International Journal of Computer Technology and Science
Volume. 1 No. 4 October 2024
e-ISSN :3048-1961; dan p-ISSN :3048-1899, Hal. 01-11
DOI: https://doi.org/10.62951/ijcts.v1i4.47
Available Online at : https://international.arteii.or.id/index.php/IJCTS

Preparation of Information Technology (IT) Master Plan of SMK Ma'arif 1 Metro Using the Open Group Architecture Framework (TOGAF) Method

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Abstract. *This study aims to compile an Information Technology (IT) Master Plan for SMK Ma'arif 1 Metro using The Open Group Architecture Framework (TOGAF) method. This method is applied to design a structured and integrated information technology infrastructure to support operations and learning in schools. The results of the study indicate that the main business processes in schools, such as student registration, curriculum management, and financial administration, are still carried out manually, making them prone to errors and inefficiencies. Through TOGAF, an information system architecture is designed that includes the development of the Academic Information System (SIAKAD) and other school management applications. In addition, improving network infrastructure and cybersecurity are priorities in the proposed technology architecture. Implementation strategies and change management are also formulated to ensure the success of the digital transformation. This IT Master Plan is expected to improve the efficiency of school operations and the quality of learning, as well as support the achievement of more optimal educational goals in the digital era.*

Keywords : *IT Master Plan, TOGAF, Technology Architecture, Digital Transformation, SMK Ma'arif 1 Metro*

1. INTRODUCTION

The development of Information Technology (IT) is currently progressing rapidly. With IT, all forms of information needed can be obtained anytime and anywhere easily and with fast access. The use of IT is one of the determining factors in the performance of an Educational Institution. The Educational Institution uses IT by creating a computer technology-based information system. In addition, management expertise in using IT is very important to improve the performance of educational institutions/agencies (Lafirda et al., 2019: 197-212). Utilizing IT is an opportunity for Educational Institutions to increase their productivity, and also has the potential to support increased resources in rapid technological competition. Several Educational Institutions argue that the use of IT is only a waste of budget because it does not have a significant impact on increasing productivity. On the other hand, Educational Institutions are required to make large investments to implement IT (Imam et al., 2023: 301-309).

Private Vocational High School (SMKS) Ma'arif 1 Metro is one example of an educational institution that has begun to utilize IT in its operations. However, the integration and efficiency of IT use in this school is still not optimal. Some operational processes such as teacher attendance are still done manually, so the data produced is often

Received: August 21, 2024; Revised: September 20, 2024; Accepted: October 09, 2024; Published October 11, 2024

inaccurate. Therefore, strategic planning is needed to design an IT architecture that is in line with the operational needs of the school and current technological developments.

One solution that can be taken by SMK Ma'arif 1 Metro is to prepare an Information Technology (IT) Master Plan, which details long-term planning related to IT development in the educational institution. This IT Master Plan not only formulates strategies that support the school's vision and mission, but also becomes the basis for implementing a more efficient information system.

To design an IT Master Plan, there are several frameworks that can be used, such as TOGAF, FEAF, Gartner, and Zachman. Among these frameworks, TOGAF was chosen because it offers comprehensive methods and elements for evaluating, creating, implementing, and maintaining enterprise architecture. In addition, TOGAF is open and free, and uses internationally recognized concepts and terminology. Gartner is an iterative model that focuses on the development of the Enterprise Architecture process, migration changes, organizational governance and sub-management. Meanwhile, the Zachman framework shows information systems from various perspectives for planning, design and configuration management (Putra and Anggreani, 2022).

Based on this, this article will discuss how to prepare an IT Master Plan at SMK Ma'arif 1 Metro using the TOGAF framework. Hopefully, this IT Master Plan design can increase the efficiency of IT use in schools and support the achievement of the school's vision and mission more optimally.

2. LITERATURE REVIEW

Understanding The Open Group Architecture Framework (TOGAF)

The Open Group Architecture Framework (TOGAF) is a standard framework used to design, implement, and manage information systems architecture in organizations. TOGAF was developed by The Open Group, a global technology consortium, and is an international reference in enterprise architecture design. TOGAF provides systematic and comprehensive guidance for planning, developing, and managing information technology (IT) architecture that is aligned with the organization's business objectives. In its application, TOGAF consists of four main domains: business architecture, data architecture, application architecture, and technology architecture.

