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Topic (i): Developing common high-level architectures

Building an Enterprise Architecture of Statistics Korea

Prepared by Leechul, Bae, Statistics Korea, Korea

I. Introduction

1. This paper presents the background, contents and progress of the enterprise architecture (EA) implementation of the Statistics Korea (hereafter, KOSTAT). Also based on the experience of the EA implementation, the plans for informatization of the Republic of Korea will be shared.

2. The paper presents not only the EA implementation results of KOSTAT but also the EA implementation results of Korea, which was sponsored by the Ministry of Public Administration and Security, a steering governmental agency, with a focus on statistical service.

II. Background

3. With the recent expansion in the role of the KOSTAT, there has been much progress in informatization. As for statistical service systems, the KOSTAT developed KOSIS (the world largest integrated DB of Macro data at the nation level), Geographic Information Service (a combination of statistics and maps) and MDSS (microdata service). As for statistical production systems, the KOSTAT developed the Integrated Establishment Statistics Management System, the Integrated Household Management System and the Integrated Administrative Data Management System which uses administrative data (e.g. tax data) for statistical production.

4. In spite of ever increasing informatization costs and expanded human resources, there was much dissatisfaction with informatization because the governance system to control informatization was inadequate. The departments in charge of statistical production showed a suspicious view on the achievements of informatization-related human resources and the provision of high quality services. There existed many problems such as the building of architecture at the KOSTAT level regardless of quantitative growth, the difficulty of statistical information sharing due to no standardization of statistical information, the separate construction of respective survey systems, duplicated system development without reuse of similar functions. Therefore, to solve these problems, a totally new approach should be made.

III. KOSTAT's EA effort

5. With extensive interviews with KOSTAT staff and analyses on interior and exterior environment, the KOSTAT derived the vision for the construction of informatization architecture to support the production and dissemination of national statistics of high quality. The architecture will help implement informatization more efficiently. To implement the EA vision, the KOSTAT derived the following strategies; Achievement-based support for the accomplishment of business objectives, Standardization and reuse for the improvement of application systems and interoperability, Standardization of data and systematization of metadata management, and Reinforcement of the security system for the management of informatization infrastructure.

6. The KOSTAT started constructing the architecture at the CIO and CEO's view in 2008 and the architecture at the designer's view in 2009, and completed the construction of the architecture for social statistics at the designer' view in 2009. Over the two years, the KOSTAT described business processes of 35 minor functions in social statistics and the architecture of information systems for 19 application programs and 17 servers, and classified 930 tables into 8 domains.

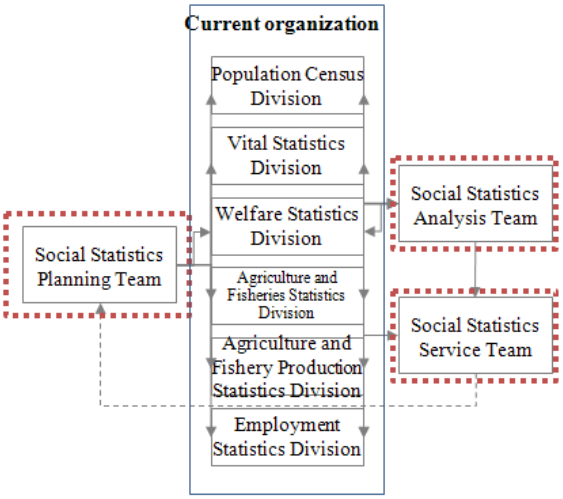
7. Based on the analyses on respective architectures, the KOSTAT found out pending issues, defined improvement tasks necessary for the accomplishment of future goals. The tasks were elaborated through interviews with the officials in charge. Improvement tasks were derived for both informatization and statistical business.

