Infrastructure for e-Government in Korea

Chapter 07

Information Resources Management
Through this chapter, learners understand the importance of information resources as the infrastructure to build an e-government, and look into the main contents of information resources management in Korea.
Chapter 07

Objectives

- To understand the importance of information resources as the infrastructure to build an e-government
- To learn about main contents of information resources management in Korea
Chapter 07

Structure

1. Government Integrated Data Center and G-cloud
2. Government-wide Enterprise Architecture
3. Public Information Sharing
4. Open Data and Big Data Analysis
5. Records Management
6. Electronic Signature Certificate Management System
1990s
After the administrative network was built, agencies quickly increased the amount of their information resources such as servers.

2000s
e-Government project implementation rapidly increased the amount of such resources, and management costs were therefore predicted to also increase, necessitating integration of these resources for better management.
Government Integrated Data Center (GIDC) for sharing and efficient management of information resources.

- **Operation**
  - Information Systems: Servers and Storages
  - Infrastructure: Electricity, Ventilation

- **Management**
  - Service
  - Resources
  - Security
  - Fire Control
  - Situation Room

**Government Network**

- People
- Internet
- Mutual Backup Between Centers
- Government Offices

**Source:** NIA(2019) All that Digital Gov. KOREA
## Strategy of Government Integrated Data Center

<table>
<thead>
<tr>
<th>Mission</th>
<th>To provide quality ICT services leading the Digital Gov.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vision</td>
<td>Professional institute providing intelligent cloud service</td>
</tr>
<tr>
<td>Core Values</td>
<td>Future, Integrity, Relationship, Service, Technology</td>
</tr>
</tbody>
</table>

### Strategy
- Future-oriented challenge and innovation
- Smart service based on digital technology
- Performance creation for client satisfaction

### Tasks for Innovation
1. Complete building intelligent cloud infrastructure system
2. Fulfill AI-based cyber security management system
3. Upgrade operational system as a whole
4. Innovate services to support digital government innovation
5. Improve organization and enhance core competences

Source: MOIS(2020), The Heart of Smart Digital Government NIRS
History of Government Integrated Data Center

The Korean government selected “Innovation to Efficiently Manage the Government-wide Computing Environment” as one of the 11 e-Government initiatives and established the BPR/ISP to integrate its information resources.

2004
- It had migrated the information systems of 20 central administrative agencies to the First Government Integrated Data Center in Daejeon.

2007
- It had also migrated the information systems of 19 central administrative agencies to the Second Government Integrated Data Center in Gwangju.
Chapter 07 1. Government Integrated Data Center and G-cloud

History of Government Integrated Data Center

2012
- Cloud computing technology was introduced to facilitate allocation and collection of the resources after use

2015
- The information systems of 47 agencies were migrated to two Government Integrated Data Centers

2017
- 740 government projects would be moved to cloud service
Effects

Through the establishment and operation of the Government Integrated Data Centers, the monthly average system interruption time decreased from 67 minutes to 3.6 seconds.

Joint purchases, deployment, and operation of information resources required by all government agencies reduced purchasing costs and operation and maintenance costs by 30%.
G-cloud

Cloud service brand name of GIDC, currently NIRS (G implies ‘Government’, ‘Global’)
Chapter 07  1. Government Integrated Data Center and G-cloud

**G-cloud**

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>Initiated G-cloud service</td>
</tr>
<tr>
<td>2017</td>
<td>Completed the roadmap for i-cloud (through TF)</td>
</tr>
<tr>
<td>2018</td>
<td>Standardized cloud infrastructure; Set up operating system design requirements</td>
</tr>
<tr>
<td>2019</td>
<td>Pilot-implement i-cloud infrastructure</td>
</tr>
<tr>
<td>2020</td>
<td>Implement i-cloud infrastructure; BPR/ISP for Total Cloud Managing System (TCMS)</td>
</tr>
<tr>
<td>2021</td>
<td>Expand the infra to NIRS Deagu; Implement TCMS</td>
</tr>
<tr>
<td>2022</td>
<td>Expand the infra to NIRS Gongju</td>
</tr>
<tr>
<td>Mid-term (‘20-’22)</td>
<td>“Complete i-cloud computing service”</td>
</tr>
</tbody>
</table>
# G-cloud Service Case

## Statistics Korea e-Census Integrated System

- Population & Housing Total Survey System (Internet Surveys, Homepages, Cyber Education)
- Agricultural and Fisheries Industries Survey System (Internet Surveys, Homepages, Cyber Education)
- Business System

## Components of Service

- Since an unspecified number concurrent connections are made, assurances for user convenience and performance are needed
- After completion of total survey service, resource usage needs to be changed to another task

## