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Designing Claim Systems in Health Insurance Companies with Microservices and Event-Driven Architecture Approach

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Abstract: Through digital transformation, insurance companies, especially in the health sector, are increasingly adopting modern technologies to enhance efficiency and service quality. Health insurance allows individuals or families to mitigate the financial risks associated with high and unexpected medical expenses. One crucial area is insurance claim, where a fast and accurate process is key to customer satisfaction. This study proposes the design and architecture of an insurance claim system using a microservices and event-driven approach. This approach enables insurance companies to break down applications into separate components, facilitating scalability, flexibility, and easier maintenance. Additionally, with an event-driven approach, the system can quickly respond to changes and events in the business environment. A comprehensive analysis shows that implementing microservices and event-driven architecture in the insurance claim system can enhance overall system performance, scalability, and resilience. For insurance companies, adopting microservices and event-driven architecture can lead to increased operational efficiency, reduced time to market for new products, and improved customer experiences through faster claim processing. Policyholders will benefit from quicker claim resolutions and a more transparent and responsive claim process. This study provides valuable insights for health insurance companies looking to upgrade their IT infrastructure to meet future challenges. The findings from this research will be documented to support the development of insurance business technology, specifically for health insurance claims in Indonesia.

Keywords: Event-Driven; Health Insurance; Insurance Claim; Insurance Company; Microservices

INTRODUCTION

Digital transformation has become crucial for companies to survive in the digital era. In the process, companies must continuously change and innovate their information technology by considering its benefits on business processes, business models, as well as their relationships, and external factors (Linus, 2023) (Borstnar, 2021). In this regard, companies, including insurance companies, must also follow and innovate the use of existing technology for business sustainability.

Insurance companies are service businesses that provide services to ensure their customers against unwanted events or occurrences. These events are not only related to health aspects but also to other aspects such as vehicles, life, home, and other important assets (Anwar, 2023). Claims are an essential part of the insurance business to maintain reputation and are trusted to provide certain benefits between insurance companies and their customers (Astralife, 2021).

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To enhance the quality of service in insurance companies, the use of technology is highly recommended. There are three technology trends such as cloud computing, which is commonly used for data storage and backup, hosting applications and services, as well as for analysis purposes; artificial intelligence, which is commonly used for chatbots, virtual assistance to improve customer service performance, and enhance the quality of claims processes by the underwriting team, predicting risks, and enabling companies to determine their product pricing more accurately; and robotic process automation (RPA), which is commonly used for policy management, claims management automation, and premium payment submission automation (Deloitte, 2023).

Companies generally still use monolithic architecture, which is the basic and oldest software architecture, by consolidating all existing components such as processes, logic, and user interface into a single application. For small-scale applications, monolithic is the fastest and most efficient solution in application development. However, as businesses grow and applications evolve over time, it becomes increasingly difficult to maintain them. Changes to monolithic architecture applications become more challenging due to the many processes involved. Therefore, if an error occurs, the entire application will not function, and the implementation of new technology must update every part, including during application testing. In a distributed system process, applications with monolithic architecture cannot communicate with each other. This renders the architecture ineffective (Elgherianti, 2022).

Service-oriented architecture (SOA), which is an improvement over monolithic architecture, has the advantage of breaking down each business process into small service forms. In the implementation process of SOA, an Enterprise Service Bus (ESB) is needed for the exchange of information and communication between existing services (Chamari, 2023) (Jayarana, 2023). In its development, SOA also has weaknesses such as complexity in development and communication between each object and service, difficulty in connectivity with each service across a wide network, frequent connection disruptions, and SOA often becoming difficult to maintain when services become large or numerous (Rushani, 2023).

With the presence of microservices architecture, the problems present in monolithic and SOA architectures can be addressed. Microservices is a popular architecture for designing and building distributed systems in companies, and it has advantages that cover the weaknesses of the previous two architectures (Huye, 2023) (Rushani, 2023). In its implementation, a large design is broken down into separate small services that are easier to understand, have high fault tolerance, good scalability, and enable faster application development (Al-Debagi, 2018) (Elgherianti, 2022) (Pikkumaki, 2023). With microservices, each developed service can use different technologies. Each existing service will produce output as a REST (Representational State Transfer) API to communicate with each other, making the system more distributed (Huye, 2023) (Rushani, 2023).

Similar to microservices architecture, event-driven architecture is one of the software architectures that sends messages based on specific events. There are three main elements in event-driven architecture: the publisher as the message sender, the channel as the message distributor from the publisher to the subscriber, and the subscriber as the message receiver. The operation of event-driven architecture is done asynchronously (WSO2, 2016) (Rahmatulloh, 2022) (Lazzari, 2023). Event-driven architecture can be combined with microservices to achieve better capabilities in application development (Zuki, 2024).

This research will explain the implementation of microservices and event-driven architecture on the claims process, raising the following research questions:

1. How is the design architecture of microservices and event-driven implemented for insurance companies in the claims process? (Q1)
2. What other technologies are used and can be implemented in which areas to support system development in insurance companies in the claims process, and what are their benefits? (Q2).

LITERATURE REVIEW

Some of the research conducted focuses on the creation and design of applications tailored to insurance systems, specifically on the claims process, but do not include a clear depiction of the existing flow in terms of technology, especially in software development. Several previous studies describe the insurance business process and the issues raised in the table below.

