Developing Enterprise Architecture Using Togaf 9.1 for It Master Plan in the Graduate Program of Institute of Informatics and Business Darmajaya

by Dr. Sutedi, S.kom., M.t.i

Developing Enterprise Architecture Using Togaf 9.1 for It Master Plan in the Graduate Program of Institute of Informatics and Business Darmajaya

Sutedi[1], Nirmala Handayani[2]

[1]Department of Information Systems, [2]Department of Informatics Engineering, Graduate Program
Institute of Informatics and Business Darmajaya
ZA Pagar Alam Street No.93, Gedong Meneng, Lampung, Indonesia
e-mail: [1]sutedi@darmajaya.ac.id, [2]irmalahandayani13@gmail.com

Abstract : The graduate program of Institute of Informatics and Business (IIB) Darmajaya established in September 2009. This graduate program had two programs, e.g., Master of Management (MM) Program and Master of Informatics Engineering (MTI) Program. The implementation of the educational services in this graduate program carried out through computer devices and had not used a special system. The data of the educational services had been stored into personal computers (PCs) and the the back-up data were managed into offline medium through external hard disks. The problem statement of this study was that there was a high risk of the data damage / loss so that the act of violating the acceptable standards of the educational standards emerged. The importance of excellent service and good data security of the graduate proogram of IIB Darmajaya created the ideal IT support. The objective of this study was conducting the IT Master Plan to support the implementation of all educational services of the graduate program of IIB Darmajaya. This IT Master Plan carried out through an enterprise scale. The Togaf 9.1 was a framework for enterprise architecture development that provided a comprehensive approach to designing, planning, implementing, and managing the enterprise information architecture. TOGAF 9.1 assessed through the business needs of the graduate program of IIB Darmajaya. Therefore, the graduate program of IIB Darmajaya had a master plan for IT development used as a guide for implementing IT at the institution level. The targeted IT development plan in accordance with the users' needs and requirements also increased the effectiveness of IT implementation in order to improve the service quality and guarantee the data security at IIB Darmajaya.

Keywords: NodeMcu TOGAF 9.1, Postgraduate, Enterprise

1. INTRODUCTION

The Graduate Program of Institute of Informatics and Business (IIB) Darmajaya was established in September 2009. The Graduate Program had two programs e.g., Master of Management and Master of Informatics Engineering. Master of Management was managed under Faculty of Economics and Business and Master of Informatics Engineering was managed under Faculty of Computer Science.

The implementation of the educational services at the Graduate Program of IIB Darmajaya was carried out through a computer device without a special system for 11 years. The data of this educational services had been stored on the personal computers (PCs) by the graduate secretariat staffs. It was periodically backed up to offline media (external hard disks). It had a high risk of the data damage / data losses and caused a misuse of the education services. The preparation of the IT Mater Plan for this Graduate Program was carried out on an enterprise scale sp that a good framework was needed to solve this. Several studies had been carried out through the preparation of an enterprise architecture (EA) in higher education, e.g., Reference [1] through TOGAF for planning EA higher education at the University of Lampung and Reference [2] EA compilation for higher education institutions using the TOGAF Architecture Development Methodology (ADM); References [3] IT Master Plan planning for higher education at Pamulang University; and,

Reference [4] procurement guide and information system development compilation at STIKES XYZ through TOGAF.

Referring to the previous study that had been described above, this study chose TOGAF as the framework used in the preparation of the IT Master Plan Graduate Darmajaya Graduate Program. The TOGAF version used in this study was TOGAF 9.1. including data, function, network, people, time, and motivation [4].

The implementation of the training and competency testing services in IIB Darmajaya used a stand-alone information system and had not been integrated with the finance, department, academic, and graduate and student affairs departments. This caused the educational services and the administrative services needed by the leaders and lecturers to be hampered. From this problem, this study was focusing on the enterprise architecture through the TOGAF framework in order to develop an integrated database of each unit.

2. LITERATURE REVIEW

The Open Group Architecture Framework (TOGAF) was originated from The Technical Architecture for Information Management (TAFIM) based at the United States Department of Defense. The Open Group Architecture Framework (TOGAF) was adopted later by the Open Group in the mid-1990s. The Open Group Architecture Framework (TOGAF) was the framework and the method that was able to be widely accepted in the development of Enterprise Architecture (EA). Its specification was first introduced in 1995 as TOGAF 1.0. In early 2004, TOGAF 8 (Enterprise Edition) was released. TOGAF 9 had currently been released to complement the previous versions as a whole.

Figure 2.1 was TOGAF 9.1 ADM Stages. The Architecture Development Method (ADM) was the methodology for the architectural design in TOGAF. ADM was the comprehensive, integrated process for developing and maintaining an EA. ADM was a key element of TOGAF [5] [6] and the core [7] to develop and manage the EA life cycle [8].

A good EA was enabled to strike the right balance between information technology efficiency and business innovation. This enabled individual business units to innovate in a safe manner used to pursue their competitive advantage. The purpose of EA was to optimize the entire company into an integrated environment that was responsive to change and supports business strategy. A good EA brought important business benefits and was able to be clearly seen in organizational reports.

TOGAF had several characteristics explained in the following points.

1. It was an open-standard framework [9].
2. The TOGAF approach was holistic [7] [10] [11].
3. TOGAF was able to integrate a variety of different systems
4. TOGAF was generic and flexible [9] [12] [13] because TOGAF was able to anticipate a variety of artifacts that appeared in the design process (TOGAF-based resource provided various reference materials), TOGAF standards were widely accepted, and TOGAF was able to cope with various changes. .
5. TOGAF focused on the implementation cycle (ADM) and processes [14].
6. TOGAF was relatively easy [15] to implement.
7. TOGAF was open source [9] [12] so it did not side with vendor technology.

The following was six components generally owned by TOGAF 9:

a. The Architecture Development Method (ADM)
    This component described the management of EA. ADM had provided several tested and repeatable processes for developing architectures. Each of ADM phases was shown in Figure 1. [10] [16] showed a sequence of iterative steps for developing an enterprise-wide architecture that iterated the process.

Figure 1. TOGAF 9.1 ADM Stages.

b.   ADM Guidelines and Techniques
     This component described the process of ADM. TOGAF 9 ADM contained a collection of
     guidelines and techniques used in the application of TOGAF and ADM. The guidelines were
     used to which the ADM process was adapted, while the techniques were used while the ADM
     process was implemented. On the one hand, the example of the use of guidelines was shown
     in Figure 2. where the guidelines were used to apply iterations to ADM [16]. The figure
     showed the iterative concept and potential strategies for applying iterative concepts to ADM.
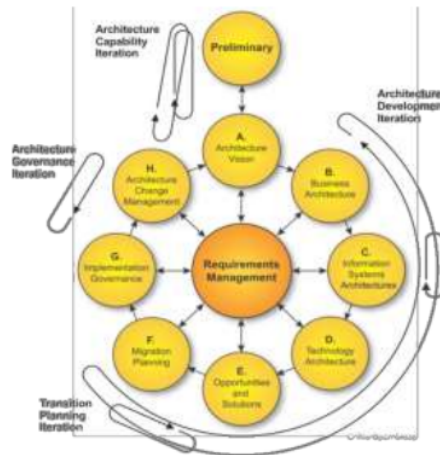

Figure 2. Iteration guidelines for ADM TOGAF 9.1

Furthermore, Figure 2. presented the guidelines to implement ADM at various levels of companies [16]. The different types of architectural involvement occurred at different levels of the company. In addition, the guidelines were also used to demonstrate security and ADM architectures. They provided an overview of specific safety considerations that should be considered during different phases of ADM. Furthermore, the guidelines also showed the SOA concept supported by the TOGAF framework.
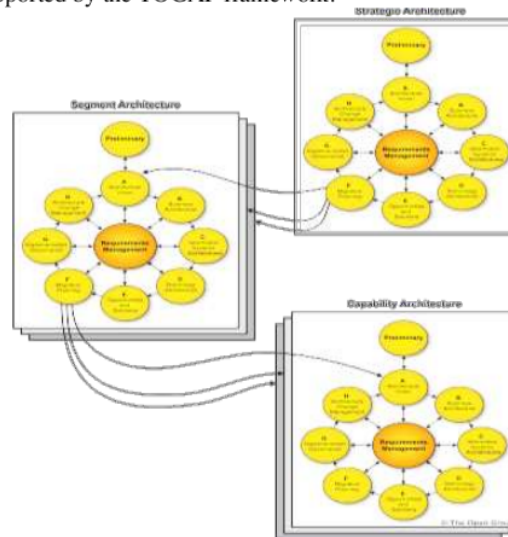

Figure 3. Guidelines for implementing ADM TOGAF 9.1 at various company levels

On the other hand, the application of techniques was exemplified in conducting gap analysis from which these techniques were used in the TOGAF ADM to validate the developed architecture.

