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

Intan Setya Palupi[1], Husni Satra Mihardja[2], Habibullah Akbar[3], Gerry Firmansyah[4]

[1,2,3,4] Universitas Esa Unggul, Indonesia

E-mail: palupisetyaintan@student.esaunggul.ac.id, husni@esaunggul.ac.id, gerry@esaunggul.ac.id, habibullah.akbar@esaunggul.ac.id,

*Correspondence: gerry@esaunggul.ac.id

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

The research methodology used in this study consists of several steps that include data collection, analysis, and development. The method used is qualitative, and here are the details: Observations are made by direct observation at PT AKT to understand the

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architecture of the ongoing business process model. Its main purpose is to identify the data and information required by PT AKT. The research also conducted interviews with relevant employees at PT AKT. It aims to gain further insight and understanding of existing business processes in the company. Literature studies are conducted using sources such as journals, books, and articles. It helps in understanding the theoretical foundations as well as the internal and external environment relevant to the research (Hizviani, 2020).

In addition to qualitative methodology, this research also uses analytical tools such as Value Chain and Service Oriented Modeling and Architecture (SOMA) to understand business processes and develop the necessary architecture (Savana et al., 2020). Value Chain is used to identify the main and supporting processes in PT AKT. The main activities include inbound logistics, operations, outbound logistics, sales and marketing, and service (Gunawan, 2019). While supporting activities involve infrastructure firms, human resource management, technology, and procurement. SOMA (Service Oriented Modeling and Architecture): Used to analyze and design service-based architecture (SOA) for PT AKT. It involves identifying architectural needs and the design process that will be implemented at the company.

This research framework includes requirements analysis steps, which include Business Modeling, Solution Management, Identification, Specification, Realization, Implementation. Thus, this methodology provides comprehensive guidance for understanding, designing, and implementing the business architecture changes required by PT AKT.

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).

Figure 1 PT AKT Value Chain

Figure 4.1 is 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. The following are the main activities in PT AKT's value chain:

Inbound Logistics

The entry logistics process at PT AKT is the process of ordering from clients who enter PT AKT for picking up and delivering goods from clients with fleets from PT AKT.

Operation

The operation process at PT AKT is the process of picking up and delivering orders that have been ordered by the client, the driver will pick up and deliver the order to the ordered destination.

Outbound Logistics

In the logistic process, this exit is billing from client orders. In this process, PT AKT will bill the client for orders from clients that have been completed.

Promotion (marketing)

Promotion at PT AKT is a process carried out by PT AKT to promote existing services, or to introduce PT AKT to companies that have not yet become clients of PT AKT. This is done so that PT AKT can get more clients who place orders on PT AKT services.

Service

Layana at PT AKT is an activity at PT AKT that is carried out to provide explanations or answers to client questions asked. This is done so that clients are clearer and understand more about the obstacles faced.

In addition to the main activities, the value chain also has supporting activities. The supporting activities at PT AKT include the following:

Firm infrastructure

Supporting activities in PT AKT is a financial division that is a financial regulator to assist in the process of running the main activities.

Human resource management

Another supporter is human resource management where the task is employee recruitment, payroll, training and assignment. This recruitment is usually done to add employees to support faster work completion. This assignment is to give tasks to each employee so that their work runs well according to existing procedures.

Technology deployment

This technology deployment supporting activity is tasked with accommodating software and hardware needs at PT AKT. Which is also done like maintaining existing hardware and software.

Procurement

Another supporter is procurement where this activity is a procurement process. The procurement referred to here is in the form of procurement of inventory items that are useful to support work at PT AKT. These spare parts, fleets, stationery and other items are inventory processed by the procurement department.

1.2. Application Platform used

In the process that runs on PT AKT, there are already several applications used on PT AKT. The first application is an application that is useful for processes related to orders, finances, and employee management, the second application is an application that is useful for carrying out the process of administering goods, and there is one more application that is useful for carrying out the maintenance administration process. In table 4.1 will be explained the mapping between existing processes and applications used.

Table 4. 1 List of PT AKT Applications

Process		Application	Technology	Database	Server Specifications
1 2 3	Order Finance Employee management	AKT System	Java (desktop Apps)	SqlServer	• Windows • RAM 4GB • Core i3
1 2	Goods Administration Fleet Administration	AKT System 2	Java (desktop Apps)	SqlServer	• Windows • RAM 4GB • Core i3
1 2	Care Administration Complaint Management	AKT System 3	Java (desktop Apps)	SqlServer	• Windows • RAM 4GB • Core i3

From table 4.1 it is explained that in PT AKT there are three existing systems but of the three systems there is no integration, which results in the need for a data cannot be directly obtained.

1.3. Service Oriented Modeling and Architechture (SOMA)
1.3.1 Bussines modelling and transformation
0 - Define bussines architecture and bussines models.

Define bussines architechture and bussines models, in this process to find out business models 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 (Qori'Rahmawati Pertiwi & Anjarwani, n.d.).
1.3.2 Solution Management

Define bussines architechture and bussines models, in this process to find out business models 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 (Iskandar & Jannah, n.d.).
1 - Proses Initiate Project Management Activities

The initiate project management activities process describes the current process at PT AKT. There are several main processes that run on PT AKT in running a business in the field of trucking service, which are explained in the following table

Table 4. 2 The PT AKT Process

Proses	Process Description
Billing invoice	This process runs when the message delivery / pick-up process has been

	completed, an invoice will be issued that must be billed to the client that the order has been completed.
Purchase payment	The purchase payment process occurs when there is billing from the supplier of goods.
Employee recruitment	This employee recruitment is a process to add more employees to a division that is felt to lack members by making requests to HRD.
Employee Recruitment	The acceptance process is a continuation of employee recruitment, this process is to screen candidates who have applied to be processed until they become employees.
Employee payroll	This employee payroll process is the process of paying salaries for employees every month.
Employee training	Employee training is a process of providing training or work-related skills so that employees understand better.
Employee assignment	This employee assignment is a process of explaining and providing direction for the flow and workings of new employees that must be carried out in employee positions.
Maintenance hardware software	Hardware maintenance software is a process that will run when there is a request for maintenance from existing employees or divisions.
Fleet Maintenance	This fleet maintenance is carried out to check the condition and maintain the condition of the fleet to remain in good condition.
Procurement of goods	The procurement process is a process for procuring goods. This process occurs when there is availability of goods must be immediately held again to maintain stock.
Acceptance of goods	The process of receiving goods is the process of receiving goods after the procurement of goods and purchases to suppliers of goods.
Expenditure of goods	This process of issuing goods occurs when there is a request for the use of goods such as the use of spare parts

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	for repairing existing trucks.
Booking services	This ordering process is a process carried out by the client to perform the services needed by the client.
Delivery / pick-up of ordered goods	Delivery / pick-up of ordered goods is a process that occurs after the customer process from the client.
Promotion	This promotion process is a process of providing new offers to companies that have not used PT AKT's services, or promotions for companies that have become clients of PT AKT.
Service (After Sales)	This service is a process of providing an answer to questions from clients.

Based on table 4.2 in this study in the preparation of the SOA architecture will not take all existing processes, the processes that will be described to become SOA, namely, the process of ordering services, the invoice process, the process of delivering / picking up ordered goods, and the service process.

2 - Proses Select Solution Template and Pattern

The Select Solution Template and Pattern process is the process of defining the solutions provided from this research for PT AKT. The needs of PT AKT are ease in the system development process and ease in the relationship between data and systems. The solution provided is a system architecture using services as a link between data and existing systems with the proposed system.

3 - Conduct Method Adoption Workshop

The Conduct Method Adoption Workshop process is the process of making proposals for new business processes to be adopted by PT AKT. Based on the results of the interview with PT AKT, there are several processes from the current running process at PT AKT, there must be a new business process proposal and there is a process that must be made at PT AKT which will be described in table 4.3

Tabel 4. 3 Usulan bisnis proses

Process	Type	explanation
Service Order	Business Process Changes	In this service order, initially the client places an order via telephone, which makes there is no clear order history. So the new proposal for the order process is a more structured order process with the recording of orders to deal orders from clients
Satisfaction Survey	New Business Processes	This satisfaction survey is a new business process proposal, this process aims to determine client satisfaction with the services ordered. In addition, this process is