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Table 1. Previous Research on Insurance Claim Business Process

Author	Research Title	Description	Gap
(Asrori, 2023)	The Procedure for Submitting a Health Insurance Claim for Health Fund Solution Products at PT. XYZ	There is an explanation regarding the business direction of the insurance claim process, and the outcomes that occur if a claim is rejected, pending, or accepted. It depicts the claim process in general.	Focused on PT. XYZ. The depiction of the insurance claim business process flow does not use flow diagrams for the processes within it. The journal only explains the business process and does not provide any explanation about the technology used in the health insurance claim system.
Author	**Research Title**	**Description**	**Gap**
(Basoni, Fajar., 2023)	Perancangan Aplikasi Klaim Produk Auransi Instividual PT. Asuransi Jiwa Inhealth Indonesia (MANDIRI INHEALTH)	There are use case diagrams, class diagrams, and their relationships, making the conceptual depiction of the process understandable. The general process of insurance claims is illustrated. In the development, the waterfall method is used.	The claims process only focuses on the main business process flow and does not consider that claims can have different statuses, making it less comprehensive. Additionally, the insurance claim business process is not clearly visible. The architecture used in the design and development of the insurance claim application is not explained.
(Lilayati, 2016)	Prosedur Klaim Asuransi Produk Prulink Investor Account ("PIA") Pada PT. Prudential Life Assurance Surabaya	Clear explanation and depiction of the business direction of the claim process, as well as the factors that can lead to its rejection and their solutions. General depiction of the claim process.	This is a 2016 study, and while the business process flow can serve as a reference, there is a high chance that the business flow has since changed. There is no explanation regarding the existing technology or architecture.
(Hikmah, Yulial., 2018)	Analysis of Health Insurance Claim Decisions in Indonesia	It includes a depiction of the business direction process with outcomes for accepted claims, partially accepted claims, pending claims, and rejected claims. It provides a general illustration of the claims process.	It includes a depiction of the business direction process with outcomes for accepted claims, partially accepted claims, pending claims, and rejected claims. It provides a general illustration of the claims process.

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(Nurzaman, Fahrul., 2021)	Sistem Notifikasi Otomatis Tracking Klaim Reimbursement Melalui Whatsapp Dalam mendukung Peningkatan Layanan Pelanggan Pada Perusahaan Asuransi Kesehatan PT. XYZ	The depiction of the claims process is reimbursement-based, with a clear flow diagram, including a tracking process for reimbursements sent via WhatsApp if the phone is not answered three times. The development process uses the agile methodology and employs the MVC (Model View Controller) method with the CodeIgniter framework.	The architecture used is monolithic.
(Siburian, Nelsi Agustina., 2022)	Analisis Pengajuan Klaim Produk Jasa Asuransi di PT. Prudential Syariah Cabang Binjai	The explanation of the claim process is generally clear.	There is no flow diagram and it pertains to life insurance. There is no explanation of the technology and architecture used, focusing solely on the insurance claim business process.
(Otoritas Jasa Keuangan, 2019)	Asuransi Kesehatan: Kajian Perlindungan Konsumen di Sektor Jasa Keuangan	The explanation of the claim process is detailed both in general and for reimbursements, and it also provides clear decision outputs such as the status of claims being accepted, pending, or rejected. The technology used is described generally, and the future technology trends are briefly explained.	There is no explanation regarding how the application development process is carried out along with the architecture used for its development process.

Author	**Research Title**	**Description**	**Gap**
(Rachman, Fanur., 2023)	Perancangan Sistem Informasi Kliam Asuransi Kendaraan Pada PT. Bina Dana Sejahtera Berbasis Java	There is a context diagram to provide an overview of the flow, as well as an ERD (Entity-Relationship Diagram) to show what data will be stored and to illustrate the direction of data processes. The waterfall method is used in the application development process.	It pertains to the vehicle insurance business. There is no explanation regarding the technologies used in the development process or the architecture employed.
(Rizki, Muhammad., 2020)	Microservices Architecture Design: Proposed for online HealthCare	The use of SOA in microservices architecture employs domain-driven design. There is an infrastructure design for the healthcare system as a whole. There is an explanation of the use of technology along with design diagrams that support application development.	The depiction of the claims system is only at a high-level overview.

Based on the information obtained from the table above, it can be concluded that the business processes of insurance claims have the same basic framework and flow, but the differences lie in the technology and methods used in the development and implementation of the applications. In previous research, differences emerged in the technology used, such as the use of WhatsApp in applications to

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provide information to customers through notification services, and the architectures employed, with some studies not specifying the architecture but indicating the use of monolithic and one study using SOA. Other differences include incomplete information regarding the insurance claim business processes, such as the depiction of flow diagrams, use case diagrams, and sequence diagrams that can help in the accurate implementation of the insurance claim system in the future.

This research will adopt a different approach from previous studies, with the state-of-the-art aspect in this research being the design and development of software architecture using microservices and event-driven approaches for insurance companies by analyzing the business processes in the claims section, focusing on health insurance in Indonesia. The aim of this research is not to identify weaknesses in previous designs and business process flows but to enhance performance and quality during the application development process. The results of this research will serve as a study that can support the design and development of software for digital transformation in insurance companies in Indonesia.

This research will also provide various illustrations of insurance business processes using IT approaches, such as use case diagrams, sequence diagrams, a list of services in the microservices architecture along with their relationships, and information on how the event-driven architecture will work to improve the performance of the insurance claim business system, where the event-driven architecture can be integrated with microservices, and its effects.

The implementation of microservices and event-driven architectures is believed to positively impact the insurance business, particularly in insurance claim processes. However, implementing these two architectures in application development poses risks and challenges. These risks and challenges can be mitigated if software developers have substantial experience with both architectures. This research aims to facilitate the implementation process of microservices and event-driven architectures.