Figure 4. Architecture content framework

3. METHOD

This study discussed the process of developing information technology (IT) blueprint needed to support performance improvement in the Operations Planning and Control Division of the Bandar Lampung Police. Moreover, the method chosen in this study was TOGAF 9.1. The data collection was based on the result of the reference of the study [20] compared the top 4 EA Frameworks, e.g., Zachman Framework, TOGAF, Federal Enterprise Architecture (FEA) Framework, and Gartner Framework through a Likert scale (1 = Very Bad, 2 = Inadequate, 3 = Good, and 4 = Very Good). The 12 criteria were used to evaluate the four frameworks. TOGAF and FEA showed the highest average score. Furthermore, TOGAF had strength because it only had one weakness in the maturity model criteria; while, the FEA had two weaknesses seen on the criteria of the business focus and the time to value. The result of the assessment was presented on Table 1.

Table 1. Result of the Assessment

Criteria	Zachman	TOGAF	FEA	GARTNER
Taxonomy completeness	4	2	2	1
Process completeness	1	4	2	3
Reference-model guidance	1	3	4	1
Practice guidance	1	2	2	4

Table 1. Result of the Assessment (continue)

Criteria	Zachman	TOGAF	FEA	GARTNER
Maturity model	1	1	3	2
Business focus	1	2	1	4
Governance guidance	1	2	3	3
Partitioning guidance	1	2	4	3
Prescriptive catalog	1	2	4	2
Vendor neutrality	2	4	3	1
Information availability	2	4	2	1
Time to value	1	3	1	4

The data collecting technique was carried out through two techniques e.g., interviews and observation. These two techniques were chosen because they were the most suitable for extracting information and getting a clear picture of the object of research. In this matter, the object under study was the implementation of th educational process of the Graduate Program of IIB Darmajaya.

There were several stages set out in TOGAF as follows:

a. Preliminary Phase

This phase required the preliminary phase to develop the architectural capabilities e.g., customizing TOGAF and defining architectural principles. The purpose of this phase was making the architectural processes successful. In this phase, the architecture must be specified through who, what, why, when, and where questions.

1. What was the scope of the business?
2. Who would be responsible for working on the architecture?
3. Where the architecture would be allocated? how was its role?
4. How did EA determine? How were framework and methods used to capture information?
5. When was the completion of the architecture?
6. Why was this architecture built? This related to the organizational goals; and, how did the architecture meet organizational goals?

b. Phase B: Business Architecture

This phase included the developing business architecture to support the architectural-agreed vision. At this stage, the general tools and methods for modeling were: Integration Definition (IDEF) and Unified Modeling Language (UML). They were used to build the required model. Some of the objectives of this phase were as follows.

1. Describing a basic business architecture description.
2. Developing business architecture objectives,
3. Outlining product and / or service strategies and geographic, informational, functional and organizational aspects of the business environment based on business principles, business objectives and strategic drivers.
4. Doing the gap analysis between the current architecture and goals.
5. Determining the relevant point of view that allowed the researcher to demonstrate how stakeholder intent was achieved in the business architecture.
6. Determining the relevant tools and techniques used in the selected viewpoint.

Some of the steps taken in this phase were as follows.

