Analysis and Design of Serviced Oriented Architecture (SOA) with Service-Oriented Modeling And Architecture (SOMA) Method in Trucking Services Company (Case Study: PT Argo Kencana Transindo)

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Service Oriented Architecture, Service Oriented Modelling and Architecture, Trucking Services.

ABSTRACT
Service Oriented Architecture (SOA) is an architectural approach which uses basic construction in the form of services to support rapid system development at low cost and has the ease of managing the composition of distributed applications even in heterogeneous environments. PT Argo Kencana Transindo (PT AKT) is a company in the field of transportation services or freight forwarding. Until now, the company in carrying out its operations still uses an information system that is only integrated with computerized applications, namely Microsoft excel, Microsoft word and also a simple system but there is no information system that is integrated between departments to be able to manage a lot of existing work. For the trucking industry, fast and efficient delivery times are essential to meet customer needs and maintain competitiveness in a competitive market. Facing the opportunity of changing business process needs in the future, SOA offers adaptive and reactive to the environment and offers solutions to business complexity, system diversity and technology. This research analyzes and designs SOA using the SOMA method which is expected to contribute to making it easier to integrate with other systems and services, helping to streamline communication and data sharing throughout the supply chain, leading to more efficient and effective operations.

Introduction
Service Oriented Architecture (SOA) can be defined as an architectural approach that uses services as fundamental building blocks to support rapid and cost-effective development while providing ease in orchestrating distributed applications in heterogeneous environments (Hantana, 2013). In the context of trucking service companies, SOA can facilitate the integration and interoperability of various systems and
applications used in the company's operations, such as delivery management systems, fleet management systems, warehouse management systems, and so on.

PT Argo Kencana Transindo (PT AKT) is a transportation and cargo delivery service company. Currently, the company operates with information systems that are only computerized applications, such as Microsoft Excel, Microsoft Word, and some simple systems. There is no integrated information system among departments to manage the various tasks efficiently (Warkim & Sensuse, 2017).

PT AKT operates in the transportation service sector (trucking), where the business process involves clients who use PT AKT's services. Clients request available fleets to transport or pick up the goods they need. Sometimes clients require multiple fleets, and checking the fleet availability at that moment can be challenging. Monitoring is currently done in a straightforward manner: PT AKT's admin directly contacts the drivers of the fleets. This manual process can lead to inaccurate data due to the possibility of driver error in reporting their locations.

For the trucking service industry, fast and efficient delivery is crucial to meet customer demands and stay competitive in a competitive market. By implementing SOA, trucking service companies can expedite deliveries by integrating different systems and applications, automating business processes, and enhancing visibility and control over PT AKT's operations.

According to Papazoglou, Michael P., et al. (2008) in (Fajar & Shofi, 2016), SOA emerged by offering adaptability and responsiveness to the environment while providing solutions to business complexity, system diversity, and technology. In the evolution of an organization, there is always the potential for changes in business processes in the future that may lead to changing user needs and, consequently, changes in the flow of business processes from the old system. Therefore, there should be a solution to accommodate such possibilities. SOA can assist in addressing future user needs since it represents functions in the form of services, supports multi-platforms, and meets the demands of independence and loose coupling for complex computing needs. SOA is reusable, which means that existing services can be reused, saving costs and development efforts.

Furthermore, by leveraging SOA, trucking companies can easily integrate with other systems and services, such as transportation management systems and logistics providers. This can simplify communication and data sharing across the supply chain, leading to more effective and efficient operations (Muslih & Hasanah, 2019). Overall, this thesis aims to explore the potential benefits of SOA for trucking service companies, as well as the challenges and considerations that may arise when implementing this architectural approach (Van Eck & Waltman, 2016).

Based on the background presented, the research problem is formulated as follows: How can user data retrieval and inter-departmental data connectivity be simplified? How can users be facilitated in the fleet booking process and live tracking of orders? The objective of this research is to design a system architecture using SOA as a development solution for PT AKT to simplify user data retrieval and inter-departmental data connectivity. It aims to create a separate system architecture from PT AKT's internal system, which can be accessed by clients for order placement and live order tracking.