METHOD

Microservices architecture, which is the de facto standard for companies in software development today, focuses on breaking down applications into small, independent parts that communicate with each other through the APIs (Elgherianti, 2022) (Pikkumaki, 2023). Design and implementation process, can be optimized through the following steps (Korotenko, 2023):

1. Assessment and Planning Phase: This phase aims to evaluate the current architecture, define objectives and scope, and identify the necessary skills and resources.
2. Design Architecture Phase: The goal here is to design the microservices, select the technology stack, and define a data management strategy.
3. Develop Environment Setup: Configure the development environment and implement DevOps practices.
4. Microservices Development and Testing: Develop using microservices architecture, implement an API gateway, and conduct comprehensive testing.
5. Deployment and Orchestration: Deploy containers using Docker, orchestrate with Kubernetes, and implement load balancing and service discovery.
6. Monitoring, Logging, and Maintenance: Implement monitoring and logging, handle error management and recovery, and maintain the existing services.
7. Review and Scaling: Review performance, strategize for scaling, and gather feedback to optimize services and address issues like slow processes.
8. Documentation and Training: Document all services created and provide training and skill development for the completed services.
9. Future Roadmap: Assess emerging trends, plan future developments, and conduct continuous experimentation.

Event-driven architecture is an architecture that is similar to microservices architecture, but the communication process between services is through producers and consumers with an event bus as an intermediary. This communication between services is done asynchronously using messaging events. Generally, this architecture is used for real-time applications such as sensors, stock markets, trading, monitoring, and others (Rahmatulloh, 2022) (Lazzari, 2023).

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This research uses a qualitative comparative approach with secondary data obtained from previous studies. These studies are compared based on existing business processes and implementation workflows, detailed through the following stages:

Stage One: Literature Review. Conduct a literature review of journals on the design and development of claim systems and those focused on the business processes of insurance claim systems. The goal of this initial stage is to determine whether current technological development stages use modern technologies or older methods and to see if there have been any changes in insurance claim business processes.

Stage Two: Analysis of Findings. Analyze and compare the findings. The results show that the current business processes for insurance claims have not changed, regardless of the type of insurance (e.g., automotive, life, health). The distinguishing factor between previous research and this study lies in the use of technology and the method of implementing business claims into software design and development. Previous studies did not discuss microservices and event-driven architectures as part of the development process, nor did they consider several other supporting technologies. Other findings include the lack of detailed process diagrams like use case diagrams and sequence diagrams in previous research.

Stage Three: Finding Technology Trend. Search for technologies that can be used in the insurance claim business process. This stage aims to enhance the efficiency of designing and implementing the insurance claim process with current trending technologies.

Stage Four: Identification and Redesign. Identify new aspects for the insurance claim system, design changes, and redesign the existing system to update or improve process efficiency using microservices and event-driven architectures. This includes how services will communicate within a broad framework and the application of identified technologies to the services.

Stage Five: Implementation and Documentation. Implement the redesigned processes and create documentation for the insurance claim process, illustrated with use case diagrams and sequence diagrams.

Stage Six: Evaluation and Recommendations. Evaluate the development process and provide explanations and recommendations for improving the insurance claim business. This includes clarifying key points for system enhancement to make design and development more efficient using microservices and event-driven architectures, supported by other technologies. The results of these stages can be used as a research document for the development of insurance business technology, particularly for insurance claims in Indonesia.

RESULT

Based on the information obtained from the Financial Services Authority (OJK, 2019), there are two claim submission methods: general or cashless, where the guaranteed process is deferred to the insurance company directly, and reimbursement, which uses personal funds as collateral, and then claims are made to the insurance company. Finally, if the claim is accepted, the funds will be reimbursed (Nurzaman, 2021).

Fig. 1 General or Cashless and Reimbursement Insurance Claim Process Flow
Source: Document OJK 2019

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From the analysis of existing business processes, there is a technique for implementing the design of microservices and event-driven architecture, namely by evaluating how the system operates, identifying which functions can be transformed into services, identifying which parts of existing functions can be consolidated or separated in terms of processes, and making changes to minimize processing time (Hoang, 2024).

Through Figure 1, the general insurance claim process is analyzed to have a constraint on the relationship between the claim analysis part through the system and the decision-making process, where combining both can pose a risk of artificial intelligence making inappropriate decisions due to the potential bias in decisions made by artificial intelligence (UMN, 2023). The function of artificial intelligence is only good for assisting in data analysis, the results of which will aid decisions made by humans rather than determining decisions (Prasanth, 2023). Based on these risks, a proposal is made for a new business process that does not change many processes from the old business process by adding a flow to the dependency of insurance claim decision-making by humans and also modifying the document checking process by officers, then officers upload document completeness, as shown in the following figure.

