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Designing Enterprise Architecture Using TOGAF Architecture Development Method

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Abstract. The purpose of this research is to developing an existing information system by designing a school data reporting system from the regional coordinator for further processing in the Sub Division of Programs and Reporting at Office of Education, Youth, and Sports of Karawang Regency (Dinas Pendidikan, Pemuda Dan Olahraga Karawang). The method used for designing Enterprise Architecture is the open group architecture framework Architecture Development Method (TOGAF ADM). The steps applied in this design are TOGAF ADM, among other Preparation, Architectural Vision, Business Architecture, Information System Architecture, and Technology Architecture. This research produces a blueprint that will be used to support informed business processes. The output of this stage will produce an enterprise architecture that can later be used by organizations to support business processes and achieve their strategic goals. This study concludes that using the TOGAF-ADM methodology as a tool used in designing this information system enterprise architecture can produce a design architectural models in general that are in accordance with the organization's vision and mission and can be applied in other organizations that have similarities in business processes. The impact of this research is a solution to the problem of data loss and damage during the reporting process in the form of manual.

1. Introduction

For designing the E-Government master plan is good, we must choose a good framework that can have guidelines, perhaps the method, or even tools. TOGAF is one of the most interesting frameworks that exist and have a point of view which is very rich for designing its systems for companies [1]. The open Group Architecture Framework (TOGAF) is a framework for enterprise architecture, which provides an approach to design, plan, implement, and manage enterprise information technology architecture [2]. TOGAF architecture framework is like that. Architectural specification ANSI/IEEE 1471-2000 standard (software-intensive systems) may be stated as: "the basic organization of a system, embodied in its components, their relationships to each other and the environment, and the principles that govern its design and evolution [1]. However TOGAF has its own view, which can be defined as a formal description of a "legal system, or a detailed plan of the system at component level to guide its implementation, or as" "structure components, the reverse correlation, and the principles and guidelines governing their design and evolution over time. " [1].

TOGAF gives a detailed method on how to build and implement the EA and the information system called the Architecture Development Method (ADM). TOGAF ADM is the result of continuous contributions from practitioners of architecture. TOGAF ADM is a method to develop and manage the life cycle of EA. ADM makes the perspective of TOGAF integrated into the document architecture to meet the needs of business and its organizations [4]. TOGAF ADM provides a tested process that can be repeated to develop architecture. ADM includes the establishment of framework architecture, building



architecture, content, and manage the transition of the realization of the architecture. TOGAF ADM also represents a clear vision and principles about how to develop an enterprise architecture. Those principles are used as a measure in assessing the success of the development of enterprise architecture by the organization. TOGAF ADM phases for this research consists of the introduction, the vision of architecture, business architecture, data architecture, application architecture, and architecture technology [4]. Architecture Development Method (ADM) is the core of the TOGAF describes methods for developing and managing the life cycle of enterprise architecture [3]. Office of Education, Youth, and Sports of Karawang Regency (Dinas Pendidikan, Pemuda dan Olahraga Karawang) composes with the vision and mission of the Regency Government, so that it involves the implementation by strengthening and synergizing to grow and realize the Karawang Regency community that is independent, advanced, fair and prosperous [5]. Regarding the vision and mission of the Karawang Regency Government, the Department of Education, Youth, and Sports of Karawang Regency sets out a vision and mission that is considered relevant to the vision and mission of the Regency Government and strategies with education, youth and sports in the Karawang Regency at this time. As for the vision of the Education Office, this determined youth sport is as follows: "The Reality of the Community of Intelligent, Skilled, Karawang District Based On Pekerti Luhur and Competitive"[5].

In general, the position of the Dinas Pendidikan, Pemuda dan Olahraga Karawang is an element of the Regional Government Karawang regency which is given responsibility in the field of education, headed by a Head of Service who is under and responsible to the Regent through the Regional Secretary accordingly with the Karawang Regency Regional Regulation Number 14 of 2016 concerning the Formation and Composition of the District Regional Apparatus Karawang. Department of Education, Youth and Sports Karawang Regency is an implementing element of regional autonomy in the education sector which has the main task of helping the regent in carrying out regional government affairs in the field of education, youth and sports and co-administration tasks assigned to area [6]. The Organizational Structure of Dinas Pendidikan, Pemuda dan Olahraga Karawang is as attached and is an integral part of the Regulations of the Karawang Regent and the chart can be seen in Figure 1 [6].

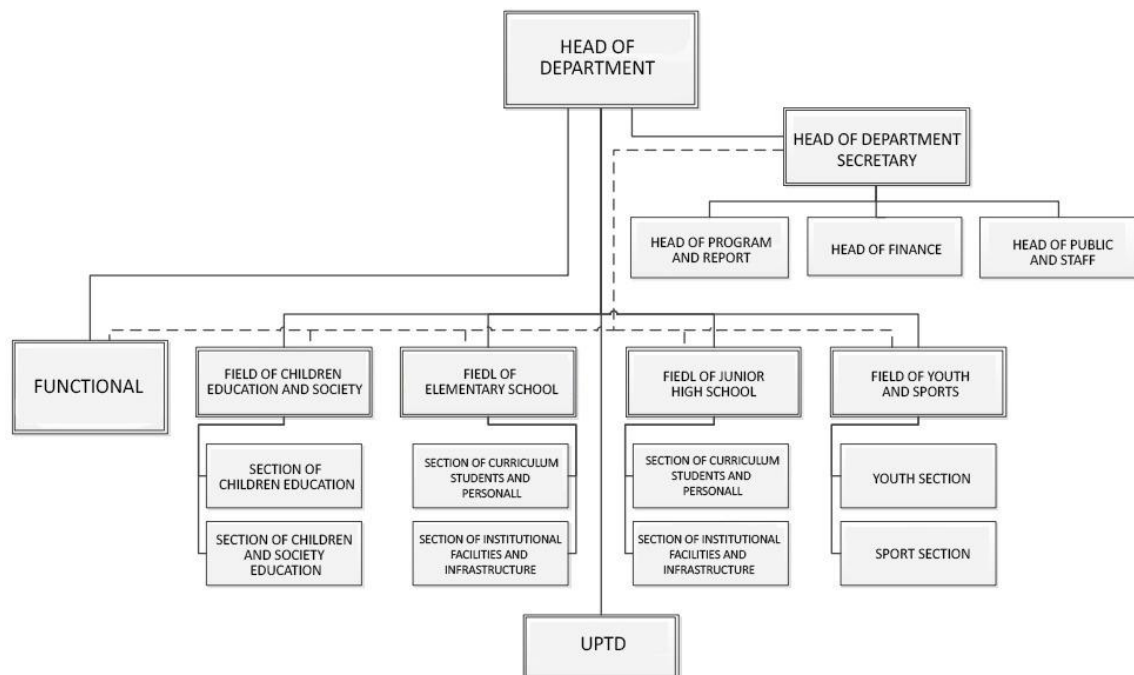


Figure 1. Organizational Structure of Dinas Pendidikan, Pemuda dan Olahraga Karawang [6]

With the design of the Enterprise architecture can develop information systems that exist with design data reporting systems school of regional coordinators for further processing in the reporting Program and the Subsections at the Dinas Pendidikan, Pemuda dan Olahraga Karawang. As well as with the integration of the system can facilitate the school as well as the related instance to do business processes properly.

2. Method

Methods used in the design of the enterprise architecture is based on a study of the literature of TOGAF ADM, direct observation and interviews with stakeholders. In the early stages, it is direct observation, collecting documents in the business process and conducting interviews with my interest.

Research done in the Sub Division of Programs and Reporting on Education, youth and sports of Falkirk. Documents obtained from the direct observation of any business process and interviews with stakeholders, then the problem is obtained, architectural vision, business architecture, the architecture of information systems and Technology Architecture. So it can be made a blueprint for enterprise architecture with reference to the framework of enterprise architecture in use today. The Basic structure of the TOGAF ADM can be seen in Figure 2.

