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Enterprise Architecture Model of the New Student Admission System at Stella Maris University Sumba

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ABSTRACT

This research aims to design an Enterprise Architecture (EA) model for the new student admission system at Stella Maris Sumba University. The background of this research is the need to improve efficiency, transparency, and integration in the new student admission process, which currently still faces various administrative and technical challenges. The research method used is qualitative which includes literature studies and in-depth interviews with relevant parties. The data obtained was analyzed to identify needs and design the right EA model. The purpose of this research is to create a system capable of automating the admission workflow, ensuring data security, and providing real-time access for application status tracking. The results showed that the proposed Enterprise Architecture model can improve operational efficiency, user satisfaction, and support the strategic decisions of Stella Maris Sumba University based on accurate and integrated data.



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I. INTRODUCTION

Higher education is a stage of education covering various programs such as diploma, bachelor, master, doctoral, professional, and specialist programs. These programs are organized by universities with reference to Indonesian cultural values. Stella Maris University (Unmaris) Sumba is one of the private universities in Sumba, NTT Province, established in 2008 and located in Tambolaka City, Southwest Sumba Regency. Unmaris Sumba, as one of the private universities in Sumba, always strives to improve the quality of institutional management, academic service management, and curriculum according to the vision and mission of Unmaris Sumba. The utilization of information technology in higher education, especially the new student admission system at Unmaris Sumba, still does not have a qualified architecture. Its current information technology infrastructure is still not sufficient to respond quickly, accurately, effectively, and efficiently. As an institution that has a vision and mission, Unmaris Sumba continues to strive to achieve its vision and mission with the aim of competing competitively with other universities. The success and competition between universities are determined by internal and external factors.

One of them is the effectiveness of information technology management in higher education.

The use of information technology has a significant impact on organizational operations. Effective data and information management will enable extensive access to globally connected data networks[1]. The development of information systems must be in line with and in accordance with the overall organizational strategy (enterprise)[1]. The role of information systems and information technology is very important for an organization to integrate each component and improve the quality of service to users of information systems and information technology. Therefore, information systems and information technology must be in accordance with organizational goals in order to provide the necessary information[2]. Information technology (IT) has a growing role for many organizations as IT management becomes increasingly important in achieving business goals[3]. The Industrial Revolution 4.0 has a significant impact on all aspects of organizations, including the education sector. Industry 4.0 provides opportunities to adapt learning, teaching, research, innovation, services, and infrastructure in the context of education[4].

The role of technology in organizations, companies, and government is currently very significant[5]. Technology improvement is currently the main focus in the education domain. Unmaris Sumba feels it is important to make changes to meet the needs of business processes that are already well computerized and systematic. Information systems are not yet integrated and do not fully support business processes at Unmaris Sumba, such as the new student admission process (PMB), which still uses conventional recording and management methods using Microsoft Excel and Microsoft Word[6]. In the era of rapid technological development, the process of registering new students can be done flexibly anywhere and anytime, including at home or out of town, without the need to visit the campus in person. Prospective students no longer need to queue to take the registration form, and the payment process can be done online[7]. The construction and development of information infrastructure becomes possible on the basis of a modern architectural approach that provides a certain balance between the information needs of the business in solving management tasks and information support for those needs, that is, the enterprise architecture that needs to be developed. The main problem in enterprise architecture is the alignment of information systems architecture with business architecture. The enterprise management architecture model makes it possible to transform the strategic goals of enterprise development and the goals of its operational activities into an information systems architecture[8].

With reference to previous research, the author aims to conduct research and develop an enterprise architecture concept that includes business architecture, data architecture, application architecture, and technology architecture for planning new student admission systems at Unmaris Sumba. This research is focused specifically on the new student admission system (PMB), with the aim of investigating and understanding the registration and enrollment processes. The main goal is to simplify the access of prospective new students to the new student admission system at Unmaris Sumba.

