

# TOGAF ADM Planning Framework for Enterprise Architecture Development Based on Health Minimum Services Standards (HMSS) at Cimahi City Health Office

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**Abstract.** This research aims to develop strategic information system plan and make modeling of priority information system architecture at organization of Cimahi City Health Office. Information system planning by optimizing the role of Information System and Information Technology is an effort to optimize organizational performance and create competitive advantage, which can give more value in context of innovation in public sector which give new color in service delivery to society. Planning begins by defining the main function of business organizations using Value Chain analysis. Company Architecture The TOGAF ADM framework is used to model the information system architecture that has been selected in the planning of information systems, using the six stages of TOGAF-ADM (introduction, architectural vision, business architecture, information systems architecture, technology architecture, opportunities and solutions, 12 indicators Health Minimum Services Standards (HMSS). The research results illustrate that there are eight business functional areas divided into four main business functions and four supporting business functions that will be candidates for information systems. Applications are based on priority interests and their role in the organization and directly affect business processes Health operational information system is a candidate of information system that get prior development priority, because its role in supporting vision and mission of organization

## 1. Introduction

Making the information system without thorough planning in the development of the information system will lead to less optimal information system that will be built [1]. Enterprise architecture planning needs to be done, because the use of enterprise architecture can help unify the development of business processes, reduce complexity, and achieve better alignment [2].

Methods for preparing such enterprise architecture, well known is the Zachman Framework, The Open Group Architecture Framework (TOGAF), Enterprise Architecture Planning (EAP), and the Federal Enterprise Architecture Framework (FEAF). Each enterprise architecture framework has advantages and disadvantages of each.

Zachman framework has advantages in architecture documentation is good, has a good integration between the components of sub-system architecture with a system architecture that is wider [2], received a lot of support tools to visualize, and excelled in explaining the architecture of the system [3], but Zachman framework is a framework static so are less able to respond to changes especially technology. FEAF has the advantage to provide a good integration which ensures that business rules



are consistent across the organization, providing the concept of segmentation to management complexity, as well as have a reference model which is very good, However FEAF has drawbacks one of which there has been no support for the cloud (cloud) [2].

TOGAF can be used to develop a wide range of enterprise architecture, and can be used in conjunction with any other framework that focuses on a particular sector as designed as a generic framework [4], which is appropriate for the characteristics of the design of information systems in this study. However TOGAF has a weakness in the difficulty to use and quite difficult to learn because it is designed as a generic enterprise architecture framework, TOGAF then become very large and complex, presents artifacts that relies needs so that it cannot be used, and require adjustments in its use [5].

Improving the quality of basic services to the community continue to be the government, among others, with the enactment of Law No. 23 of 2014 on Regional Government in Article 18 paragraph (3) states that further provisions regarding the minimum service standards set by government regulation. In response to these needs of the Ministry of Health set a Minimum Service Standards for Health in the District/City by Decree No. 741/Menkes/Per/VII/2008, which was set forth in 2016 by Decree No. 43 Year 2016 on Health Minimum Services Standards (HMSS).

This research will be used as a planning framework TOGAF enterprise architecture based on indicators HMSS considering that TOGAF provides steps in building information systems architecture, as it is designed as a generic framework and have a good alignment between business and technology.

## **2. Methods**

The methodology used is action research conducted in collaboration between researchers with sources in the environment that made the object of research and based on best practice derived from literature to take design of information systems architecture. An initial stage through direct observation, collecting materials related documents and through interviews.

This research was conducted at Cimahi City Health Office for data retrieval. Data obtained from direct observation is the problem, the current state of enterprise architecture is a model state business architecture, application architecture, data architecture, technology architecture and data from interviews. Enterprise architecture framework subsequently been taken from unwilling library referenced by comparing the enterprise architecture framework that is used at this time.

## **3. Results and Discussion**

Based on observations and interviews showed that the application of the HMSS in Cimahi City Health Office has not applied optimally, especially in terms of information for health professionals, patients, and communities.

