Development Of Eunterprise Architecture Information System In Parungkuda Sukabumi Puskesmas District Using Togaf Adm Model

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Abstract

This study aims to design an effective enterprise architecture for the information system of the Community Health Center in Parungkuda District, Sukabumi. Adopting the TOGAF (The Open Group Architecture Framework) and ADM (Architecture Development Method) Architecture Development Process Model, this study will provide systematic steps to design a structured and integrated architecture. Health services at the Community Health Center are one of the technical service units in the management of the Community Health Center. The Community Health Center is one of the government agencies engaged in the field of Health services in its daily life providing health services to the community. The Parungkuda Community Health Center has currently implemented a computer and information system to support its processes. Unfortunately, the availability of information systems as one of the health service facilities that are run is considered less than optimal. The purpose of this study is to design and implement the proposed information system which can later help optimize the health service management process at the Parungkuda Community Health Center. In this study, the TOGAF framework has been proposed as a reference for architectural design. Where TOGAF contains the structure and components of ADM (Architecture Development Method) which represents TOGAF itself and provides details on how to determine an enterprise architecture based on the main needs of the organization. The output produced in using this framework is a blueprint that is used as a reference for the Parungkuda Health Center itself to develop information system technology. Thus, every business process in the Parungkuda Health Center can answer all the visions and missions to be achieved. With the implementation of the health service information system, it is hoped that it can improve health services and efficiency, employees in manipulating service data at the Parungkuda Health Center.

Keywords: Enterprise Architecture Design, Togaf (ADM), Health Center Information System

INTRODUCTION

The development of information technology (IT) and science during the era of globalization has collaborated with many other fields of science and penetrated all fields. IT brings fundamental changes to both private and public organizations. Because the results of human thinking are increasingly advanced and developing rapidly. A good system is a system that is easy to use and very useful. In developing a system, a design is needed which will later be developed to create a system.

An information system is a system that presents information that aims to make a decision and carry out the operational activities of an organization and provide a competitive advantage. The system is formed from the integration of people, information technology and organized procedures. System applications are one part of the information system that is used as a supporting tool for activities in an organization as a tool to facilitate the business process of an organization. Information systems combined with computer technology will produce information technology that is useful and efficient in managing information that is a source of activities in a business process within the organization.

TOGAF (The Open Group Architecture Framework) is a framework designed to help organizations develop, manage, and align enterprise architecture with business strategy. Developed by The Open Group, TOGAF provides systematic guidance and methods through its main components, namely the Architecture Development Method (ADM), which consists of phases such as Preliminary, Architecture Vision, Business Architecture, Information Systems Architecture, and Technology Architecture. In addition, TOGAF includes the Enterprise Continuum to group architectural assets, the Content Framework to document results, and Reference Models as design guidelines. With a flexible and modular approach, TOGAF enables organizations to improve efficiency, consistency, and adaptability to change, while ensuring that technology investments support long-term business goals.

Health centers as an integral part of the health system in a region play an important role in providing public health services. In the era of information technology modernization, it is important for health centers to have an information system that is integrated, measurable, and adaptive to changes in the needs of public health services. Health centers are a health service institution, which provides health services to the community, in implementing their performance requires speed in service and information because every day they provide health services to the community, the number of patients in processing patient data in each of the 2 service sections, the existing system at the Parungkuda Health Center has used computer technology, but not yet comprehensively in its use and application only in some sections. In the service section, there are still many obstacles because the existing system in its use still has shortcomings so that users cannot use the existing system. The obstacles that exist in the system that is running such as in the data processing section which consists of patient data, labs, referrals, drugs, reports, employee data and schedule data. Handling in services that are less effective makes services in the registration section have obstacles, such as slow registration, patient data collection and searching for patient data which contains many patient data documents making it difficult to search for patient data. With the existing problems, the use of a better and more integrated system and computer technology in the service section is very much needed to support needs and facilitate data input, data search, speed up services, and minimize data redundancy.

Enterprise Architecture design is a strategic solution in developing a structured and integrated framework to overcome the complexity of the information system of the Parungkuda sub-district health center. In this context, the use of the TOGAF ADM Model has been identified as an appropriate approach to designing and implementing the right EA.

The Health Center Information System is a system designed to support information management in the Health Center. This system includes various modules, such as electronic medical records, drug inventory management, examination schedules, and reporting. Good integration between modules in the Health Center Information System can improve the efficiency and quality of health services.

