

# Designing Service Oriented Modelling Architecture in Customer Service Management at the Catholic Church of the Archdiocese of Jakarta



Kristianto, Gunawan Wang

**Abstract:** The role of information technology today is increasing in the sector of modern people's lives. The development of this information technology needs to be responded to by the Catholic Church by updating the IT system, in accordance to the motto "Ecclesia semper Reformanda" (the church must continue to update itself). In this spirit, the Catholic Church of the Archdiocese of Jakarta (KAJ Church) seeks to respond to the changing times with the applications that are easy for devotees in the ministry. However, the existing applications operate separately (not integrated), therefore it is very difficult for data to provide in real time, duplicate data and create application silos, and causes services for customers to be hampered. As the result, IT groups find it difficult to support the speed of change required by the organization due to the relatively long application development process with the continued dependency between each application silo. Therefore, the right solution is needed for some of the above problems to improve the system and architecture of different platforms and databases (interconnection between applications). To make it easier for organizations to adapt the changes, especially in bringing together the management of applications and facilitating the process of developing systems going forward, the KAJ Church needs to implement a Service Oriented Architecture (SOA)-based system with a wealth of applications. This update was done with the implementation of Service Oriented Modelling Architecture (SOMA) methodology, especially customer service management implementation. The implementation of SOMA is necessary to facilitate organizations to adapt changes, especially to integrate existing applications and to develop systems in the future. SOMA methodology represents a high level view work process that starts from the data collection process, the ongoing business process, the issues found in the field, the proposed solutions, to the process of implementing the selected solution until the implementation stage. The implementation of SOMA is not only limited to cost and energy savings from application development efforts, but ultimately the realization of an organization that is able to quickly adapt the business processes in it in order to be able to respond to the latest market demands.

The goal is for KAJ church to provide better Customer Services, be more accurate, effective and efficient and able to help donors to provide appropriate assistance funds.

**Keywords:** SOA, SOMA, Customer Service Management, KAJ Church, technology architecture, services.

## I. INTRODUCTION

Advances in information technology today impact the progress of an organization, including the Catholic Church that must also update itself. The Catholic Church of the Archdiocese of Jakarta (KAJ Church) seeks to respond to this advancement of information technology by making updates in the structure and system information of the people's services. KAJ Church organization has 8 departments/areas of service covering a wide range of products, including: services planning, research of people's needs, procurement of service services for small churches/parishes, up to ministry of the people. The related entities in the activity include many things, both internal and external, therefore, the service process within the KAJ Church is quite complex. In order to facilitate the people/customer to get good service, the KAJ Church made 4 applications to serve the needs of the people. The application include the system of a database people of Catholics known as BIDUK (Basis Integrasi Data Umat Katolik) built since 2016, Application of financial and property management of the Church called PELITA (Program Elektronik Akuntansi), application of strategic plan and e-budgeting called SAPA (Sistem Aplikasi Program Karya Pelayanan dan Anggaran) operating since the beginning of 2019, and BAKKAT (Badan Amal Kasih Katolik) which is an application that manages the assistance fund for socio-economic needs for pre-prosperous people in Indonesia. The dream in the future of KAJ Church can be present to serve the people effectively and efficiently with the presence of applications that exist to reach the needs of the people in real time. But the statement in the current field is different: The service is performed based on a database that is out-of-date or less valid so that the service is not on target. Redundant or duplicated people's data and the unconnected data interactions between applications make it difficult for the Church to provide targeted services. Each application runs separately without being able to adapt to the market needs process in order to be able to answer the latest market demands for better service.

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With 4 existing applications and the absence of continuity between one application and another it makes it difficult to transfer data between applications until there is an application silo in service management.

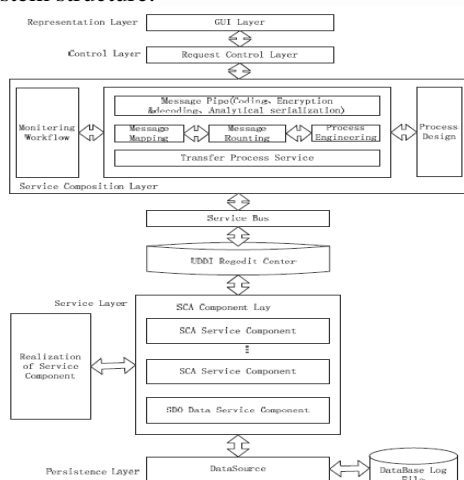
These application silos occur because the departments of one department do not share the same priorities, objectives or even the same data, so that each department operates as an individual business unit or entity within the organization.

Seeing the problem, KAJ Church needs the right solution, namely the application of Service Oriented Architecture (SOA). The implementation of SOA/SOMA architecture is one of the most relevant choices of architecture solutions because it is able to integrate separate applications into silos by implementing service concepts so that it will facilitate implementation without much change to the business processes that are running. Another reason is that KAJ Church already has a very large and important existing database application namely Biduk, and other applications namely Sapa, Pelita, and Bakkat. Indeed, what SOMA promises is not only limited to cost and energy savings from application development efforts, but ultimately the realization of an organization that is able to quickly adapt the business processes in it in order to be able to answer the demands of the current market and also in the situation of covid-19 pandemic that demands everything digital. So the implementation of SOMA architecture is the most appropriate solution.

## II. LITERATURE REVIEW

### A. Implementation SOA Design in PHMS

Based on a paper written by Zhang Yimin, Song ping, Sun Qi [1] with the title "Design of Public Health Management System Based on SOA Architecture", they proposed the design of PHMS (Public Health Management System) with SOA architecture. Their research is the design of SOA architecture designed to be professional real time workstation and user oriented. The importance of their SOA is to combine the SOA architecture model with the background of the system and the business to design the public health structure model of the management system. SOA design represents and describes the relationship of each layer and module function of the system structure.



**Figure 1.1: System Structure Function Module (PHMS)**

Based on figure 1.1 the SOA Design in the paper, there are 5 Layers and several module functions to be applied. These layers include:

#### 1. Presentation Layer

This layer is intended for users who can directly operate the application. This layer will give you the calculation process. Based on their paper this layer is the purpose of obtaining the accusation data and passing it on to the business component logic service through the appropriate control layer.

