2014 8th International Conference on Telecommunication Systems Services and Applications

(TSSA 2014)

Kuta Bali, Indonesia
23-24 October 2014

IEEE Catalog Number: CFP1491P-POD
ISBN: 978-1-4799-7448-1

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E-Government Master Plan Design with TOGAF Framework

Case Study: Payakumbuh City Government, Indonesia

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***Abstract*—This paper presents how to implement TOGAF Framework for designing E-Government Master plan. TOGAF is usually used to design Application or Information System, with several audit based on TOGAF in small number of Master plan. The challenge is to use which kind or version of TOGAF that is suitable and try not to trap on the detail design as if is implement on the Application or Information System design.**

TOGAF ADM is chosen to guide the Business, Data, Information System, and Technology Architecture Design, while the Proposed Method is proposed to accomplish solution domains. This proposed method is planned to be submitted to Open Group Organization as enrichment for Enterprises Continuum in TOGAF Framework.

The Proposed Method for E-Government Master plan Design is to cover the Solution, Migration Plan, Implementation Governance, and Change Management Domains. The method contains guideline solution for those domains include the artifacts that are suitable for E-Government Master plan solution.

The Case Study is perform for Local Payakumbuh City Government, the additional challenge is to interpret non TOGAF-wise guidelines from Central Government and effective and economic solution required. Although the case study is perform for local government but the method or tools itself is to make in generals which can be customized as tool for any central government.

***Index Terms*—Master Plan, E-Government, TOGAF, Architecture, Guidelines, Method, Tools, Case Study.**

I. INTRODUCTION

To design good Master plan of E-Government we must choose a good framework that can be has a guidelines, perhaps methods, or even tools. TOGAF is one of the most interesting frameworks that exist and has very rich angle views to design an IT System for the Enterprise.

A. TOGAF Overview

The Open Group Architecture Framework (TOGAF) is a framework for enterprise architecture, which provides an approach for designing, planning, implementing, and governing an enterprise information technology architecture. [1]. TOGAF has been a registered trademark of The Open Group in the United States and other countries since 2011 [2].

TOGAF is a high level approach to design. It is typically modeled at four levels: Business, Application, Data, and Technology. It relies heavily on modularization, standardization, and already existing, proven technologies and products. An architecture framework is a set of tools which can be used for developing a broad range of different architectures [3]. It should:

- describe a method for defining an information system in terms of a set of building blocks
- show how the building blocks fit together
- contain a set of tools
- provide a common vocabulary
- include a list of recommended standards
- include a list of compliant products that can be used to implement the building blocks.

TOGAF is such an architecture framework. The ANSI/IEEE Standard 1471-2000 specification of architecture (of software-intensive systems) may be stated as: "the fundamental organization of a system, embodied in its components, their relationships to each other and the environment, and the principles governing its design and evolution.

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However TOGAF has its own view, which may be specified as either a "formal description of a system, or a detailed plan of the system at component level to guide its implementation", or as "the structure of components, their interrelationships, and the principles and guidelines governing their design and evolution over time."

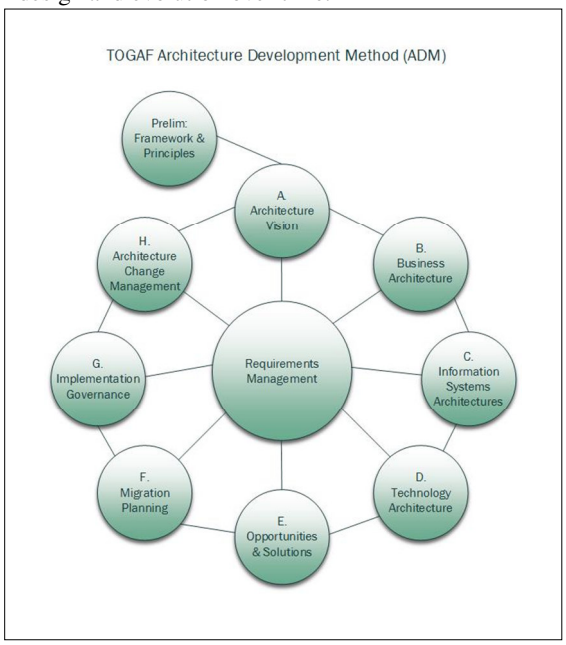

Fig. 1. TOGAF Framework Architecture [4]

B. TOGAF ADM

The Architecture Development Method (ADM) is core of TOGAF which describes a method for developing and managing the lifecycle of enterprise architecture.