Research [9] explained in their writing that the business strategy for new student admissions at Yapis University Papua was the use of enterprise architecture planning as a guide to building an effective and efficient new student admission system. Research [10] explain in their writing that enterprise architecture is a tool used to integrate and align information technology (IT) with business needs in an organization. Research [11] explain in their writing that universities really need IT to align the initial goals (vision). By achieving this alignment, business processes can be carried out more easily and regularly according to organizational needs. Research [12] explain in their writing that enterprise architecture planning is a concept that describes the structure of an organization, institution, or institution in the context of information systems. Research [13] explained in their writing that planning is done by defining the data structure, applications, and technology used to manage information and support business processes. Based on the literature review that has been discussed, So, research is proposed that aims to help facilitate the business process of admitting new students at Unmaris Sumba.

Enterprise architecture (EA) is a master plan that acts as a collaborative partner in various aspects, including goals, vision, mission, and principles of good governance[14]. In this context, enterprise architecture (EA) can also be explained as a plan designed to meet the needs of the company by aligning business strategies and activities with information systems and information technology[15]. Enterprise architecture (EA) effectively integrates various domains in business, data, applications, and information in the organization[16]. With Enterprise Architecture (EA), there will be a mapping of current conditions and also the desired conditions in the future[17]. Therefore, improving business processes and designing information systems technology, including data infrastructure and applications, is an important step for the advancement of information technology[18]. The Enterprise Architecture (EA) approach has been widely adapted as a planning approach to align organizational resources towards a common goal[19]. Enterprise architecture (EA) includes the organization's business capabilities, business processes, information, IS, and technical infrastructure[19]. By implementing Enterprise Architecture (EA), there is a reliable approach to integrating business strategy with information technology[20]. Enterprise architecture (EA) is a specialized field developed based on the practice of information system architecture design and implementation. In developing Enterprise Architecture (EA), developers generally start from an overall optimal perspective and then understand business strategy, organizational composition, business processes of each department, collaboration between departments, information systems, and other elements as a hierarchical structure[19], [20]. Enterprise architecture (EA) is a defined practice for conducting enterprise analysis, planning, governance, and evaluation, with a comprehensive approach to successful strategy development and implementation. To analyze, design, plan, and implement Enterprise Architecture (EA), it is usually necessary to develop Enterprise Architecture (EA) models to realize Enterprise Architecture (EA) visualization. Enterprise Architecture (EA) visualization allows information system designers to gain a broad view of the business and organization [20].

II. RESEARCH METHOD

This research followed the steps as seen in Figure 1 above, which included the following stages:

- 1) Data Collection. Researchers collected data through literature study, observation, and interviews
- 2) Business Process Identification. At this stage, the researcher compiles a knowledge base about the

business and information aspects of the current business process.

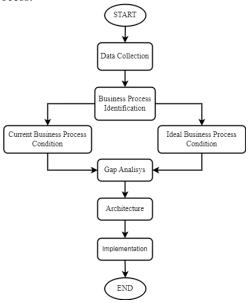


Figure 1. Research Stages

- 3) Gap Analysis. At this stage, a comparison is made between the current condition of the ongoing business process and the ideal condition of the business process in the future, according to management expectations.
- 4) Architecture. At this stage, the required business architecture, data architecture, application architecture, and technology architecture are determined.
- 5) *Implementation*. This stage determines the order in which the proposed application will be implemented.

III. RESULT AND DISCUSSION

A. Data Collection

In collecting data, researchers conducted a literature study to understand the concepts and frameworks of the enterprise architecture of new student admission systems in various universities by reading various journals [9] [10] [11] [12] [13] related to the enterprise architecture of new student admission systems for reference. Furthermore, researchers conducted observations at Stella Maris Sumba University and conducted in-depth interviews with relevant parties at Stella Maris Sumba University, such as administrative staff, IT staff, and university leaders, to identify the needs, constraints, and expectations of the desired new student admission system. Based on the results of the interviews, the data obtained was analyzed to design an enterprise architecture model that suits the needs and context of Stella Maris Sumba University using BPMN 2.0.

B. Business Process Identification

1) Current Business Process Condition

One of the identified business aspects is the new student admissions process. Currently, at Unmaris Sumba, the new student admission process is still carried out conventionally and faces obstacles in the use of excessive data. In line with the objectives and strategic plan of Unmaris Sumba to increase the utilization of information technology in the academic and non-academic fields, a suggestion is made to address the issue through the development of a system that can simplify the process of admission and administration of new students. So, it is hoped that prospective new students and management will find the process of admitting new students easy and reduce data redundancy. The basic model used is the current business process model, which is depicted in the BPMN 2.0 diagram. One of the processes implemented is the new student registration process, as shown in Figure 1 below

The current new student admission process can be seen in the BPMN diagram below.

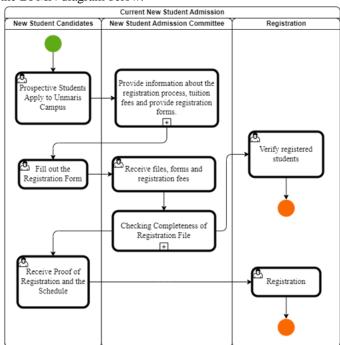


Figure 2. Current new student admission process

2) Ideal Business Process Conditions

The ideal business process conditions in this research include high efficiency, transparency, and system integration. In this ideal model, all stages of student admission, from online registration, administrative selection, entrance examination, to result announcement, are conducted through a user-friendly integrated digital platform. The system is able to automate workflows, minimize human error, and provide real-time access for application status tracking. In addition, the security of prospective students' data is ensured with

strong encryption, and all data is stored properly for further analysis. This business process also enables effective communication between prospective students, administrative staff, and the academic bureau, so that each party gets clear and timely information. The implementation of this model will improve user satisfaction and operational efficiency and support the university's strategic decisions based on accurate data.

C. Gap Anaysis

Gap analysis identifies problems in the new student admission business process at Unmaris Sumba. In this analysis, a comparison is made between the current condition of the ongoing business process and the ideal condition of the business process in the future according to the expectations of the management of Unmaris Sumba. The ideal condition of the business process expected by the management of Unmaris Sumba is a system that can accelerate, improve efficiency, save time, costs, transparent and integrated, as well as a system that is able to automate workflows, minimize and facilitate human work and can be accessed in real-time.

The gaps found in the new student admission business process at Unmaris Sumba are considered problems that must be resolved, and solutions are provided. This is because the new student admission business process at Unmaris Sumba is currently still done manually without the support of a system that can speed up, improve efficiency, save time, and costs. Next, determining solutions that are considered in accordance with the strategic plan for system development at Unmaris Sumba in the next five years. Based on the results of the gap analysis and proposed solutions to the problems found in the new student admission business process at Unmaris Sumba, an appropriate business architecture model was created.

D. Business Architecture

With the implementation of a system that simplifies the process of admitting new students and managing them, it is hoped that prospective new students and management can easily carry out the process of admitting new students and reduce data redundancy. The business process model is the center of attention in the development. illustrated using BPMN 2.0. The processes covered are new student registration and enrollment, as shown in Figures 2 and 3 below.

Upcoming new student admission process

1) The new student registration process can be seen in the BPMN diagram below.

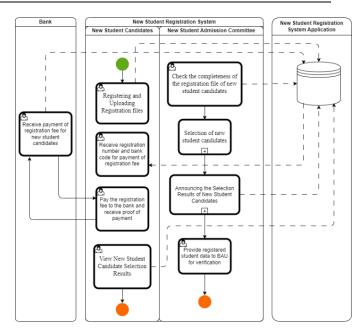


Figure 3. Enrollment process

2) The new student registration process can be seen in the BPMN diagram below.

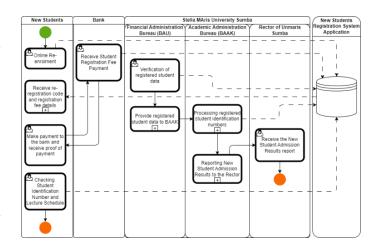


Figure 4. Registration process

E. Data Architecture

Data architecture aims to identify data entities to support business functions at Unmaris Sumba. The initial stage in creating a data architecture is to compile a list of required data entities, as seen in Table 1.