1. Developing a description of the current business architecture to support the target business architecture.
2. Identifying reference models, viewpoints and tools
3. Complementing the business architecture
4. Conducting gap analysis and make reports

c.   Phase C: Information Systems Architectures

At this stage, the information system architecture was developed. The definition of information system architecture in this stage included the data architecture and application architecture used by the organization. The data architecture focused more on how the data was used for the needs of business functions, processes, and services. The techniques used in this study were the Entity Relationship Diagrams, Class Diagrams, or Object Diagrams. The objective of this phase was developing the architecture in the data and application domains. The scope of the business processes supported in the phase C was limited to the processes supported by IT and the interfaces of those processes related to non-IT. The implementation of this architecture needed not to be in the same order, however, the precedence was needed. Some of the steps required to create the data architecture were as follows:

1. Developing a description of the basic data architecture.
2. Reviewing and validating of principles, reference models, viewpoints and tools.
3. Creating architectural models
4. Choosing a data building block architecture
5. Completing the data architecture
6. Performing the gap analysis of current data architecture with target data architecture and create reports.

d.   Phase D: Technology Architecture

Developing the technology architecture was started from determining the type of technology candidate by requiring Technology Portfolio Catalog including the software and hardware. In this stage, it also considered the alternatives needed in determining the technology. Some of the steps needed to create technology architecture were as follows:

1. Creating basic descriptions in TOGAF format
2. Considering different architectural reference models, viewpoints and tools.
3. Creating an architectural model from building blocks.
4. Selecting the portfolio services required for each building block.
5. Confirming that the business objectives are being achieved.
6. Determining the specification selection criteria.
7. Completing the architectural definition.

8. Conducting a gap analysis between current technology architectures and technology architectures target.

4. RESULT AND DISCUSSION

a. Preliminary Phase. This phase required the preliminary phase to develop the architectural capabilities e.g., customizing TOGAF and defining architectural principles. The purpose of this phase was making the architectural processes successful. In this phase, the architecture must be specified through who, what, why, when, and where questions.

1. Scope of Organization

The organization was the Graduate Program of IIB Darmajaya. It had supporting activities related to management. This Graduate Program was described through the value chain (Michael Porter) as it was shown in Figure 5.
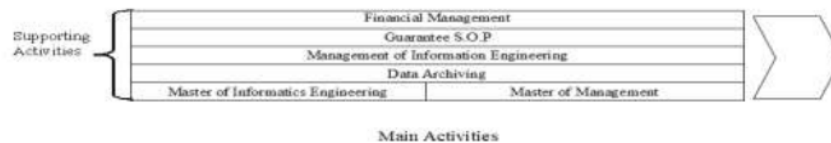
Figure 5. Value Chain of Graduate Program of IIB Darmajaya

2. Organizational Business Processes

The description of the Graduate Program of IIB Darmajaya was:

a) Main Activities

1. Master of Informatics Engineering

Master of Informatics Engineering was the main activity which had a scope of functions based on the Circular Letter of Alfian Husin Foundation. There were several business functions or activities as follows:
- Execution of Entrance Exams,
- Course Preparation
- Final Student Graduation Evaluation
- Course Conversion
- Lecturer evaluation

2. Master of Management

Master of Management had the same business function as follows:
- Execution of Entrance Exams,
- Course Preparation
- Final Student Graduation Evaluation
- Course Conversion

b) Supporting Activities

1. Financial Management

Organizational management activities in support of the main activities related to funding and budget planning and investment. The business functions were:
- Checking the organization's revenue and expenditure budget.
- Managing of financial funds.

2. Guaranteed Standard Operating Procedures

Quality assurance activities in support of main activities related to Standard Operating Procedures (SOP) and the main performance indicators (KPIs) of the organization. The business functions in TC activities were:
- KPI socialization.
- Assistance in making SOP.

- SOP for checking.
- Internal audit.
- External audit.
- Curriculum Syllabus Development

c) Information Technology Management (PTI)

Information Technology Management Activities in supporting the main activities of developing application software and information technology. Business functions in PTI activities were:

1. Analyzing the needs of the application program.
2. Making application programs.
3. Doing the test programs with users.
4. Doing Program adjustments according to user requirements.
5. Doing Program socialization to users.
6. Doing Maintenance program.

d) Data Management (PD)

Data Management activities were related to the data belonging to the Graduate Program students. The PD activities were:

1. Doing exam validation
2. preparing Academic calendar
3. Inputting student data
4. Scheduling Seminar and Thesis Session