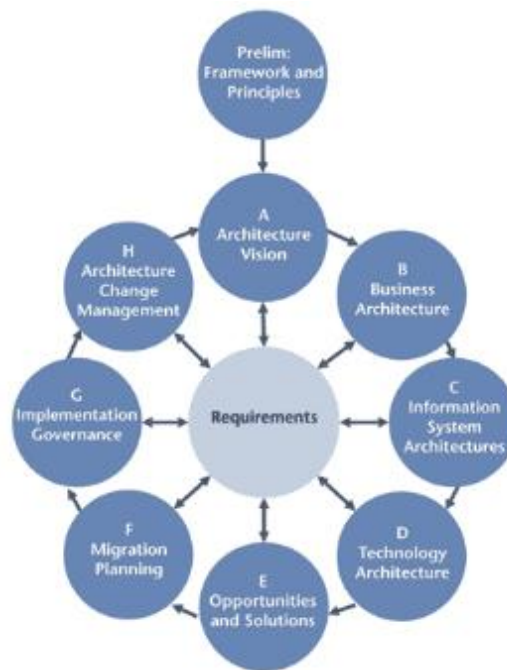


Figure 2. The Basic structure of the TOGAF ADM

TOGAF ADM is the result of ongoing contributions from a large number of practitioners of architecture. It describes methods for developing and managing the life cycle of Enterprise Architecture and forms the core of TOGAF. It integrates elements of TOGAF described in this document as well as other architectural assets available to meet the needs of the business and its Organization [3].

3. Results and Discussion

Based on observations and interviews show that in Sub Division of Program and Reporting at Dinas Pendidikan, Pemuda dan Olahraga Karawang there is no blueprint for designing the architecture of enterprise information system that will support your business processes and it still using a manual process that will not be delivered properly. When creating an enterprise architecture blueprint, it will use the TOGAF ADM. Architectural design enterprise will refer to the architecture of the vision phase, a phase of business architecture, the architectural phase of information systems and Technology Architecture Phases [3]. This research is the blueprint for the guidelines for creating information systems so that they can support the ongoing business processes. The following are phases of the TOGAF ADM.

3.1. Preliminary phase

This phase will explain preparation and initiation to EA, including the definition of organizational identification, the destination organization, organization model for the EA and principles of architecture. Sub Division of Program and Reporting at Dinas Pendidikan, Pemuda dan Olahraga Karawang as the implementing Technical Unit of the Ministry of education and culture with the function as an organization is in charge has the task to develop and empower the workforce educators and educational personnel in the field of education. Sub Division of Programs and Reporting is responsible for implementing education and training. In preparation for the development of EA is designed to implement education and training [4].

The principle of architecture is the basis for the development of EA [3]. Architecture principles developed to consist of business principles, principles, the principle of data and application of the principle of technology. The results of the interviews and document strategic planning studies can be identified as follows: the principle of a prescribed business will make educators and staff education to become a professional in accordance with the standards. By developing the professionalism of educators and educational staff, Dinas Pendidikan, Pemuda dan Olahraga Karawang will become the international standard and training institutions. The principle of data consists of data assets, shared data, the data can be accessed, and data security. The principles of technology change management consists of responsive and interoperability [4].

3.2. Architecture vision

Vision architecture delivers enterprise architecture vision is proposed. A high-level description of the basic architecture and architecture target architecture vision is provided by a domain that includes business, data, application, and technology with the objective to achieve a target architecture that integrates business applications, technology infrastructure, and the needs of the organization. Determining the vision of architecture is an important step to analyze the value chain of the organization. The result is an analysis of the value chain that includes the domain and business functions and supports the core business functions in the organization. The purpose of the analysis of the value chain is to process identification in the Organization and providing the highest margins to its stakeholders [4]. The value chain of the Office of education can be seen in Figure 3 that includes supporting activity and core activity.