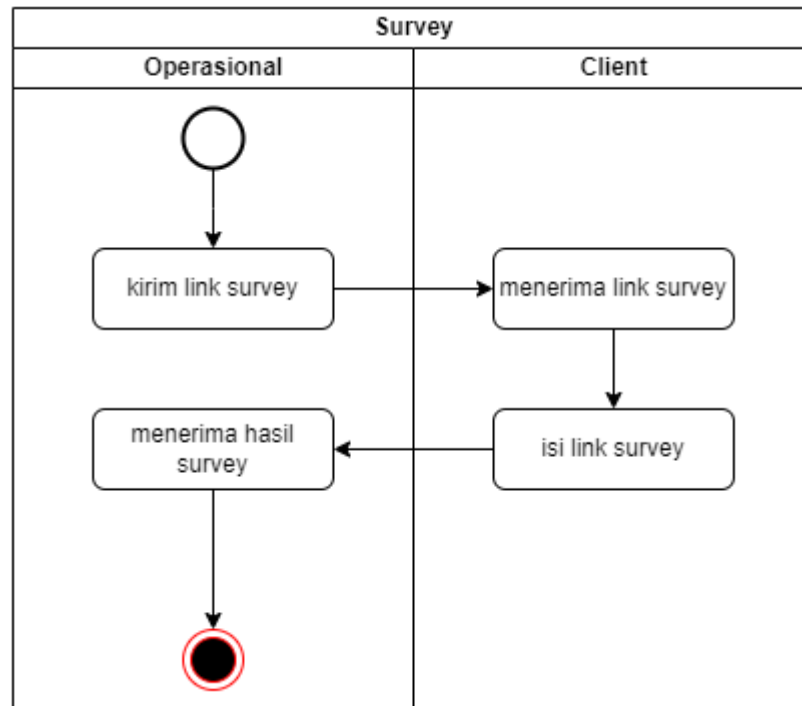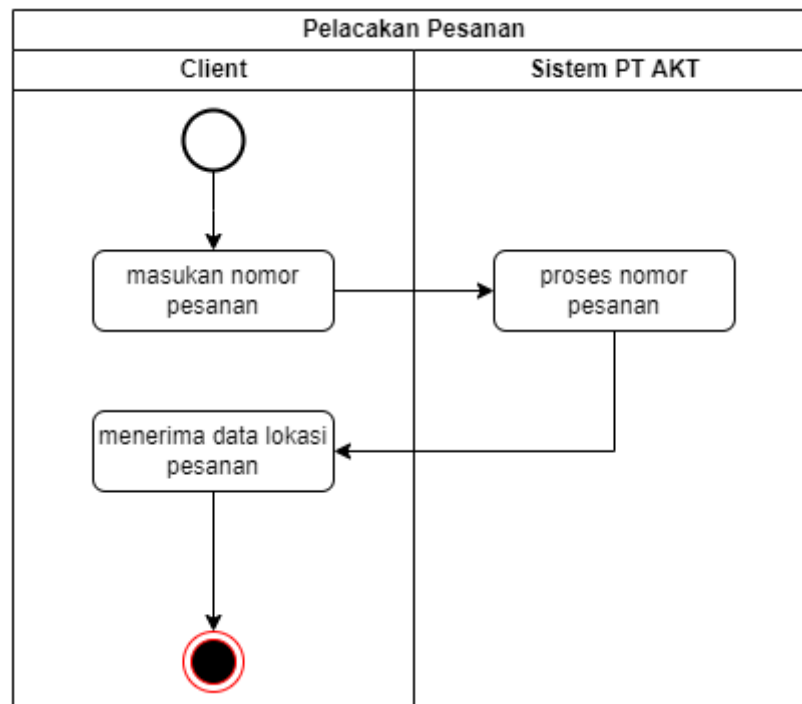|		for PT AKT's internal evaluation of service to clients.
Order Tracking	New Business Processes	This process aims to find out the update of the location of the fleet that carries the client's ordered goods .

Figure 4. 2 Business Process Survey

Figure 4. 3 Business Order Tracking Process

1.3.3   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. 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.

4 - Conduct Goal Service Modeling

Table 4.4 describes Goal Service Modeling (GSM) as consisting of high-level statements of business objectives broken down into achievable sub-objectives that are evaluated using Key Performance Indicators (KPIs). In this case study, the ultimate goal of PT AKT is to increase service bookings from clients, attract new clients and retain clients to continue using PT AKT's services. In addition to focusing on clients, Goal Service Modeling also aims to produce work efficiency in PT AKT's internal by integrating data needs between systems.

Table 4. 4 Goal Service Modeling

Goal & Subgoal	KPI	Metric	Service
Provide excellent service to clients who use freight forwarding services.	Increase client satisfaction with PT AKT's services. Increase the number of service orders and increase re-orders from clients.	The number of clients who are satisfied with PT AKT's services is increasing. The number of reorders from clients increases.	
Making data integration and distribution processes better.	Improve work efficiency in PT AKT internally	Faster and more accurate data collection and report generation	

5 - Decomposition Domain

In the domain Decomposition phase, it 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 4.4 describes the subprocess of domain decompose of identification.

Table 4. 5 Domain Decomposition

Domain	Function Area	Sub-System
Employee Administration	Employee Recruitment Employee Recruitment Employee Payroll Employee Training Employee Assignment	Management Employee Management Training
Financial	Billing Invoice	Invoice

Administration	Purchase Payment	Payment
Booking Administration	Order Tracking Order Creation	Management Booking
Goods Administration (Inventories)	Purchase Application / Goods Delivery Goods Receipt Goods Expenditure	Mutation Good Procurement Application
Promotion Administration	Promotion Target Promotion data	Management Promoted
Service Administration (After Sales)	Complaint Service Service FAQ (Frequently Asked Questions)	Management Complain Management FAQ
Survey Administration	Proses survey	Management Survey
Care Administration	Maintenance Hardware Software Fleet Maintenance	Management Maintenance Management Hardware Software Management Armada

6 - Existing Asset Analysis

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

- Employee Administration
- Financial Administration
- Booking Administration
- Goods Administration (inventory)
- Promotion Administration
- Service Administration (After Sales)
- Care Administration

From the existing processes at PT AKT, there are processes that have been accommodated with the system and some have not been accommodated with the existing system at PT AKT.

7 - Refactor and Rationalize Services

Refactor and rationalize services is the process of describing the flow and service of the domains of financial administration, order administration, service administration and survey administration in PT AKT based on the function area in the domain decomposition process. Here is the structure of the existing service:

1. Penagihan Invoice
   1.1. Data invoice
      1.1.1. Create_invoice()
      1.1.2. Get_list_invoice()
      1.1.3. Get_invoice_by_id_client()

           1.1.4. Get_detail_invoice_by_id()
           1.1.5. Get_total_invoice()
      1.2.Data pembayaran invoice
           1.2.1. Get_invoice_terbayar()
           1.2.2. Get_total_invoice_terbayar()
2. Pelacakan Pesanan
      2.1.Data pesanan
           2.1.1. get_lokasi_pesanan()
           2.1.2. get_status_pesanan()
3. Pembuatan Pesanan
      3.1.Pembuatan pesanan
           3.1.1. Create_pesanan()
      3.2.Verifikasi pesanan
           3.2.1. Verifikasi_pesanan()
      3.3.Pemilihan armada dan jadwal
           3.3.1. Get_list_jadwal()
           3.3.2. Set_armada_to_pesanan()
           3.3.3. Set_jadwal_armada()
4. Pelayanan Komplain
      4.1.Daftar complain
           4.1.1. Get_list_komplain()
      4.2.Status complain
           4.2.1. Get_status_komplain()
           4.2.2. Set_status_komplain()
5. Pelayanan FAQ (Frequently Asked Questions)
      5.1.Daftar FAQ
           5.1.1. Get_list_faq()
      5.2.Status FAQ
           5.2.1. Get_status_faq()
           5.2.2. Set_status_faq()
      5.3.Buat Data FAQ
           5.3.1. Create_faq()
6. Proses survey
      6.1.Buat data survey
           6.1.1. Create_survey()
      6.2.Daftar survey terisi
           6.2.1. Get_list_survey()

1.3.4 Spesification

        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.

8 - Specify Service

        Specify service is a process to explain the flow of existing services and services used in the ordering system at PT AKT that supports the order process, billing process (invoice) and service process at PT AKT. Specify Service will describe what services are used in the order process, invoice process and service process.

Order Process :
- Create_pesanan()
- Verifikasi_pesanan()
- Get_list_armada()
- Get_list_jadwal()
- Set_armada_to_pesanan()
- Set_jadwal_armada()
- get_lokasi_pesanan()
- get_status_pesanan()

Billing Process (Invoice) :
- Create_invoice()
- Get_list_invoice()
- Get_invoice_by_id_client()
- Get_detail_invoice_by_id()
- Get_total_invoice()
- Get_invoice_terbayar()
- Get_total_invoice_terbayar()
- get_status_pesanan()
- Create_survey()
- Get_list_survey()

Service Process :
- Get_list_komplain()
- Get_status_komplain()
- Set_status_komplain()
- Get_list_faq()
- Get_status_faq()
- Set_status_faq()
- Create_faq()
- get_lokasi_pesanan()
- get_status_pesanan()

9 - Analyze Subsystems

In the Analyze Subsystems process is a process to find out the subsystem used from the service used in the specify service process, there are 5 subsystems used based on the service used, namely :
- Management Pesanan
- Invoice
- Management Komplain
- Management FAQ
- Management Survey.

10 - Specify Components

Specify Component describes the relationship between existing services and processes in PT AKT, which will be used as a service component for realization needs.

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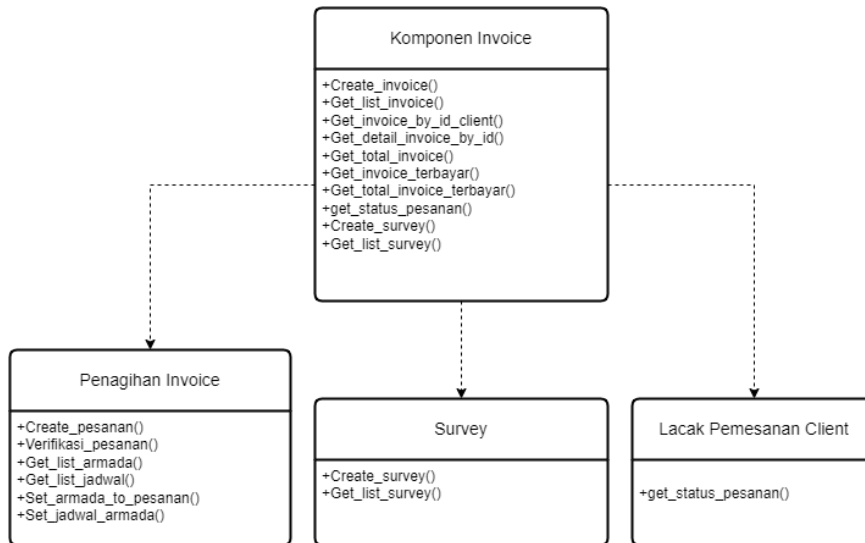
Figure 4. 4 Service Component Invoice

In figure 4.21 service component Invoice is a component that contains services related to invoices.This invoice component is related to three processes, namely the invoice billing process which functions to bill the client. This survey process is a process to find out client satisfaction, this survey is filled every time there is an invoice collection from PT AKT. This track order process is related to invoices because each invoice will be issued when the order process is complete .
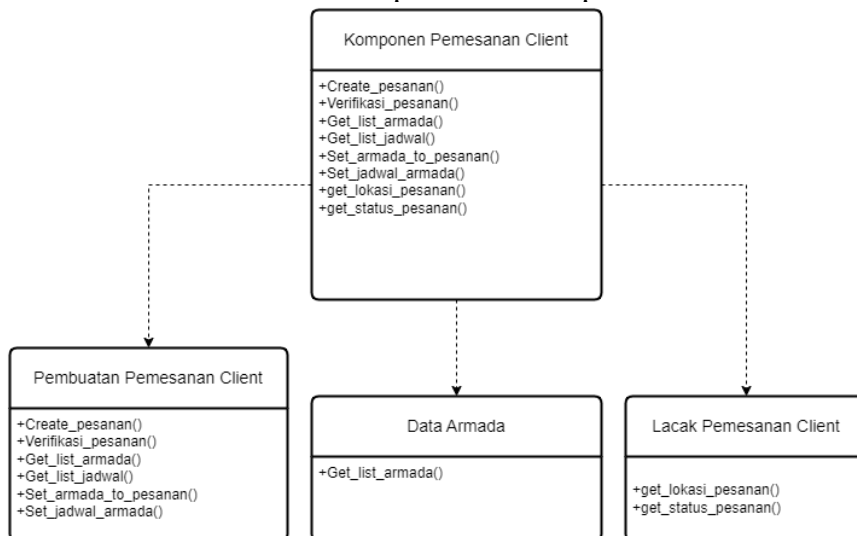
Figure 4. 5 Service Component Booking Client

In figure 4.22 it is explained that the client ordering component is a process for clients to place orders, do live tracking on orders ordered. This ordering component is connected to three processes, namely the order creation process, fleet data, and order tracking process. This process is useful for ordering services by clients to PT AKT, and also for monitoring the location and status of orders by clients in order to get the latest information.
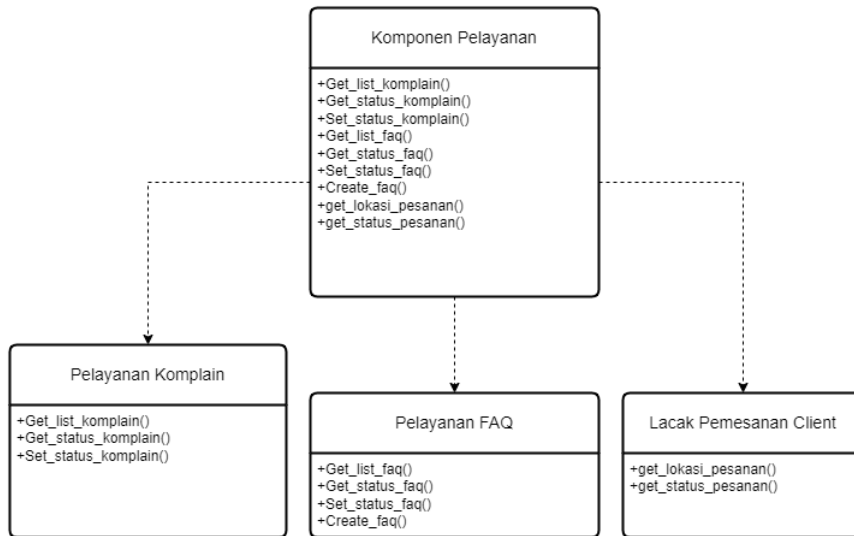
Figure 4. 6 Service Component Service

In figure 4.22 explained below service component service is a process needed by the client, which is used by the client to ask a question or make a complaint if any. This complaint is made by the client when there is a problem or problem related to the service order used. In this component, there are three processes that run complaint services, FAq services, and track client orders.

After describing and explaining the existing service components, the component layer can be described as follows:
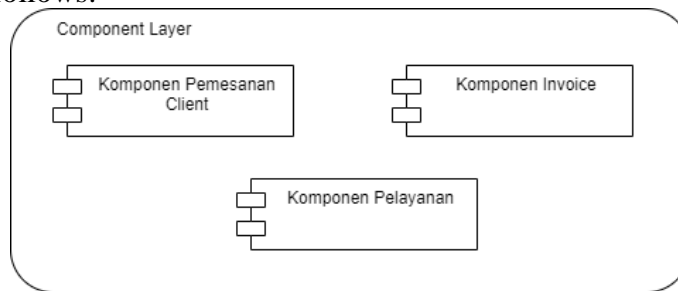
Gambar 4. 7 Component Layer

In figure 4.23, there are three component layers in this study, namely Order Component, Invoice Component, Service Component.

11 - Refactor and Rationalize Services

Refactor and rationalize services is the process of identifying the service layer used in PT AKT's SOA design. Figure 4.24 is a list of existing services used in the main process of PT AKT, from which the service is made into one layer, namely the service layer which is side by side with all services to be used.

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Gambar 4. 8 Service Component

1.3.5 Realization

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

12 - Refine and Detail Components

In refine and detail component, this stage is the process of defining the components to be used so as to describe the relationship between the service layer, component layer and operational layer at PT AKT.
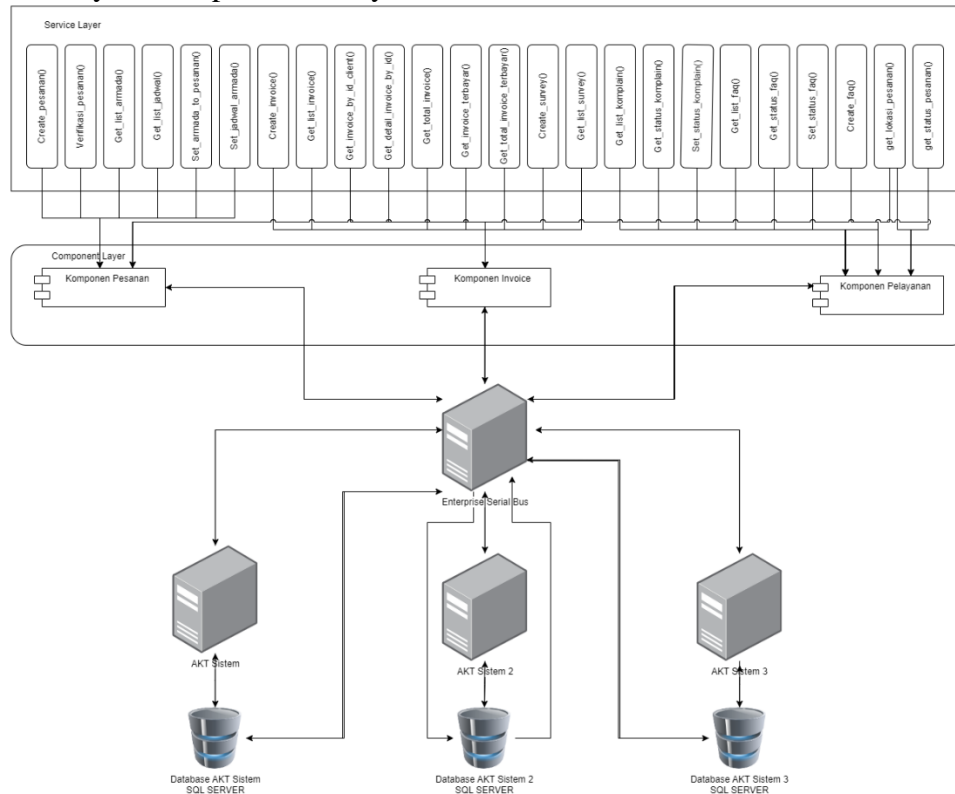
Gambar 4. 9 Refine and Detail Component

13 - Establish Realization Decisions

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

14 - 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 until the implementation process is only limited to a service-oriented architecture design.

