

INTRODUCING THE INDONESIAN GOVERNMENT ENTERPRISE ARCHITECTURE

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Abstract

Along with many kinds of enterprise architecture frameworks, Indonesia has created a unique Government Enterprise Architecture (GEA) framework which has 6 domains in its architecture namely Electronic-Based Government System (SPBE). This architecture is unique compared with best practices GEA in the world. Before it can be implemented in the government system, people need to know and understand about the terms and method in this architecture framework. This paper will exploit the uniqueness of SPBE, discuss its differences, and give some recommendation on how to implement it.

Keywords: enterprise architecture; electronic government; SPBE

I. INTRODUCTION

A. BACKGROUND

Like many countries in the world, Indonesia has started some initiatives to implement enterprise architecture knowledge. Started in 2003 with the President Instruction number 3 the Year 2003 concerning the implementation of e-government (e-govt) in Indonesia. With this instruction, the President has asked the government institution to use enterprise architecture knowledge, namely, e-govt to improve the quality and effectiveness of the government services.

Referring to the instruction, many agencies have developed their e-govt trying to improve their services. not just around the central agencies, many regional governments have also developed their e-govt or smart cities. Since there were no further details about the implementation, that developed e-govt has been grown sporadically in silos. Resulting in a low-rank position of the Indonesian e-govt index according to United Nation - Department of Economic and Social Affairs (UN DESA) as shown at Table I [1].

In the year 2018, one decree of the President has been declared to improve the regulation that has been made. Presidential Regulation Number 95 of 2018 [2] has been issued and emphasizes the need for integration and collaboration between e-govt from every government agency in an "Sistem Pemerintahan Berbasis Elektronik (SPBE) / electronic-based government system"

TABLE I. E-GOVT INDEX POSITION OF INDONESIA AND THE NEIGHBORING COUNTRIES

Countries	2003	2004	2005	2008	2010	2012	2014	2016
Indonesia	70	85	96	106	106	109	106	116
Malaysia	43	42	43	34	32	40	52	60
Singapore	12	8	7	23	11	10	3	4
Filipina	33	47	41	66	78	88	95	71
Brunei Darussalam	55	63	73	87	68	54	86	83
Australia	3	6	6	8	8	12	2	2

This decree explains a concept of how to build an enterprise architecture for the whole nation as one. From that one, any government institution has to think as part of the nation and must be able to join and collaborate with other government institutions.

Following this decree, the president also released another decree to manage and control the acquisition of data along with all governmental agencies, namely "Satu Data Indonesia / SDI" (One Indonesian Data) [3].

One big question has arisen, How do we implement the "One Big Nationwide" enterprise architecture among the existing architecture but still comply with all the regulations there is. Enterprise architecture is not a common concept that people used to have. Every country should have its own uniqueness, one fitted architecture for a country usually does not match with other countries. Before starting with the implementation, the operator of the SPBE needs to understand properly the regulations and the architecture it's mentioned.

B. RESEARCH GOALS

This research was done with the purpose to explore the uniqueness of the architecture according SPBE's decree and find out a way to implement it correctly. Many constraints will be faced since Indonesia is a unique country with many islands, many cultures, lack of digital literacy spread, maturity of the regional government, etc

II. LITERATURE REVIEW

A. BEST PRACTICE ENTERPRISE ARCHITECTURE FRAMEWORK AS GEA

Between countries that implement e-govt, most of them use TOGAF or FEAF as literature. Even though many other frameworks can be used, only those two or their variants used to be used as GEA. To simplify the research, there will only be discussions about the domains in the architecture of the two EA frameworks.

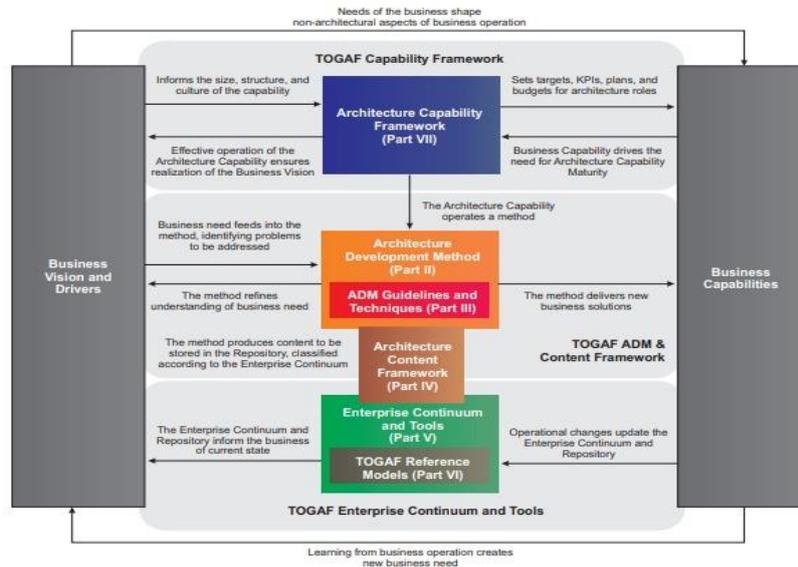


Fig. 1: The structure of the TOGAF documentation reflects the structure and content of an architecture capability within an enterprise [4]