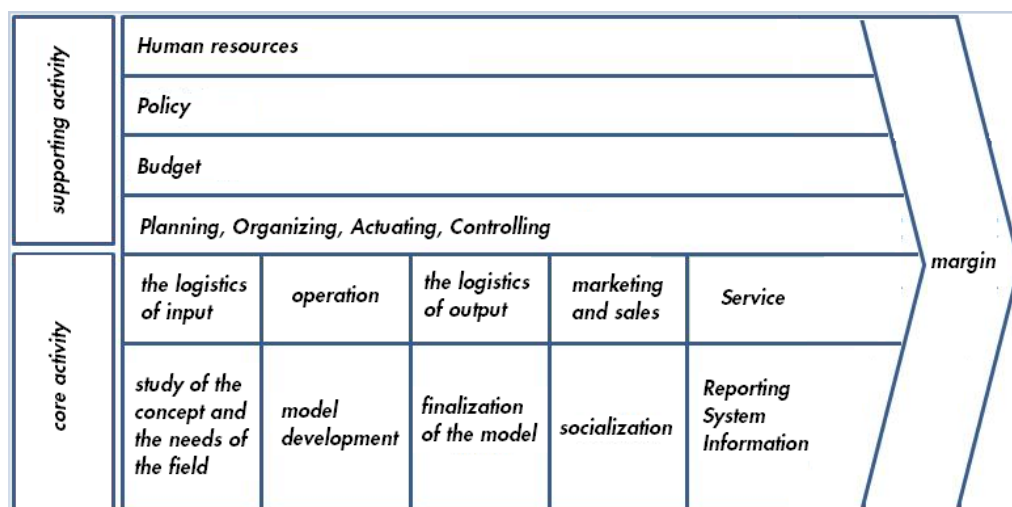


Figure 3. Value Chain Dinas Pendidikan, Pemuda dan Olahraga Karawang

In this phase, the need is to identify the business goals and strategic drivers of the organization. The vision of architecture can be determined based on the company's current condition and mission of the company itself.

3.3. Business Architecture

In this stage, the business architecture describes the architecture of the current organization and expanding it with drawing up strategies to achieve business goals stated by conceptualizing information systems-based business solutions based on the current conditions. In Sub Division of Program and Reporting at Dinas Pendidikan, Pemuda dan Olahraga Karawang, in Figure 4 can be seen there are activities undertaken to generate files in the form of a report from the school forwarded to the Coordinator

of the region then at convey to the Dinas Pendidikan, Pemuda dan Olahraga Karawang through Sub Division of Program and Reporting.

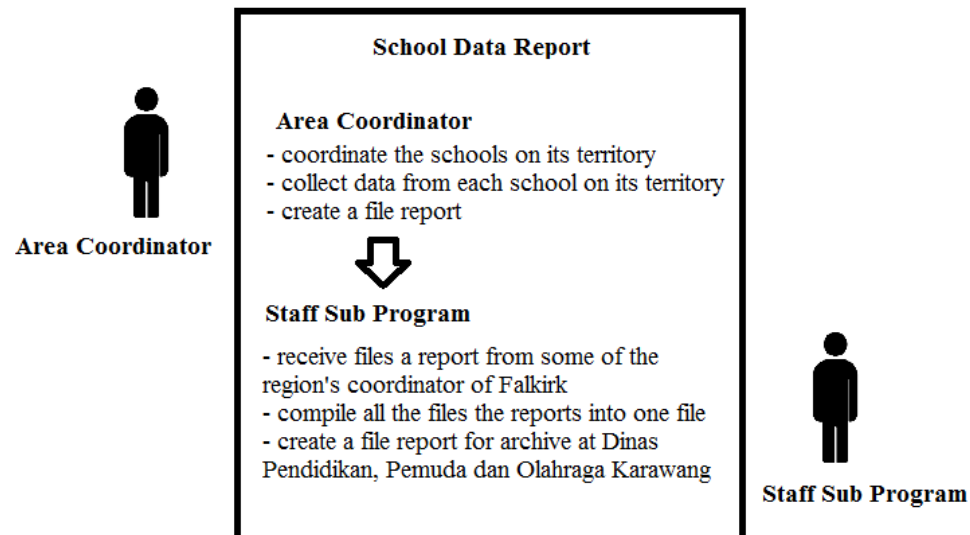


Figure 4. Business activities of Data Report

3.4. Information System Architecture

This phase involves two data architecture, including architecture and application architecture, focused on the identification and determination of the applications and data that supports the business architecture.