**Research Methods**

This research employs a qualitative approach to achieve its formulated objectives. The research method consists of several stages. It begins with direct observations at PT AKT to understand the current business process architecture and the data/information
used. Interviews are conducted with PT AKT employees to gain a deeper understanding of the business processes and architectural requirements. Literature review is carried out by referring to sources such as journals, books, and articles to acquire theoretical foundations and information about relevant internal and external environments.

Value Chain Analysis is used to identify the primary and support processes within PT AKT. This helps in mapping the company's business processes. The Service Oriented Modeling and Architecture (SOMA) method is utilized to analyze architectural needs and design the workflow for creating a Service Oriented Architecture at PT AKT. This will serve as a guide for future system development (Hizviani, 2020).

This research employs Value Chain Analysis to identify business processes and Service Oriented Modeling and Architecture (SOMA) to design the architecture. Value Chain aids in mapping primary and support processes within PT AKT. SOMA assists in designing the workflow for creating a Service Oriented Architecture (Savana et al., 2020). This process involves mapping the processes at PT AKT according to the Value Chain diagram. There are primary activities and support activities within the Value Chain (Gunawan, 2019).

Three main identification techniques are used: Goal Service Modeling, Domain Decomposition, and Existing Asset Analysis. The goal is to identify business objectives, divide business areas into subsystems, and describe the existing processes. Service specifications and subsystem analysis are performed using UML diagrams. In the Realization phase, the results of the SOA design are implemented, and service candidates are outlined for implementation. This method is used to analyze and design the SOA architecture at PT AKT through various stages, including observation, interviews, Value Chain analysis, and the application of the SOMA method.

**Results and Discussions**

1.1. Value Chain

Value chains are created to identify and define business areas and to classify areas into key business functions (main activities) and business support (support activities) in the enterprise (Hendri, 2017).

A value chain diagram at PT AKT which contains the main activities and supporting activities. The main activity is the main function based on the actions that run on PT AKT's business processes, the main function of PT AKT is obtained based on interviews with the owners of PT AKT.
1.2. Service Oriented Modeling and Architecture (SOMA)

1.2.1 Business modelling and transformation
Define business architecture and business models.

Define business architecture and business models, in this process to find out the business model and business architecture using Porter’s Value Chain. After this analysis, it is known that the main business processes at PT AKT focus on shipping services.

1.2.2 Solution Management
SOMA offers flexibility because there are different approaches to SOA migration depending on the choice made: Create a new application, deploy an old application, or integrate an application. In this thesis, the researcher proposes to create an online system for the service ordering process at PT AKT, and the ordering system will be integrated with the financial system and also the system for mechanics and drivers.

1.2.3 Identification
In this phase there are three main service identification techniques: goal service modelling, domain decomposition and existing asset analysis. Goal Service Modeling (GSM) consists of high-level statements of business objectives broken down into achievable subobjectives that are evaluated using Key Performance Indicators (KPIs). In the domain Decomposition phase, it aims to outline the top-down process.
business areas are further divided into functional areas. This process is carried out to create a set of subsystems that combine logical boundaries for business operations.

**Conduct Goal Service Modeling**

Table 1 describes Goal Service Modeling (GSM) as consisting of high-level statements of business objectives broken down into achievable subobjectives that are evaluated using Key Performance Indicators (KPIs).