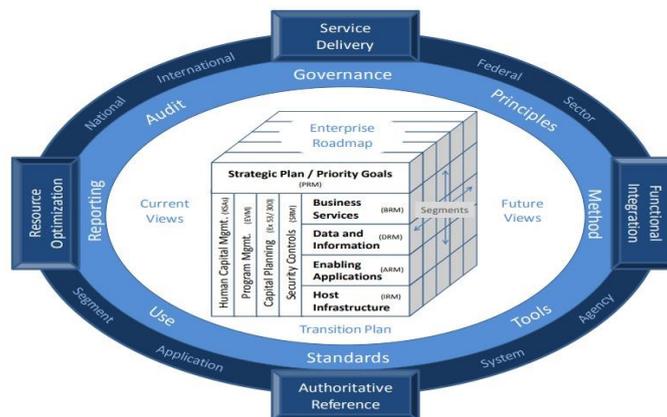


Fig. 2: The Federal Enterprise Architecture Framework Version 2 is shown on the cover book [5]

It was mentioned in TOGAF version 9 [4] that complete enterprise architecture should have four domain architectures, namely: business, data, application, and technology. But with the complexity of Indonesia, it is often not possible to build a comprehensive top-down Architecture in all four domains as recommended method for approaching. On the other hand, some institution that has developed their e-govt using TOGAF, face many constraints to comply with the six domains of SPBE.

FEAF Version 2 [5] has defined architecture with six domains: strategy, business, data, applications, infrastructure, and security. In practice, they define PRM, BRM, DRM, ARM, IRM, and SRM as references for these architectures. In strategy, they measure the successes of

the other domain using PRM. Service is put as level 4 of the BRM, while in SPBE it is separated from the business.

As Roger Session [6] said, there is no perfect EA framework that would suitable for any enterprise. Each framework has its positive and negative values.

B. 6 DOMAINS OF SPBE AS DESCRIBED IN REGULATION

As mentioned before, SPBE has 6 domains, namely: business process, data and information, service, application, infrastructure, and security. these domains were described in the regulations as follow: A business process was defined in the SPBE decree as a set of activities that were structured and interrelated in the implementation duties and functions of central and government agencies in each area. Discuss business processes in SPBE must consider the tasks/duties and functions of the agencies.

Stated in the decree that data and information include all types of data and information held by central agencies and regional governments, and/or obtained from the public, business actors, and/or other parties. Data and information are related to the business of the agencies.

Table II: Domain Comparison Between Ea Frameworks

Name of Domains		
TOGAF	SPBE	FEAF
Business	Business Process & Services	Business
Data	Data and Information	Data
Aplication	Aplication	Aplication
Technology	Infrastructure & Security	Infrastructure & Security

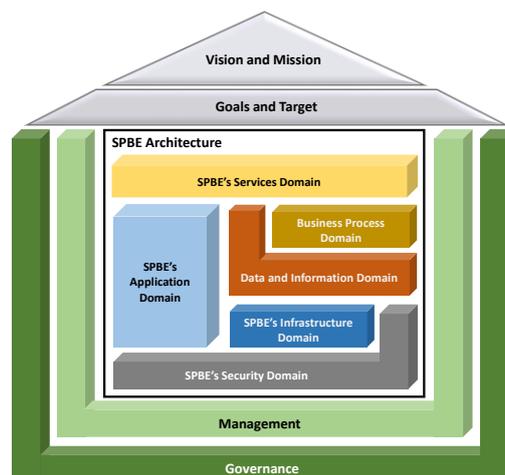


Fig. 3: SPBE Architecture Framework as described by Cahyono Tri Birowo [7]

SPBE service is the output generated by one or more SPBE application functions and has valuable benefits. While the SPBE application is one or a set of computer programs and procedures designed to perform the tasks or functions of the SPBE Service. Services and applications in SPBE have a direct relationship among them. SPBE infrastructure is all hardware, software, and facilities that are the main support for running systems, applications, data communication, data processing and storage, integration/connection devices, and other electronic devices. This definition is quite the same with all existing EA in the world. SPBE Security is an integrated security control in SPBE that covers data and information, SPBE application, and SPBE infrastructure domains. For some existing EA, security is not mentioned separately. Usually, they put it as part of the technology side and cover the whole system. Differs in SPBE, security became separated and covered the three other domains.