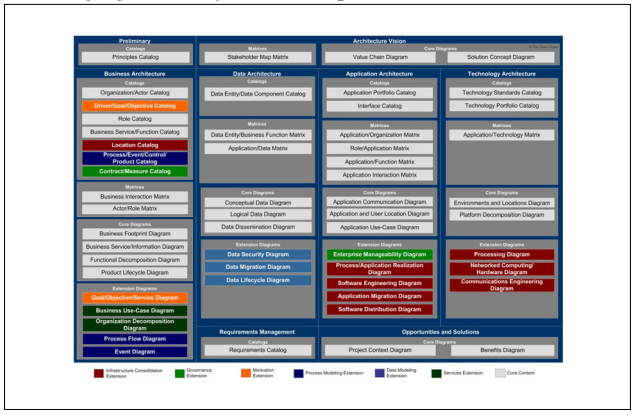

Fig. 2. TOGAF ADM

C. Enterprises Continuum

The Enterprise Continuum is a way of classifying solutions and architectures on a continuum that ranges from generic foundation architectures through to tailored organization-specific both within and outside the Architecture Repository [6]. These include architectural models, architectural patterns, architecture descriptions, and other artifacts. These artifacts may exist within the enterprise and also in the IT industry at large.

II. E-GOVERNMENT MASTER PLAN DESIGN

To design e-government Master Plan TOGAF ADM is chosen as a guideline, the methods and artifact that is required to be present is depict in Figure 2. The process is iterative and cyclic. Each step checks with Requirements Management.

A. The Enterprise Architecture

TOGAF is based on four interrelated areas of specialization called architecture domains:

- Business architecture which defines the business strategy, governance, organization, and key business processes of the organization
- Applications architecture which provides a blueprint for the individual application systems to be deployed, the interactions between the application systems, and their relationships to the core business processes of the organization with the frameworks for services to be exposed as business functions for integration
- Data architecture which describes the structure of an organization's logical and physical data assets and the associated data management resources
- Technology architecture, or technology architecture, which describes the hardware, software, and network infrastructure needed to support the deployment of core, mission-critical applications

B. Proposed Additional Guidelines for E-Government Master Plan Design

The Enterprise Continuum consists of both the Architecture Continuum and the Solutions Continuum. The Architecture Continuum specifies the structuring of reusable architecture assets and includes rules, representations, and relationships of the information system(s) available to the enterprise. The Solutions Continuum describes the implementation of the Architecture Continuum by defining reusable solutions building blocks.

The model in Figure 3 is proposed additional guidelines for the solution continuum specialized on E-Government Master Plan Design. The following describes catalogs, matrices, and diagrams that may be created in each phase in the proposed additional guidelines.

- Opportunities and Solutions
  - SWOT Analysis Diagram
    A SWOT Analysis Diagram shows the strength, weaknesses, opportunities, and threats involved in implementing E-Government.
  - Technical Benefit Catalog
    The Technical Benefit Catalog shows technical opportunities and benefits identified in the master plan. This catalog can be used by stakeholders to make prioritization and sequencing decisions on identified information.