RESEARCH METHODS

Parungkuda Health Center, located at street Siliwangi No. 21, Parungkuda District, Sukabumi Regency, West Java, is a regional public service agency (BLUD) that provides various health facilities, including a TB Polyclinic that is open on Tuesdays and Thursdays from 08.00–11.00 and an ultrasound service that is open on Mondays and Wednesdays from 08.00–11.00. This health center is active in community activities, such as the TB screening event for children at the Sakura integrated health post in Sundawenang Village, evaluation of P4K stickers in Langensari Village and Bojongkokosan Village, and external monitoring of PDAM drinking water quality. In an effort to improve health services, Parungkuda Health Center requires a technology-based information system to model and support various operational, administrative, and health service activities in an integrated manner.

In this study, the author applies the TOGAF ADM architecture method for the design needs of the Parungkuda District Health Center Information System, consisting of several stages, namely:

Preliminary Phase, Architecture Vision, Business Architecture, Information Systems Architectures, Technology Architecture, Requirements Management, which will be explained as follows:

1. Preliminary Phase

This phase is the initial stage which is the preparation of enterprise architecture and determines the scope of the architecture to be developed. So the things that must be described include determining the principles as a reference for architecture development (Principal Catalog) and identifying 5W + 1H.

2. Requirement Management

This phase aims to determine the architectural needs in designing the information system of Parungkuda sub-district health center. Stages carried out:

- a) Core Business
- b) Organizational Issue
- c) Business Solution.

3. Architecture Vision

This phase is the initiation phase of the architecture development cycle which includes defining the scope, and submitting approval to start architecture development. The needs that will be explained at this stage include understanding the main key of the architecture vision which contains:

a) Defining the vision and mission.

b) Determining the purpose of making the Parungkuda District Health Center Information System architecture planning.

c) Defining the Organizational Structure and its Duties.

4. Business Architecture

This phase is to analyze current business activities at the Parungkuda District Health Center with the aim of developing a business architecture to support the architectural vision and modeling the desired architecture.

a) Identifying current business activities at the Parungkuda District Health Center

b) Designing the proposed business activity architecture using the usecase model

5. Information System Architecture

This phase discusses the development of data architecture and application architecture as desired and emphasizes how the information system architecture is built including data architecture and application architecture that will be used by the Parungkuda District Health Center.

6. Technology Architecture

This phase is useful for defining the technology architecture to support the required information system architecture. To build a technology architecture, the following stages are needed:

a) Network Architecture

b) Technology platform.

c) Required software and hardware specifications.

RESULTS AND DISCUSSION

1. Preliminary Phase

This stage defines the architectural principles and identification of 5W+1H. The following is Table of Architectural Principles and 5W+1H Identification:

a. Architectural Principles

These principles help in the process of selecting the architecture to be used in system design, as in

Ta	ble 1. Bussines Prosses
Principles of Architecture	Objective
Business Principles	
The architecture created must	ective and efficient.
be in accordance with the	ccordance with applicable regulations and laws.
objectives of business	kimizing enterprise utilization.
activities at the Parungkuda	iness continuity.
Health Center	vice-oriented.
Application Principles	
Ensuring the architectural	With application reliability and ease of use, the
design of the application used	application can increase the activity of business processes.
in Parungkuda Health Center,	
the system must be easy to use	
by users and easy to develop	
the system	
Data Principles	
Data Architecture must be	Data (information as an asset. , data systems must always
Safe and easy to access	be up to date and integrated data. With data management
	according to the job description. As well as ease in
	accessing data.
Technology Principle	
Technology Independence	Can adjust user needs with secure technology security and
	Use software, hardware, and platforms to prevent
	incompatible data

b. 5W+1H Identification

5W + 1H Identification aims to explain objects related to Parungkuda Health Center, can be seen in Table 3.2.

No Identification Object and Description		Object and Description
1	What	Object: Scope of Architecture
		Description: Making Enterprise Architecture Design for
		Puskesmas Patungkuda using
		TOGAF model
2	Who	Object: Who made the Enterprise Architecture Design of
		Terminal Information System?
		Description:
		Employee of Parungkuda Health Center

3	Where	Object: Where was this research conducted?	
		Description: This research was conducted at the	
		Parungkuda Health Center	
4	When	Object: When is the completion time of this design? Description: Project starts in September – November 2024	
5	Why	Object: Why create an Enterprise Architecture Design for Information Systems at the Health Center? Description: The planning of information system architecture is made in order to align the organizational architecture with the needs of the information system being built so as to facilitate every business activity of the organization,	
6	How	Object: How to do the process of designing Enterprise Architecture of Information System in health center? Description: All planning of information system architecture is made using TOGAF framework and ADM as development model.	