3.4.1. Application Architecture

The purpose of the application architecture section of the application architecture Phase is to develop the target application architecture that allows the business architecture and vision Architecture while handling the requests and interests of Architecture Jobs Regent interests. Required platform for Sub Division of Program and Reporting at Dinas Pendidikan, Pemuda dan Olahraga Karawang that can function adequately, based online and in real-time so that Sub Division of Program and Reporting at Dinas Pendidikan can obtain information anytime and anywhere. This had an impact on the achievement of business functions, especially in Dinas Pendidikan, Pemuda dan Olahraga Karawang.

3.4.2. Data Architecture

In the architecture of data, stakeholders Dinas Pendidikan, Pemuda dan Olahraga Karawang requires an integrated and centralized data from various work units aimed at improving the coordination and synchronization of business processes and information can be delivered timely, accurate and relevant. After the data is integrated, it is expected to create information that is timely, accurate and relevant.

3.5. Technology Architecture Phase

At this stage to explain the technology architecture can support the vision and business strategy. Building design for the information system that can be integrated with the other parts of the company based on the analysis that has been done before. It can be seen in Figure 5 the selection of technology for platform technologies in applications, ranging from application software, network and security technology, and the internet architecture that supports the application.

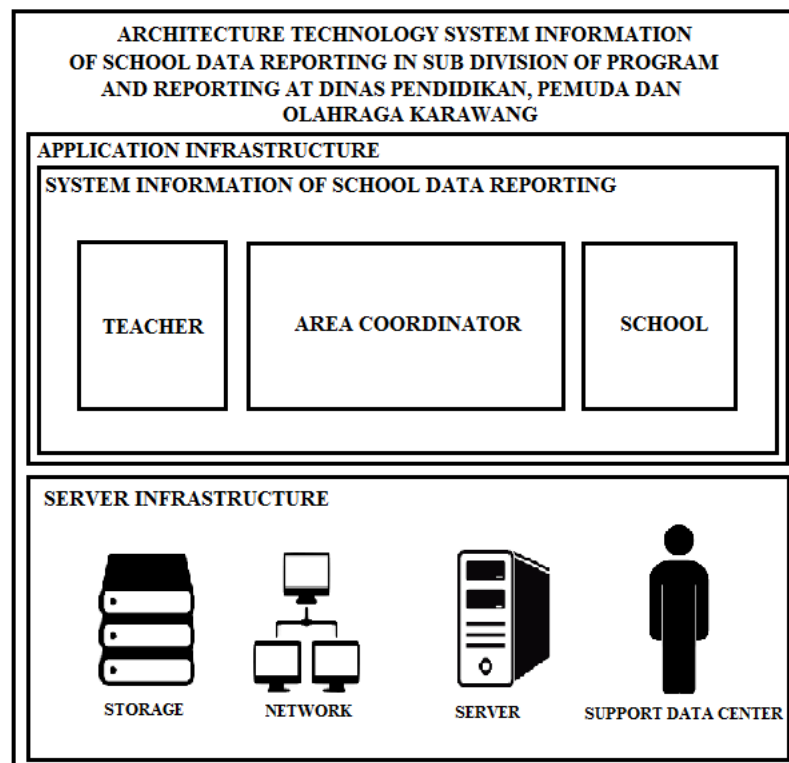


Figure 5. Technology architecture for models internet architecture

In designing and developing enterprise architecture that fits the needs of State-owned companies, some things that should be considered include business goals, business drivers, business constraints [7]. In addition, companies should also consider the scope of architectural design company itself as well as the scope of application of the framework for enterprise architecture will be used [7].