A. Current Status and Improvement Plans for Statistical Business

8. The most urgent problem of statistical production business was to standardize the statistical business process. The analysis on the business of social statistics showed that the statistical business of the KOSTAT was optimized at the respective survey levels. However, standardized terms were not being used and the standardized process to be commonly used in several surveys was not derived. And the standardization of the statistical production business, which has been widely discussed in the international community, was not sufficiently studied. Prior to the standardization of informatization process and the elimination of duplication, the standardization of the statistical business process should be implemented first by referring to GSBPM.

9. Another challenge was the reinforcement of planning and analysis function. According to the comparison of GSBPM and the KOSTAT statistical business process, the KOSTAT had a weakness for demand survey and analysis support. It was due to the lack in human resources. To solve this problem, the organizational restructuring for planning, analyses and services was suggested.

GSBPM / KOSTAT process	Specify needs	Design	Build	Collect	Process	Analyze	Disseminate	Archive	Evaluate
Planning		○							
Preparation		○	○	○					
Survey				○					
Processing					○	○			
Datarelease							○	○	
Report and dissemination								○	



[Figure 1] Comparison GSBPM and the KOSTAT Work Process

B. Current Status and Improvement Plans for Informatization

10. The most urgent problem of informatization in social statistics was to make a plan for the integration and reuse of individual information systems. The analysis on the application systems in social statistics showed that some systems were integrated into one system in case the same officials were in charge of surveys concerned, or in case surveys were carried out simultaneously. In other words, the integration was done for the sake of business convenience. Currently, some application systems of economic statistics are being integrated.

Survey systems in2008	Integrated Survey system in 2009	
Social Statistics Survey System	Integrated Household Management System	Integration
Integrated Household System (Economic activities)		
Integrated Household System (Household Income and Expenditure Survey)		
Agricultural Production Cost Survey System	Integrated Farm Household Economy and Production Cost Survey System (Agriculture)/ Integrated Farm Household Economy and Production Cost Survey System (Fruits and livestock)	Integration
Farm Household Economy Survey System		

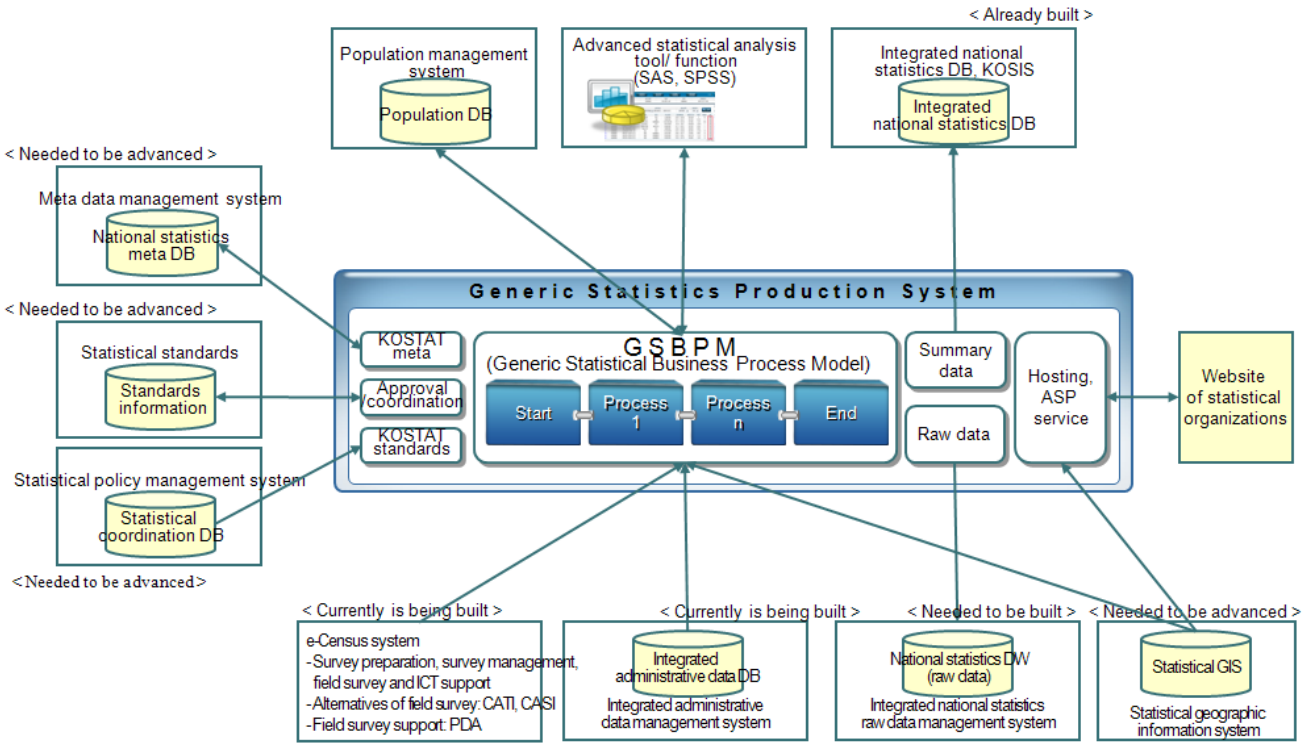
[Table 1] Integration Status of Survey Systems of Social Statistics (2009)