In the Implementation phase, it will be carried out up to the server specification stage, network topology specifications and application interface design. For the Deployment, Monitoring and Management phase, there is no process described in this study because the focus of this study is the analysis and design of the SOA architecture not up to the development of the system. The process carried out in this research is up to the Implementation stage, but at this stage the researcher is limited to the proposal of server specifications, network topology specifications and application interface design for PT AKT.

1.3.6 Arsitektur SOA
15 - SOA Solution Stack Layers Details

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 4.26 describes the subprocess of realization, namely SOA solution stack layers:
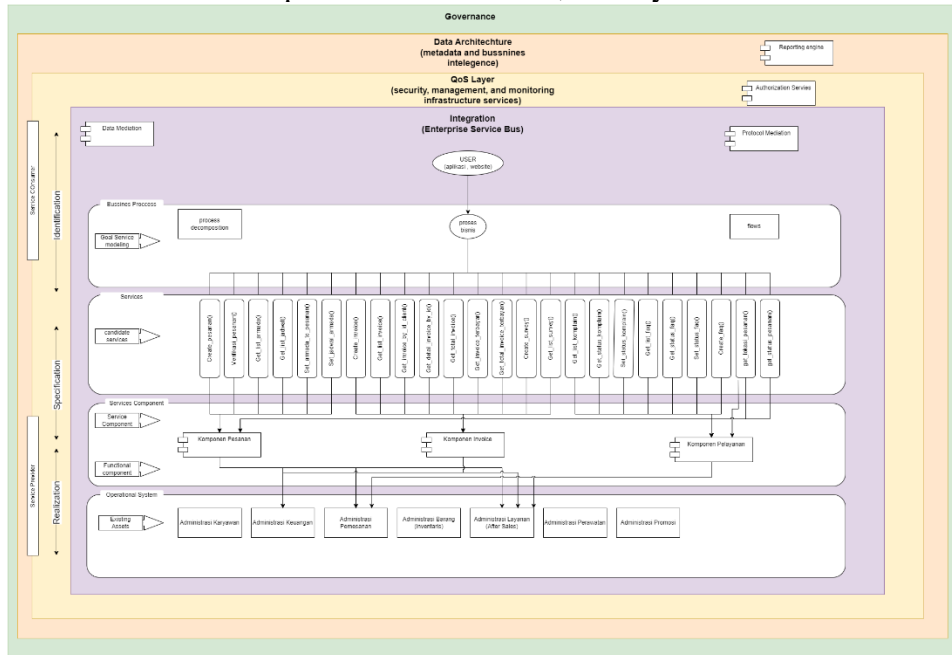
Figure 4. 10 Inteltiation of SOA architecture reference for PT AKT

The following is an explanation of Figure 4.27:

a.   Data Architecture Layer

At the data architecture layer, it describes the recommended database design to meet the needs in accordance with SOA. This layer will contain the database configuration used for SOA (Sumampouw, 2016).

b.   Quality of Service (QOS) layer

At the QOS layer, it provides an explanation of security and service infrastructure. Such as authorization for access to this service like what and the firewall used for system security is used.

c.   Integration Layer

The integration layer describes how data and system integration can run and function. In SOA, it is used using Enterprise Serial Bus for integration.

1.3.7 Implementation

At this implementation stage, suggestions are determined for the hardware and software infrastructure used to support the running of the system with the implementation of SOA at PT AKT. The following will be described detailed specifications for application servers in table 4.5

Table 4. 6 Server Specification Suggestions

System	Technology	Database	Webserver	Specifications
AKT System	• Web Based • PHP 7.2	MySql	• Apache • CentOS	• RAM 4GB • SSD 50GB

	• Framework codeiginter		7.9.	• Intel Xeon(R) 2.00 GHz * 2
AKT System 2	• Web Based • PHP 7.2 • Framework codeiginter	MySql	• Apache • CentOS 7.9.	• RAM 4GB • SSD 50GB • Intel Xeon(R) 2.00 GHz * 2
AKT System 3	• Web Based • PHP 7.2 • Framework codeiginter	MySql	• Apache • CentOS 7.9.	• RAM 4GB • SSD 50GB • Intel Xeon(R) 2.00 GHz * 2
Enterprise Serial Bus	• Web Based • PHP 7.2 • Framework codeiginter • REST API (JSON)	MySql	• Apache • CentOS 7.9.	• RAM 8GB • SSD 50GB • Intel Xeon(R) 2.00 GHz * 2

In addition to specifications for servers, there are also hardware specifications used by PT AKT to later access all existing systems on the hosting server. In table 4.6 we will describe the hardware specifications as follows:

Table 4. 7 PT AKT Hardware Specification Suggestions

Application	Server Specifications
AKT System	• Windows 10 • Intel i5 13 2.GHz • RAM 8GB • SSD 256GB

For system access on hosting, PT AKT needs a network topology, which is useful for system access and services that exist and have been provided, this topology explains that users will connect to the internet through a router (Wijayanto, 2014). The existing router will connect to the internet which when connected to the internet will connect to the ESB server to carry out the process that will be connected to the AKT 1 system, AKT 2 system and AKT 3 system according to data and service needs. Figure 4.28 describes a network topology, as follows:
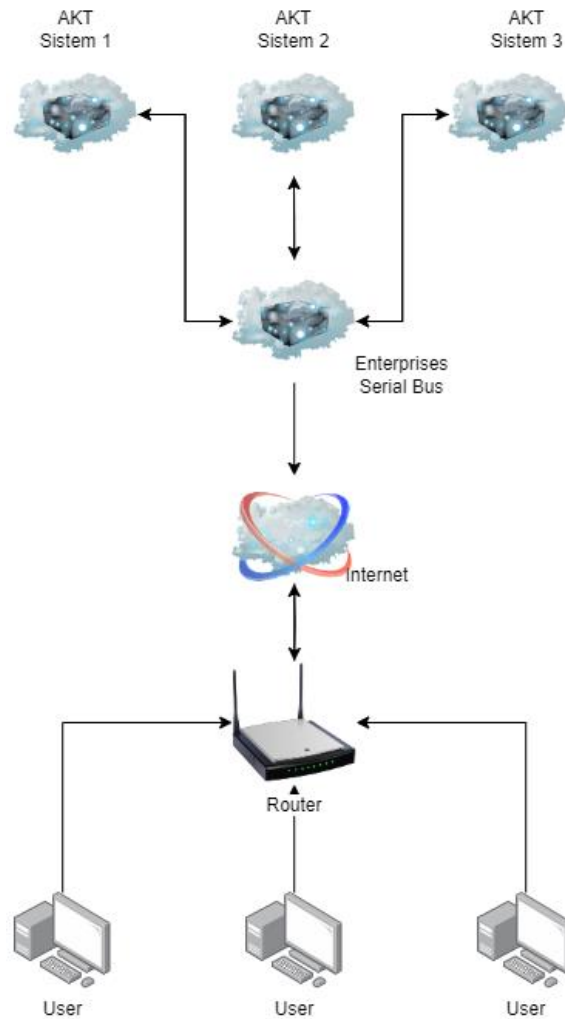
Figure 4. 11 Network Topologies

In this research, an interface design (UI) was also produced which was suggested for system development at PT AKT in the future. Here is the proposed interface (UI) design:
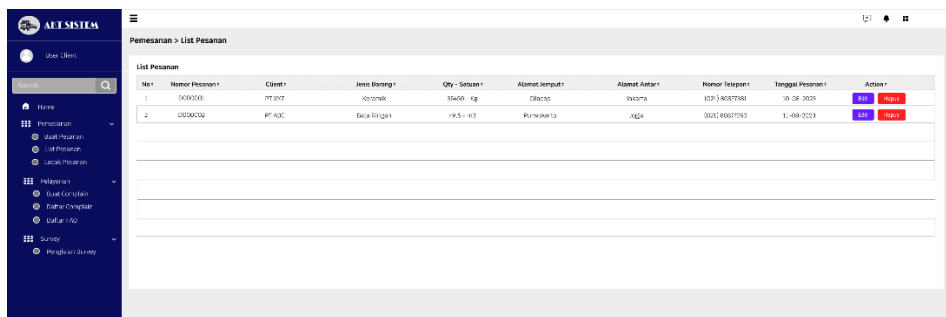
Figure 4. 12 Proposed Client List Order Design

