Design of Enterprise Architecture Information System Practicum Scheduling in Computer Laboratory STMIK WIDYA CIPTA DHARMA Samarinda using TOGAF ADM Method

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Abstract. Technology development happens incredibly fast, it has been proven with the increase of technology’s role in many aspects. STMIK Widya Cipta Dharmo Samarinda has been one of the private university that has been accredited by BAN-PT. The university was solicited to increase the learning and service quality, including in the administration practical schedule. In STMIK Widya Cipta Dharmo Laboratory. The problem that usually happens is the schedule of practical work clashes with the learning schedule in the classroom. Enterprise Architecture contains the meaning of planning, classification, definition, and connectivity plan. From multiple components that arrange an enterprise in the form of model and picture. Because of that, the work planning which used in this research is TOGAF. The surplus of TOGAF is focused on the implementation cycle of the Architecture Development Method (ADM). Because of that, the work planning which used in this research is TOGAF. From the research, the conclusions are: (1) The implement of schedule processing is done by using Microsoft excel. (2) An information system that handles schedule management not yet. (3) Technology platforms supporting candidate applications are suggested to focus on processing schedules. Thus the design of this enterprise architecture can be used to design laboratory architecture from schedule information.

1. Introduction
The development of information technology is very influential in the delivery of information to users. The use of information technology that is fast, precise and accurate is a way to provide added value in the form of competitive advantage in the organization's business competition, STMIK Widya Cipta Dharmo Samarinda is one of the private campuses in Samarinda City, in which there are 3 Study Programs namely Informatics Engineering, Information Systems, and Information Management.

Every semester the Wicida STMIK Computer Laboratory Serves around 1000 Students to carry out Practicum. To provide maximum service to students, it is only natural that an information system is built, especially for practicum scheduling, which aims to manage practicum schedules in order to run optimally. The problems that exist when making the practicum schedule are how to balance a number of things such as the class schedule lectures that may not occur in common and the use of the laboratory at the time of the practicum. besides that, the existing information system is not integrated between one system with another system, in this case, it becomes a problem This is the background for the design of Enterprise Architecture which aims to produce blueprints. Enterprise Architecture can facilitate business success to be effective by using information management strategies and IT resources. Competitive advantage depends on
customer satisfaction, process life cycle, resource management, task allocation and scheduling, and cost estimation [1]. In this Enterprise Architecture design using a method of Architecture Development (ADM). TOGAF ADM is a result of the continuous contribution of architecture practitioners. TOGAF ADM is a method for developing and managing the Enterprise Architecture life cycle. ADM makes the TOGAF perspective integrated into the document architecture to meet the needs of businesses and organizations [2,3].

2. Methods

The method used in the company's architecture design is based on the TOGAF ADM literature study, direct observation, and interviews with the Head of the Laboratory. At the initial stage, is direct observation, collecting documents in the process and conducting interviews. The study was conducted at Widya Cipta Dharma STMIK Laboratory. The interview process with the Head of Laboratory, then the problem is obtained, the vision of architecture, business architecture, information system architecture and Technology Architecture. So it can be made a blueprint for enterprise architecture by referring to the enterprise architecture framework in use today. The basic structure of the TOGAF ADM can be seen in Figure 1.

![Figure 1. The Basic Structure of the TOGAF ADM](image)

The EA must determine several features of the TOGAF methodology such as level of detail, the extent of coverage, and level and time. TOGAF ADM is the result of ongoing contributions from a large number of architectural practitioners. It describes methods for developing and managing the life cycle of Corporate Architecture and forms the core of TOGAF. It integrates the TOGAF elements described in this document as well as other architectural assets that are available to meet the needs of businesses and their organizations [4,5]. TOGAF ADM has 2 parts namely Architectural Context and Architecture Development. in the architectural context, there are initial phases and architectural vision. then in architecture development, there are business architecture, information system architecture, and Technological Architecture. [6]. This research uses a case study descriptive approach. To understand the phenomena that have been focused more deeply, the method used in research is quantitative methods [7]. The method used in this study was divided into 3 processes, namely
literature study, Early Stage (TOGAF), Data collection Literature study as a reference to get the design process includes several ways, as follows: Literature search, namely research carried out by exploring the literature that is relevant and related to the research topic under study [7]. Direct observation of the company by conducting interviews with relevant parties. Early Stage (TOGAF) This phase allows defining the organizational-specific architecture framework and the principles of architecture. According to Dave Hamford, this phase is not an architectural development phase [8]. After determining the stages that will be carried out in the preliminary stage, the data collection will begin by observing and interviewing the Laboratory directly.