11. According to the study on the entire survey systems of social statistics in terms of EA, the individual survey systems had much similarity in their functions. And several survey systems didn't support some processes of the whole business processes.

		Question mgt.	Edit mgt.	Population mgt.	Sample mgt.	Enumeration district mgt.	Enumerator mgt.	ED assignment	Household register mgt.	Questionnaire mgt.	Aggregation/ sampling	KOSIS uploading	Microdata transfer
Survey system	Household Wealth Survey System		O			O	O	O	O	O	O	O	O
	Local Area Labor Force Survey System		O			O	O	O	O	O	O	O	O
	Time Use Survey System		O			O	O	O	O	O	O	O	O
	Private Education Expenditures Survey System		O		O	O	O	O	O	O	O	O	O
	Agriculture and Fisheries Establishment Survey System		O		O	O	O	O	O	O	O	O	O
	Farm Household Economy and Agricultural Production Cost Survey System		O		O	O	O	O	O	O	O	O	O
	Fishery Production Survey System		O		O	O	O	O	O	O	O	O	O
	Agriculture Survey System		O			O	O	O	O	O	O	O	O
	Fisheries Survey System		O			O	O	O	O	O	O	O	O
	Food Grain Consumption Survey System		O			O	O	O	O	O	O	O	O
	Integrated Household Management System	O	O		O	O	O	O	O	O	O	O	O
Input system	E-daily Log System									O	O		
Aggregation system	Vital Statistics System		O							O	O	O	O
	Causes of Death Coding System		O							O	O		
	Internal Migration Statistics System		O							O	O	O	O

[Table 2] Function Comparison of Survey Systems of Social Statistics

12. Functions of application systems of social statistics were partly integrated and reused for the sake of business convenience. Therefore, functions will have to be shared and reused all over the KOSTAT in the future. And the information architecture to systematically support the whole process of statistical production business should be produced.