In figure 4.28 it is explained that the design of the display is useful for clients to monitor orders that have been made.
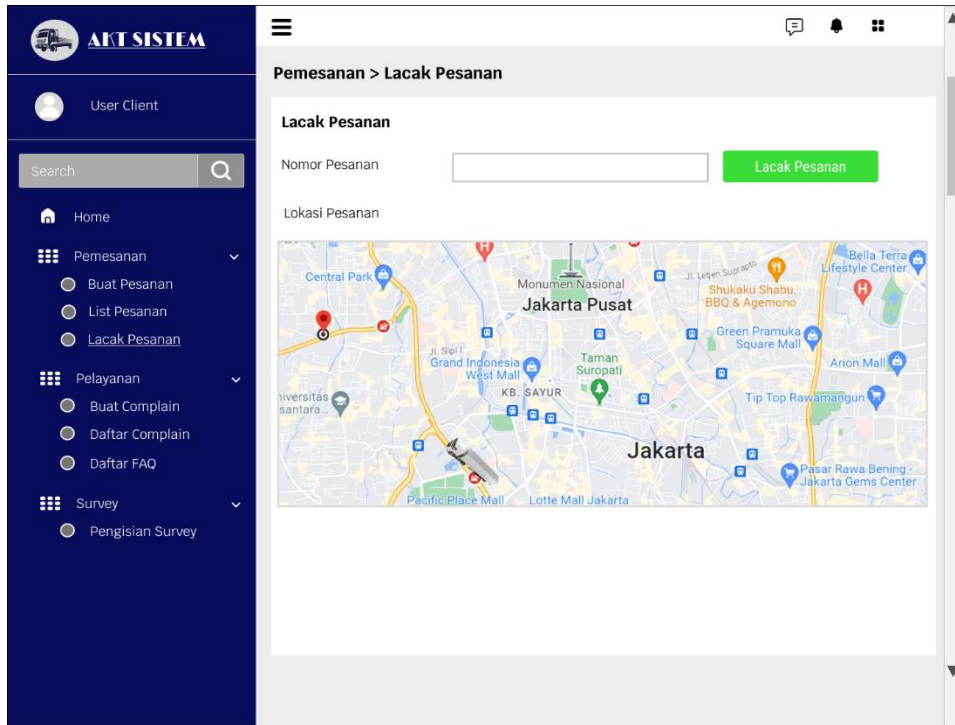
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Figure 4. 13 Order Track Client Design Proposals

In figure 4.29 it is explained that clinet can track existing orders by entering the existing order number and later the last location of the order will appear.
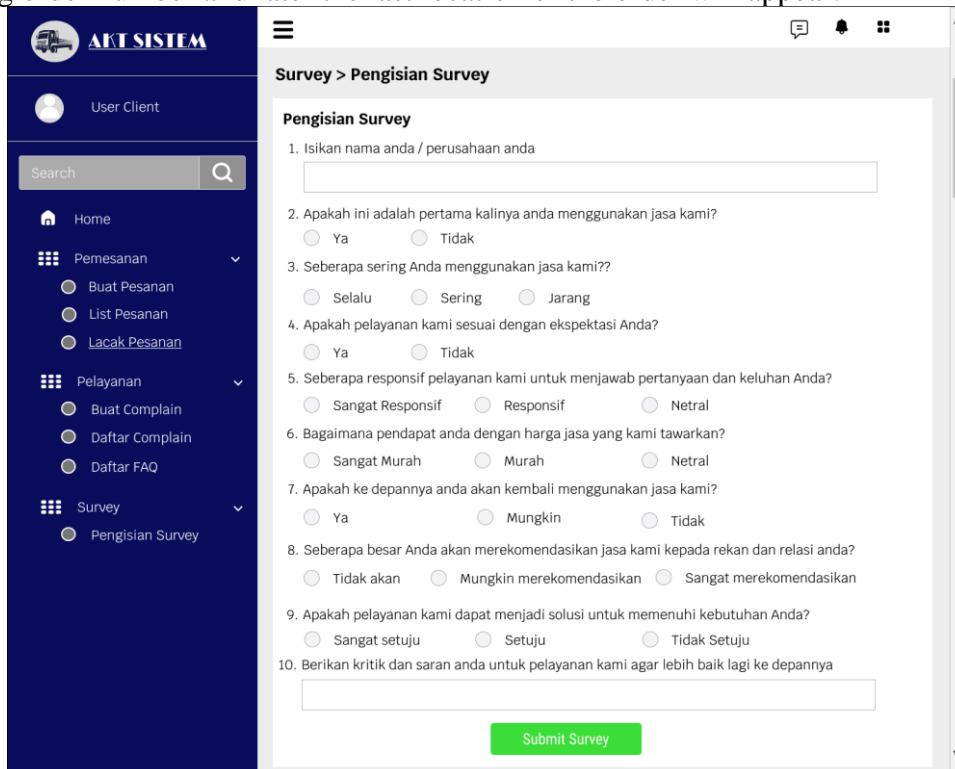
Figure 4. 14 Proposed Client Design Survey Filling

Figure 4.30 explains that the client can conduct a survey provided by PT AKT, where this survey will be useful for evaluation at PT AKT to make the guidelines better in the future.
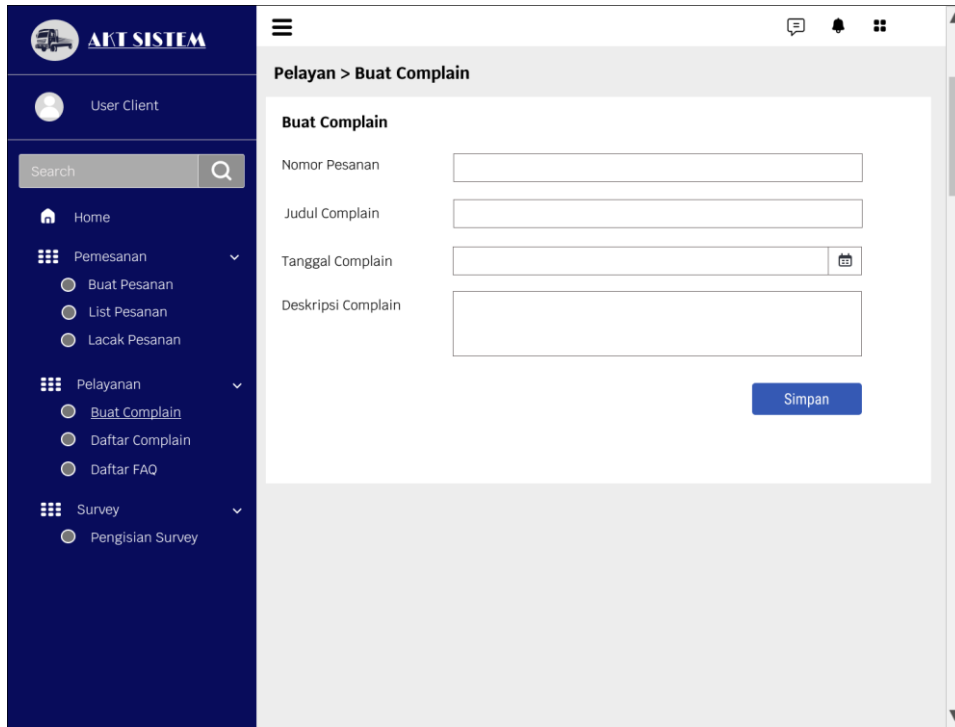
Figure 4. 15 Client Design Proposals for Complaints

Figure 4.31 explains the process of making a complaint, where if there is an obstacle, the client can make a complaint to PT AKT to get a solution.
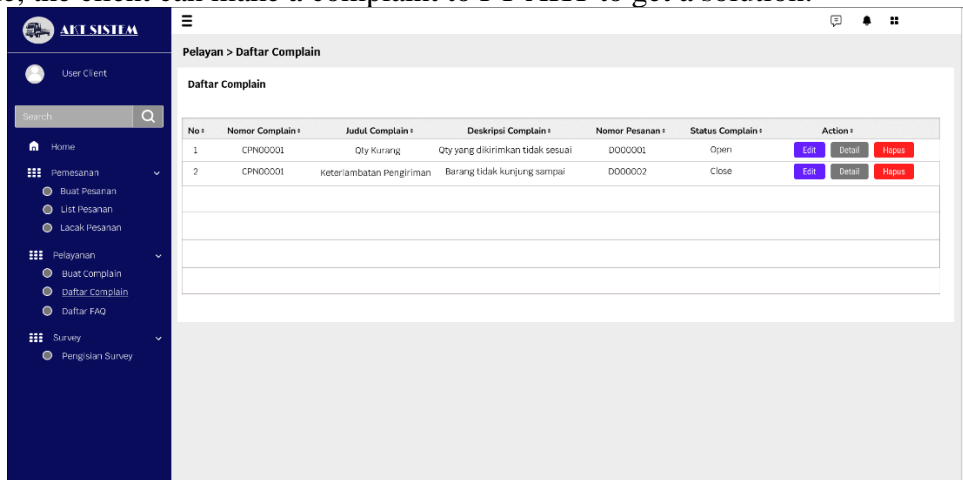
Figure 4. 16 Proposed Client Design List of Complaints

Figure 4.32 explains that every complaint that has been made can be monitored with a list of complaint data.