III. DISCUSSION

A. THE UNIQUENESS OF SPBE IN BUSINESS SIDE

The basic difference between SPBE and the best practices EA is distinguishing service and business. There are six domains namely: business process domain, data and information domain, service (the business side), application, infrastructure, and security (the technology side).

The process began from the business processes that had been delegated as tasks of any specific agency. According to their task, the agencies should define some business functions that need to be done as consequences from it. Before the decree about SPBE, the agencies had defined their functions independently and released some micro regulations inside the organization. Even though some agencies have developed their EA, it is hard to find is there any function duplication or not among those agencies. SPBE with its business process architecture was mentioned to solve this problem and govern the task and function of those agencies correctly. Since it was just released (less than 3 years old), there are a lot of things to be prepared and done before we can get results. Especially if we consider that many agencies and regional governments have developed silo systems in their own.

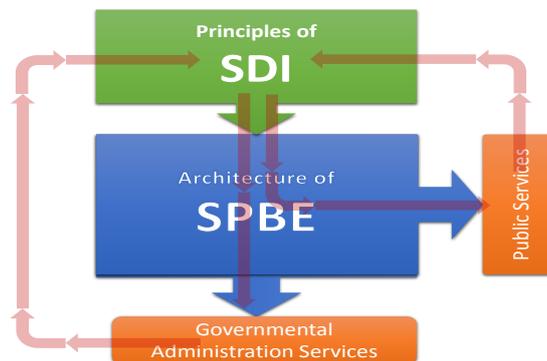


Fig. 4: Collaboration SPBE and SDI should maintain the improvement of data and services

Data and information should be collected during any activities done by the agencies. In all those years of activities of the Indonesian Government, this data has been collected so many. The government could not avoid any redundancy data that happened, because of the lack of regulations in governing data as a result of the activities of those agencies. The SDI decree was released to solve the problems in managing reliable data in governmental businesses. The digital world needs reliable data to deliver some services. A good GEA would deliver nothing if there is no good quality data as input material for it. The SDI decree will assure a good quality of data collection. Fig. 4. Shows the cycle that assures the improvement of the quality of data by collaborating SPBE and SDI.

With so much data and information in a business process, the government agencies need to create some services (electronically in SPBE) either a G2C, G2B, G2G, or even a G2E. This service does not belong to any specific business process, but more consider the target of the service. It is more concerned about to whom it was served. Collaboration between business processes is possible to gather all data needed. Separating services from business and application gives us more changes in creating more innovative services, wider users,

These rules in business management should vary in any country. It depends on the existing regulation that has been released in the country. Indonesia has declared the goal of the government in the constitution, describing the businesses of government in the law, explaining the task and function of the agencies in a presidential decree, which may not be against any of the existing regulations. It is the reason why business management in SPBE differs from the other EA framework.

B. THE UNIQUENESS OF SPBE IN TECHNOLOGY SIDE

On the other side, in technology, SPBE has SPBE application domain, SPBE infrastructure domain, and SPBE security domain.

Application in SPBE is divided into two major classifications, namely common applications and specific applications. Applications that are supposed to be used by other agencies should be classified as common applications. Integration and collaboration between applications are the main principles to be applied. These principles encourage the collaboration between tasks and functions of the agencies to deliver effective and efficient services for the users. These also support the SDI decree implementation for using data and information only from the origin of the data.

Infrastructure SPBE should be the same as what people do for the infrastructure domain in other EA frameworks. It might be the only similarity between SPBE and other EA frameworks.

IT security is a common thing in IT Governance. It is deployed to secure everything in the system. SPBE has more concern about the maturity level of the institution that runs this security activity by making it a separate domain.

Generally, the technology side of SPBE is similar to other EA frameworks. It is supposed to be the enabler to reach the enterprise goal which is in this case the goal of the nations through the management of the government businesses.

C. DEFINING THE REFERENCES

The uniqueness of SPBE brought something that needed to be solved. References for the architecture could not just copy and paste from any existing EA framework in the world. Since SPBE application, SPBE infrastructure, and SPBE security domains only slightly differ from existing EA frameworks, then it is better to discuss the references in the business side of the architecture.