The main purpose of TOGAF is to help organizations manage technological change and dynamic business needs using a structured approach. By providing a flexible

methodology, TOGAF enables companies to increase efficiency, reduce risk, and ensure that technology initiatives support the organization's strategic needs. TOGAF is also very flexible and can be adapted by various types of organizations, both in the public and private sectors.

Framework The Open Group Architecture Framework (TOGAF)

The TOGAF framework is known as the Architecture Development Method (ADM), which is the center of the entire process. ADM consists of a series of phases that help enterprise architects design, build, and manage an organization's IT architecture. The phases in ADM include Preliminary Phase, Vision Phase, Business Architecture, Information Systems Architectures, Technology Architecture, Opportunities and Solutions, Migration Planning, Implementation Governance, and Architecture Change Management.

Each phase in ADM is designed to provide an iterative approach, enabling an adaptive architecture development process to changing business needs and conditions. ADM provides tools and techniques to evaluate architecture needs, design solutions, and monitor implementation to ensure alignment between technology architecture and business objectives. Thus, TOGAF provides a holistic and iterative approach to designing and managing enterprise architecture, which aims to improve interoperability, scalability, and flexibility of information systems in an organization.

IT Master Plan

IT Master Plan is a strategic document that defines long-term planning in the development and management of information technology systems in an organization. The IT Master Plan summarizes the vision, objectives, strategies, and IT initiatives that will be carried out within a certain period of time. This document is designed to support business growth and meet operational needs in an effective and efficient manner.

In preparing the IT Master Plan, important steps taken include analyzing the organization's IT needs, identifying existing IT infrastructure, and planning the necessary human resources and budget. The IT Master Plan also considers aspects of security, innovation, and changing technological developments. This document serves as a guide for management to make strategic decisions related to IT investments and ensure that technology development is in line with the company's mission and vision.

IT Master Plan Design Tools

In designing an IT Master Plan, various tools can be used to assist in the planning, analysis, and implementation processes. IT Master Plan design tools include project management software, simulation tools, and applications for IT architecture modeling. Examples of tools that are often used are Enterprise Architecture (EA) tools such as ArchiMate, Sparx Systems, and IBM Rational System Architect. These tools are used to model IT architecture, identify required system components, and plan an integrated implementation roadmap.

These tools help organizations conduct in-depth analysis of technology needs, identify appropriate solutions, and design optimal system architectures. In addition, these tools allow IT managers to monitor the implementation of the IT Master Plan, ensure that IT projects are running according to plan, and manage risks that may occur during the implementation process. The use of these tools ensures that IT Master Plan planning and management is carried out in a more efficient and measurable manner.

3. RESEARCH METHODS

In this study, the framework used in designing the IT Master Plan is based on The Open Groups Architecture Framework (TOGAF) ADM method. TOGAF ADM is a general approach and can be easily adopted to meet the needs of organizations in the education sector, especially in the context of preparing an IT Master Plan in a school.

TOGAF is one of the frameworks or business architecture frameworks in organizations or companies that provides a competitive approach to the planning, implementation, design and governance of information architecture. TOGAF explains how the detailed description is needed to ensure an enterprise architecture is accurate and on target according to the needs or requirements required by its users.

The following is an explanation of the principles or stages of the TOGAF ADM method:

1. **Pleminary Phase**

   In this stage, detailing how the design can be done becomes the focus. The presence of this stage is considered as an approach that can increase success in managing the master plan of the organization/education.

2. **Phase A: Architecture Vision**

At this stage, efforts are made to ensure alignment in perceptions regarding the urgency of implementing the planning.

3. **Phase B: Business Architecture**

   This stage includes business strategy, organizational structure, and information related to core activities.

4. **Phase C: Information System Architecture**

   The focus in this phase is to identify and determine the power that supports the school's business architecture and considerations in the application.