#### 2. Control Layer

This layer provides a Service entrance that carries the data and the data process is collected or processed to the next layer of service composition.

#### 3. Service Composition Layer

Based on their paper, some complex business processes that need to be changed are incorporated into this layer. This layer provides encryption information from the control layer, and transfers the message results to the appropriate business process instance

#### 4. Service Layer

According to the SOA Service specification, the layer defines the appropriate service component, which relates to particular business logic. This layer includes service components and a simple combination of service components, and primarily provides a special layer of business logic from JSONRPC services and web service processing systems based on SCA component technology.

#### 5. Persistence Layer

Provides all the access database components and specific implementations of web services, and defines the strategy of accessing the database and how to handle system log file issues, etc.

#### 6. System function modules

Based on their paper, they analyze the background of the system and combine it with actual business needs, PHMS can be divided into eight sections: basic information management, population health archive management, child health care management, women's health management, vaccination management, chronic disease management, death registration management, health education management.

### B. SOA Implementation in WBHBS

The implementation of SOA design has been researched and analyzed by several people in several domains, this domain discusses a paper containing Service Oriented Architecture in Web Base Home Banking System (WBHBS). Based on a letter sheet that has been likened by A. Appandairaj and Dr. S. Murugappan [2] to the title "Service Oriented Architecture Design For Web-Based Home Banking Systems With Cloud-Based Services", they design and develop devices into services using SOA principles.

They also decided to model SOA singles that would exist in the banking system with the aim of energetic redundancy, inflexibility, and non-efficient in the process in the banking system.

In their paper, they design the service with 4 basic applications that each application has different functions and each other.

The 4 basic applications are Bank Enterprise System (system for payment), Customer Tenant Organization, multi-channel, New Account Application. Figure 1.2 will describe the SOA design in WBHBS.

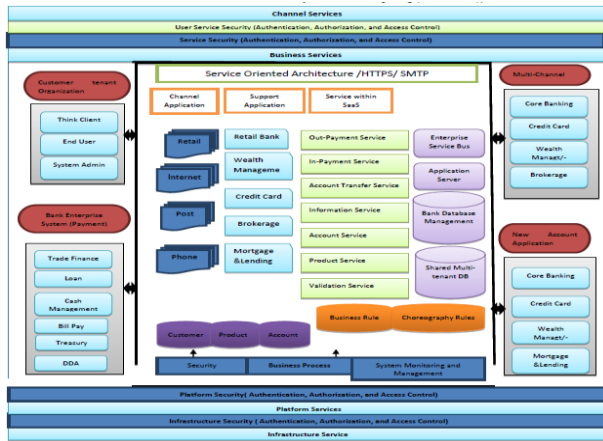


Figure 1.2: SOA design in WBHBS

Based on their paper, they argue that the banking sector should implement a consistent model for regulating, providing, and operating activities across all layers. This includes provisioning not only on the infrastructure side, but also all the components and services needed to improve bank services. According to their paper, the SOA design at WBHBS has 4 basic applications that are integrated with each other and have 5 services such as:

#### 1. Infrastructure Layer

It includes servers, storage, and networks, both inside and outside the banking services for data centers. Many banks are building internal Cloud IT infrastructure. This layer is often called IaaS.

#### 2. Platform Service

It provides an application and tool hosting environment, middleware technology, development frameworks and tools, and standards applied to specific business services.

#### 3. Business Service

It provides core Bank services such as corporate and retail banking, wealth management, Treasury management, risk management and compliance, trading.

#### 4. Channel Service

This service supports various channels that can be connected to WBHBS such as ATM, branch, Call Center, mail, Mobile online, etc. Customized service per channel, built on a dedicated channel technology stack with several existing channels through intermediary technology.

#### 5. Security Service

This service provides critical needs for security, privacy, and control in a cloud environment. For applications that require a lower level of security and control, a public cloud may be sufficient. According to their paper, a more stringent level of security is controlled with the private cloud. For more sensitive banking sector service applications, they use a higher level of privacy and control, and maintain their security at existing security.

### III. PROBLEM DEFINITION

In order to analyze the problems in KAJ church, we interviewed and observed of the parties who are in contact with the business process. Among the things by the KAJ Church is the management and development of information systems that are difficult in the heart so that some

departments. To solve the root of the problem, we analyzed Ishikawa fishbone method. As for the analysis as follows:

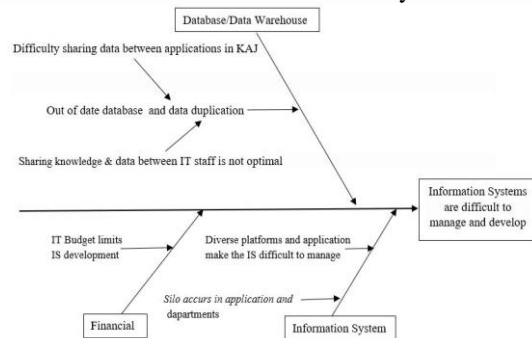


Figure 1.3: Ishikawa analysis of fishbone method

Many applications owned by KAJ church causes silo problems that occur in the management of the ministry and its department. Therefore, the right solution is needed for the above problems to improve the system and architecture against different platforms. To make it easier for organizations to adapt to changes, especially in bringing application management together, the KAJ Church needs to implement a Service Oriented Architecture (SOA) based system. SOA is an architecture model that supports service orientation that focuses on architecture models, service orientation, services as well as features that stand out in SOA. Indeed, what SOA promises is not only limited to cost and energy savings from application development efforts, but ultimately the realization of an organization that is able to quickly adapt the business processes in it in order to be able to answer the latest market demands [3]. With its implementation, SOA can easily bridge the understanding of business processes into information system technology and connect various application components in KAJ church. The organization's priority in implementing SOA is Customer Service Management, whose purpose the KAJ Church wants to provide better, accurate and informative service functions and help donors to be able to channel aid funds (on target) to pre-prosperous families so that they can live decent lives and get a good education.