2. Management Requirements

a. Core Business (Main Business Activities)

The main business activity at the Parungkuda Health Center is to provide health services regarding health center service information. The application of IS/IT design that can be used as a reference in the implementation of system creation, such as:

- 1) Utilization of information technology can facilitate managers in delivering information.
- 2) Improve services to patients.
- b. Organizational Issues

From the results of observations and analysis of business processes and activities at the Parungkuda Health Center, a picture of the problems in the health center was obtained, these problems are:

- 1) There is no system that helps the health service process such as for registering patients, searching for old patient data, conducting medical records, payment administration, and recording drug intake.
- 2) There is no system for financial management within the Parungkuda Health Center such as for purchasing equipment and health center supplies.
- c. Business Solutions

3.Architecture Vision

a. Definition of Vision and Mission

With the Vision made by the Parungkuda Health Center is "The realization of a healthy and noble Parungkuda sub-district community". The description of the Parungkuda Health Center Mission is:

1) Providing quality, friendly, noble, equitable and affordable health services for the community.

2) Encouraging community independence to behave in a clean and healthy way.

3) Creating a productive, comfortable and environmentally friendly atmosphere.

b. Organizational Objectives

The objectives of achieving the vision and mission at the Parungkuda Health Center have the following objectives, namely increasing access to delivery services carried out by doctors or midwives in order to reduce MMR (Maternal Mortality Rate) and IMR (Infant Mortality Rate) through guaranteed financing for delivery services.

c. Organizational Structure
 The following is the organizational structure at the Parungkuda Health Center. Seen in Figure 3 below.



Figure 1. Organizational Structure

d. Value Chain Analysis

Analyze the entire work process at Parungkuda Health Center using Value Chain analysis which aims to map all work processes that occur in the organization. The activity categories are divided into two, namely main activities and supporting activities, as in Figure 2 below.



Figure 2. Value Chain Analysis

e. Main Activities

The main activities included in the Value Chain analysis, here are the details of the activities: a. Pre-service

- b. Service process
 - Health services, including examination, diagnosis, and treatment.
 - Administrative process, including appointment management, patient registration, and scheduling.

c. Post-service

- Patient monitoring after treatment or examination.
- Patient education to prevent disease and promote a healthy lifestyle.
- f. Supporting Activities

- 1) Health Center Operations This activity includes carrying out the arrangement of the Health facility yard at the Parungkudda Health Center
- 2) Medical Personnel
 - Who are tasked with helping to examine patients according to patient complaints.

4. Business Architecture

a. Proposed Business Activity Architecture The proposed business activities at the Parungkuda Health Center are described using a Use Case diagram as in Figure 3 below.



Figure 3. Proposed Business Activity Use Case

5. Information System Architecture

a. Data Architecture

This stage is the data architecture design stage. The design will be described by the researcher in the form of activity diagram and database design, here is the description:



Figure 4. Login Activity Diagram



Figure 6. Database

The database design in Figure 9 above is used for storing data and relations between tables in the database system. Which will be used by the Parungkuda Health Center management to be able to align the system requirements that will be used later.

b. Application Architecture

The following is a description of the design of the Application catalog for the Parungkuda Health Center Information System design which can be seen in Table 4.

	rable 4. Application Mentecture				
No	Proces	System Features			
1	Management of the health center information system menu is carried out by the Admin/employee.	Providing health services for patients, and for employees of the Paruungkuda Health Center can provide patient medical record data management services, provide drug management services, provide financial management services.			
2	Login	There is a form containing a username and password			

 Table 4. Application Architecture

6. Technology Architecture

a. Network Architecture

Figure 10 below is a picture of the proposed network architecture at the Parungkuda Health Center



Tabel 5. Software spesification

Sofware	Spesifikasi
Ooperating System	Microsoft Windows
Coding	PHP, Xampp
DBMS	MySQL
Web Browser	Google Chrome,
	Mozilla Firefox
Microsoft Officce	2019

Hardware

architecture.

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Figure 7. Network

Tabel 6. Hardware Spesification			
Spesifikasi			
Intel Core i9			
Intel Pentium Dual			
Core 2 GHz			
2 GB			
Mouse, Keyboard			
Monitor LCD			

Results of Enterprise Architecture (EA) Design Blueprint The results of the Parungkuda Health Center enterprise architecture design are in the form of a health service blueprint regarding administrative registration and examination, in addition to producing an information system architecture and technology architecture in order to align the business strategies needed by the Parungkuda Health Center, as in Figure 11 below.



Figure 8. Blue Print

CONCLUSION

The selection of TOGAF ADM as a model for designing a health center information system provides a systematic structure and methodology for developing and designing the architecture. This helps ensure that the entire process is carried out in a structured manner, from understanding needs to implementation. With the design of the service enterprise architecture at the Parungkuda Health Center, it is expected to facilitate the processing of service data in each section such as in the registration section, inputting examination data, prescriptions, drugs, management in reports, data processing. And can minimize the occurrence of data redundancy and can reduce existing problems and can help with problems that occur

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