<table>
<thead>
<tr>
<th>Goals &amp; Subgoals</th>
<th>KPIs</th>
<th>Metrics</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Give excellent service to clients who use it service transportation goods</td>
<td>Increase client satisfaction with PT AKT services</td>
<td>The number of clients who are satisfied with PT AKT's services has increased.</td>
<td>System login</td>
</tr>
<tr>
<td>Make the process of data integration and distribution more efficient good</td>
<td>Increase amount order services and improve order repeat from the client. Increasing work efficiency internally at PT AKT</td>
<td>Amount order repeat from clients increases. collection and creation report more faster and more accurate</td>
<td>Making order</td>
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<td>Order history</td>
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<td>Track orders</td>
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<td>Billing details</td>
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<td>Survey completion</td>
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<td>Client Opens service PT AKT online ordering</td>
<td>Increase amount order in use service</td>
<td>Amount order and quantity user service increase</td>
<td>System login</td>
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<td></td>
<td>Making order</td>
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<td>Order history</td>
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<td></td>
<td>Survey completion</td>
</tr>
<tr>
<td>Operational open PT AKT internal system</td>
<td>Increase the work efficiency of operational divisions</td>
<td>Data processing becomes more better and more data processing accurate.</td>
<td>System login</td>
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<td>Order list</td>
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<td>Verification order</td>
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<td>Fleet list</td>
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<td>Application checking fleet condition</td>
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<td>Travel letter</td>
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<td>Fleet schedule</td>
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<td>Price list</td>
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<td>Application for pocket money</td>
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<td>Fleet checklist _</td>
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<td>Making details bill</td>
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<td>Report results inspection</td>
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<td></td>
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<td>Track orders</td>
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<td></td>
<td></td>
<td></td>
<td>Manage users</td>
</tr>
<tr>
<td>Mechanic open PT AKT internal system</td>
<td>Increase efficiency Work mechanic reporting and reporting processes results inspection more fast.</td>
<td></td>
<td>System login</td>
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<td></td>
<td>Fleet list</td>
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<td>Fleet inspection process</td>
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<td>Report fleet inspection</td>
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<td>Application ethnic group spare</td>
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<tr>
<td>Driver open PT AKT internal system</td>
<td>Increase reporting efficiency from drivers Reporting process driver more fast sent.</td>
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<td>System login</td>
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<td>Mail list road</td>
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<td>Check point process</td>
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<td>Application fleet check</td>
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</tbody>
</table>
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Finance open PT AKT internal system

Increase efficiency Work finance

Data processing becomes more better and more data processing accurate.

- System login
- List of pocket money applications
- Details of pocket money application
- Making bill
- List of bills
- Billing details
- Satisfaction survey customer

Personal and general open the internal system of PT AKT

Increase personal and general work efficiency

Data processing becomes more better and more data processing accurate.

- System login
- List of employees
- Absence list
- List of permits / leave employee
- Payroll _ employee

The warehouse opens PT AKT internal system

Increase personal and general work efficiency

Data processing becomes more better and more data processing accurate.

- System login
- List of items
- Exit process goods
- Login process goods
- Stock list goods
- Application purchase goods

<table>
<thead>
<tr>
<th>Decomposition Domain</th>
</tr>
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<tbody>
<tr>
<td>In the domain Decomposition phase, aims to outline the top-down process. Related business areas are further divided into functional areas. This process is carried out to create a set of subsystems that combine logical boundaries for business operations. Table 2 describes the subprocess of domain decomposition of identification.</td>
</tr>
</tbody>
</table>

**Tabel 2 Domain Decomposition**

<table>
<thead>
<tr>
<th>Domains</th>
<th>Function Areas</th>
<th>Sub System</th>
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<tbody>
<tr>
<td>Management booking service</td>
<td>Transaction booking</td>
<td>Administration booking</td>
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<td></td>
<td>Tracking booking</td>
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<tr>
<td>Fleet management</td>
<td>Fleet data</td>
<td>Fleet administration</td>
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<td>Fleet inspection data</td>
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<td></td>
<td>Fleet schedule</td>
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<tr>
<td>Management payment</td>
<td>Billing process bill</td>
<td>Administration bill</td>
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<td></td>
<td>Billing data</td>
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<td>Payment data from the client</td>
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<tr>
<td>User management</td>
<td>Employee data</td>
<td>User Administration</td>
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<td>Employee profile</td>
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<td>Permit / leave data</td>
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<td>User data</td>
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<tr>
<td>Management inventory</td>
<td>inventory</td>
<td>Administration inventory</td>
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<td>mutation out of goods</td>
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<td></td>
<td>incoming mutation of goods</td>
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<tr>
<td>Survey management</td>
<td>Survey data</td>
<td>Survey administration</td>
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<tr>
<td></td>
<td>Client satisfaction level</td>
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</tbody>
</table>

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Existing Asset Analysis

In the existing asset analysis phase, it is a sub-process of identification, explaining the existing processes at PT AKT, namely:

- Order Process
- Financial Process
- Inventory Process

From the system, there is no data connection and the system runs with each system and its own database.

Refactor and Rationalize Services

Refactor and rationalize services is the process of describing the flow and services that will be applied to PT AKT.