	TABEL I
DATA	ARCHITECTURE

Entity	Data Entity	
	New Student Candidates	
New Student Enrollment	New Student Admission	
	Committee	
	Bank	
	New Students	
	Bank	
New Student Registration	Financial Administration Bureau	
	Academic Administration Bureau	
	Rector of Unmaris Sumba	

1) Entity Relationship Diagram of New Student Enrollment Data

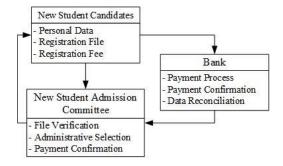


Figure 5. Entity Relationship Diagram of New Student Enrollment Data

Explanation of Enrollment Data Entity Relationship.

New Student Candidate → New Student Admission Committee: Prospective new students send personal data and registration files to the Admissions Committee. After the files are received, the Admissions Committee conducts administrative verification and selection.

Prospective New Student →Bank: Prospective new students make payments of registration fees or other fees through the bank. The bank processes payments from prospective new students and provides proof of payment.

Bank → Admissions Committee: The bank sends confirmation of payment to the Admissions Committee. The Admissions Committee receives confirmation from the bank and verifies the payment made by prospective new students.

New Student Admission Committee → Prospective New Student: After file verification and payment confirmation, the Admissions Committee informs the prospective new students of their registration status.

With this diagram, the relationship between the data entities "Prospective New Student", "New Student Admission Committee", and "Bank" can be clearly seen, showing how the data flow and payment process occurs in the new student admission system at Stella Maris Sumba University.

2) New Student Registration Data Entity Relationship Diagram

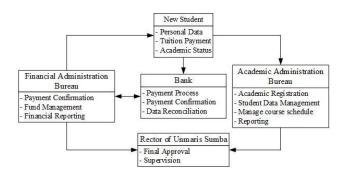


Figure 6. New Student Registration Data Entity Relationship Diagram

Explanation of Registration Data Relationship

New Student → Bank: New students make tuition payments through the Bank. The bank processes the payment and provides confirmation of payment to the New Student.

Bank → Financial Administration Bureau: The bank sends payment confirmation to the Financial Administration Bureau. The Financial Administration Bureau verifies and manages the payment data received from the Bank.

Financial Administration Bureau → New Student: After confirmation from the Bank, the Financial Administration Bureau informs the payment status to the New Student. The Financial Administration Bureau ensures that the payment has been made correctly before academic registration continues.

New Student → Academic Administration Bureau: After the payment is confirmed, the New Student conducts academic registration at the Academic Administration Bureau. The Academic Administration Bureau manages the New Student's academic data and class schedule.

Bureau of Financial Administration → Rector of Unmaris Sumba: The Financial Administration Bureau reports the financial status and payment of New Students to the Rector. The Rector monitors and supervises the management of funds carried out by the Financial Administration Bureau.

Academic Administration Bureau → Rector of Unmaris Sumba: The Academic Administration Bureau reports registration data and academic status of New Students to the Rector. The Rector makes the final decision regarding academic and administrative policies.

With this diagram, the relationship between the data entities "New Student", "Bank", "Financial Administration Bureau", "Academic Administration Bureau", and "Rector of Unmaris Sumba" can be clearly seen, showing the data flow and processes that occur in the new student admission system at Stella Maris Sumba University.

F. Application Architecture

Application architecture identifies the types of applications needed to process student admission data at Unmaris Sumba. Application architecture does not design the system in detail but rather defines applications that process data and provide information related to business processes to users. Application architecture related to new student admissions at Unmaris Sumba can be found in Table 2.

TABEL II
APPLICATION ARCHITECTURE

Application Group	Application
Navy Student Admission System	Enrollment System
New Student Admission System	Registration System

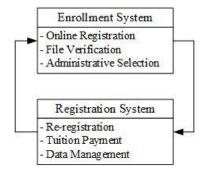


Figure 7. Relationship Diagram between applications

Explanation of Relationship between Applications Enrollment System → Registration System:

Data Flow: After new prospective students register and go through the file verification and administrative selection process in the Registration System, the data of prospective students who pass the selection is forwarded to the Registration System.

Interaction: The Registration System sends information related to registration status and selection results to the Registration System for further processing.