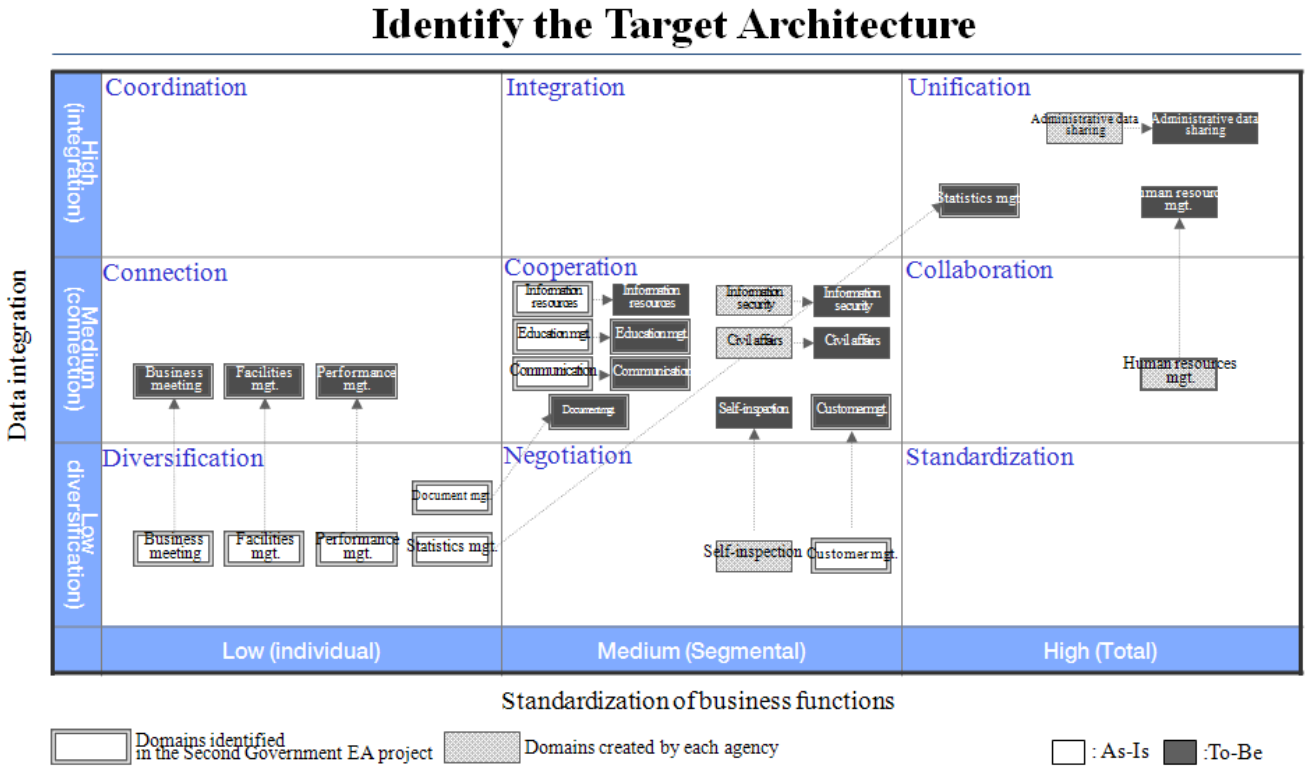
[Figure 2] Generic National Statistics Production Framework

13. It is necessary to construct the generic statistics production system so as to share and reuse application functions of individual survey systems. The system will be based on GSBPM, eliminate the duplication of survey systems and improve the efficiency. The interconnection of survey systems will make it possible to construct the comprehensive national statistics production and informatization system. The system is still in its planning stage. In 2010, the KOSTAT will make a detailed plan after investigating the current status of the statistical production business and informatization process of statistical organizations.

IV. The Sharing System of the EA Infrastructure of Korea

14. The Ministry of Public Administration and Security is in charge of the EA of Korean government. The Ministry presents information strategies and goals at the government level, facilitates link with information plans of individual governmental agencies and plans to build the EA of Korean government for the purpose of avoiding the duplication among agencies. In the Sharing Project of the EA Infrastructure of Korea in 2009, administrative services of the governmental agencies were categorized into 38 domains so as to avoid the overlap of information resources and make the integration and sharing system at the government level. The Ministry presented the new target architecture for 14 domains needed to be improved.

15. In order to describe the target architecture, according to the needs to standardize business functions and the data integration, the administrative services of the government were classified into 9 types from diversification to unification. And in terms of data and business functions, statistics management was diagnosed as diversification and advised to step up to the unification phase.



[Figure 3] Improvement Plans for Administrative Services of Korea

16. As a result of the government EA project, at the government level, the standardization of business functions and the integration of statistical data were proposed. This is closely related to the generic national statistics production system proposed by the KOSTAT EA project. Therefore, the KOSTAT will make plans for the advancement of the production and management system of national statistics (ISP) in 2010 and start a long-term project to build Generic statistics production system.