1.2.4 Specification

The specification phase of SOMA is the Service Oriented Architecture (SOA) design process. The specification phase consists of several activities: service specification, subsystem analysis and component specification (Qori’Rahmawati Pertiwi & Anjarwani, n.d.). When performing service specification activities, researchers can define a set of service operations and a hierarchy of services to be exposed as Web services. To support service specification activities, researchers use UML diagrams to describe specify services (Iskandar & Jannah, n.d.).

Specify Service

At PT AKT there are several actors: Client, Operational, Mechanical, Driver, Finance, Warehouse, HRD. Some of the existing actors will be explained through a sequence diagram as an explanation of the specify service subprocess. (Gita, 2010)

Figure 2. Sequence diagram client login process

Explanation of figure 2 client login by entering username and password. The username and password entered will be sent to the database and a check process will be carried out for data validation. If the data does not exist it will send a notification of the wrong username and password, and if the username and password are correct it will display dashboard data from the client.
Figure 3. Sequence diagram of client order creation process
Explanation of Figure 3, the client inputs the ordering data into the system, then the system will send the ordering data to the database for later validation. If the data is valid, an order will be formed, if it is invalid, it will issue an invalid order notification.

Figure 4. Sequence diagram client process Order history
Explanation of Figure 4, the client inputs date data to filter the order history data and the system sends it to the database then searches for data according to the date. If there is, the order history will appear, and if there is none, the data notification will appear.

Figure 5. Sequence diagram client track orders
Explanation of Figure 5, The client enters the order code into the system and the system will send the order code to the database to search for data and display order data.
Figure 6. Sequence diagram of client billing history process
Explanation Figure 6, The client enters the date for the data filter in the system, then the date is sent to the database to find billing data. If the data exists it will be displayed billing history, if it is not found it will issue a notification that the data is not found in the billing history.

Figure 7. Sequence diagram client process billing details
Explanation of Figure 7, The client inputs date data to filter data into the system, then the system sends to the database to search for billing data. If the data is not found, it will issue a notification that the data is not found, if the data exists it will display the billing history (the client can select one of the history data to see the billing details according to the billing number).

Figure 8. Sequence diagram client survey process
Explanation of Figure 8, The client accesses the survey link and enters the system, then the system enters the survey data into the database and the survey results are stored.
Figure 9. Sequence diagram of operational division of login process
Explanation of Figure 9, Operational user login by entering username and password. The username and password are sent to the database and then a check process is carried out for data validation. If the data does not exist it will sends a notification of the wrong username and password, if the username and password are correct it will display dashboard data from operational users.

Figure 10. Sequence Diagram of Operations Division Order List Process
Explanation of Figure 10, The operational user enters the date filter into the system, then sends it to the database to check the order list data. If the data does not exist it will issue a notification that the order data does not exist, if the order data is present it will display the order data according to the date filter.

Figure 11. Sequence diagram of operational division of order verification process
Explanation of Figure 11, The operational user enters the order code into the system and sends it to the database to check the data. If the data does not exist, it will issue a notification that the data was not found. If the data is found, it will display the order data according to the order code, and then it will carry out the order verification process.

Figure 12. Sequence diagram of operational divisions of fleet listing process
Explanation of Figure 12, The operational user enters data for data filters (such as vehicle number, vehicle type, vehicle type), and then the system will send it to the database to check the data. If the data is not found, it will issue a notification that the data was not found. If data is found, it will display fleet data based on the data filter inputted.

Figure 13. Sequence diagram of operational division of fleet check application process
Explanation of Figure 13, The operational user inputs data to request fleet checking to the system and then the data is sent to the database. The data inputted will be stored in the database and the fleet check application data is formed.
Figure 14. Sequence diagram of operational division of road mail process
Explanation of Figure 14, The operational user inputs the path letter data into the system, then the path letter data will be sent to the database. The input data will be stored in the database and the road letter data will be formed.

Figure 15. Sequence diagram of operational division of fleet scheduling process
Explanation of Figure 15, The operational user filters the departure date of the fleet to the system, then the system will send data to the database and check the empty fleet data. If the empty fleet data does not exist, it will issue a full date notification, if available, it will carry out the schedule registration process on that date.

Figure 16. Sequence diagram of operational division checking service price list
Explanation of Figure 16, Operational user enters the system to search for price data to the database. Then from the database will bring up the required price data.
Figure 17. Sequence diagram of operational division of allowance application process

Explanation of Figure 17, The operational user inputs pocket money data into the system, then the system will send pocket money data to the database. The input pocket money data will be stored and pocket money data will be formed.