Registration System → Enrollment System:

Feedback: The Registration System can send feedback or status of re-registration and repayment to the Registration System for complete data recording and integration of new students.

Data Integration: The Registration System manages reregistration, fee payment, and student data management which can then be integrated with the initial data from the Registration System.

With this diagram, the relationship between the "Enrollment System" and "Registration System" applications and the data flow that occurs can be clearly seen, showing how the new student admission process at Stella Maris Sumba University runs in an integrated and efficient manner.

G. Technology Architecture

The concept of enterprise architecture describes the technical requirements that must exist in the business environment to run an application architecture capable of managing data. Technology architecture can be defined as the infrastructure requirements provided to support the data and application architecture used by the enterprise. Technology principles are designed to recognize the types of technology needed to support applications and data architecture. This principle is adjusted to the development of information technology, business models, data architecture, and application architecture. The development of technology architecture is very important in supporting the business processes of new student admissions at Unmaris Sumba. The technology architecture related to new student admissions at Unmaris Sumba can be found in Table 3.

TABEL III TECHNOLOGY ARCHITECTURE

Technology		
1.	Internet and Network Architecture	
2.	Server	
3.	Personal Computer (PC)	
4.	Hardware	

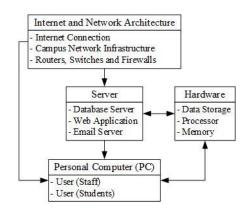


Figure 8. Diagram of the Relationship between Technology

Explanation of Relationship between Technologies

Internet and Network Architecture → Server: Internet Connection and Network Infrastructure: Internet connections and campus network infrastructure connect servers to the internet, ensuring that servers are accessible from outside and inside the campus. Routers, Switches, Firewalls: Network devices such as routers, switches, and firewalls manage data traffic and network security, ensuring secure and efficient communication between servers and users.

Server → Hardware: Data Storage, Processors, Memory: Servers use hardware such as data storage, processors, and memory to run web applications, databases, and email

servers. Hardware provides the storage capacity and processing power required for server operations.

Internet and Network Architecture → Personal Computer (PC): Network Connections: Personal computers (PCs) are connected to the internet and campus network through connections managed by the network infrastructure. This allows users (staff and students) to access applications and services provided by the server.

Server → Personal Computer (PC): Access Applications and Services: Personal computers (PCs) are used by users to access web applications, databases, and email services provided by the server. The PC serves as the endpoint where users interact with the admission system.

Hardware → Server and Personal Computer (PC): Hardware Support: Hardware supports server operations by providing computing power and storage. Likewise, hardware supports PCs to run client applications and access server services.

With this diagram, the relationship between the technologies "Internet and Network Architecture", "Server and Personal Computer (PC)", and "Hardware" can be clearly seen, showing how these technology components interact and support the new student admission system at Stella Maris Sumba University.

H. Implementation

Enterprise architecture (EA) can be implemented for the new student admission system at Unmaris Sumba. Application development is also needed to plan new student admissions for the next few years. Application development is tailored to the needs of business processes at Unmaris SMS Sumba. The management of Unmaris Sumba who are directly involved in the system to be built, especially the Rector, Academic Administration Bureau (BAAK), and Financial Administration Bureau (BAU), feel very enthusiastic about the plan to create a new student admission system at Unmaris Sumba so that it can simplify, speed up, and save time and costs in carrying out the business processes of the institution in terms of new student admissions, and hope that the implementation process will be carried out immediately in the first year of the institution's strategic plan for the next 5 years. The business functions and application systems needed by Unmaris Sumba can be seen in Table 4.

TABEL IV
APPLICATION ARCHITECTURE

Business Functions	Application	Status
New Student Admission	Enrollment System	Planned/potentially built
System	Registration System	Planned/potentially built

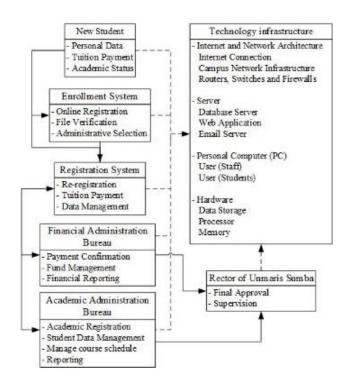


Figure 9. Overall Enterprise Architecture Result Diagram

Explanation of the overall Enterprise Architecture result diagram:

Rector of Unmaris Sumba: Makes the final decision and oversees the entire new student admission process.