3. Organizational Unit

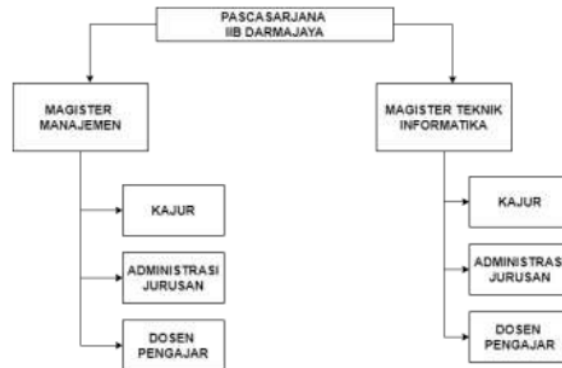The Graduate Program had organizational structures as it was shown on Figure 4.2

Figure 6. Organizational structure

The main tasks and functions in accordance with the organizational structure of this Graduate Program were:

a) Dean

1. Developing Academic Calendar.
2. Having responsibility for the implementation of the work plan and program that will run.
3. Considering, consulting, and proposnig policies related to the field of work carried out by Postgraduate Darmajaya to the Rector.
4. Coordinating the sections in carrying out tasks relating to teaching and learning activities.

    5. Providing the directions and orders to subordinates regarding teaching and learning activities at Postgraduate IBI Darmajaya
    6. Controlling / supervising the work of subordinates optimally.
b)   Head of Department (Kajur)
    1. Making plans and work programs in accordance with the current curriculum.
    2. Monitoring and ensuring the implementation of all work established plans and programs
    3. Conducting Course Conversion.
    4. Monitoring the process of procurement and distribution of exam questions (new student admissions, UTS and UAS)
    5. Monitoring the course of teaching and learning activities in their respective departments.
    6. Monitoring the activities of the thesis proposal seminar to the thesis trial.
    7. Evaluating Department Lecturers.
    8. Doing Final Evaluation of Student Graduation.
c)   Department Administration
    1. Verifying student payments.
    2. Coordinating student activities.
    3. Preparing for the implementation of lectures.
    4. Coordinating exam questions.
    5. Coordinating the proposal seminar activities to the thesis session.
    6. Doing activity information to students.
d)   Lecturers.
    1. Carrying out teaching and learning activities.
    2. Making UTS and UAS questions.
    3. Providing exam assessment.
    4. Performing thesis testing.
    5. Providing final exam assessment.
b. Internal User Stakeholders and External Users

In general, stakeholder relationships with business functions were described through the use case diagram modeling as it was seen on Figure 4.3.

Figure 7. Use Case diagram

5. CONCLUSIONS

a. The enterprise architecture is used as a guide for the management of Graduate Program of IIB Darmajaya
b. Business modeling for Graduate Program of IIB Darmajaya had main activities e.g., Masters in Informatics Engineering and Masters in Management; while, the supporting activities included Financial Management, S.O.P Training, Data Management, and Information Technology Management.

ACKNOWLEDGEMENTS

REFERENCES

[1]   G. F. Nama, Tristiyanto, and Di. Kurniawan, "An Enterprise Architecture Planning for Higher Education Using the Open Group Architecture Framework (TOGAF): Case Study University of Lampung," *Proc. 2nd Int. Conf. Informatics Comput. ICIC 2017*, vol. 2018-Janua, pp. 1–6, 2018, doi: 10.1109/IAC.2017.8280610.

[2]   S. Alamri, M. Abdullah, and A. Albar, "Enterprise architecture adoption for higher education institutions," *Int. J. Simul. Syst. Sci. Technol.*, vol. 19, no. 5, pp. 16.1-16.8, 2018, doi: 10.5013/IJSSST.a.19.05.16.

[3]   A. Zein, "Perencanaan IT Master Plan Untuk Perguruan Tinggi Menggunakan Kerangka Kerja Togaf (Studi Kasus Pada Universitas Pamulang)," *J. Ilmu Komput.*, vol. I, no. 01, pp. 34–44, 2018.

[4]   L. Sofyana and A. R. Putera, "Business architecture planning with TOGAF framework," *J. Phys. Conf. Ser.*, vol. 1375, no. 1, 2019, doi: 10.1088/1742-6596/1375/1/012056.

[5]   E. Gunawan and I. Sutedja, "Using Enterprise Architecture with the Open Group Architecture Forum to Design Information Technology Plan Gap Analysis at Bank Pengkreditan Rakyat (BPR)," in *2018 International Conference on Information Management and Technology (ICIMTech 2018)*, 2018, no. September, pp. 388–393, doi: 10.1109/ICIMTech.2018.8528094.