Business characteristics of the Indonesian government need particular architectural references that match with all businesses of the whole area in the government. Traced from the nation's history, the constitution has explicitly named some government businesses and implicitly some other businesses. According to these businesses, the legislation has declared law number 39 in the year 2008 which defines all 46 businesses that have to be dealt with by the Indonesian government. All 46 businesses have been declared as the level two of business process architecture reference to make sure nothing is left in operating the government and to know that everything is by the law. Grouping the level two business process architecture references and comparing it with some existing business classification, it can be found 9 level one business processes architecture references that comply with the president's vision and national development plan (NDP). To have an image of the national business process conditions, require level three and four of business processes architecture references which can be tracked down from the functions of the agencies and regional government.

While running the business process they have, agencies and regional governments will collect a lot of data and information even if it is just a report of activities. To classify these data and information, simply just connect it to their origin business process. A data support collection was added to complete the classification of data and information. In the end, data and information architecture reference taxonomy become 10 levels one and 50 levels two data and information classifications. In line with the SDI decree, this classification will be improved over time.

On the other hand, according to the SPBE presidential decree, SPBE services must refer to the programs or activities in the business processes of agencies and regional governments. It seems that services can be put in the business process domain, but to accommodate integration and collaboration between the business processes we need to put the services as a separate domain other than the business process domain. In developing the taxonomy, any possible services that can result from the function of any agencies and regional governments were collected and grouped. SPBE decree has mentioned putting the services into two basic categories: public services and governmental administration service. The taxonomy was built of 2 levels one and 52 level two of SPBE service architecture references.

Since the technology side domains in SPBE are quite similar to other EA/GEA frameworks, there is no need to discuss them in this paper.

D. BUILDING THE GOVERNMENT ACCORDING TO THE ARCHITECTURE

Besides covering the architecture with 6 domains in SPBE, the decree also explains the scope in implementing this GEA. It covers the principles in governance and management that are needed to make the system run smoothly. With the 6 domains of architecture, Indonesia has developed a framework as described in Fig 3.

SPBE architecture as GEA started with the business processes domains which produce data and information. Using these data and information that have been collected, the government needs to create some services for society (including other agencies and government employees). On the other hand, according to the SPBE presidential decree, SPBE services must refer to the programs or activities. It means for the national scope the services must configure the national program and activities. Any agencies and regional governments may only have services that comply with the national development program.

While in common EA's implementation, we will need to map the as-is condition architecture and then configure the future condition architecture, and at the end define the necessary road map as the milestone of achievements. In Indonesia, due to the complexity of the country, it is hard to capture the as-is condition architecture. There are too many silos in the governmental system. Every agency uses its language to define and develop e-govt. As a result, it is impossible to integrate and make collaboration between them. Silos became the first challenge to be faced.

The first thing to be done before implementing SPBE is to socialize the terms in SPBE to all government agencies and regional governments. Once they speak in the same language and terms, there will be a chance to integrate and collaborate. With more than 700 agencies and regional governments, it should take a long time to finish the socialization.



Fig. 5: The beginning of the SPBE implementation journey

Since the NDP has defined everything that the nation wants to do, Indonesia doesn't need to wait until all agencies and regional governments have been socialized to make an architectural road map. All the goals that need to be achieved for a certain period are already described and planned in NDP. A road map has already been given by the NDP. Parallel with the socialization, it can be mapped the achieved targeted plan as substances in the architecture. SPBE architecture can start from empty substance architecture (just the concept). In time, it will be filled by the achievement of activities of the institutions according to the NDP.

E. PREPARATION TO IMPLEMENT SPBE

Even though a development road map has already been given by NDP, SPBE still needs to define prerequisites for the architecture. Having the same term in defining the business processes will be necessary to be done between all the institutions. Since it is the starting point for the whole process in the architecture, it must be done before anything else. For this, the Ministry of Empowerment of State Apparatus and Bureaucratic Reform has proposed a presidential decree about “SPBE Nasional Architecture” (national e-govt) as references for any e-govt development in Indonesia. Following this decree, there would be regulations that will be released as a manual for implementing the SPBE as shown in Fig. 5.

The next step is to convert any existing e-govt system of the institutions into the SPBE architecture. This conversion means that any e-govt or smart city must be able to be translated from 4 domains architecture into 6 domains architecture. Any institution that does not have any e-govt system at all can develop directly in 6 domain architecture to comply with the SPBE. Once all the institutions started thinking in a 6 domain architecture term, SPBE can be rolled and implemented and be filled with all the substances there are.