Envirollment System: Application for online registration, file verification, and administrative selection of new student candidates. Sends verified data to the Registration System.

Registration System: Application for re-registration, fee payment, and new student data management. Manages re-registration and fee payment, and student data management.

New Student: Personal data and registration status of new students. Interacts with the Enrollment System and Registration System.

Financial Administration Bureau: Manage payment confirmation and fund management. Interacts with the Registration System and reports financial status to the Rector. Academic Administration Bureau: Manages student data and class schedules. Interacts with the Registration System and reports academic status to the Rector.

Technology Infrastructure:

Internet and Network Architecture: Connecting servers and personal computers with internet connections and campus network infrastructure. Servers: Running web applications, databases, and email servers. Personal Computer (PC): Used by users (staff and students) to access applications. Hardware: Provides the computing power and storage required by the server and PCs.

With this diagram, the relationship between data entities, applications, and technology can be clearly seen, showing

how these components interact and support the new student admission system at Stella Maris Sumba University as a whole.

I. Implications

This research shows Unmaris Sumba's efforts to improve the new student admission system by implementing the Enterprise Architecture model. This model is intended to provide a strong basis for managing the new student admission process, from the registration stage to the final decision. This method is expected to improve operational efficiency, integrated data management, and student experience. In addition, there will be a focus on data security and the ability to integrate with other systems, which will result in an efficient system that can grow according to the needs of the school. This journal aims to explain how the application of the Enterprise Architecture model can be a strategic step to improve the quality and competitiveness of Unmaris Sumba by providing optimal new student admission services. The following are some rare practical implications that can be identified:

- Increasing the Efficiency of the New Student Admission Process: Implementation of the enterprise architecture model can help improve efficiency in the new student admission process at Unmaris Sumba. Process optimization steps can include automation, real-time monitoring, and data integration to speed up admission decisions.
- Simplification of Student Data Management: This model can make a significant contribution to simplifying new student data management, including the registration process, verification, and management of student personal information. Data integration can reduce duplication and manual errors, improving data accuracy and availability.
- Improved Student Experience: With the enterprise architecture model in place, the student experience of accessing and managing their personal information is expected to be smoother. Features such as student portals, notifications, and easy access to academic information can have a positive impact on student satisfaction.
- Enhanced Data Security: The implementation of an enterprise architecture model should consider data security aspects, including encryption and strict access rights settings. This will help protect student information from potential security threats, such as data theft or unauthorized access.
- Integration with Other Systems: The model may also enable better integration with other systems in the educational institution, such as academic, financial, and human resource systems. This can create a more integrated information ecosystem and support holistic decision-making.
- Customization and Development Capability: An enterprise architecture model can provide a strong foundation for the ability to customize and develop new

- admissions systems in accordance with evolving institutional and regulatory needs.
- Maintenance and Technical Support: The implementation of this model also implies the need for a solid technical support infrastructure and an ongoing maintenance strategy for the system to operate optimally in the long term. Through the application of the enterprise architecture model in the new student admission system, Unmaris Sumba is expected to utilize this potential to improve efficiency, service quality, and data security, which in turn can have a positive impact on the student experience and overall institutional performance.

IV. CONCLUSION

Unmaris Sumba is one of the private universities in Sumba, NTT Province. Unmaris Sumba was established in 2008 and is located in Tambolaka City, Southwest Sumba Regency. Unmaris Sumba, as one of the private universities in Sumba, always strives to improve the quality of institutional management, academic service management, and curriculum according to the vision and mission of Unmaris Sumba. The utilization of information technology in higher education, especially the new student admission system at Unmaris Sumba, still does not have a qualified architecture. Information technology infrastructure can be implemented for the new student admission system at Unmaris Sumba. Application development is also needed to plan new student admissions for the next few years. Application development is tailored to the needs of business processes at Unmaris Sumba to respond quickly, accurately, effectively, and efficiently.

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