In making the application of the Information System blueprint HMSS refer to the TOGAF ADM see enterprise architecture within four (4) categories: business architecture, data, applications, and technology. Enterprise architecture planning stage refers to the stage of TOGAF ADM consisting of five (5) phase of activities required in building architectural information systems, among others: architecture vision, business architecture, information systems architecture, technology architecture and the opportunities and solutions. Further explanation of each phase of TOGAF ADM is as follows:

### *3.1. Phase Preliminary Phase*

A preliminary phase of the preparatory phase which aims to confirm the commitment of stakeholders, determination of framework and architectural principles to be used in the development of enterprise architecture. Input from the preliminary phase is a strategic plan while the output of this phase, namely: management commitment, electoral framework architecture and design principles of enterprise architecture. Output preliminary phase, including: management commitment, framework architecture and architecture design guidelines.

### 3.2. Phase Requirement Management

The purpose of the requirement management phase is to provide the processing needs of all phases of the ADM cycle, collect, inventory and identify all the requirements, save and then give it to the relevant phase of TOGAF ADM. References required in this phase include the Health Service Strategic Plan Cimahi, indicator HMSS and Standard Operational Procedure (SOP).

Requirement management phase includes an important phase because it is associated with the strategic plans and policy management. HMSS information system development application must comply with the requirement management to achieve organizational goals

### 3.3. Phase Vision Architecture

The purpose of the phase architecture vision is to ensure that the architectural design to be made in harmony with the needs of the organization. Aspects identified in this phase is the vision and mission, organizational goals, strategic objectives, scope and stakeholders.

### 3.4. Phase Business System Architecture

The purpose of the phase architecture vision is to ensure that the architectural design to be made in harmony with the needs of the organization. Aspects identified in this phase is the vision and mission, organizational goals, strategic objectives, scope and stakeholders (See Table 1).

**Table 1.** Gap analysis business architecture.

No.	Issues	Architecture Current	Method	Architecture Expected
1	Completeness of business architecture	Lack of business architecture for the implementation of the HMSS field of health	Preparation of Standard Operating Procedure (SOP)	The completeness of the business architecture
2	Alignment between the vision of architecture to technology architecture	Lack of alignment between the vision testing to the formation of technology architecture	Evaluation by using architecture	The alignment of the vision of architecture to technology architecture has been tested
3	Still doing manual processing	There are several processes that have not automated	Automation processes with information systems	The processes have been automated

From the gap analysis in table 1 it can be concluded that it is necessary to complete business architecture, the harmony of architectural vision until proven technology architecture and business processes can be automated.

### 3.5. Phase Information System Architecture

At this stage more emphasis on how the information system architecture that will be developed. Requirement management on the phase information system seen from the two (2) aspects, application architecture and data architecture. Explanation of these two aspects are as follows:

**3.5.1. Application Architecture.** The need in the application architecture is in need of management information system applications that support the application of HMSS to run with the maximum and online. With the application of an online information system that is expected to be accessible anytime and anywhere. Applications are also needed is a single system that runs on a platform so that there is no stand-alone application, which is managed by each unit of the organization and has no standardization. In addition to the application is online and single system, management wants an application that is dynamic and real-time system. With the application that is dynamic and is expected real-time information presented is accurate, timely and up to date.

**3.5.2. Data Architecture.** In the data architecture, management requires resources and integrated centralized data with the aim of improving the coordination and synchronization of data processing operations and can provide multilevel information, cross functional, timely, accurate, relevant. With integrated data expected later presented the information quickly and accurately (See Table 2).

**Table 2.** Gap analysis information system architecture.

No.	Issues	Architecture Currently	Method	Architecture Expected
1	Meeting the needs of the application	Not all business processes of indicators HMSS supported app	Making an application that supports HMSS	The availability of applications that can accommodate existing business processes
2	Application integration	Application integration with database	Service Oriented Architecture (SOA)	The existing applications modular construction services

Gap analysis of information systems in Table it can be concluded that the necessary data integration, implementation of Service Oriented Architecture (SOA) in the process of integration of existing information systems.