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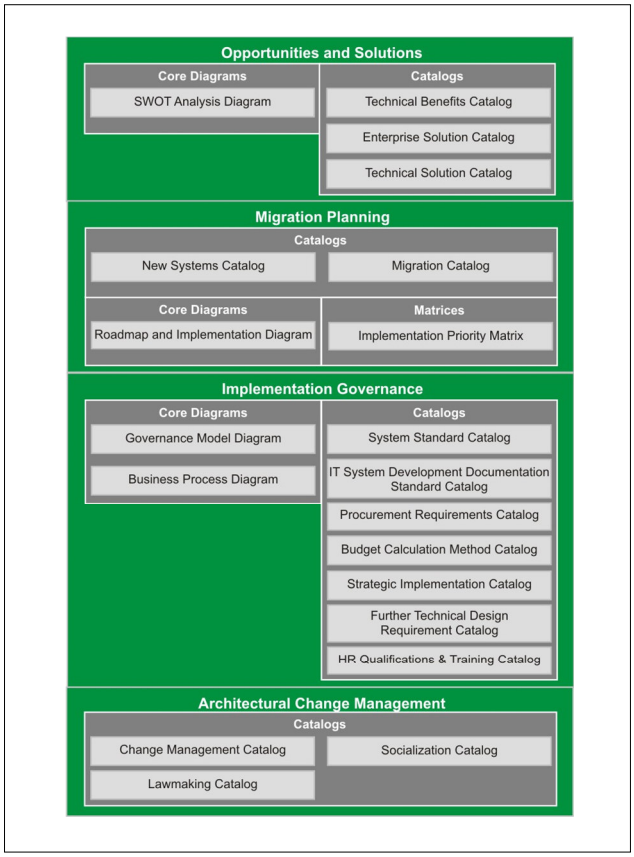

Fig. 3. Proposed E-Government Master Plan Guidelines for TOGAF ADM (Solution Continuum)

  - Enterprise Solution Catalog
    An Enterprise Solution Catalog shows high level solutions of an organization in implementing the master plan.
  - Technical Solution Catalog
    The Technical Solution Catalog shows solutions in technical aspect.
- Migration Planning
  - New Systems Catalog
    A New Systems Catalog contains systems, including applications, information systems, technologies, and supporting infrastructures, that are proposed in the master plan.
  - Migration Catalog
    A Migration Catalog shows existing systems, including applications, information systems, technologies, and supporting infrastructures, within the environment of master plan design.
  - Roadmap and Implementation Diagram
    A Roadmap and Implementation Diagram shows the scope of all work packages to be implemented as a part of master plan design in each certain period.
  - Implementation Priority Matrix
    The Implementation Priority Matrix shows relations of one system to others and its implementation priority.
- Implementation Governance
  - Governance Model Diagram
    Governance Model Diagram shows process chain that manages proposed business processes and implemented business processes.
  - Business Process Diagram
    The Business Process Diagram shows business processes, either proposed or implemented ones.
  - System Standard Catalog
    A System Standard Catalogs shows minimum standard for each system, includes application, information systems, and infrastructures.
  - IT System Development Documentation Standard Catalog
    The IT System Development Documentation Standard Catalogs shows documents that have to be provided as part of requirements on system development.
  - Procurement Requirements Catalog
    A Procurement Requirements Catalog captures things that the organization/government needs to procure to implement the master plan.
  - Budget Calculation Method Catalog
    The Budget Calculation Method Catalog shows how to do budget calculation to realize the systems needed in the master plan.
  - Further Technical Design Requirements Catalog
    The Further Technical Design Requirements Catalog shows requirements that are needed to do further design on technical aspects.
  - HR Qualifications and Training Catalogs
    An HR Qualifications and Training Catalog show qualifications that are required to obtain specific role or position; and proposed trainings to improve human resources quality and capability to meet the organization/government needs.
- Architectural Change Management
  - Change Management Catalogs
    A Change Management Catalogs shows changes and transitions that will be made as a result of master plan implementation. The Catalogs includes changes of organizational structures, the organization's business process and functions.
  - Lawmaking Catalog
    The Lawmaking Catalog contains recommendations on lawmaking, including proposal of new rules and revision on existing rules.
  - Socialization Catalog

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The Socialization Catalog contains recommendations and guides to socialize the master plan to the community.

III. E-Government Master Plan Design, Case Study: Payakumbuh City Government

Challenge to Design Master Plan:

- Non-TOGAF Based Guidelines from Central Government, hence the Non-TOGAF Guidelines must be mapped into the Master Plan Design based on TOGAF.
- Effective and Economical Requirement from the local government, hence to make more details Master Plan in is required.