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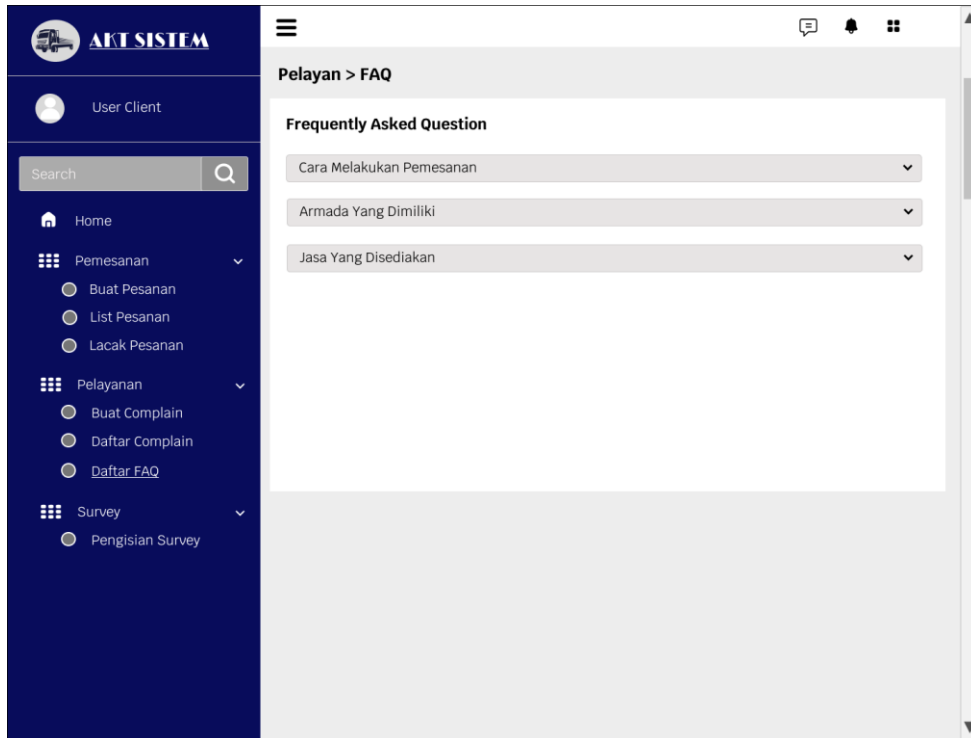
Figure 4. 17 Proposed Client FAQ Design

Figure 4.33 explains that the display design is made to display FAQs, so when clients are about problems, they can read the existing FAQs that are expected to provide solutions. But if it is considered less than optimal, it can be directed to a complaint.
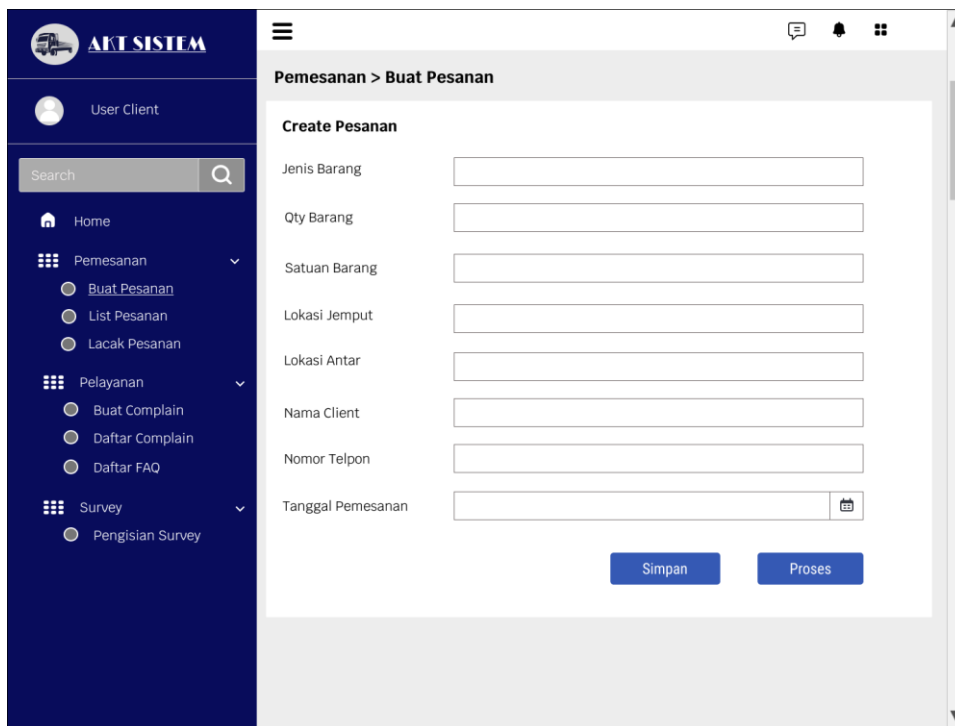
Figure 4. 18 Client Design Proposals Create Orders

In figure 4.34 it is explained that the design that is made useful for clients to order services to PT AKT by filling in the existing fields for verification needs by the PT AKT admin.
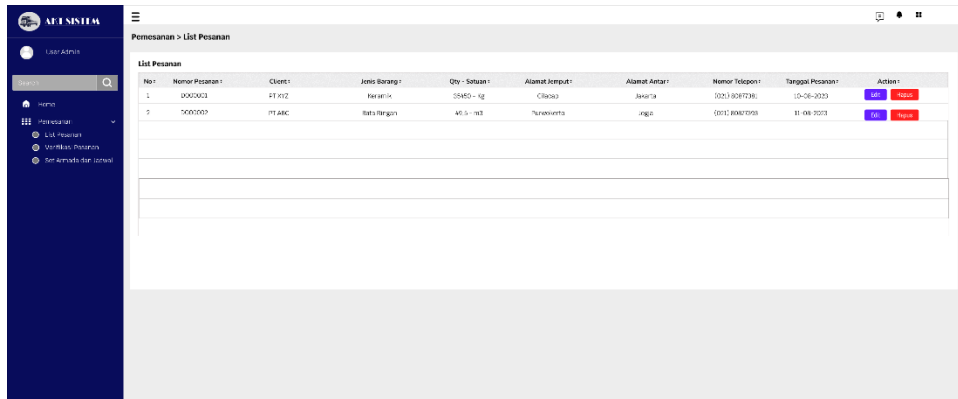
Figure 4. 19 System Admin Design Proposal 1 Order List

In figure 4.35 it is explained that the admin of system 1 can monitor order data from clients with a list of orders from incoming clients.
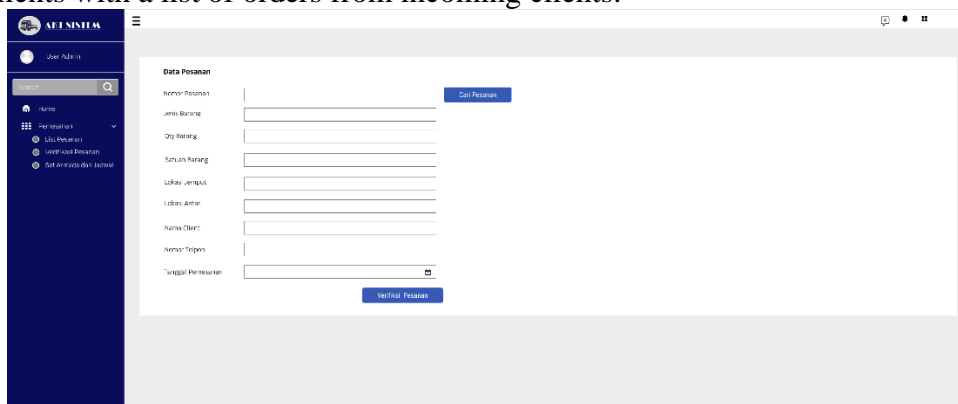
Figure 4. 20 System Admin Design Proposal 1 Order Verification