5. **Phase D: Technology Architecture**

   This phase can improve or repair the operation of existing applications and can describe the technological structure needed to manage raw material procurement, production and sales activities in the field of entrepreneurship projects at SMK Ma'arif 1 Metro.

6. **Phase E: Opportunities and Solution**

   In this stage, the results of the gap analysis starting from phase A to phase D are outlined.

7. **Phase F: Migration Planning**

   At this stage, preparation and planning are carried out for migration to implement the new application architecture that was created in the previous stage.

8. **Phase G: Implementation Governance**

   In this stage, the implemented project serves as a work plan program to achieve the desired architecture.

9. **Requirement Management**

   In this stage, an analysis of the object requirements and system user requirements is performed. The goal is to perform analysis and management of architectural requirements throughout the entire ADM stage.

4. RESULTS & DISCUSSION

In an effort to compile the IT Master Plan at SMK Ma'arif 1 Metro, The Open Group Architecture Framework (TOGAF) method is used as the main framework. TOGAF offers a comprehensive guide that allows organizations to design and implement information technology architecture systematically and structured. Through this method, SMK Ma'arif 1 Metro can align educational needs with optimal IT infrastructure. As

mentioned in Gharajedaghi's study (2011), TOGAF allows stakeholders to gain a holistic understanding of IT development, from needs analysis to solution implementation.

1. **Preliminary Phase**

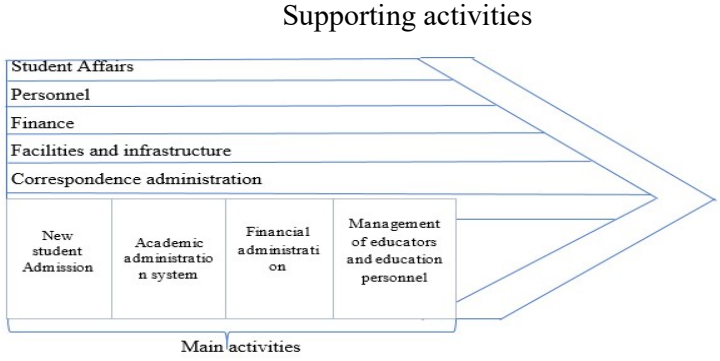
   The initial step taken in the Preliminary Phase is to define how the enterprise architecture will be created. While the purpose of the Preliminary Phase itself is to confirm the commitment of management, determine the framework and methodology to be used and design the architecture and implement it.

2. **Phase A: Architecture Vision**

   The condition of the architectural technology system at SMK Ma'arif 1 Metro is still not systematic between one operational section and another. For example, the acceptance of new student registration (PPDB) is still very manual, namely manual input of one by one new prospective student data into the computer and also the attendance of educators and education personnel who are still handwritten for arrival and departure times so that data manipulation can occur.

3. **Phase B: Business Architecture**

   The business architecture process in this study includes business processes using a value chain where there are main activities and supporting activities in the school environment.



Picture 1. *Value Chain* SMK Ma'arif 1 Metro

When the school value chain contains a description of its operational system, it is also used as a description of the business function which consists of main activities and supporting activities.

4. **Phase C: Information System Architecture**

   Information System Architecture at SMK Ma'arif 1 Metro is emphasized on the information system/information engineering activities that will be designed. In

defining this architecture, it includes what will be designed/improved to become a better system than before.

Table 1. Entities and their Definitions

No	Application Candidate	Data Entity
1.	New student Admission	1. Prospective New Students 2. Selection/test 3. Test result 4. Department 5. Class
2	Academic administration system	1. Teacher Data 2. Lesson Schedule 3. Student Attendance 4. Studen Recitation Absence 5. Student PKL Data 6. Student Exam Data 7. STS/SAS Schedule 8. Student Report Cards 9. Student Release
3	Financial administration	1. Student Payment Data 2. Teacher and Education Personnel Honorarium Data 3. List of ART
4	Management of educators and education personnel	1. Data on Educators and Education Personnel 2. Educator Attendance 3. Teaching Journal 4. Educator Report Card 5. Extracuricular Supervisor Data
5	Student Affairs	1. Handling of problematic students 2. Achieving Students 3. Alumni Data 4. Extracurricular Activities
6	Personnel	1. Incoming Staff 2. Outgoing Staff 3. Staff Report 4. Staf Development
7	Finance	1. Honorarium for Extracurricular coaches