F. COMPARISON BETWEEN THE IMPLEMENTATION OF SPBE AND FEAF

Compared with the implementation of GEA in the United States, Indonesia started quite a bit late. FEAF version 1.1 has been published and implemented since 1999 and revised with FEAF version 2 at the beginning of 2013. Some of the reasons why they need to revise the first version were declared in early October 2010, when the Federal CIO Council hosted a meeting attended by approximately 80 senior architects, CIOs, and CTOs from throughout the federal government to discuss the concerns of federal EA practitioners and stakeholders and plan for the future of the federal EA program [8]. The concerns raised at this meeting are:

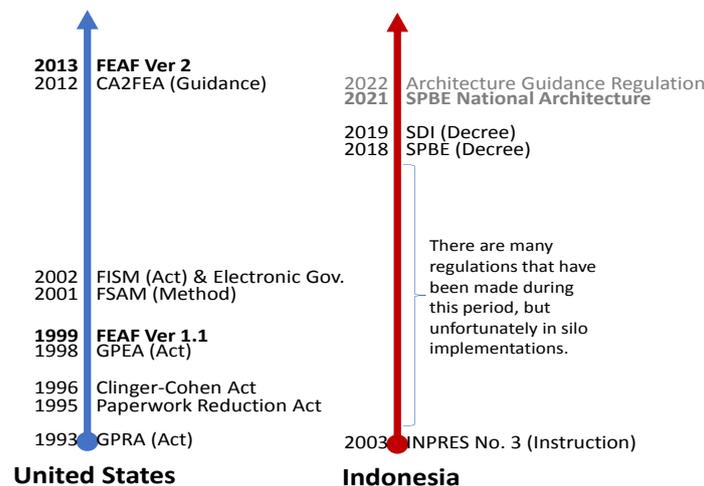


Fig. 6: Comparison between FEAF and SPBE development

1. Lack of the same understanding between community members.

Lack of coordination and clarity among federal sector architecture concepts and practices is one of the reasons. A number of members desire to see a “common approach” in the architecture that can be understood by civilian, military, and intelligence agencies to promote the ability to better exchange architecture information and to improve work being done on multi-agency, sector-wide, inter-government, and international efforts.

2. Meaning of the Enterprise Architecture for them.

Lack of understanding of the ontology of the enterprise built some confusion of the enterprise itself. For some with a silo mentality would ask: Where does Enterprise Architecture belong?

3. Too much concern with the report rather than the acts.

The federal EA community has been often focused on compliance documentation at the expense of supporting mission improvements.

4. Need for changes occurred.

Fundamental change is needed. The attendees recognized both that the EA community has to change and that the time for a change has come. This is the beginning of version 2.

Learning from the story above, SPBE needs to avoid all those concerns. Avoiding point 1, SPBE has deployed much socialization to the agencies all over Indonesia. In the socialization, also mentioned the togetherness between the agencies as “one enterprise” to avoid point 2.

Regarding points 3 and 4, there should be some preparation to avoid that happened during the implementation.

IV. CONCLUSION

A. SPBE AS GEA

In general, SPBE has been prepared to be GEA. There was defined the ontology of the enterprise (the government of Indonesia), the architecture structure, principles and rules to govern the architecture, initiative strategies to start the architecture, and road map as a milestone to be achieved. But enterprise architecture is a living document, it should adapt to all the changes there are. It is a never-ending journey. It must be improved and revised all the time.

As a document, SPBE is ready to be implemented. The next step is how to do the action for more than 700 institutions among the government of Indonesia. Within a cycle period of 5 years, SPBE should have many revisions to adjust and comply with the faced condition in the field. Many regulations would be declared to give a more clear direction of the implementation. It is a big hope that SPBE could deliver a significant result in its first period of implementation.

B. RECOMMENDATION

As a unique enterprise architecture framework, SPBE needs to prove all the concepts and theories in the implementation. The first period of the architecture should be a very hard time in implementation and full with review and revision of the concept. There is a long journey ahead to get mature and perfect. Collaboration and cooperation from all stakeholders are hardly needed to let the concept run smoothly. Willingness to have a well-operated government to conduct services for the citizens is a must.

Some changes of mindset need to be done, namely:

1. Any organization in the government works and acts as a part of one big enterprise.
2. Everybody needs to know their specific task as always mentioned in the regulation.
3. Inventory all the data and information belonging to the tasks as their valuable assets.
4. Figuring out what kind of services or benefits can be taken from all the data and information for the people or even their organization or other governmental organization. Find out if there is any other reliable information needed from another organization.

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