#### A. Problem Solution

Looking at the situation and conditions that exist in KAJ church organization there are actually several solutions that could be proposed for existing problems. These solutions are the implementation of ERP and the implementation of SOA/SOMA architecture. But for now the KAJ Church Institute does not have an ERP application that can meet its business needs. In addition, the implementation of ERP also has a high risk because it causes BPR (Business Process Reengineering) which requires considerable costs accompanied by a relatively long implementation time. The implementation of SOA/SOMA architecture is one of the most relevant choices of architecture solutions because it is able to integrate separate applications into silos by implementing service concepts so that it will facilitate implementation without much change to the business processes that are running. Another reason is that KAJ Church already has a very large and important existing database application namely Biduk, and other applications namely Sapa, Pelita, and Bakkat.



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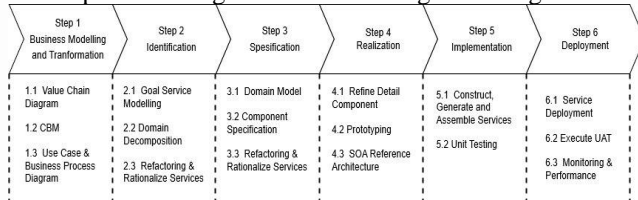
Indeed, what SOMA promises is not only limited to cost and energy savings from application development efforts, but ultimately the realization of an organization that is able to quickly adapt the business processes in it in order to be able to answer the demands of the current market and also in the situation of covid-19 pandemic that demands everything digital. So the implementation of SOMA architecture is the most appropriate solution.

Indicator	ERP / ETL	SOA/SOMA
Focus	Data Integration	Application Integration
Primary Tecnologies	Database	Application
Data	Historical	Transactional
Validation	Strong data validation	Limited Data Validation
Flexibility	no	yes
Cost	Expensive (Software Lisence)	Cheap (Existing application)
Investment	Short-term	Long-term

**Figure 1.4: Comparison between ERP/ETL and SOA/SOMA**

## B. Methodology

The purpose of this research is to design Service Oriented Modeling Architecture on Customer Service Management in KAJ Church. The design methodology to be used is SOMA (Service Oriented Modeling and Architecture) methodology for analysis and design. SOMA is a software development lifecycle method to develop a solution from a business problem using the concept of SOA. SOMA will go through 6 stages starting from defining the ongoing business process to the deployment and monitoring stage which will be spelled out below [4]. However, in this study was not carried out phase 6 (Deployment), this study was carried out until stage 5 that is until Unit Testing. From the 6 SOMA stages mentioned above can be mapped with the details of each stage into an overall picture or high level view through the image below:



**Figure 1.5: SOMA High Level View**

The 6 stages of SOMA that will be implemented consist of:

### 1. Business modeling and transformation

At this stage the business architecture and business model are defined in detail by the form of business roadmap transformation. This stage plays an important role in the early stages of SOMA's methodology.

### 2. Identification

At this stage identification of services, components, flows, and information is carried out. The selection of top-down or bottom-up analysis becomes an important part of the next stage of work.

### 3. Specification

At this stage the service, flow, information and components begin to be specified and analyzed against the existing subsystem. Downsizing services are done further.

### 4. Realization

At this stage the components are detailed and formed, as well as how the details of the planning and technical level of performance are decided and begin to be explored further.

### 5. Implementation

At this stage the service - service began to be established and a unit test was carried out against each service. Tests of its integration system are carried out.

### 6. Deployment, Monitoring, and Management

At this stage the results of the service are arranged and grouped to be deployed. Monitoring and performance settings on deployment results will also be performed.

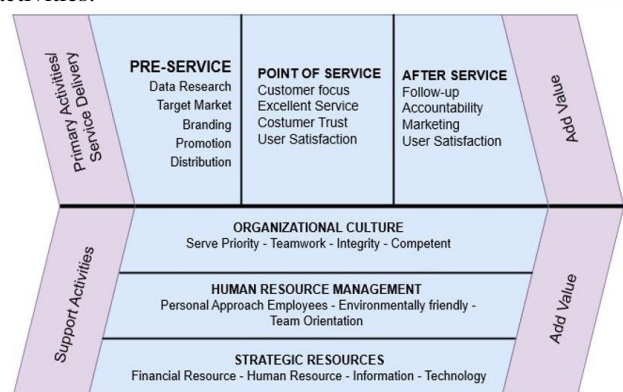
## IV. RESULT AND DISCUSSION

### A. Step 1: Business Modeling and Transformation

The first step of SOMA is Business Modeling and Transformation, at this stage we identify existing business architecture and models and transformation plans. The business processes that run will be modeled, simulated, optimized, and identified [5]. The results consist of a Value Chain Diagram study describing business processes from KAJ Church, Component Business Model describing hot areas of business processes, and Use Case and Business Process Diagrams describe the stage details of business processes that are in the hot areas outside before.

#### A.1 Value Chain Diagram

Value Chain Diagram adopts from the view of Value Chain according to Michael Porter. According to Porter, Value Chain is a collection of activities carried out by an organization to generate value to customers [6]. Porter uses the point of view of the system, how each input is processed so as to produce the output that the customer expects and needs. Porter divides the activity into two groups, namely primary activities and supporting activities. Primary activities are activities that physically produce goods and services, along with sales, maintenance and support in the production process of such goods and services. Supporting activities are activities that support the implementation of primary activities.



**Figure 1.6: Value Chain Diagram of KAJ Church**

KAJ Church service to the people is basically to provide superior values to customers / people. The superior value is the satisfaction and loyalty of the people to the service giver. To be able to create that superior value, KAJ Church needs a series of value chains as shown in Figure 1.6.

From the Value Chain Diagram there are three main activities in the provision of KAJ church service, namely Pre-service, Point of service, and After-service.

#### A.2 Component Business Model

Component Business Model (CBM) becomes an important part that will show the hot area of the business process section that will describe the scale of business priorities be it internal components or external components of a set of business components [7]. CBM's hot area determination involves the Board of Management and IT Manager of KAJ Church which is matched with the organizational strategy namely TICA (Teamwork, Integrity, Competent, and Accountable).