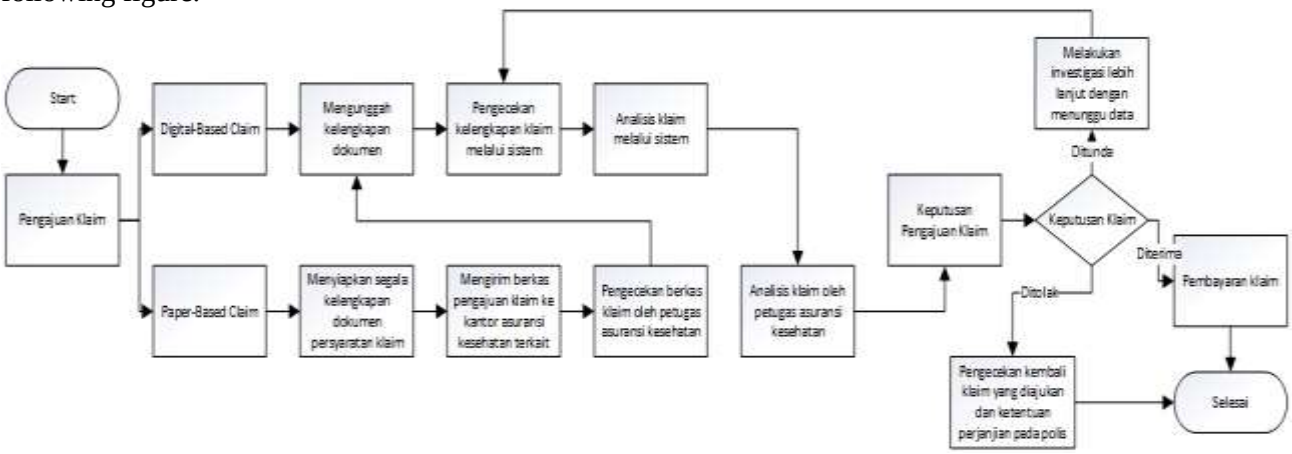

Fig. 2 Proposed Flow of Insurance Claim Business Process
Source: Researcher Property

In the proposed business process, several services can be depicted to support the design and development of the claim system in insurance companies. Here is a list of designed services along with their purposes:

1. Frontend Service: This is where users interact with the application or service through the user interface.
2. API Gateway Service: This service acts as a bridge between other services and ensures that all services can only be accessed through this service by configuring the addresses of other services to be connected. In terms of security, the API Gateway Service can be used to limit access, such as rate limiting, permanent or temporary IP bans, JWT token checks, and so on.
3. Discovery Service: The service used to discover and monitor the list of available services and their active status.
4. Authentication Service: This service is responsible for the login and logout processes, generating JWT tokens containing data and access that will be used when accessing other services, and logout, which is the process of deleting the token. JWT tokens are sessions that function statelessly (Aldya, 2019), so the security gap prevention process is different from regular sessions, requiring the token deletion process through what is called a blacklist token. A blacklist token is a prevention method against the use of tokens that are not yet expired but are no longer in use due to the login and logout processes.
5. User Service: That functions to control application or service users.
6. Role Service: Used to control user access rights to each API.
7. Policy Service: It functions to display policy data, which is the core data of insurance business, and within it, there are relationships between one policy and many products and plans.

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8. Customer Service: The service is used to manage customer data who register along with their roles such as beneficiary, beneficiary owner, policy holder, insured, contact numbers, and other important data.
9. Medicine Service: It is a service that manages the list of drugs available and used in the claims system.
10. Illness Service: It is a service that contains a list of diseases that are allowed and covered by the insurance business.
11. Test-lab Service: It is a service to support what lab tests can be conducted based on plan code and product. With this data, the system can be facilitated in decision support.
12. Document Service: It is a service used to store important document data in the form of PDFs, images, voice recordings, videos, and other documents used by customers to process claims.
13. Medical History Service: The service used to depict the medical record history of insurance customers.
14. Product Service: The service that functions to manage insurance product data.
15. Plan Service: A service that functions to manage plan data.
16. Claim Service: It's the main process of the insurance service that functions to input new claim data, add new documents before the claim process is completed, and continues until the claim process is finished.
17. Notification Service: It's a service that provides notifications to customers so they are aware of which stage the claim process has reached.

Based on the 17 identified services, there are several types of users who have access or actions towards services in the insurance claim business that can be represented through a use case diagram and illustrated by a sequence diagram, which is used to show the relationship between existing services and users, focusing on the insurance claim business process. Below are depictions of both diagrams.