Figure 18. Sequence diagram of operational divisions list of fleet checking processes

Explanation of Figure 18, The operational user filters the fleet data into the system and then the data is sent to the database. From the database, fleet checklist data will appear according to the fleet filter inputted. In this case, operational users want to know the data from fleet checks that have been done previously by mechanics.

Figure 19. Sequence diagram of operational division of billing breakdown process

Explanation of Figure 19, The operational user enters the billing data into the system, then the data will be sent to the database. The input billing data will be saved and the billing detail data is formed.
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Figure 20. Sequence diagram of operational division process check inspection report

Explanation of Figure 20, The operational user performs a date filter to check the inspection result report, then the data is sent to the database to check the data, if the data does not exist it will issue a notification that the data is not found. If the data is present, it will display the inspection report data according to the date filter inputted.

Figure 21. Sequence diagram of operational division of order tracking process

Explanation of Figure 21, The operational user inputs the order code data into the system, and then sends it to the database for data check. If the data is not found, the system will send a notification that the data was not found. If the data exists, it will display the order location data according to the order code entered.

Figure 22. Sequence diagram of operational division process managing user data
Explanation of Figure 22. Operational user logs into the system, then from the system will access user data to the database, and from the database will display user data.

**Figure 23. Sequence diagram of mechanical division of login process**
Explanation of Figure 23. The mechanical user logs in by entering the username and password that have been registered. Username and password will be sent to the database and a check process will be carried out for data validation. If the data does not exist, it will send a notification of the wrong username and password. If the username and password are correct it will display dashboard data from mechanical users.

**Figure 24. Sequence diagram of mechanical division process fleet list**
Explanation of Figure 24. The mechanical user logs into the system and enters filter data (such as vehicle number, vehicle type, vehicle type), then the filter data is sent to the database and the data is checked. If the data does not exist, a notification will appear that the data was not found. If the data exists, it will display fleet data according to the filters inputted.
Figure 25. Sequence diagram of mechanical division of fleet inspection process

Explanation of Figure 25, The mechanical user inputs fleet inspection data into the system, then the data is sent to the database. The input data will be stored in the database and fleet inspection data will be formed.

Figure 26. Sequence diagram of mechanical division of process checking fleet inspection report

Explanation of Figure 26, The mechanical user logs into the system and will see the fleet inspection report data that has previously been inputted by the mechanic. The system will access the database to retrieve fleet inspection report data and display the required fleet inspection report.

Figure 27. Sequence diagram of mechanical division of parts application process

Explanation of Figure 27, The mechanical user inputs the spare parts application
data on the system, then the system sends it to the database to store the data into parts application data.

**Figure 28. Sequence diagram of driver process mail list road**

Explanation of Figure 28, User The driver performs the process of retrieving road letters on the system, then the system will send data to the database to display the list of road letters that must be carried by the driver.

**Figure 29. Sequence diagram of checkpoint process driver**

Explanation of Figure 29, User Driver performs the checkpoint process on the system, then the system will send it to the database to save the data into checkpoint data.

**Figure 30. Sequence diagram of the driver of the fleet check application process**

Explanation of Figure 30, User Driver inputs the fleet check request data in the system, then the system will send the data to the database to be stored into fleet check request data.
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**Figure 31. Sequence diagram of financial division login process**

Explanation of Figure 31, The Financial User inputs the username and password in the system, then the system sends the username and password to the database for validation. If validation fails it will display a notification of the wrong username and password, if true it will display dashboard data from financial users.

**Figure 32. Sequence diagram of the financial division of the process of applying for allowance**

Explanation of Figure 32, The Financial User inputs filter data (such as date, nominal) in the system, then the system will send it to the database to check the data. If the data is not found, it will display a notification that the pocket money application data does not exist, if the data is present it will display a list of pocket money requests according to the filter.
Figure 33. Sequence diagram of the financial division detailed process of applying for pocket money

Explanation of Figure 33, The Financial User inputs the allowance application number in the system, then the system sends it to the database to check the data. If the data is not found, it will display a notification that the application detail data does not exist, if the data is found, it will display the detailed data of the application for pocket money according to the application number entered.