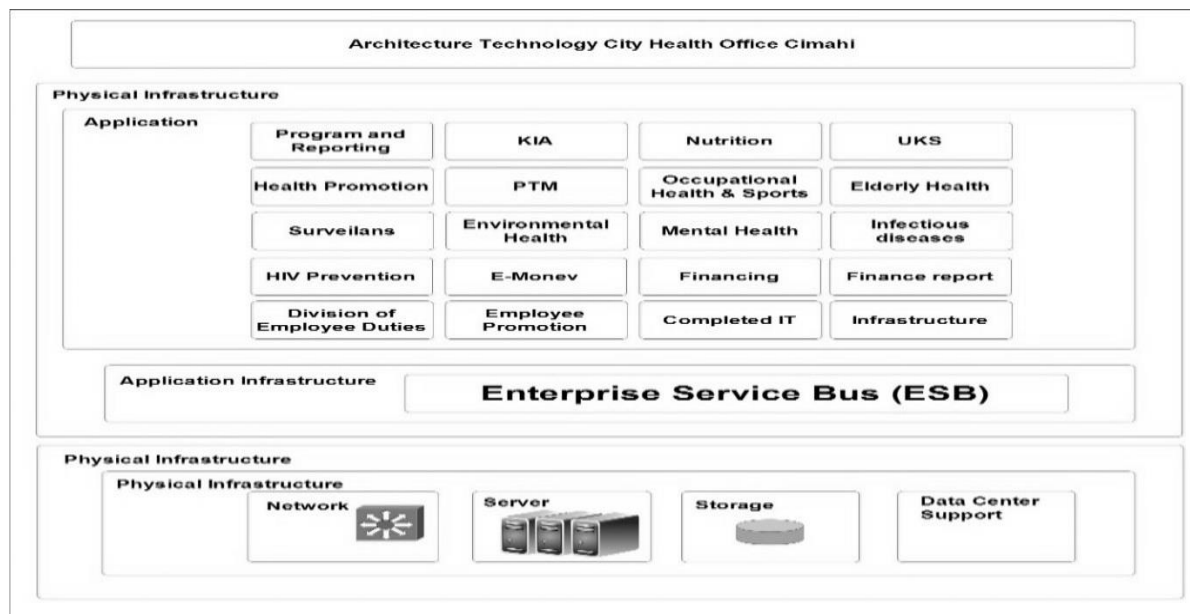
### 3.6. Phase Technology Architecture

This phase aims to make the modeling of information systems architecture. This phase consists of 2 (two) architecture, the architecture of application and data architecture. The application architecture discusses existing applications and applications to be designed, while the architecture of the data used to design a database that will be used to draft the application of information systems HMSS in Cimahi City Health Office (See Table 3).