Customer Service is a front-end application owned by KAJ Church which is an important factor in providing services to people supported by IT architecture that supports process dynamics and business needs more flexibly and quickly. Customer service data service with IT assistance is the focus of solving existing problems with a clear strategy. The business components with the hot area of the KAJ Church are described in detail in the image below.



Figure 1.7: Component of Business Model of KAJ Church

Based on the CBM diagram above, the role of Customer Relationship and Information Technology becomes the focus in this writing. This is based on the KAJ church organization's strategy to increase the value of Customer Satisfaction and Brand supported by increasing the value of ANP (Analytic Network Process) and EV (Enterprise Value) in providing services to hundred thousands of people.

Level	Name	Description
Competency	Customer Relationship	As a bridge between the company and the people/customers connected to products and information related to Biduk and Bakkat.
	Information Technology	Providing services both in terms of hardware and software to support the organizational and operational interests of KAJ church organizations.
Business Component	Provider Services	Provide information based on products and data related to Catholic Family Card (Biduk's database) accurately and in real time.
	Application / Architecture Maintenance / Development	Providing applications in a flexible architecture, so as to minimize the cost and time required within the SDLC

Figure 1.8: Description CBM of KAJ Church

#### A.3 Business Process Diagram (BPD)

BPD describe the various activity flows in the system that are being designed how each flow begins, what decisions may occur, and how they end.

BPD starts with a contact made by the customer to customer service either by telephone, fax, or email. The

customer service will input the information data provided by the customer is an information inquiry.

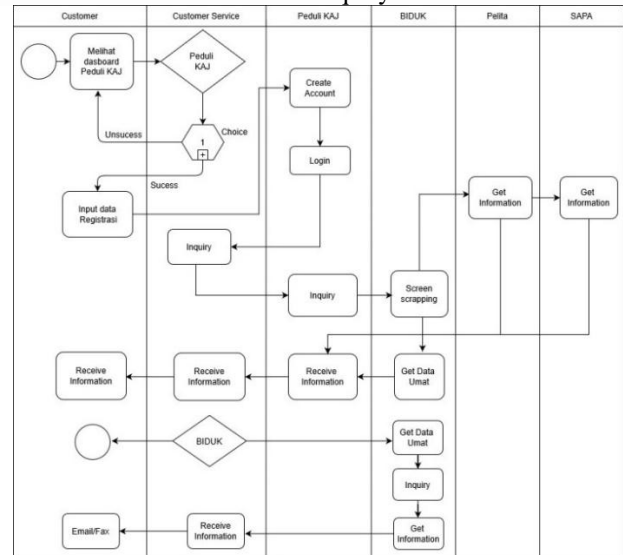


Figure 1.9: BPD Customer Service Inquiry on Peduli KAJ

If the necessary information is in the form of an inquiry then customer service will check if the information needed comes from Peduli KAJ, Biduk or other applications. If the application is Biduk, then the user will open Peduli KAJ application to connect to Biduk application for screen scrapping process to obtain data. If the required data comes from Sapa and Pelita applications, then the user will directly access the Sapa application to obtain the data.

#### A.4 Use Case Diagram on Peduli KAJ

At this stage Peduli KAJ application will be interpreted into a Use Case Diagram (USD) that describes what activities users can do inside peduli KAJ application. The details of the use case diagram description in Peduli KAJ application are as follows:

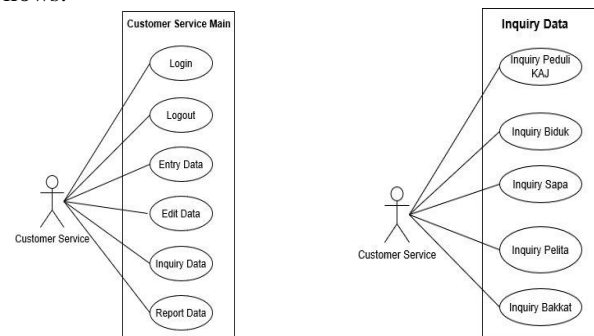


Figure 1.10: Customer Service Main USD & Customer Service Inquiry USD

#### B. Step 2: Identification

The identification stage is the stage to form the main fundamental of SOA namely services. At this stage through the establishment of Goal Service Modeling, the SOA development process conflates on the creation of services, continues to the Domain Decomposition stage to identify the process to be created, and continues to service identification for mapping processes into services to be built into this research.

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## B.1 Goal Service Modeling

Based on the Goal Service Modeling (GSM) that has been designed, the goal of KAJ church can be determined is how the organization is able to provide maximum service to customers related to the accuracy and speed of data as a provider of information from customers while increasing it flexibility in dealing with the dynamics of changing lives of digital people [8].

GOAL	KPI	METRIC
Improving service to customers related to data	Increase data availability from H-3 to online real time data	Comparison of data accessed/provided with data in the master database
Increase the flexibility of IT development that needs to be done in connection with changes in organizational dynamics	Minimizing human resource needs for development process up to 20%	Number of human resources needed to develop in SDLC

Figure 1.11: GSM on Customer Service Management

## B.2 Domain Decomposition

Process Decomposition is one of the important processes in the design of SOMA. At this stage, decomposition will be performed against the pre-defined (Business Process and Transformation). Each business process will be decomposed to produce a service component to be used.

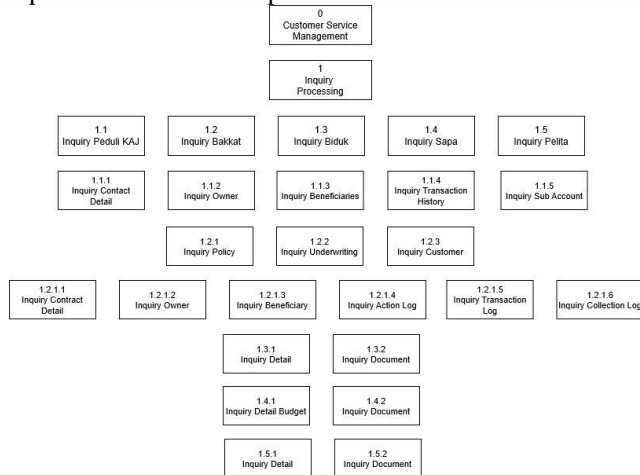


Figure 1.12: Process Decomposition on Customer Service Management (CSM)

## B.3 Refactoring and Rationalize Services

This stage is the final stage of the identification process that serves to define any services from the information needed by the Peduli KAJ application which will later form a service portfolio.