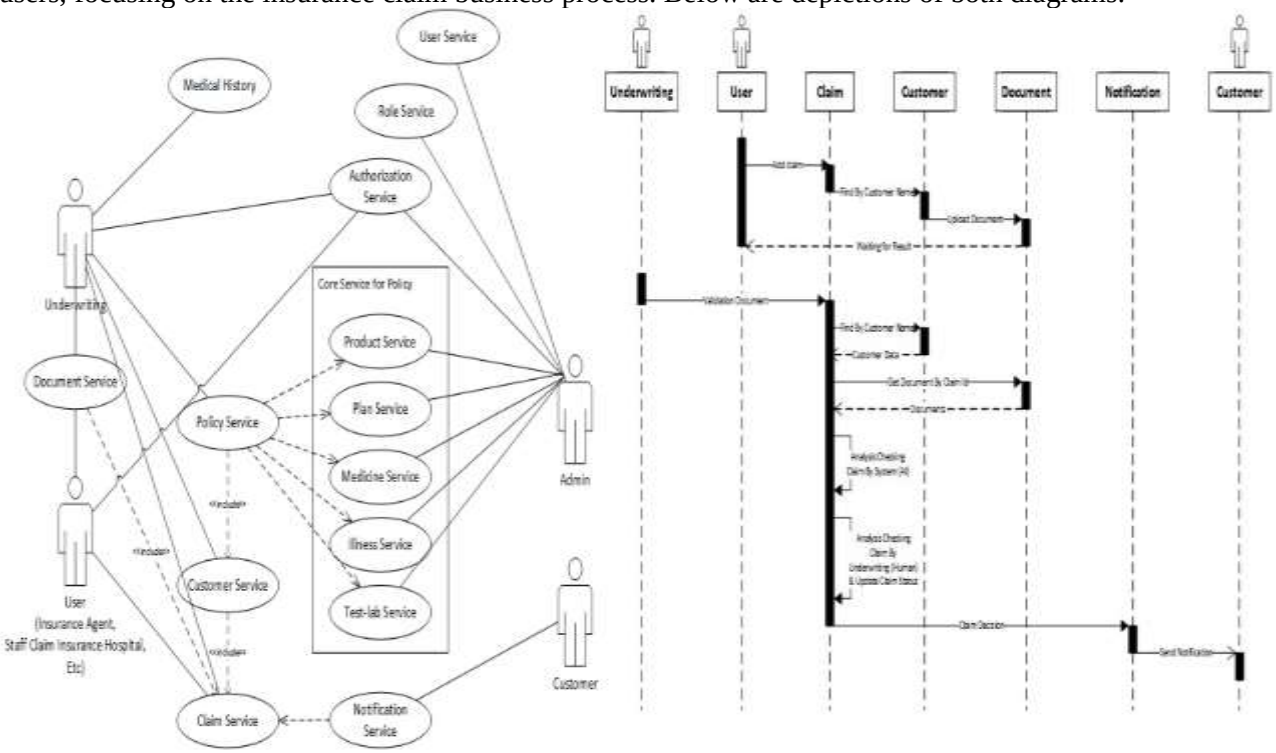

Fig. 3 Insurance Claim Business Use Case Diagram and Sequence Diagram
Source: Researcher Property

Incorporating containers into microservices architecture offers several advantages. Firstly, it provides portability, allowing deployment in any environment, including different operating systems. Secondly, scalability is enhanced as container deployment is faster compared to virtual machines, as

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containers do not require booting. Thirdly, containers contribute to speed by isolating services, so changes only affect the container and its contents. Additionally, fault tolerance, a feature of containers, ensures application resilience and availability even if one container fails, with other processes continuing as usual (AWS, 2023). Containers themselves are lightweight virtualization processes that can improve the deployment performance of microservices (Li, 2020). Here is an illustration of the design of container usage in microservices and event-driven architecture in insurance business focusing on insurance claims.

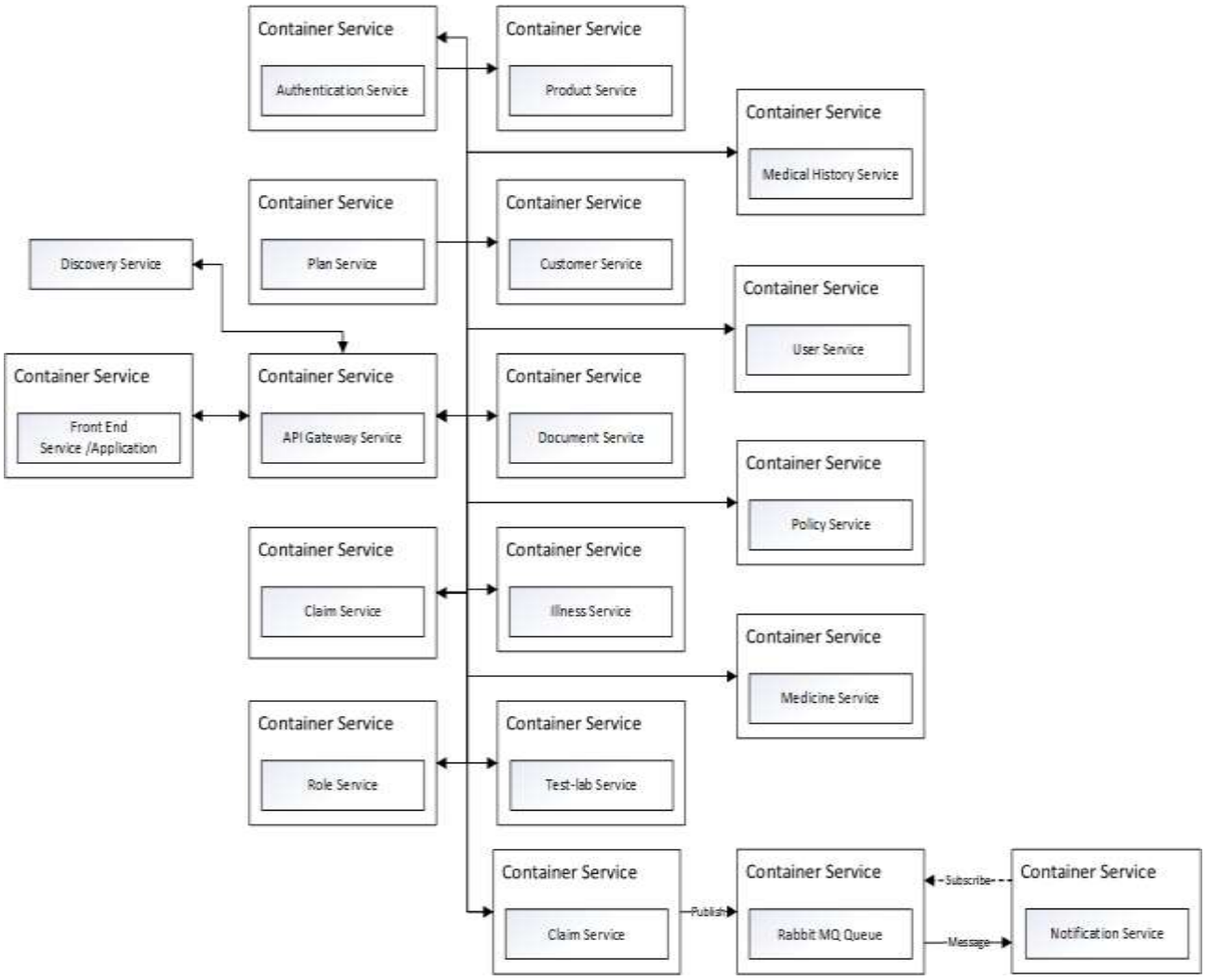

Fig. 4 Architecture Diagram of Microservices and Event-Driven for Insurance Claim Business
Source: Researcher Property