V. Conclusion

17. The KOSTAT EA and the generic government EA greatly contributed to making a plan for the advancement of the informatization of national statistics. However, to advance the functions of statistics informatization, the standardization of statistical business process and data should be done first. Then after examining advanced practices of statistics informatization of international organizations and developed countries, practically applicable strategies should be derived.

18. The government EA was stipulated in related laws. Therefore, the KOSTAT had to follow the meta model specified by the Ministry of Public Administration and Security in chare of E-government. However, the model is not proper for KOSTAT situations, and the KOSTAT becomes passive, which is a problem. In the future the EA should be produced according to the needs of each governmental agency. And it is necessary to introduce the EA plan proper for the situations of each governmental agency. For this, related laws should be amended.

19. For the stabilization of EA, terms should easy and convenient for the personnel of statistical production to understand and utilize. And the functions of the management system should be user-friendly. Through these efforts, the KOSTAT should describe the EA that not only the divisions of informatization but also those of statistical production will utilize together.

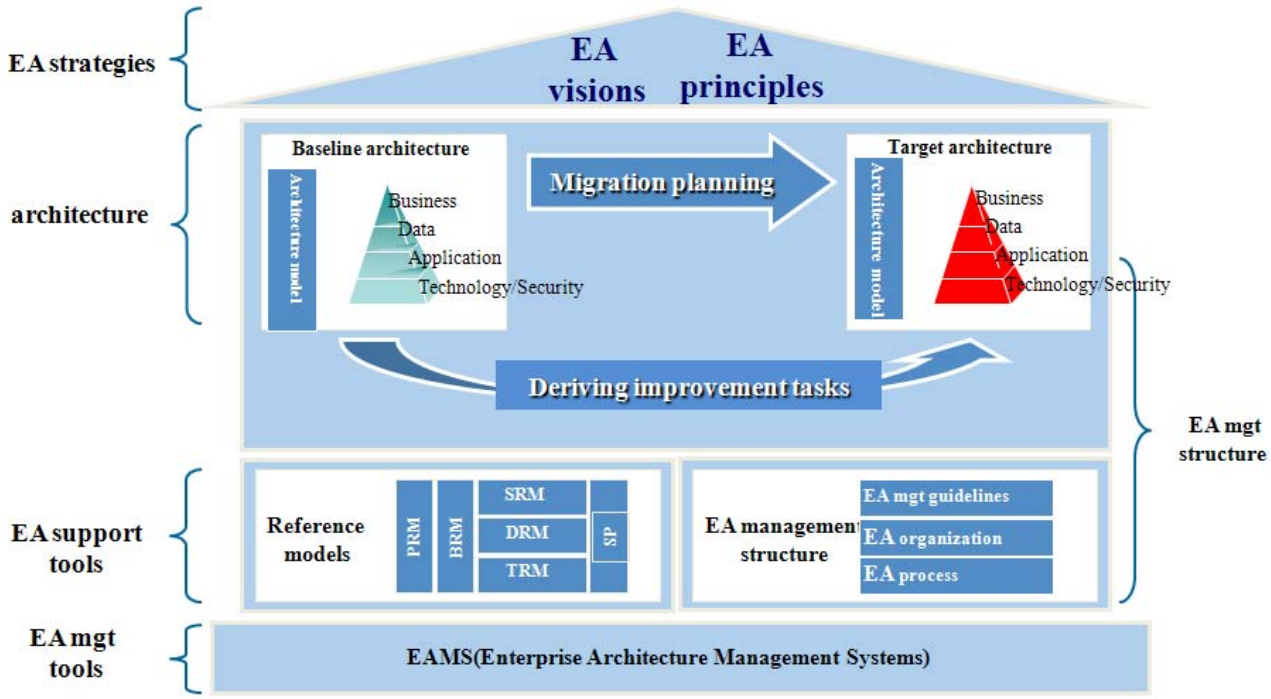
Annex 1: EA of the Republic of Korea

1. Governmental agencies are building the EA under the support of the Ministry of Public Administration and Security responsible for e-government. These efforts were initiated by the Act on the Effective Introduction and Operation of Information Systems enforced in 2006. The Act specified the construction of the EA to enhance the effectiveness of informatization investment and improve the performance of organizations.