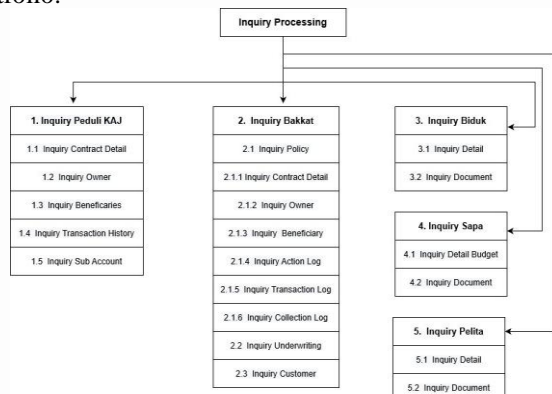


Figure 1.13: Service Identification on CSM

Services identified above will be layered into the service layer in SOA References Architecture which at a later stage will form a component layer.

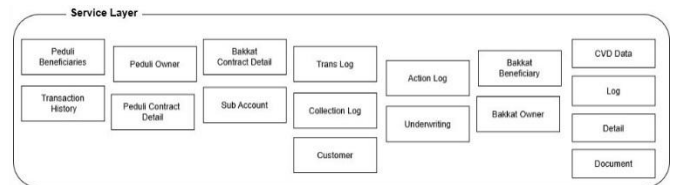


Figure 1.14: Service Layer on SOA Reference Architecture

## C. Step 3: Specification

The results of this stage include the composition of services as well as the design of the architecture of the data exchange process between silos. This stage is divided into 2 main stages namely Domain Model for object services content mapping and Component Specification for component mapping in each of the main applications and the use of services by those components.

### C.1 Domain Model

Domain model is a conceptual model of a system that will describe the relationship between entities that are in a system. Through the model domain, a structural design of the system will be built. Model domain details are described in 4 main applications that support providing data into Peduli KAJ applications, such as Bakkat, Biduk, Sapa, and Pelita.

#### 1. Domain Model Bakkat

The domain model of Bakkat application consists of several inquiry details such as inquiry beneficiary, inquiry contract detail, inquiry owner, inquiry insured, inquiry transaction log, sub account inquiry, and AVG Balance inquiry. The domain depiction of the Bakkat model is as follows:

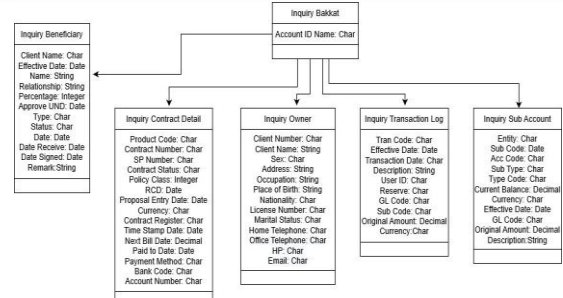


Figure 1.15: Domain Model Inquiry Bakkat

#### 2. Domain Model Biduk

The domain model of the Biduk application consists of Biduk inquiry, inquiry document, and Biduk inquiry details. The description of the Biduk model domain is as follows:

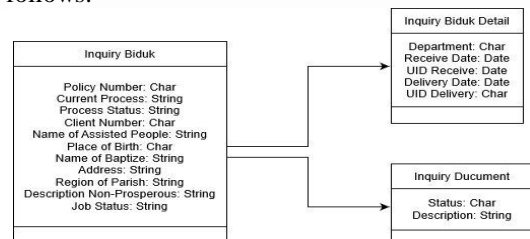


Figure 1.16: Domain Model Inquiry Biduk

#### 3. Domain Model Sapa

The model domain of Sapa application consists of sapa inquiry, budget detail inquiry, and sapa detail inquiry. The description of the Sapa model domain is as follows:



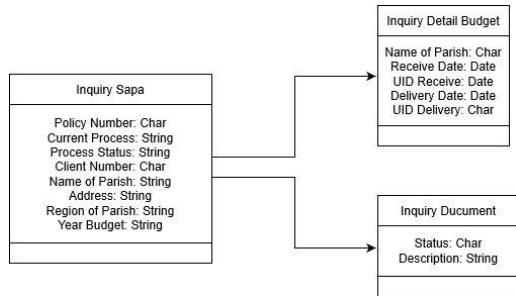


Figure 1.17: Domain Model Inquiry Sapa

#### 4. Domain Model Pelita

The model domain of Pelita application consists of pelita inquiry, pelita inquiry detail, and pelita document inquiry. The description of the Pelita model domain is as follows:

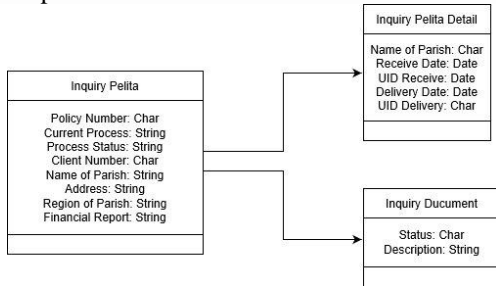


Figure 1.18: Domain Model Inquiry Pelita

#### C.2 Component Specification

At this stage the steps are software components, each of which explains the need for implementation, realization, or operation within the services. Therefore, this step is often referred to as a service component. The services component describes the definition of the service, both in the function and the quality of the services.