Because the proposed method using the TOGAF framework as a basis in the process of development, this method also provides a tested and repeatable process for developing the EA as given by the TOGAF ADM [8]. Method Development IEA provides the process step by step in the overall process of development which includes project planning on phase 1 (start), assess the current state of the in phase 2 (identify), the design of future detailed in phase 3 (sets), planning transitions in phase 4 (plans) and implementation in phase 5 (implement) [8]. It also provides the governance design, compliance documents, standards, and guidelines in phase 3 (determine) to guide government entities in applying EA in their environment [8]. It concerns changes in the future by providing evaluation and monitoring mechanisms and uses recurring processes in the business and it can cause the spread of new Stage 6 (evaluation) [8].

Implementation of the business transformation depends on the vision given by leaders and its managers on the project organizational transformation, where the establishment of the Office architects is fundamental to solve business problems through a framework architecture [9]. The company also should be managed based on the reference model that corresponds to the current state, this model should be launched in long-term projections, and it will improve the structure of the business where the Company Act [9]. From previous research using the TOGAF ADM, among others, stated that in implementing TOGAF ADM does not always have to use the entire phase. The use of ADM in designing enterprise architecture must be applied sequentially between phases, and the entire process [10].

4. Conclusion

The conclusion of the implementation of the TOGAF ADM in the Sub Division of Program and Reporting at Dinas Pendidikan, Pemuda dan Olahraga Karawang, a conclusion can be reached that is, the process of designing enterprise architecture using the TOGAF ADM can be used in a Sub Division of Program and Reporting at Dinas Pendidikan, Pemuda dan Olahraga Karawang in accordance with documents and processes that are currently running and able to produce a blueprint for making the reporting information system so that they can support business processes ongoing, solutions offered for reporting information system mobile and web-based technology platform and integration for each proposed information system is a Service Oriented Architecture (SOA).

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References

- [1] I Y Edward, Wervyan Shalannanda, Aldo Agusdian and S I Lestaringati 2014 Proposal of TOGAF ADM enterprise continuum for organization-specific solution on e-Government pp 283 – 288
- [2]. Dirk Draheim, Gerald Weber ed. (2007) Trends in Enterprise Application Architecture: 2nd International Conference, TEAA 2006, Berlin, Germany, November 29 - December 1, 2006, Revised Selected Papers. pp. 260
- [3]. TOGAF 9.1 White Paper an Introduction to TOGAF Version 9.1 <http://www.opengroup.org/togaf/>
- [4]. Dede Rusli and Yoanes Bandung 2017 Designing an enterprise architecture (EA) based on TOGAF ADM and MIPI International Conference on Information Technology Systems and Innovation (ICITSI) pp 38 – 43
- [5]. Dinas Pendidikan, Pemuda dan Olahraga Kabuapten Karawang <https://www.karawangkab.go.id/dokumen/dinas-pendidikan-pemuda-dan-olahraga>
- [6]. renstra disdikpora <http://www.disdikpora.karawangkab.go.id/sites/default/files/pdf/renstra%20disdikpora%20krw.pdf>
- [7]. H Qurratuaini 2017 Designing enterprise architecture based on TOGAF 9.1 framework, International Conference on Engineering and Applied Technology (ICEAT)
- [8]. Saiya A A and Arman A A 2018 Indonesian Enterprise Architecture Framework: A Platform for Integrated and Connected Government. International Conference on ICT for Smart Society (ICISS)
- [9]. Armando A C S, Marco Abad, Danilo R J, Jefferson G and J Carrillo V 2016 Definition and Implementation of the Enterprise Business Layer Through a Business Reference Model, Using the Architecture Development Method ADM-TOGAF. Springer International Publishing Switzerland
- [10]. Y. Rika and R. Budi 2011 Designing enterprise architecture for mining by using TOGAF framework. Magister Thesis of Informatics, Institut Teknologi Bandung