A. EA components

2. Governmental agencies are building the EA after examining advanced practices (e.g. U.S.A). The EA of Korea is composed of EA direction, EA information and EA management infrastructure. And migration plans to accomplish the target architecture are included for each architecture.

(a) EA direction: EA visions, EA strategies, EA framework
(b) EA information: Baseline architecture, target architecture, migration plans, reference models
(c) EA management infrastructure: EA management structure, EA management system



[Figure 1] EA Components of the Republic of Korea

B. EA meta model

3. The Ministry of Public Administration and Security defined reference models (performance, business, data, service and technology) and essential products of the EA as meta model. And the Ministry guides that each agency builds the architecture by reflecting its own specific characteristics.

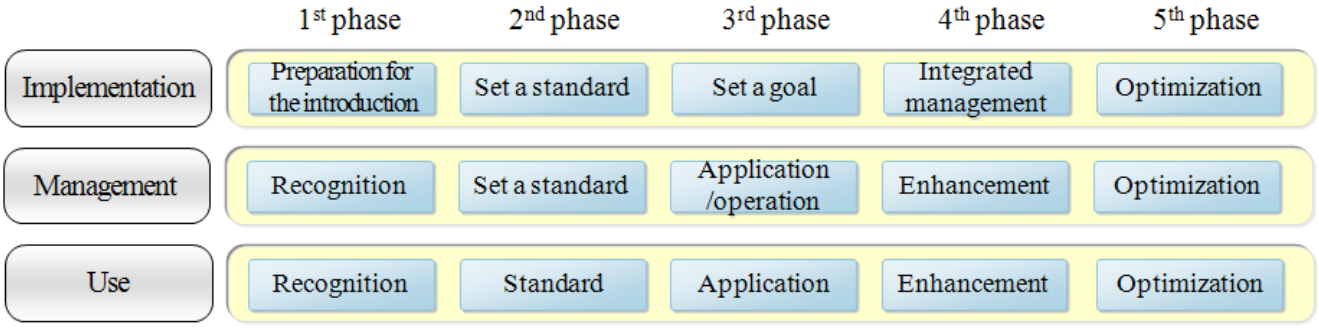
Direction and guidelines	Visions and missions of an organization, principles of IT architecture, standard terminology				
Reference models	Business reference model, service reference model, data reference model, technology reference model /standard profile, performance reference model				
Classification	Business	Application	Data	Technology infrastructure	Security
CEO/CIO	Organizational chart/specification, Business chart/specification	Application system structure/specification	Data structure /specification	Infrastructure organization /specification	Security policy, Security structure/ specification
Official in charge	Business function relationship diagram/technical book, Business function decomposition/technical book	Application system relationship diagram /technical book, Application function decomposition/technical book	Conceptual data relationship diagram/technical book, Technical book of data exchange	Infrastructure organization relationship diagram/technical book	Technical book of security relationship
Designer	Business process blueprint	Application function blueprint	Logical data model, Data exchange blueprint	Infrastructure organization blueprint, System capability blueprint	Management security blueprint, Physical security blueprint, Technical security blueprint
Developer	Business manual	A list of application programs	Physical data model	A list of commodities	Security manual

[Table 1] Meta Model of Government EA

C. EA management structure

4. To successfully implement the EA and achieve goals, performance management is essential. So as to manage EA performance, visions and goals of an agency, visions and goals of EA, and related laws should be reviewed to analyze key success factors, to define a performance indicator which measures the achievement level, and to consistently manage performance.