A. Artifacts from TOGAF ADM

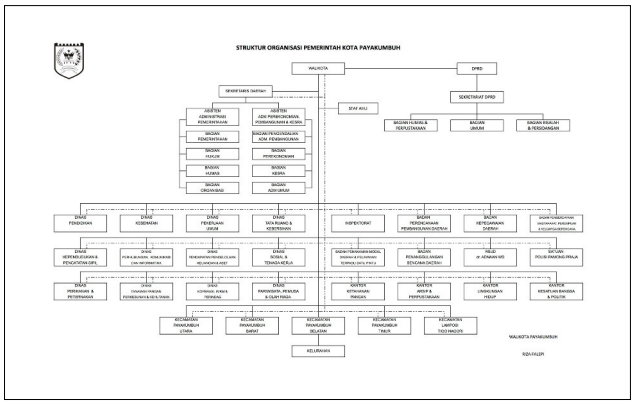

Fig. 4. Organization Diagram

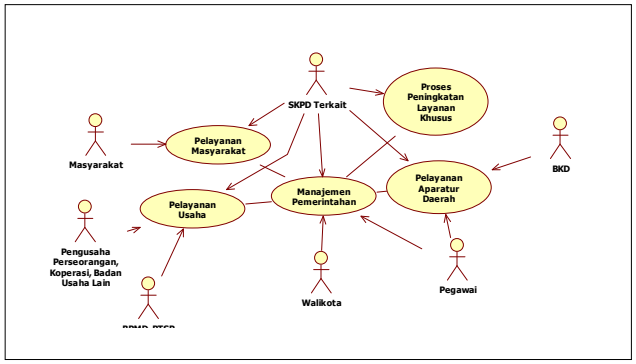

Fig. 5. Main Business Process of Payakumbuh E-Government

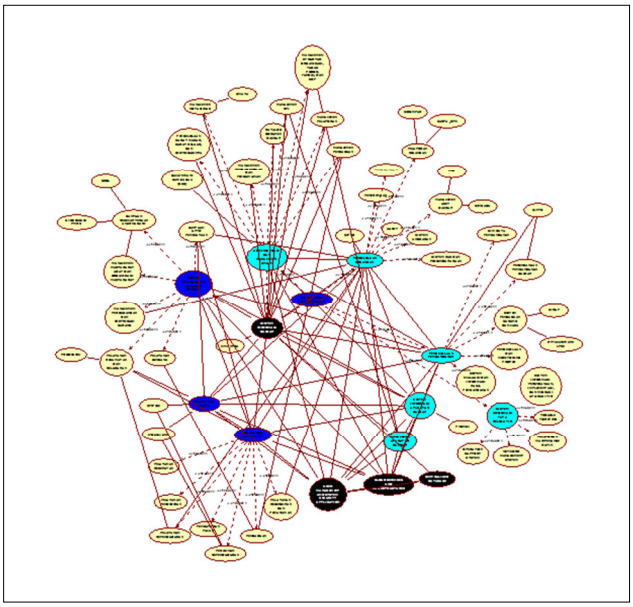

Fig. 6. Application Interaction/Communication Diagram of Payakumbuh E-Government

B. Artifacts from Proposed Guidelines

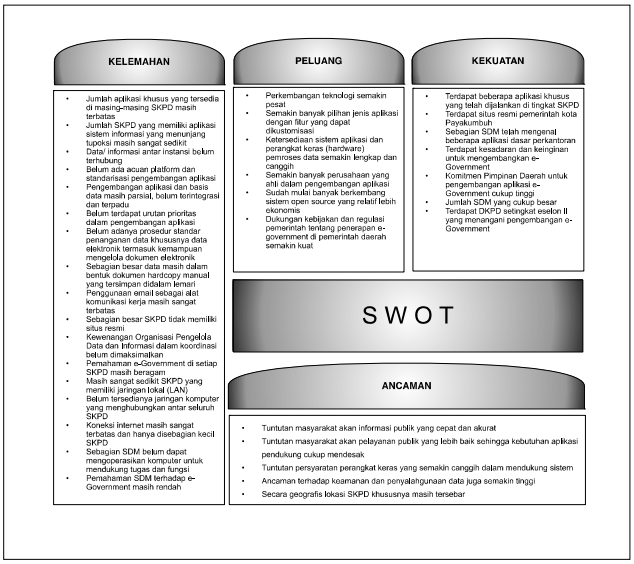

Fig. 7. SWOT Analysis Diagram

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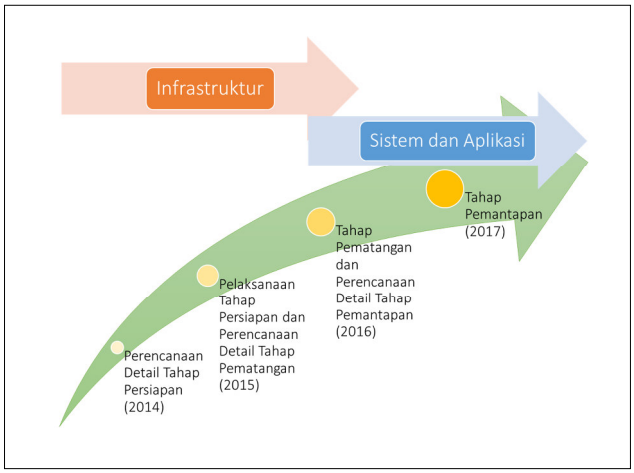

Fig. 8. Roadmap Diagram

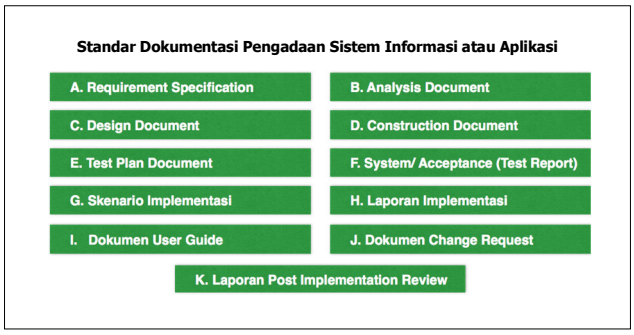

Fig. 9. IT System Development Documentation Standard Catalog: Information System/Application Procurement

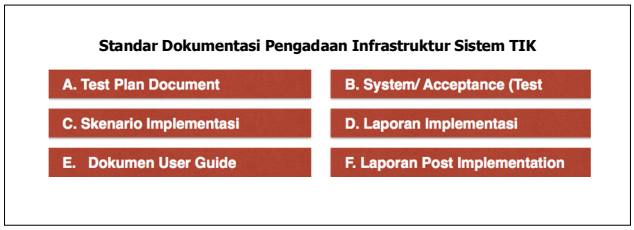

Fig. 10. IT System Development Documentation Standard Catalog: IT Infrastructure Procurement

C. Connectedness Analysis of Proposed Additional Guidelines for E-Government Master Plan Design

According to the description of the proposed additional guidelines for E-Government Master Plan Design, we may see that architectural artifacts in both TOGAF ADM and proposed guidelines are coexist and/or related. Extending architectural artifacts associated with the core content metamodel and extensions by ADM phase in TOGAF ADM using artifacts from proposed guidelines, we may obtain E-Government Master Plan Design in as following phases.

1. Preliminary
2. Architecture Vision
3. Business Architecture
4. Information System Architecture
5. Technology Architecture
6. Opportunities and Solution
7. Migration Planning
8. Implementation Governance
9. Architecture Change Management