[6]   Z. Chaczko, C. Chiu, A. S. Kohli, and V. Mahadevan, "Smart Hospital Management System: An integration of Enterprise Level Solutions Utilising Open Group Architecture Framework (TOGAF)," in *3rd IEEE International Conference on Computer Science and Information Technology, (ICCSIT 2010)*, 2010, vol. 5, pp. 8–15, doi: 10.1109/ICCSIT.2010.5564121.

[7]   D. Proenca and J. Borbinha, "Enterprise Architecture: A Maturity Model Based on TOGAF ADM," in *IEEE 19th Conference on Business Informatics, (CBI 2017)*, 2017, vol. 1, pp. 257–266, doi: 10.1109/CBI.2017.38.

[8]   I. Y. M. Edward, W. Shalannanda, S. I. Lestariningati, and A. Agusdian, "E-Government Master Plan Design With TOGAF Framework," in *8th International Conference on Telecommunication Systems Services and Applications, (TSSA 2014)*, 2015, pp. 1–6, doi: 10.1109/TSSA.2014.7065957.

[9]   A. Dores, D. Fitrianah, and P. Meilina, "IS/IT Framework for Disaster Mitigation on Forest Fires Using TOGAF," in *5th International Conference on Information Management, (ICIM 2019)*, 2019, pp. 252–256, doi: 10.1109/INFOMAN.2019.8714663.

[10] N. B. Kurniawan and Suhardi, "Enterprise Architecture Design For Ensuring Strategic

Business IT Alignment (integrating SAMM with TOGAF 9.1)," in *Joint International Conference on Rural Information and Communication Technology and Electric-Vehicle Technology, (RICT and ICEV-T 2013)*, 2013, doi: 10.1109/rICT-ICeVT.2013.6741505.

[11] Y. Osadhani, A. Maulana, D. Rizkiputra, E. R. Kaburuan, and Sfenrianto, "Enterprise Architectural Design Based on Cloud Computing using TOGAF (Case Study: PT. TELIN)," in *International Conference on Sustainable Engineering and Creative Computing: New Idea, New Innovation, (ICSECC 2019)*, 2019, pp. 111–115, doi: 10.1109/ICSECC.2019.8907072.

[12] S. Soares and D. B. Styohady, "University in Timor Leste to Support the Strategic Plan of Integrated Information System .," 2014, no. September 2002, pp. 4–9.

[13] A. D. Palupi, Hambali, Fauzan, and R. M. Surosa, "Enterprise Architecture Design for Construction Services Using the Open Group Architecture Framework (TOGAF): Case Study Ministry of Public Works and Housing, Indonesia," in *International Conference on Information Technology Systems and Innovation, (ICITSI 2018)*, 2018, no. 2, pp. 66–71, doi: 10.1109/ICITSI.2018.8696011.

[14] S. Buckl, A. M. Ernst, F. Matthes, R. Ramacher, and C. M. Schweda, "Using Enterprise Architecture Management Patterns to Complement TOGAF," in *13th IEEE International Enterprise Distributed Object Computing Conference, (EDOC 2009)*, 2009, pp. 34–41, doi: 10.1109/EDOC.2009.30.

[15] U. De Fatima Gusmao and D. B. Setyohadi, "Strategic Planning for The Information Development of IPDC (Instituto Profissional de Canossa) Library Using TOGAF method," in *5th International Conference on Cyber and IT Service Management, (CITSM 2017)*, 2017, doi: 10.1109/CITSM.2017.8089289.

[16] "TOGAF 9.1 Framework - A Comprehensive Guide." https://www.visual-paradigm.com/guide/togaf/togaf-91-framework/.

[17] R. Delima, H. B. Santoso, and J. Purwadi, "Architecture vision for Indonesian Integrated Agriculture Information Systems using TOGAF framework," in *2016 International Conference on Informatics and Computing, ICIC 2016*, 2017, no. Icic, pp. 66–71, doi: 10.1109/IAC.2016.7905691.

[18] R. Yuliana and B. Rahardjo, "Designing An Agile Enterprise Architecture For Mining Company By Using TOGAF Framework," in *4th International Conference on Cyber and IT Service Management, (CITSM 2016)*, 2016, doi: 10.1109/CITSM.2016.7577466.