**Table 3.** Gap analysis architecture technology.

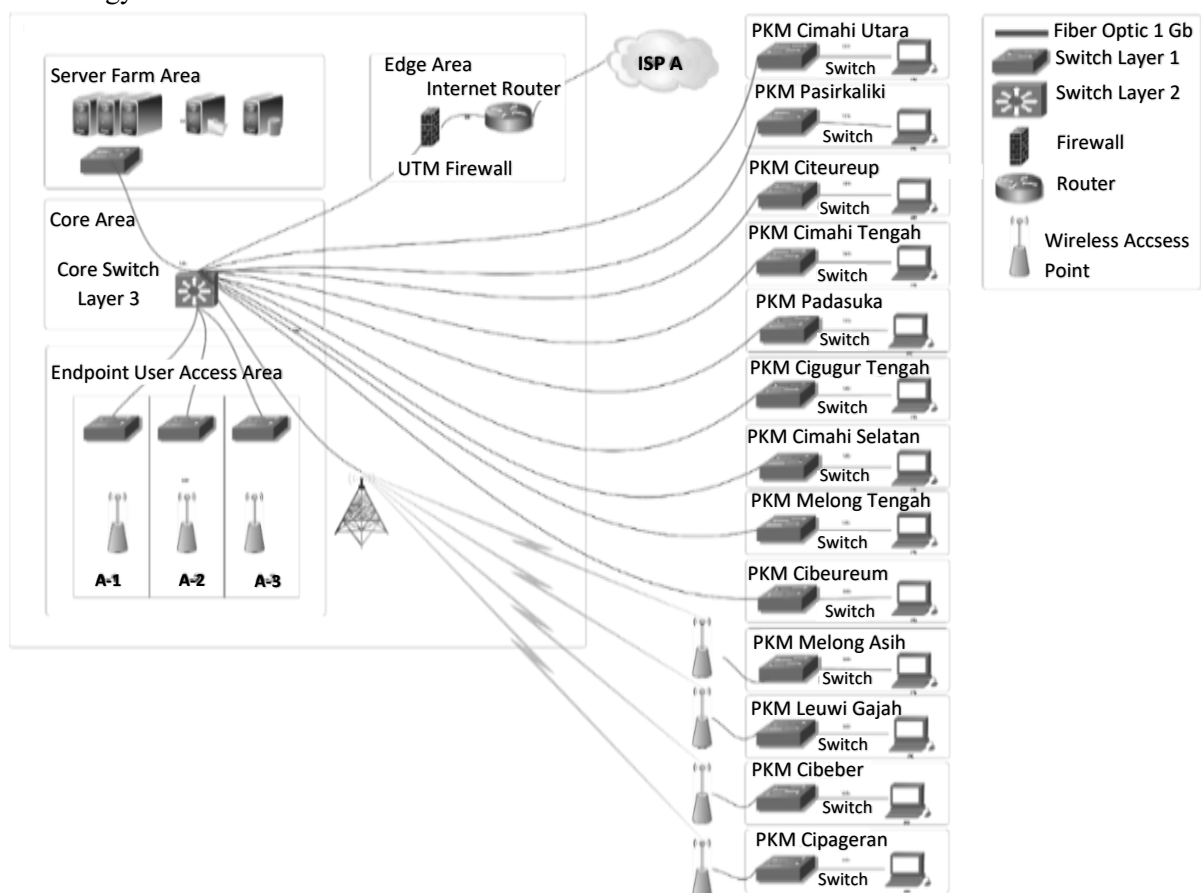
No.	issues	Architecture Currently	Method	Architecture Expected
1	Exchange of data between applications	There are no mechanisms to deal with data inconsistencies due to the exchange of data between applications	<i>Enterprise Service Bus</i>	Their application infrastructure that serves to bridge the data exchange between applications
2	Availability of the system	<i>Single point of failure</i> in almost all points	redundancies	Redundancies make higher system availability
3	Data Availability	Storage of data contained in the physical disk in the server	SAN / NAS	Use of SAN / NAS can assist management in data storage

From the analysis above requires a concept of technology to solve these problems. The design of the infrastructure is the key solution here. Service Oriented Architecture (SOA) is a concept that can be used to build applications. With the concept of SOA, applications will be built with modules that services can be used together to maintain the consistency of the process as well as streamline and simplify application development. The modules are collected to do orchestration in the Enterprise Service Bus (ESB). With this treatment concept is helpful in dealing with the interaction between processes and data exchange between applications. Figure 1 below illustrates the formulation of architectural technology solutions for the Health Service Cimahi that uses the concept of SOA. (See Figure 1)



**Figure 1.** Target technology architecture health office Cimahi.

Figure 1 below illustrates the proposed network topology architecture solutions from the technology to the Health Office Cimahi.



**Figure 2.** Proposed network topology.

#### 4. Conclusions

The conclusion that can be supplied based on the discussion and analysis on enterprise architecture planning with TOGAF ADM framework based on indicators HMSS in Cimahi City Health Office, enterprise architecture include:

- In the resulting business architecture design business modeling pertaining to the scope of application of HMSS for Health.
- On the results of the data analysis needs, there are several entities data and applications need to be developed to support the implementation of the information system of HMSS in Cimahi City Health Office.
- In the current application, architecture is replaced in its entirety from a desktop-based application to a Web-based application based.
- *platform* technology that exists today to support their candidates proposed application but need rejuvenation hardware and technology upgrades.
- This enterprise architecture modeling, provide guidance in making a blueprint for the development of information systems for the implementation of HMSS data, applications, business and technology.

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