Figure 34. Sequence diagram of financial division billing process

Explanation of Figure 34, The Financial User inputs billing data in the system, then the system sends it to the database to store the data and make it into billing data.

Figure 35. Sequence diagram of the financial division of the process of checking
the list of bills

Explanation of Figure 35, The Finance User enters a filter (number, date, client) of the bill into the system, then the system will send it to the database to check the data. If the data is not found, it will display a notification that the billing data does not exist, if the data is found, it will display a list of bills according to the filter entered.

Figure 36. Sequence diagram of the financial division of the process of checking bill details

Explanation of Figure 36, The Finance User inputs the bill number into the system, then the system sends it to the database to check the data. If the data is not found, it will display a notification that the billing detail data does not exist, if the data is found, it will display the billing detail data according to the invoice number entered.

Figure 37. Sequence diagram of personal and general division of login process

Explanation of Figure 37, Personal and General Users enter the username and password in the system, then the system will send the username and password to the database for validation. If validation fails it will display a notification of incorrect username and password, if true it will display dashboard data from personal and general users.
Figure 38. Sequence diagram of personal and general divisions of employee list checking process

Explanation of Figure 38, Personal and General Users input employee filters (name, number, position) of employees in the system, then the system sends to the database for checking. If the data is not found, it will display the notification of no employee data, if the data exists, it will display employee data according to the filters inputted.

Figure 39. Sequence diagram of personal and general divisions of attendance list checking process

Explanation Figure 39, Personal and General Users input a date filter on the system, then the system sends it to the database to check the data. If the data is not found, it will display a notification of absent data, if the data is found, it will display the absence data according to the filter inputted.
Figure 40. Sequence diagram of personal and general divisions of the process of checking the list of permits / leave

Explanation of Figure 40, Personal and General Users input the permit / leave date filter in the system, then the system sends to the database to check the permit / leave data. If the data is not found, it will display a notification that the data is not found, if the data is found, it will display the permit / leave data according to the date filter entered.

Figure 41. Sequence diagram of personal and general divisions of payroll checking process

Explanation of Figure 41, Personal and General Users input (employee name, nominal) salary filters on the system, then the system sends to the database. If the data is not found, it will display a notification that the data is not found, if the data is found, it will display employee salary data according to the filters inputted.

Figure 42. Sequence diagram division Warehouse login process

Explanation of Figure 42, The Warehouse User inputs the username and password in the system, then the system sends the username and password to the database for
validation. If the validation fails it will display a notification of the wrong username and password, if true it will display dashboard data from the Warehouse user.

Figure 43. Sequence diagram division Warehouse process checking list of goods
   Explanation of Figure 43, The warehouse user inputs a filter (item name, item code, item type) checking goods in the system, then the system sends it to the database for checking. If the item does not exist, it will display a notification of the item does not exist, if the item exists, it will display item data according to the filter inputted.

Figure 44. Sequence diagram of division Warehouse process of goods exit
   Explanation of Figure 44, The Warehouse User inputs goods data in the system, then the system sends it to the database to be stored and used as outgoing goods data in the form of stock reduction.

Figure 45. Sequence diagram of division Warehouse entry process
   Explanation of Figure 45, The Warehouse User inputs goods data on the system then the system sends the data to the database to be stored and used as incoming goods
data in the form of additional stock of goods.

Figure 46. Sequence diagram of division Warehouse process of checking stock of goods
Explanation of Figure 46, The Warehouse User inputs filters (item name, item code, type of goods) of goods on the system, then the system will check in the database. If the data is not found, it will display a notification that the item was not found, if the item is found, it will display stock data according to the filter inputted.

Figure 47. Sequence diagram of division Warehouse process for purchase of goods
Explanation of Figure 47, The Warehouse User inputs the application data for the purchase of goods in the system, then the system will send the input data into the database and will be stored into the request data for the purchase of goods.

**Analysed Subsystems**
In addition to specify service, there are six subsystems in PT AKT which are described with dependency diagrams, as follows:
Figure 48. Booking Administration Subsystem

The explanation from figure 48 is that the order administration service component is part of the order functional component. There is also a reporting order is a service to carry out the reporting process that is connected to the technical component report engine. In addition, there are also billing functional components and user functional components, where these functional components are interconnected with orders.