Based on the microservices and event-driven architecture diagram for insurance claim business, an outline diagram is depicted illustrating the crucial processes in insurance claims. In this research, four process flows are designed, including the login process, logout process, token validation process, and insurance claim business process, along with explanations about each flow. The diagram consists of two types of arrows: solid arrows indicate synchronous processes, while arrows with stripes indicate asynchronous processes or part of the event-driven architecture service.

Containers are utilized in the services to accelerate the implementation process through continuous integration and continuous delivery (CI/CD). Additionally, they make the use of CPU and RAM resources more efficient and ensure that the services are scalable according to their specific needs and functionalities.

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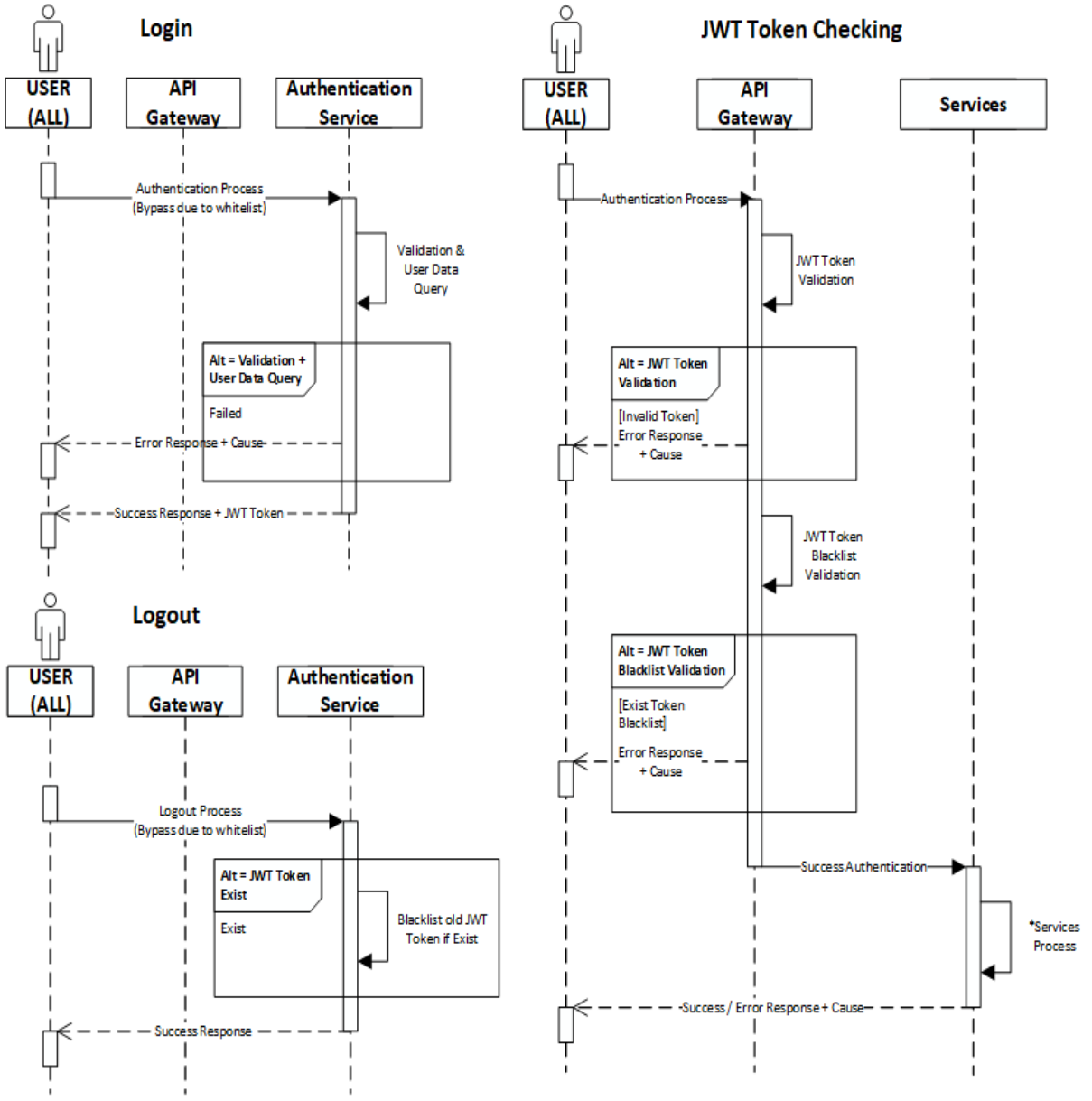

Fig. 5 Login, Logout, and Token Validation/Checking Sequence Diagram
Source: Researcher Property

The login sequence diagram illustrates the authentication or verification process of users against the system used. To avoid the process of validating JWT tokens, the API gateway provides a URL for accessing tokens. Generally, JWT tokens are obtained after the login validation process is completed. The response from this API is an access token in the form of a JWT token, which can then be used in the header of each request. If the authentication process fails, an error message response will be generated, and the API invocation process will be halted.