#### C.3 Refactoring and Rationalize Services

The Refactoring and Rationalize Services stage is the final stage of the specification stage which will then form the services connected according to the component in more detail based on the specification stage that has been done in the previous stage:

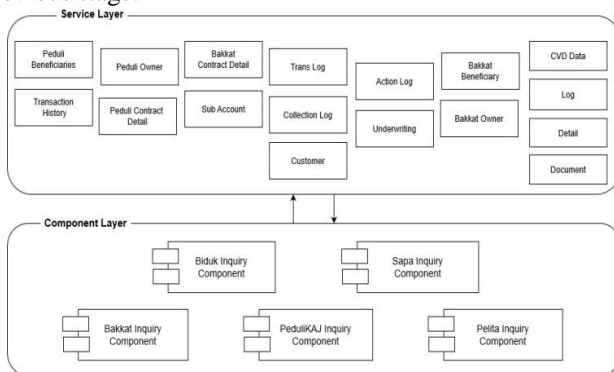


Figure 1.19: Component Layer on SOA Reference Architecture

#### D. Step 4: Realization

The Realization stage plays a role in defining or connecting pre-defined services with components to be implemented in the implementations depicted in the SOA References Architecture.

SOA Reference Architecture will describe in detail each layer of architecture formed to be applied during implementation.

#### D.1 Refine Detail Component

The Refine Detail Component stage is a step of defining the components to be used in services and connected with the service layer and business process layer until it forms a related unity starting from the business process layer, component layer, and also service layer, as described as follows:

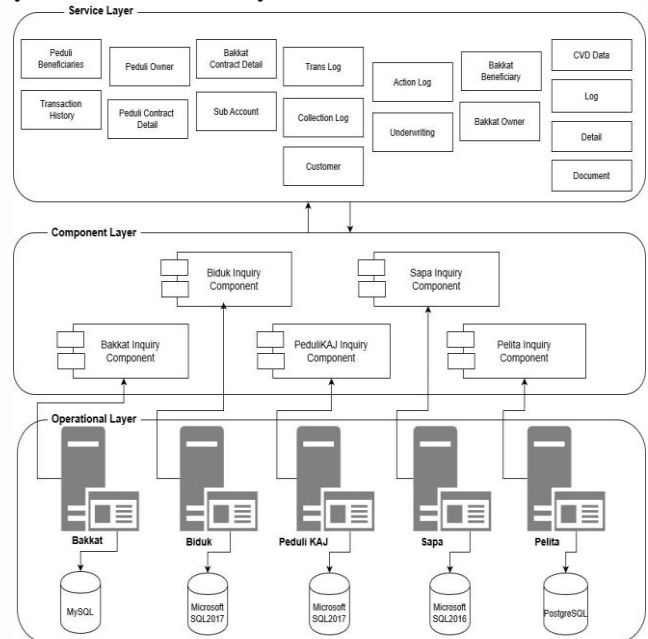


Figure 1.20: Basic Layer relationships in SOA Reference Architecture

#### D.2 Prototyping

At the Prototyping stage we make the initial formation of prototypes that will be used in the design of SOA which includes the establishment of services that will be used along with testing services based on pre-defined services in the form of web services .ASMXML (WDSL). Next this service deployment will form a new data flow diagram in the KAJ Church with a web server intermediary, with the following description:

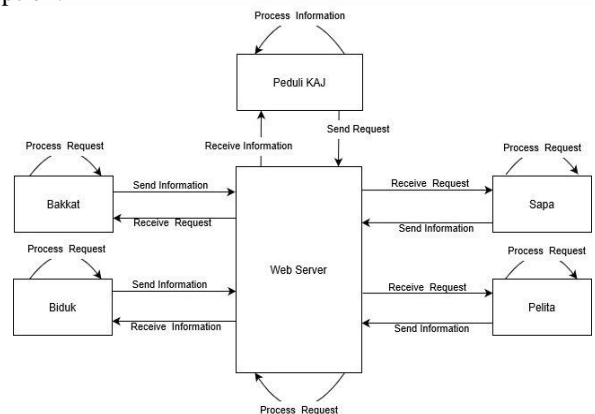
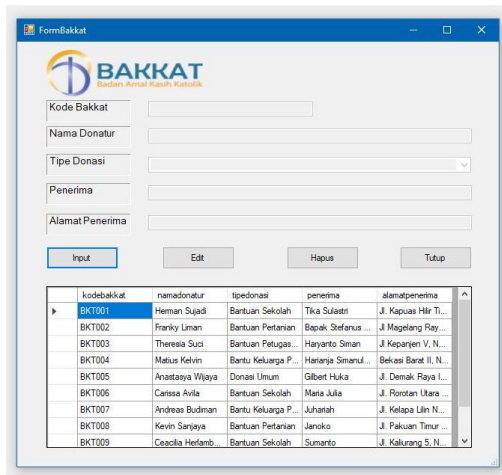


Figure 1.21: Data Flow Chart

#### Yii Platform Services (Baktat)

Yii Platform Services will use web services that are ready to be used by anyone by using the name id of Baktat donors. After the invoke process, the system will return an XML File that will be established with the third party IBM Client Access ISeries for Windows.

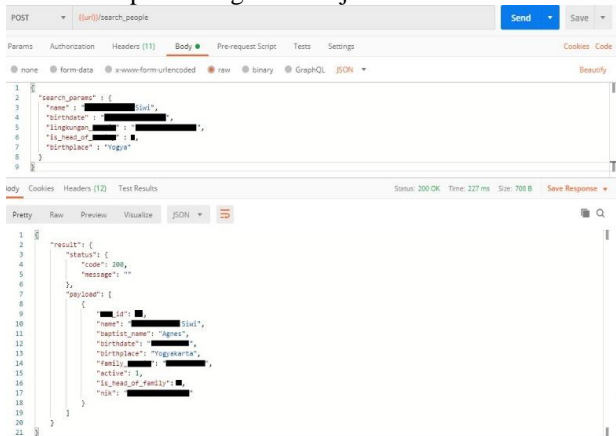
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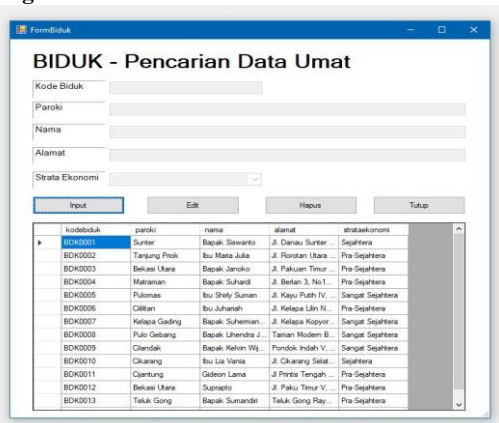
**Figure 1.22: Prototyping Inquiry Bakkat**

Net 2015 Platform Services (Biduk)

Net 2015 Platform used by Biduk application, Services will use soap toolkit intermediary to be able to read and use service result processing DLL Object into XML File.