Figure 49. Fleet Administration Subsystem

The explanation from figure 49 is that the fleet administration service component is part of the fleet functional component. There is also a reporting fleet administration is a service to carry out the reporting process that is connected to the technical component report engine.

Figure 50. Billing Administration Subsystem

Explanation from figure 50, there is a billing administration service component is
part of the functional billing component. There is also a reporting bill as a service to carry out the reporting process that is connected to the technical component report engine. In addition, there are also functional component billing and functional component user, where this functional component is interconnected with billing.

Figure 51. User Administration Subsystem
The explanation from figure 51 is that the user administration service component is part of the functional user component. There is also a user reporting administration as a service to carry out the reporting process that is connected to the technical component report engine.

Figure 52. Inventory Administration Subsystem
The explanation from figure 52 is that the inventory administration service component is part of the inventory functional component. There is also inventory reporting administration as a service to carry out the reporting process that is connected to the technical component report engine. In addition, there are also functional component mutation goods and functional component master goods, where this functional component is interconnected with inventory.
The explanation from figure 53 is that the service component of the survey administration is part of the functional component survey. There is also a survey reporting administration is a service to carry out the reporting process connected to the technical component report engine. In addition, there are also functional user components and billing functional components, where these functional components are interconnected with surveys.

Specify Components
Specify Component needs to be described because for the process of explaining the components in the subsystem that have been described in the previous process. The following is the description of specify component

In figure 54, the order manager is a mediator who functions to implement workflows or business processes or their collaboration within the boundaries of components and with other collaborative components through the required interface (Wijayanto, 2014). The order manager will connect the existing services in order administration with other functional components that require each other to process.
Gambar 55. Specify Component Armada
In figure 55, the fleet manager will connect the existing services in fleet administration with other functional components that require each other processes.

Figure 56. Specify Billing Component
In figure 56, the billing manager will connect the services in the fleet administration with other functional components that require each other to process.

Figure 57. Specify Component User
In figure 57, the user manager will connect the services in the user administration with other functional components that require each other processes.
In figure 58, the inventory manager will connect the existing services in the inventory administration with other functional components that require each other to process.

**Gambar 59. Specify Component Survey**

In figure 59, the survey manager will connect the existing services in the survey administration with other functional components that require each other to process.

**Refactor and Rationalize Services**

Refactor and rationalize services produce candidate services that will be created in PT AKT's SOA design. This service candidate will be listed in the realization process.

1.2.5 **Realization**

The Realization phase is a phase to provide a result of the SOA design that will be applied, the design uses service oriented modeling and architecture (SOMA). In this phase, service candidates are also described in the SOA preparation process at PT AKT.

**Refine and Detail Components**

The refine and detail component process is the process of describing service candidates that will be made based on existing functional areas.

**Establish Realization Decisions**

Establish realization decision is the process of determining the usefulness of the design that has been made, researchers determine this design is used for a development guideline at PT AKT.

**Perform Technical Feasibility Exploration**
Perform technical feasibility exploration is used to explore the technical feasibility of PT AKT, but this cannot be done because this research is not up to the implementation process is only limited to a service-oriented architecture design.

In the Implementation and Deployment, Monitoring and Management phase, there is no process described in this study because the focus of this research is Analysis and Design only. Where the process carried out is only up to the realization stage and the result is in the form of an SOA architectural reference for PT AKT.

### 1.2.6 Architecture SOA

**Detail SOA Solution Stack Layers**

The SOA architecture formed is the result of PT AKT's needs analysis which has been carried out using the SOMA method. The existing SOA can be used as a guideline for future system development for PT AKT. Figure 4.51 describes the subprocess of realization, namely SOA solution stack layers:

![Figure 60. Inteltiation of SOA architecture reference for PT AKT](image)

**Conclusion**

Based on the results of research at PT AKT, a service oriented architecture (SOA) design was produced using service oriented modelling and architecture (SOMA). Existing services can be used as guidelines and system integration solutions, which will make systems and data integrated with each other without re-input data in other divisions.

The proposed service can also be used as a future guideline for integration of external systems if needed. This makes PT AKT's existing system accessible and reachable from outside PT AKT's internal network. This advantage makes work efficiency for both company owners and clients to be able to access the services needed without having to ask for manual help from the relevant admin.

**References**