Figure 4.36 is a process of verifying orders that have been made by the client. This process must be in place because every order must be verified for the correctness of the data entered.
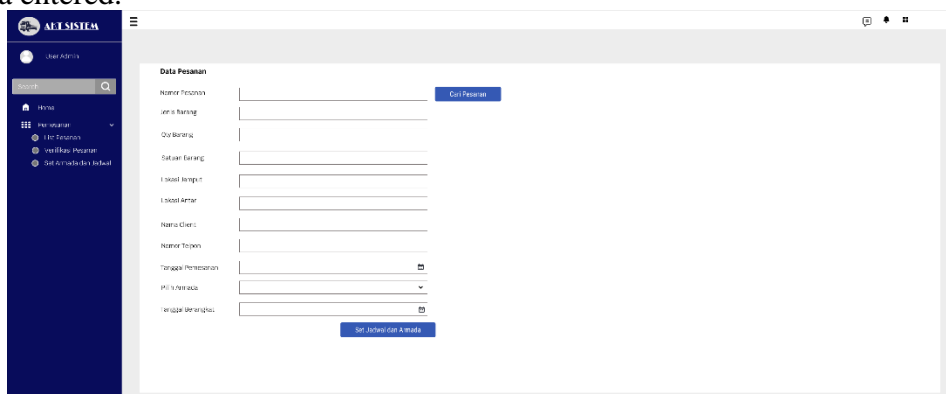

Figure 4. 21 System Admin Design Proposal 1 Fleet Set and Order schedule

In figure 4.37 is a follow-up process of order verification, where the order after being verified and can be processed, a schedule and fleet selection will be carried out that is suitable for delivery / retrieval of ordered goods.
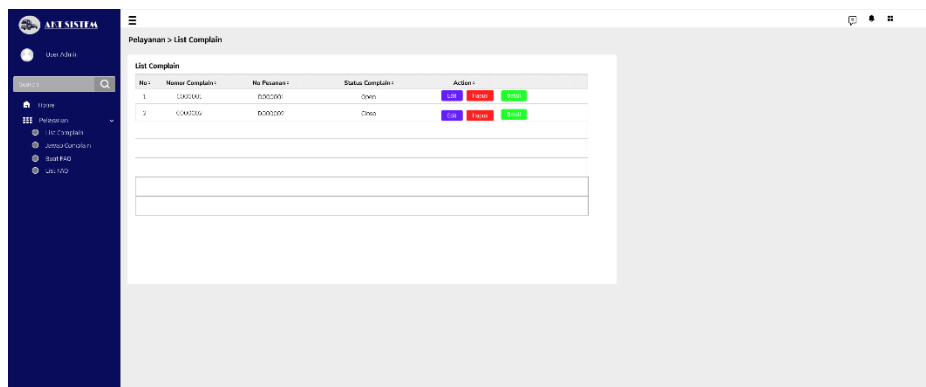
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Figure 4. 22 System Admin Design Proposal 2 List Complain

Figure 4.38 explains that the design is useful for displaying existing complaint data made by clients and for interacting with clients.
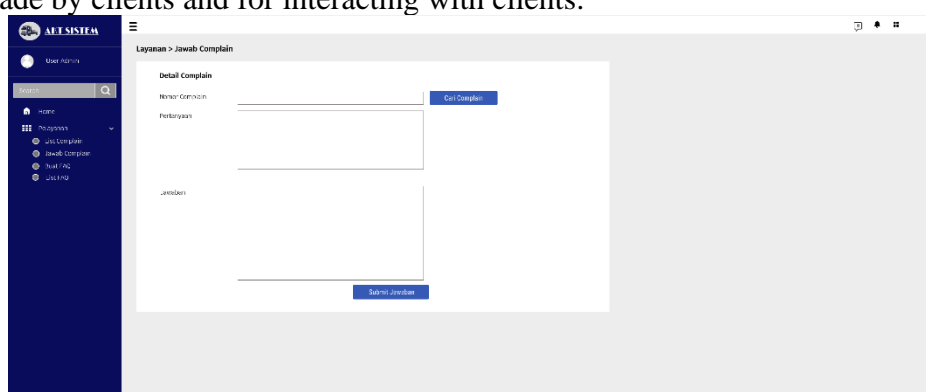

Figure 4. 23 System Admin Design Proposal 2 Detail Complain

In figure 4.39 this design is made to see the details of the complaint, and from this detailed design the admin can answer questions from the client related to incoming complaints so that the client gets new information.
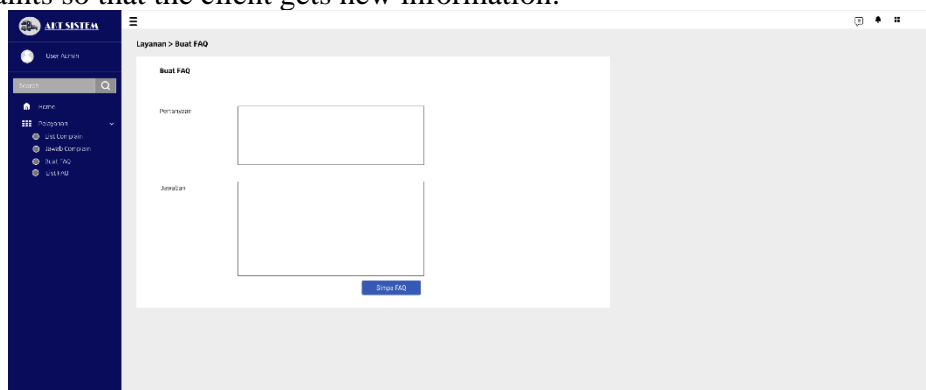

Figure 4. 24 System Admin Design Proposals 2 Create FAQ

In figure 4.40 this is the design used by the admin to make faq data or list faq. This is used before the client makes a complaint will be directed to the FAQ.
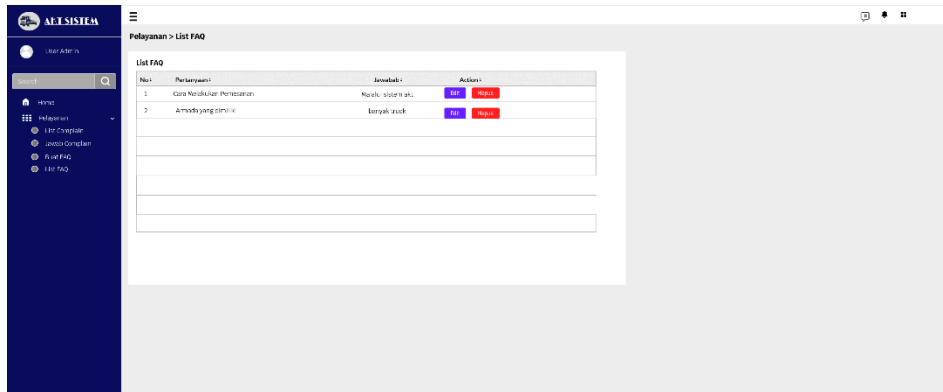
Figure 4. 25 System Admin Design Proposal 2 FAQ List

In figure 4.41 this design is used to see the FAQ list data that has been entered by the admin and can edit or delete the data if the FAQ data is no longer relevant.

Figure 4. 26 System Admin Design Proposal 3 List Invoice

In figure 4.42 it is explained that the admin of system 3 can see and monitor the existing invoice list, and is useful for seeing which ones have been paid or not.
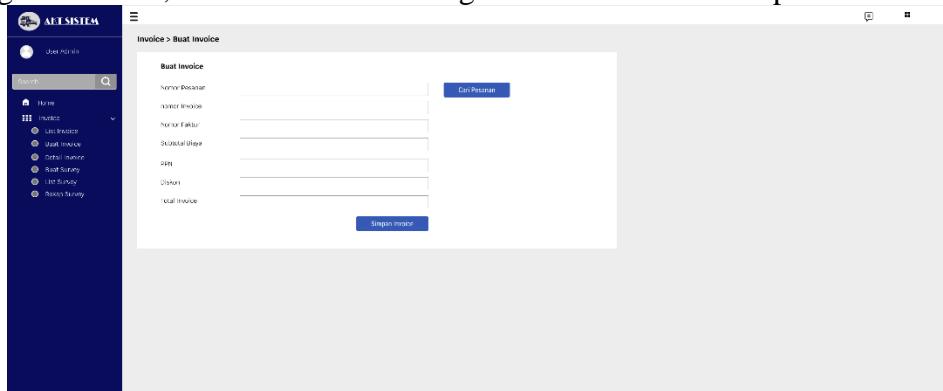

Figure 4. 27 System Admin Design Proposal 3 Create Invoice

Figure 4.43 is a design for invoice generation where this invoice refers to the order number, because each invoice is stated then the order must be completed.
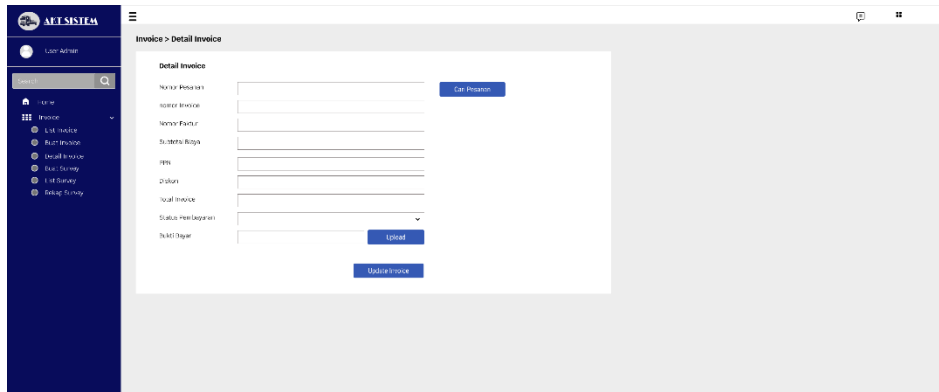
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Figure 4. 28 System Admin Design Proposal 3 Invoice Details