5. To improve the EA development capacity of governmental agencies, the Ministry of Public Administration and Security developed a measurement model of the EA process. In terms of implementation, management and use, the process is measured with 5 phases. All governmental agencies are required to achieve more than the third phase. In 2009, the KOSTAT was measured to be close to the third phase (2.75), and most of central governmental agencies were in the second or third phase.

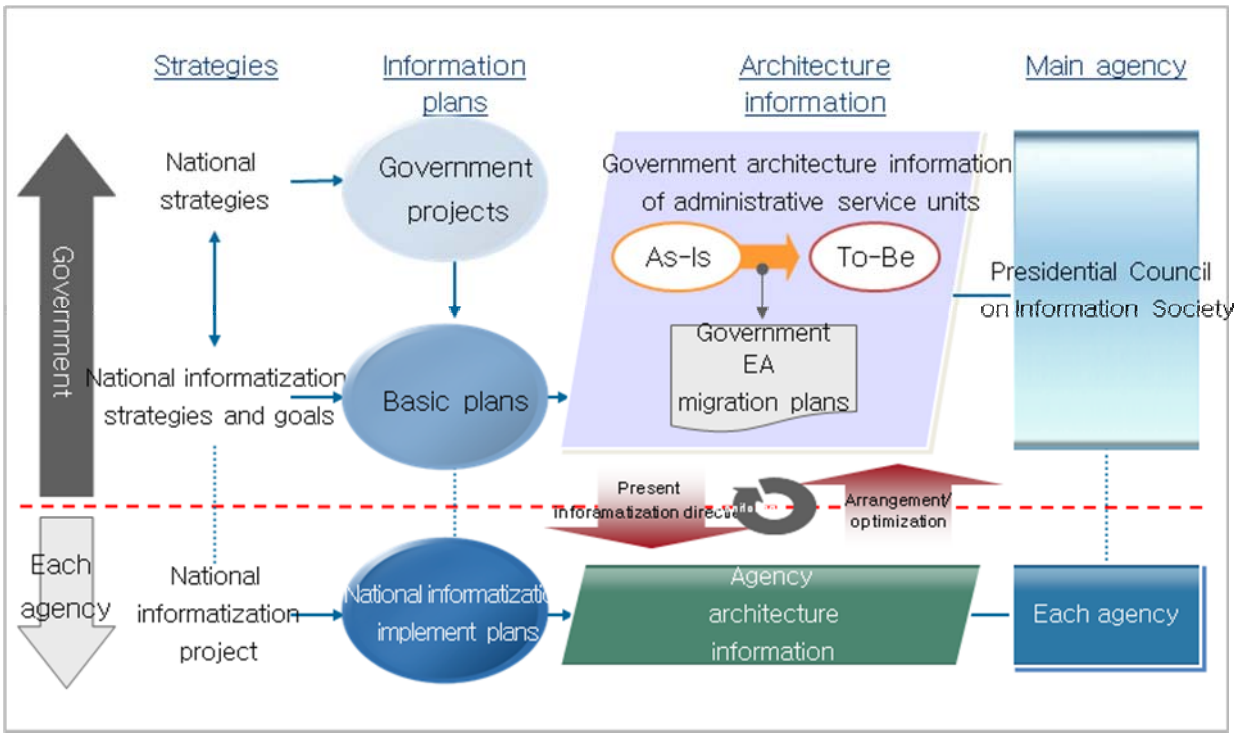


[Figure 2] EA Maturity Model of Korean EA

D. The Government EA Created by the Ministry of Public Administration and Security

6. The government EA project aims at connecting with informatization plans of each agency and avoiding overlap among agencies. So the Ministry of Public Administration and Security, which is responsible for the government EA, presented information strategies and goals at the government level.

7. The Ministry of Public Administration and Security built the government EAMS. And then the Ministry manages information at the government level by connecting with information created by each agency. It first set a goal of information services and data integration at the government level in 2009.



[Figure 2] Relationship between the Government EA and Components