[19] B. Alghamdi, L. E. Potter, and S. Drew, "Desinge and Implementation of Government Cloud Computing Requirements: TOGAF," in *11th International Conference on Telecommunication Systems Services and Applications, (TSSA 2017)*, 2018, vol. 2018-Janua, pp. 1–6, doi: 10.1109/TSSA.2017.8272929.

[20] R. Sessions and J. DeVadoss, "A Comparison of the Top Four Enterprise Architecture Approaches in 2014 by Roger Sessions and John deVadoss Table of Contents," *Microsoft Dev. Netw. Archit. Cent.*, p. 57, 2014.

Developing Enterprise Architecture Using Togaf 9.1 for It Master Plan in the Graduate Program of Institute of Informatics and Business Darmajaya

17 ojs.unikom.ac.id
Internet Source
1%

18 Anita Ratnasari, Devi Fitrianah, Wachyu Hari Haji. "BPTrends Redesign Methodology (BPRM) for the Development Disaster Management Prevention Information System", Proceedings of the 2020 2nd Asia Pacific Information Technology Conference, 2020
Publication
<1%

19 astesj.com
Internet Source
<1%

20 sersc.org
Internet Source
<1%

21 Noora Qotrun Nada, Setyoningsih Wibowo, Mega Novita. "Designing Enterprise Architecture in Koperasi Karyawan using TOGAF Architecture Development", IOP Conference Series: Materials Science and Engineering, 2020
Publication
<1%

22 Rintho Rante Rerung, Asri Wahvuni, Rinasari, Indah Susrini. "Blueprint of Smart Campus System Using TOGAF ADM", 2020 6th International Conference on Computing Engineering and Design (ICCED), 2020
Publication
<1%

23   digilib.uinsgd.ac.id
Internet Source   <1%

24   www.linkddl.com
Internet Source   <1%

25   Yulia Sulistyaningsih, Khairiyah Rizkiyah, Sofian Lusa, Assaf Arief. "Understanding Government Reorganization Impact from Knowledge Management Perspective: A Study Case", 2021 9th International Conference on Information and Communication Technology (ICoICT), 2021
Publication   <1%

26   Setiawardhana Setiawardhana, Rudy Dikairono, Djoko Purwanto, Tri Arief Sardjono. "Ball Position Estimation in Goal Keeper Robots Using Neural Network", International Review of Automatic Control (IREACO), 2020
Publication   <1%

27   Submitted to University of the Western Cape
Student Paper   <1%

28   Submitted to Northern Arizona University
Student Paper   <1%

29   Arif Ridho Lubis, Mahyuddin K. M. Nasution, Opim Salim Sitompul, Elviawaty Muisa Zamzami. "The effect of the TF-IDF algorithm in times series in forecasting word on social
  <1%

media", Indonesian Journal of Electrical Engineering and Computer Science, 2021
Publication

30 docplayer.net
Internet Source
<1%

31 I G S Rahayuda, N P L Santiari. "Dijkstra and Bidirectional Dijkstra on Determining Evacuation Routes", Journal of Physics: Conference Series, 2021
Publication
<1%

32 Submitted to Informatics Education Limited
Student Paper
<1%

33 Submitted to Universitas 17 Agustus 1945 Surabaya
Student Paper
<1%

34 Submitted to North West University
Student Paper
<1%

35 ejournals.umn.ac.id
Internet Source
<1%

36 ojs.unpkediri.ac.id
Internet Source
<1%

37 L Sofyana, A R Putera. "Business architecture planning with TOGAF framework", Journal of Physics: Conference Series, 2019
Publication
<1%

38 Holilah Holilah, Abba Suganda Girsang, Melva Hermayanty Saragih. "Designing IT Blue Print Academic System on Higher Education with Togaf", Advances in Science, Technology and Engineering Systems Journal, 2019
Publication

<1 %

Exclude quotes   On   Exclude matches   Off
Exclude bibliography   Off

Developing Enterprise Architecture Using Togaf 9.1 for It Master Plan in the Graduate Program of Institute of Informatics and Business Darmajaya

FINAL GRADE

/0

GENERAL COMMENTS

Instructor