Phases 2-6 equal to phases A-E in ADM phase, while phases 6-9 using phases in the proposed guidelines and act as further and detailed phases of phase E. In conclusion, the proposed additional guidelines for E-Government Master Plan Design are aligned and connected to TOGAF ADM.

IV. Conclusions

TOGAF ADM is chosen as a guideline to design E-Government Master Plan. The processes in TOGAF are iterative and cyclic, in which each step checks with requirements. TOGAF is based on four interrelated areas of specialization called: Business Architecture, Applications Architecture, Data Architecture, and Technology Architecture.

The Case Study is performed for Payakumbuh City Government with additional challenge such as to interpret non-TOGAF-wise guidelines from Central Government and effective and economic solutions required. Although the case study is performed for local government but the method or tools itself is to make in generals can be customized as tool for any central government.

The Proposed Method for E-Government Master Plan Design is to cover the Opportunity and Solution, Migration Plan, Implementation Governance, and Change Management Domains phases. The method contains guideline solution for those domains include the artifacts that are suitable for E-Government Master Plan.

Phases to design the E-Government Master Plan are such as follows:

- Preliminary
- Architecture Vision
- Business Architecture
- Information System Architecture
- Technology Architecture
- Opportunities and Solution
- Migration Planning
- Implementation Governance
- Architecture Change Management

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