The method is illustrated in Figure 2

![Figure 2. Model Design [9].](image)

3. Results and Discussion
The results of research conducted at Widya Cipta Dharma STMIK Computer Laboratory using TOGAF ADM with the Architecture Development Method (ADM) model as the development of work which includes 5 phases of activities such as the initial phase, architectural vision phase, business architecture phase, information system architecture phase, and architecture phase technology. The following are the results of the steps that have been carried out. Initial phase The first phase is the preparation phase, the preparation phase (Initial Phase) is the stage to determine the scope of the Corporate Architecture (EA) that will be developed and determine the commitment with management in the development of information systems architecture. Architectural Vision Phase In the second phase is the phase of architectural vision, which is the phase in which to create a vision that will be used as a benchmark in architectural design. In this phase, all must abide by the agreed vision of both outsiders and those in the Computer Laboratory itself. Business Architecture Phase In the phase of business architecture is an overview of existing business processes that will be designed to be aligned with business processes in the STMIK Widya Cipta Dharma laboratory. This description can be seen in Figures 3 and 4.
Figure 3. A Running Business Flow

Figure 3 is a business flow that is running at this time in making a practicum schedule that will be used in 1 semester. Next to the figure 4 is a business flow that will be proposed.

Figure 4. Proposed Business Flow
Figure 4 is a business flow that will be proposed, the difference is that the flow that is currently running is in the laboratory can process the data of students who will take part in a practicum in one semester. So as to minimize the occurrence of clashes with courses in class. In information systems, the architecture phase is an information system architecture phase that will be developed by emphasizing an aspect of application architecture, data architecture, and technology architecture. Application Architecture, The purpose of the application architecture section of the Information Systems architecture phase is to develop the architecture of an application that has a target of business architecture and vision. Architecture can run. The platform needed for students is a practicum scheduling system and can download a module that is expected to function adequately, based online and in real-time so that students can get scheduling information anytime and anywhere. This has an impact on achieving business functions, especially in Widya Cipta Dharma STMIK Laboratory. This description can be seen in Figures 5.

The following is Figure 5 is a use case diagram on the operational schedule for making a practicum at a Computer Laboratory that will be used every semester. The next is an explanation of data architecture. In data architecture, Widya Cipta Dharma STMIK Laboratory requires integrated and centralized data from various work units that aim to improve coordination and synchronization of business processes and information can be delivered on time, accurately and relevantly. After the data is integrated, it is expected to create information that is timely, accurate and relevant to students. Architectural Technology Phase, At this stage, explains the technology architecture can support the vision and business. Information system design that can be integrated by the Computer Laboratory with other sections based on the analysis that has been done previously. It can also be seen In the phase of technology architecture can see the feasibility of infrastructure both in terms of networks and devices used in the previous system. The following architectural technology phases can be seen in Tables 1 and 2.
Based on Table 1, it can be concluded that the architecture of software technology will develop as a framework and DBMS to support systems that run in the Computer Laboratory. While in terms of hardware are as follows:

**Table 1. The software of Technology of Architecture**

| No | Type                  | Current Software | Expected Software                  |
|----|----------------------|------------------|------------------------------------|
| 1  | Server Operating System | Using Linux      | Using Linux and the 4th generation |
| 2  | Framework            | CodeIgniter      | CodeIgniter and Flutter            |
| 3  | DBMS                 | MySQL            | MySQL                              |

**Table 2. The hardware of Technology of Architecture**

| No | Type            | Current hardware | Expected Hardware                  |
|----|-----------------|------------------|------------------------------------|
| 1  | Server          | Server Core i7   | Third Party Data Center            |
| 2  | Storage         | Ram 8GB, Hardisk Unlimited | Ram 8GB, Hardisc Unlimited |
| 3  | Supporting Media | My Personal Computer | Personal Computer |

Based on Table 2 it can be concluded that the hardware technology architecture will develop such as servers and media supporting systems in the Laboratory. Next is a topology currently running in the Laboratory (see Figure 6).

**Figure 6. Running Laboratory Network Topology**

The Following Figure 6 is a computer network structure that runs and is used as a data migration process practicum that exists at this time. This network structure is only a means of migrating data from the practicum process in the Laboratory that can be accessed when the practicum runs according to a predetermined schedule. Data requirements for practicum support can also be accessed through several PCs / Computers in each laboratory (see Figure 7).
The following figure 7 is a computer network structure that will be proposed and is expected to be used as a data migration tool for the practicum process. This network structure is only a means of migrating data from the practicum process in the Laboratory that can be accessed when the practicum runs according to a predetermined schedule. Data requirements for practicum support can also be accessed through several PCs / Computers in each laboratory, but the difference from the proposed topology is that a practicum schedule can be accessed anywhere and anytime.

4. Conclusion
The conclusion of the application of TOGAF ADM in STMIK Laboratory Widya Cipta Dharma can be concluded that the process of designing an enterprise architecture using TOGAF ADM can be used with documents and processes that are running and is able to produce a blueprint to create scheduling information systems so that they can support sustainable business processes, solutions offered for practicum scheduling information systems is a platform and integration of mobile and web-based technologies so that Students are a practicum scheduling system and can download a module that is expected to function adequately, online-based and in real-time so that students can get scheduling information when only and everywhere.

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