In figure 4.44 explains that this design is to see the details of the invoice, in addition to the details of the admin akt system can update the payment of existing invoices. Verify this payment by uploading proof of payment provided by the client.
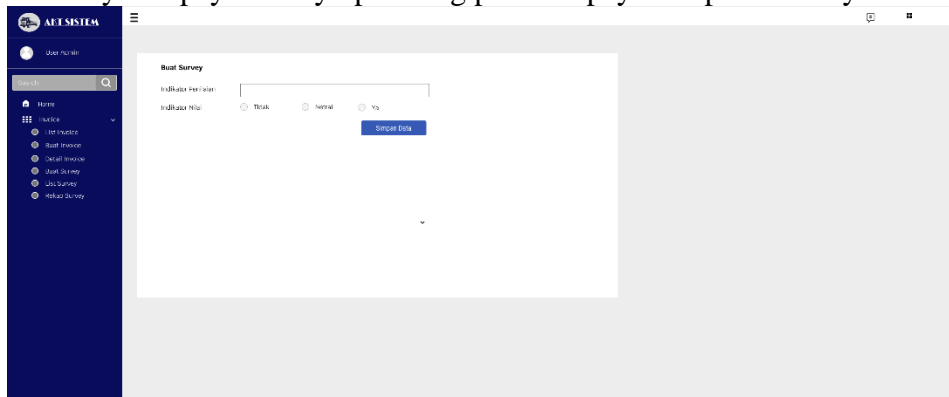

Figure 4. 29 System Admin Design Proposals 3 Create a Survey

In figure 4.45 is a menu design for creating survey data, where this survey data is made to be given to the client when PT AKT has completed the order from the client.
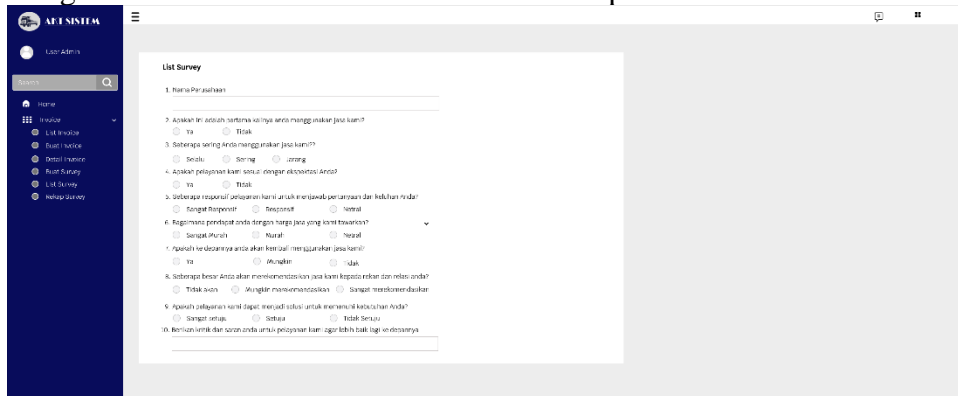

Figure 4. 30 System Admin Design Proposal 3 List Survey

In figure 4.46 is a survey menu list design that has been created and inputted by the admin of system 3.

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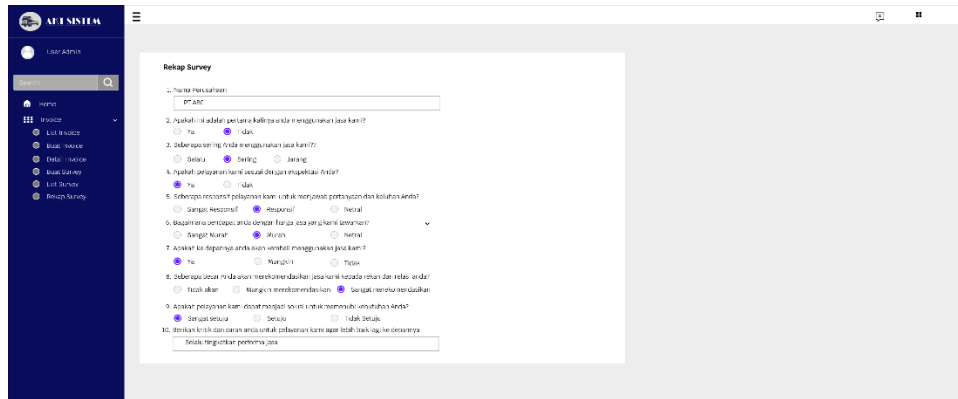

Figure 4. 31 System Admin Design Proposal 3 Survey Recap

In figure 4.47 is an existing design useful to see the results of client satisfaction with the services that have been provided by PT AKT to clients. The results of this survey recap can also be used as a thing that can make encouragement to better serve clients.

Conclusion

Based on the results of research at PT AKT, a service oriented architecture (SOA) design was produced using service oriented modelling and architechture (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

Fajar, A. N., & Shofi, I. M. (2016). Pendekatan Service Oriented Architecture (Soa) Untuk Merespon Perubahan User Requirement Aplikasi E-government. JURNAL TEKNIK INFORMATIKA, 9(2).

Gita, G. (2010). Implementasi Web Service untuk Mendukung Interoperabilitas pada Aplikasi E-commerce. Industrial Electronics Seminar.

Gunawan, Y. (2019). Service-Oriented Architecture Untuk Aplikasi E-Procurement Dengan Metode Soma PT PLN Persero. Bina Insani ICT Journal, 6(2), 65–74.

Hantana, J. S. P. (2013). Pendekatan Service Oriented Architecture (SOA) Pada Pelaksanaan E-Government di Kementerian Hukum dan HAM RI. Jurnal Nasional Pendidikan Teknik Informatika: JANAPATI, 2(3), 254–260.

Hendri, H. (2017). Analisis value chain di industri otomotif. Penelitian Dan Aplikasi Sistem Dan Teknik Industri, 11(1), 55–65.

Hizviani, N. V. (2020). Teknologi Service Oriented Architecture sebagai jalur Komunikasi Data untuk penghubung Sistem lain dengan Aplikasi Datawarehouse KTP el. Jurnal Esensi Infokom: Jurnal Esensi Sistem Informasi Dan Sistem Komputer, 4(1), 25–28.

Iskandar, I., & Jannah, N. (n.d.). ANALISA SERVICE ORIENTED ARCHITECTURE (SOA) MENGGUNAKAN WEB SERVICE UNTUK PENJADWALAN MUBALLIGH PADA IKMI DAN DDI. SITEKIN: Jurnal Sains, Teknologi Dan Industri, 11(1), 48–54.

Intan Setya Palupi, Husni Satra Mihardja, Habibullah Akbar,
Gerry Firmansyah

Muslih, M., & Hasanah, M. I. (2019). Penerapan Service Oriented Architecture (Soa) Guna Meningkatkan Pelayanan Monitoring Mahasiswa Beasiswa Di Perguruan Tinggi Berbasis Web Service. Jurnal Tekno Insentif, 13(2), 52–61.

Qori'Rahmawati Pertiwi, R. A., & Anjarwani, S. E. (n.d.). Rancang Bangun Service Oriented Architecture (SOA) Pada Sekolah Menengah Kejuruan Negeri (SMKN) 1 Selong.

Savana, A. D., Hediyanto, U. Y. K. S., & Saputra, M. (2020). Perancangan Sistem Erp Purchasing Tender Management Pada Smart Ukm Dengan Metode Service Oriented Architecture. EProceedings of Engineering, 7(2).

Sumampouw, M. G. (2016). Implementasi Metode Hasil Modifikasi Metode Soa Thomas Erl Dan Soma Untuk Pembangunan Aplikasi Berbasis Layanan Web (Studi Kasus: Kebun Tebu Di Lampung). Widya Teknik, 15(2), 80–87.

Van Eck, N. J., & Waltman, L. (2016). VOSviewer Manual: Version 1.6. 5. Universiteit Leiden.

Warkim, W., & Sensuse, D. I. (2017). Model Integrasi Sistem dengan Pendekatan Metode Service Oriented Architecture dan Model View Controller pada Pusat Penelitian Perkembangan Iptek Lembaga Ilmu Pengetahuan Indonesia. Jurnal Teknik Informatika Dan Sistem Informasi, 3(1).

Wijayanto, A. W. (2014). Service oriented architecture design using soma for optimizing public satisfaction in government agency: Case study: Bpn-national land authority of Indonesia. 2014 International Conference on ICT for Smart Society (ICISS), 49–55.