Logout sequence diagram, used to illustrate the normal application logout process with the additional step of registering the token into a blacklist token to prevent further use.

The token validation or checking sequence diagram is the process where the validation of the JWT token occurs in the API bearer header before reaching the next process, such as the claim process. There are two validations: the first is to check if the JWT token is valid or not, or if the token has expired or not, and the second is to check if the token is on the blacklist or not. Token blacklist process is added to prevent previously used tokens from being reused before they expire. If either condition is not met, the process will stop and cannot proceed.

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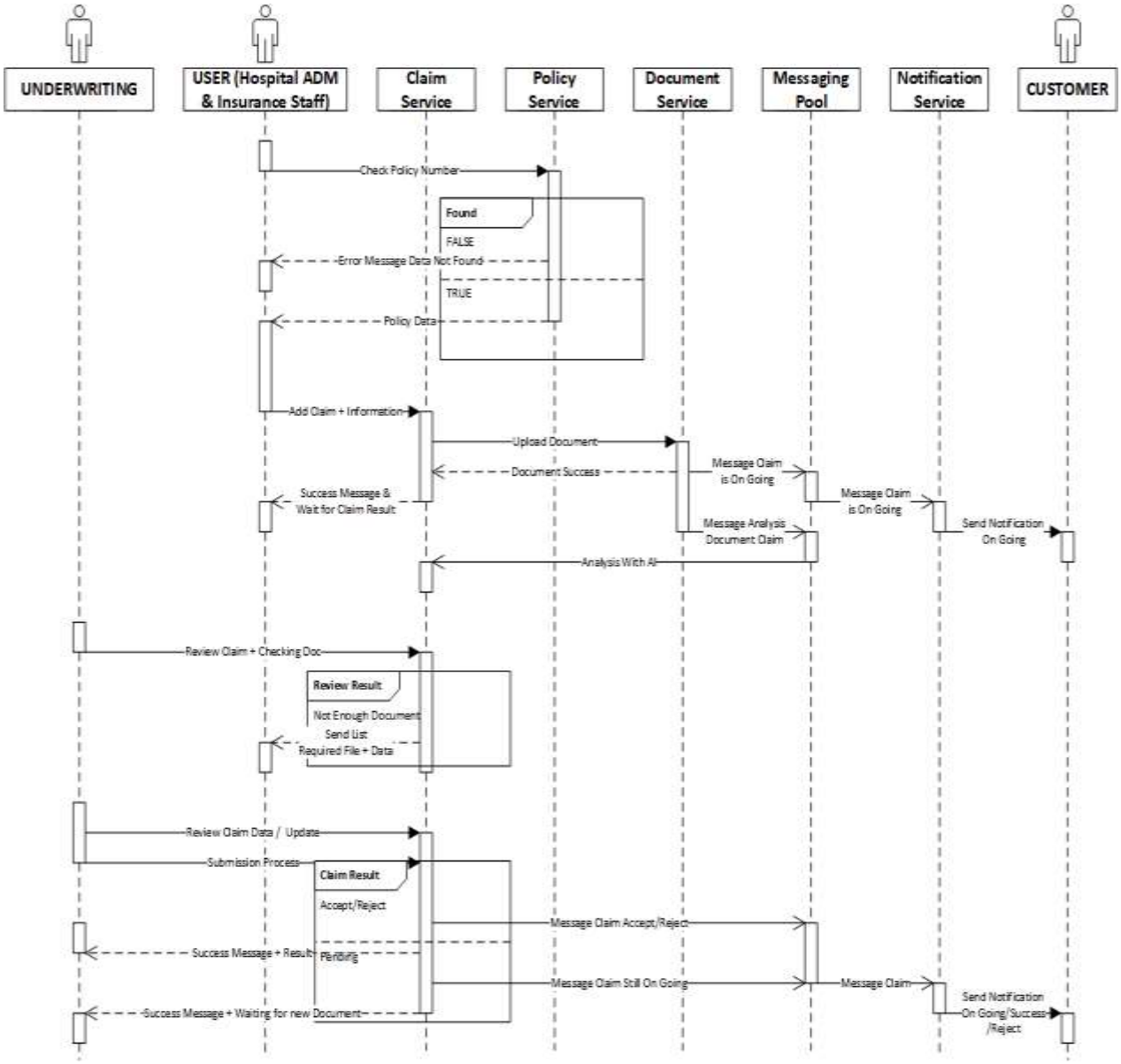

Fig. 6 Insurance Health Claim Process Sequence Diagram
Source: Researcher Property

The health insurance claim process is depicted in a sequence diagram that consists of three separate stages. Before this process occurs, a JWT token validation is performed to prevent users without access rights from proceeding to the next menu or process, such as the insurance claim process.

Initially, the user, who is either a hospital administrative staff member or an insurance staff member, checks the customer's policy number. If the data is not found, the process stops, and a message indicating that the data was not found is provided. However, if the data is found, the process continues to the stage of entering claim information and uploading the claim documents. Once the upload is complete, a notification is sent indicating that the documents have been successfully uploaded. The previously uploaded documents must meet predetermined standards to facilitate analysis. Before the process is completed, there is an asynchronous process used to analyze the existing data with the help of artificial intelligence triggered by a messaging event-driven architecture. Another asynchronous process is also used to send notifications to customers using a notification service triggered by event messaging.