		2. Honorarium for other activities
8	Facilities and infrastructure	1. Inventory
		2. Procurement of goods
9	Administration correspondence	1. Incoming mail archive
		2. Outgoing mail archive
10	Library	1. Book data
		2. Member Data
		3. Shelf Data
		4. Book Stock/procurement

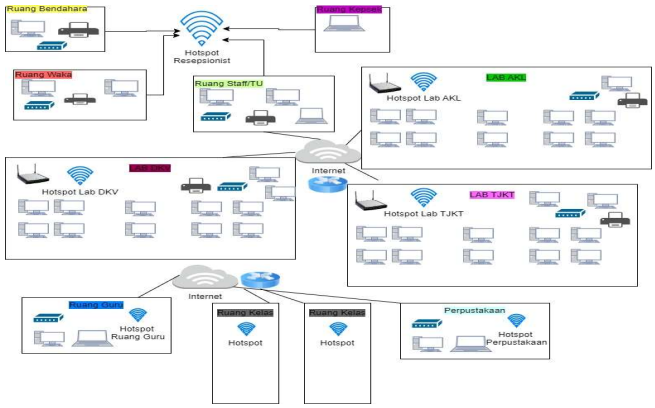
5. Phase D: Technology Architecture

Architectural technology can describe the technological structure needed to manage procurement activities in the field of business projects and entrepreneurship. Here is a proposal for the application for SMK Ma'arif 1 Metro.

Table 2. Proposed Application

	**User** Administrator Operator Proktor Students Educators Education Personnel
	**Network** The internet network can be used to access the school information system, both within the school environment and outside the school environment.
	**Web server** A web server is software that provides data services designed to receive HTTP or HTTPS requests from clients called web browsers and return the results in the form of web pages (usually in HTML form).
	Applications In addition to web servers, application systems are also stored in PCs. There are several application systems stored in the same PC in a business process.

Examples include student admissions information systems, academic administration systems, financial administration information systems, teaching staff management information systems, financial information systems, personnel information systems, facilities and infrastructure information systems, correspondence administration information systems, and library information systems.



Picture 2. Proposed Topology for SMK Ma'arif 1 Metro

6. **Phase E: Opportunities and Solution**

In this Opportunities and Solution stage, what is done is to conduct a GAP analysis between hardware, software and information systems, the results of which will show a comparison of the gap.

7. **Phase F: Migration Planning**

The purpose of Migration planning is to plan the migration process or transition from the old system to the new system so that the implementation of the information system to be built becomes focused and runs well. The migration process is carried out through an implementation roadmap plan.

8. **Phase G: Implementation Governance**

The function of this phase is to monitor the implementation of the architecture that has been implemented and the architecture that will be created for implementation.

9. Requirement Management

In the Management phase, SMK Ma'arif 1 Metro still needs hardware devices to strengthen the network architecture and also IT experts to help facilitate the arrangement of the network system because so far it has been using existing teaching staff.

5. CONCLUSION

Based on the results and discussions that have been described based on the stages in the TOGAF method, several conclusions can be drawn, namely:

1. The information system architecture at SMK Ma'arif 1 Metro has been well integrated, only some still need to be improved to be more optimal
2. There are several information systems that will be upgraded from the Google Site and Google Form applications to the Exam Browser application
3. There will be additional hardware/devices on the internet so that it is more widely integrated and can be accessed from within and outside the school environment.

Through the application of the TOGAF method, SMK Ma'arif 1 Metro can formulate a structured and comprehensive IT Master Plan. The school's main business processes can be clearly identified, technology needs are adjusted, and implementation strategies are designed to maximize the use of IT in supporting the school's vision and mission. The successful implementation of this IT Master Plan is expected to improve operational efficiency, learning quality, and school competitiveness in the digital era.

6. SUGGESTION

The advice that can be given to SMK Ma'arif 1 Metro is to continue to develop further frameworks and continue to look for references so that the design of the integrated information system can continue to develop and continue to be improved to be updated from the previous design.

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