration. In addressing load balancing challenges, OVO needs to optimize its scaling and load balancing strategies to ensure even traffic distribution and avoid overloading certain servers. In addition, OVO can improve service reliability by strengthening the security

aspects of each microservice, including improved security-related monitoring and troubleshooting. The adoption of continuous development practices is also key to ensure smooth integration of updates without disrupting the overall performance of the application. In response to the issue of inaccurate balances and lack of customer service response, OVO could make updates to the help feature with a focus on improving responsiveness. This could include investing in technology that speeds up responses to user queries and provides faster solutions. By implementing these measures, OVO is able to optimize user experience, improve system responsiveness and ensure service reliability, thus making a positive contribution to overall user satisfaction.

IV. CONCLUSION

OVO plays a significant role in facilitating payments, especially in the context of online motorcycle taxi services such as Grab. Users appreciate the variety of payment features and promotions offered by OVO. Although the user experience is generally positive, there are some issues that can affect customer satisfaction, such as transaction failure, slow response from help features, and inaccurate balance information. The adoption of microservices architecture was an effective solution to improve scalability, reliability and ease of maintenance of the OVO application. However, it also brought a number of challenges, including the complexity of managing distributed systems and coordination between services. Load balancing is a solution to address server overload issues and improve service availability. Specific steps that OVO can take to improve responsiveness, reliability and user satisfaction involve strengthening system complexity management, improving communication and coordination between services, optimizing load balancing, and enhancing security and monitoring. Implementation of continuous development practices was also required to ensure smooth integration of updates without disrupting the overall performance of the application. Improvements to help features with a focus on increasing responsiveness can also make a positive contribution to the user experience. By implementing these measures, OVO can improve the efficiency, reliability and responsiveness of its services, thereby better meeting users' expectations and needs, and improving overall customer satisfaction.

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