In the next stage, the underwriting team reviews the documents manually to check if any documents are missing. This process is also used to notify users, particularly the hospital administrative staff, if any documents are incomplete so that they can be promptly completed.

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Finally, the underwriting team can customize data, such as the amount of medication received, the costs covered, and other details, before proceeding with the claim submission process, which can result in acceptance, rejection, or pending status. All information regarding the claim submission process will be notified to the insurance customers via the notification service, which is triggered using event messaging, as part of the event-driven architecture. The purpose of this notification is to inform customers of the decision or status of their current health insurance claim.

Typically, in the insurance claim process for outpatient and inpatient care, customers must wait and cannot leave until the claim decision is made by underwriting staff, resulting in wasted time for customers with uncertain completion times. However, for insurance claims with reimbursement, customers will promptly receive information regarding whether the processed documents are sufficient or not, along with notifications indicating the status and outcome of the claim process.

By employing document analysis aided by artificial intelligence, the insurance claim process can be significantly enhanced in terms of decision support, simplification, and acceleration. This ensures that customers do not have to wait excessively long, or in the case of outpatient and inpatient care, they can even leave before the claim process is completed.

If processes like the ones depicted in figure 6, the insurance health claim process sequence diagram, are to be implemented and developed, there are several things that need to be considered, such as:

1. Exception handling and data transactions are handled using event-driven architecture. What this means is that if an unexpected error occurs during the data transaction process, all data related to that process must be rolled back.
2. All processes that do not require immediate output, such as notifications and all claim processing results handled by artificial intelligence, can use event-driven architecture that operates asynchronously, thus saving time and optimizing computer resource usage. In the implementation process, messaging application such as Apache Kafka or RabbitMQ can be used.
3. All API accesses must pass through the gateway first.
4. The blacklist token data must be emptied after a specified period to save storage costs. In this case, a scheduler can be used within the application, service, or database.

DISCUSSIONS

To answer the first question regarding "How is the design architecture of microservices and event-driven implemented for insurance companies in the claims process?", information gathering or the planning, development, testing, and deployment phases must be conducted first.

In the planning phase, identification of the necessary elements is conducted, such as what processes will be executed, like the flow of business processes, resources for infrastructure, and also human resources; designing based on the identification and analysis of microservices, considering whether existing functions can be separated or combined and whether there are additions to the existing requirements; then selecting the latest technologies to enhance the health insurance claim system, such as artificial intelligence, messaging, and cloud computing.

Next, in the development phase, the implementation process is carried out according to the planned activities and adding some processes to facilitate development, such as deployment using CDCI (Continuous Deployment Continuous Integration), implementing monitoring, logging to identify future problems, and for maintenance once the software is completed. The subsequent phase involves testing and reviewing to ensure what has been developed aligns with the requirements.

Lastly, the deployment phase occurs when all processes are completed, and a final review is conducted on the health insurance claim system regarding performance and identifying areas for improvement for the future to achieve the goals of the health insurance company.

For the second question, which addresses "What other technologies can be used and implemented in which areas to support the development of systems in insurance companies in the claims process, and what are their benefits?" it can be explored by researching through the technologies to be implemented, such as cloud computing and artificial intelligence.

The benefits provided by implementing cloud computing include cost savings due to not needing to own infrastructure equipment such as servers and labor for maintenance, thus saving costs; assurance that servers will not go down, ensuring continuous application accessibility; guaranteed system security;

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and backup processes are handled by the service provider, so users only need to use and pay for what they use (Golightly, 2022).

Artificial intelligence in insurance companies can be utilized in several ways, such as predictive analysis to acquire customers, recommendation engines to provide appropriate recommendations from insurance agents to potential customers, automated decision-making processes, analyzing text and speech with natural language processing, and much more (Eling, 2021). Additionally, artificial intelligence also provides benefits to insurance companies such as reducing financial risks due to data analysis based on predictions, providing better customer service in decision-making regarding the types of insurance to be taken, automating processes such as implementation in RPA to make processes more efficient, and also reducing human risks (Fujitsu, 2021).

CONCLUSION

The depiction of insurance business processes, focusing on insurance claim processes, generally follows a similar framework regardless of the type of insurance, such as health, life, or auto insurance. The primary differences are evident in the technology and architecture used. The common business processes are modified and proposed for enhancement through analysis and the implementation of technology specific to the insurance business.

Previous designs using monolithic and service-oriented architectures (SOA) have weaknesses that can be addressed with microservices and event-driven architectures, particularly in health insurance claim processes. This research provides an overview of the use of microservices and event-driven architectures, supported by use case diagrams and sequence diagrams, along with implementation notes to facilitate the application of these architectures in future insurance claim business processes.

Microservices architecture is employed in development to simplify application management, with a focus on insurance business processes, particularly claims. Containers are used for services to expedite deployment across any environment without concern for the operating system, supported by CI/CD systems for optimal resource usage.

Event-driven architecture is utilized for parallelizable processes, such as notifications, transaction rollback handling, and processes managed by artificial intelligence. The combination of these architectures, along with other technologies like containers, artificial intelligence, cloud computing, and robotic process automation (RPA), can enhance the performance and efficiency of insurance companies in leveraging information technology in the digital era.

However, other factors must be considered in application development, such as the application's scope, data storage techniques, and all other resources. Based on this, further research is recommended to develop the stages based on the design proposed in this study and to implement the technologies to be used. Additionally, analysis, design, and implementation should be extended to other insurance business processes, such as insurance registration or other types of insurance like auto, life, and more.

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