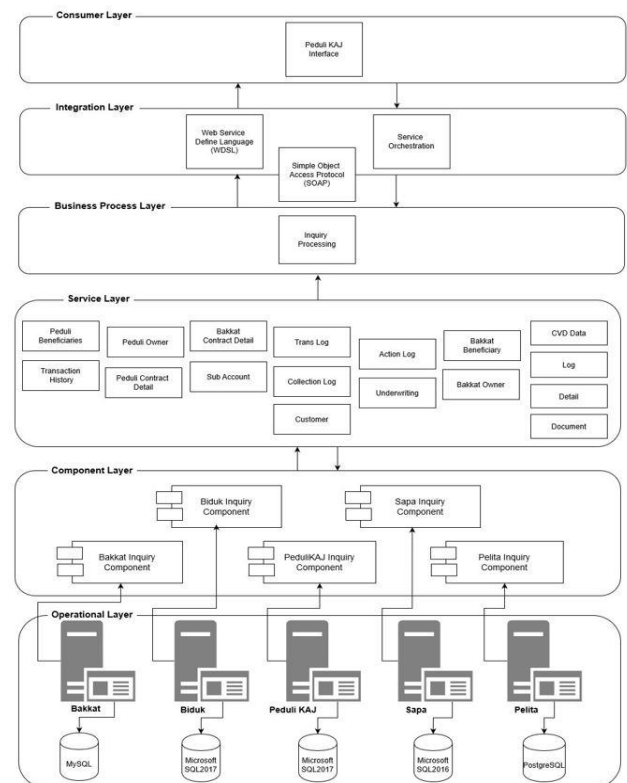
**Figure 1.23: Invoke Web Service Biduk**



**Figure 1.24: Prototyping Inquiry Biduk**

## D.3 SOA Reference Architecture

SOA Reference Architecture basically consists of 6 main layers consisting of consumer layer, integration layer, business process layer, service layer, component layer and operational layer. The image below will describe the proposed SOA Reference Architecture overview of the inquiry process by implementing an SOA tailored to customer service management business processes in KAJ Church:



**Figure 1.25: SOA Reference Architecture on KAJ Church**

## E. Step 5: Implementation

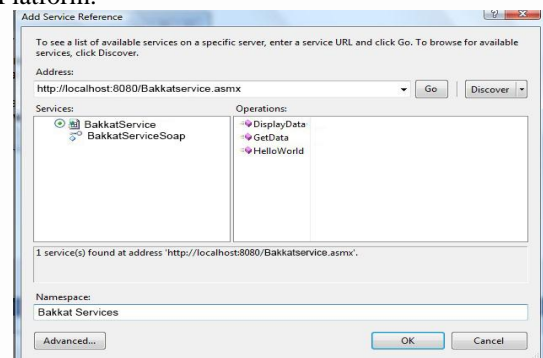
The implementation phase of services is built from the previous specification stage, which is divided into 3 main parts of this thesis namely web services for Yii framework access with MySQL database, web services for Net Access 2015 Platform with MicrosoftSQL database and web services for VB6 access with MicrosoftSQL databases.

### E.1 Construct, Generate and Assemble Services

This stage is the process of forming web services that will be used in accordance with the design of SOA Reference Architecture on each platform.

Web Service Bakkat with .Net Platform

.Net Platform web services to be used for Bakkat applications built on top of ASMX/.Net Platform with SQL Connection String. Application development uses Microsoft Visual Studio 2010. Here is an overview of the WSDL formed on the .Net Platform:



**Figure 1.26: Web Services .Net Platform**



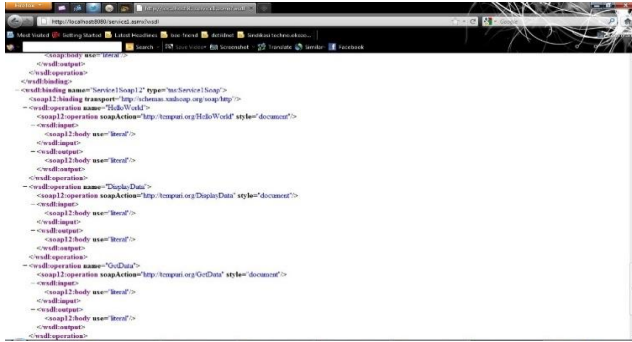


Figure 1.27: Web Services .Net WSDL

#### Web Service Peduli KAJ with VB6

VB6 web services to be used for Peduli KAJ applications are built on top of soap toolkit to generate WSDL with SQL Connection String. Application development uses VB6 and Microsoft Visual Studio 2010. Here is an overview of the WSDL formed in VB6:

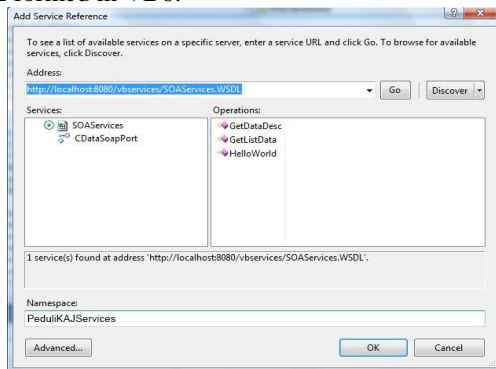


Figure 1.28: Web Services Peduli KAJ with VB6

#### Web Service Biduk with VB6

VB6 web services to be used for Biduk applications are built on top of soap toolkit to generate WSDL with SQL Connection String. Application development uses VB6 and Microsoft Visual Studio 2010. Here is an overview of the WSDL formed in VB6:

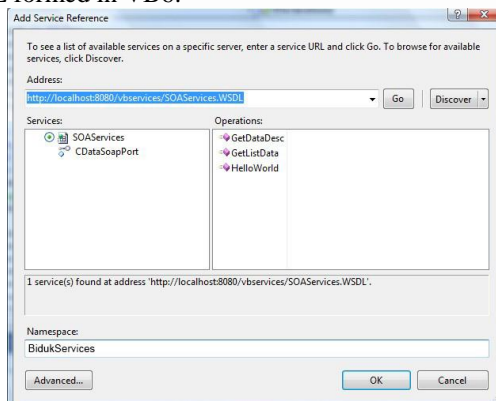


Figure 1.29: Web Services Biduk with VB6



Figure 1.30: Web Services Biduk with VB6 WSDL

#### E.2 Unit Testing

In order to see the success of this SOA design, a form of measurement was made of soa design implementation results made with the comparison between the old system and the SOA system on the server development /testing where it is expected that there is an acceleration of data withdrawal and application stability. In the previous system there was an old data pull issue on the production server for the .Net Platform system. Measurements are divided into 2 sections such as in the implementation stage, namely testing the .Net platform platform, and VB6. The details of the measurements are as follows:

##### 1. Net Platform

Comparison of 10 Biduk account numbers with each test task in which data withdrawal time is recorded based on database time and technology compared between SOA Web Services and Screen Scrapping on the development/testing server.

No Account	Loading Time (Second)					
	SOA Web Services			Screen Scrapping		
	1	2	3	1	2	3
BDK0013	0.1812	0.1343	0.1093	1.2148825	0.5438785	0.5725036
BDK0027	0.1093	0.1406	0.1093	0.5412534	0.5568785	0.5312534
BDK0035	0.0887	0.0937	0.0937	0.5725036	0.5468785	0.5568785
BDK0126	0.0935	0.0878	0.0781	0.5568785	0.5625036	0.5468785
BDK0048	0.1093	0.0785	0.1105	0.5568785	0.5468785	0.5312534
BDK0085	0.1093	0.0785	0.0875	0.5468785	0.5312534	0.5312534
BDK0064	0.1095	0.0985	0.0925	0.5568785	0.5468785	0.5468785
BDK0118	0.1025	0.0935	0.0885	0.5468785	0.5468785	0.5468785
BDK0007	0.1095	0.1095	0.1205	0.5312534	0.5468785	0.5468785
BDK0059	0.1375	0.1375	0.1275	0.5468785	0.5468785	0.5468785

Figure 1.31: Unit Testing .Net Platform

Seen from figure 1.31 data withdrawal results are better using SOA web services design than the use of technology now applied to KAJ Church.

##### 2. VB6 Platform

Comparisons made to the 10 donor account numbers contained on the VB6 platform and the time of data withdrawal were recorded based on the database time and the stability of data withdrawal became important points, experiments were conducted on server development / testing and each donor number was conducted three experiments.

No Donatur	1	2	3
DNT0034	0.001	0.001	0.001
DNT0027	0.001	0.001	0.001
DNT0012	0.001	0.001	0.001
DNT0018	0.001	0.001	0.001
DNT0006	0.001	0.001	0.001
DNT0009	0.001	0.001	0.001
DNT0021	0.001	0.001	0.001
DNT0015	0.001	0.001	0.001
DNT0026	0.001	0.001	0.001
DNT0017	0.001	0.001	0.001

Figure 1.32: Unit Testing VB6 Platform

Seen from figure 1.32 the results of the data withdrawal are stable and get the maximum results as expected in the KAJ Church.

##### 3. Yii Framework

Comparisons made to the 10 Bakkat account numbers contained on the Yii Framework platform and the time of data withdrawal are recorded based on the database time and the stability of data withdrawal becomes an important point,

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experiments are conducted on server development / testing and each Bakkat account number is conducted three experiments.

No Bakkat	1	2	3
BKT0005	0.007	0.006	0.005
BKT0010	0.001	0.001	0.001
BKT0016	0.001	0.001	0.001
BKT0012	0.008	0.004	0.004
BKT0009	0.005	0.004	0.003
BKT0018	0.001	0.001	0.001
BKT0021	0.001	0.001	0.001
BKT0027	0.001	0.001	0.001
BKT0014	0.001	0.001	0.001
BKT0022	0.001	0.001	0.001

Figure 1.33: Unit Testing Yii Framework Platform

Seen from Figure 1.33 the results of the data withdrawal are stable and get the maximum results as expected in the KAJ Church.

### V. CONCLUSION

This research resulted the design of an online Customer Service Management system built on Service Oriented Modeling Architecture (SOMA) in the form of a prototype Peduli-KAJ application. It is used for donors from Bakkat (a donation program owned by the Indonesian Catholic Church for the poor) to obtain some information about the recipients of money from pre-prosperous families in Indonesia. Customers/donors can get good and effective service from the recommended system with a report on the target/recipient of assistance based on the economic strata and the situation of the area in which the beneficiary lives. The design of SOMA designed to be proposed to the KAJ Church has been built, and from the design results mentioned it can be summed up into the following points:

- The architectural design created based on soma methodology in the research in KAJ Church successfully integrated several related applications (Biduk, Bakkat, Sapa and Pelita) in the current system without making complete application changes and in it also simplification of business processes in the Church organization making it easier for all parties, especially for users/donors.
- These designs include planning the fundamentals of SOMA, such as identifying organizational architectures, shaping new business processes (reengineering), forming Value Chain Diagrams, determining hot areas of business processes tailored to kaj church organizational strategies, determining Goal Service Modelling, and determining the model domain of existing applications.
- The design of architecture in the form of SOA Reference Architecture in KAJ Church is able to provide a real time and accurate data supply process without using H-3 data and this result becomes a target that can be achieved in Goal Service Modelling in order to provide good service to the people / customers of KAJ Church.
- The characteristics and benefits of SOA state that SOA offers ease of management and development of information systems if SOA is successfully implemented properly.

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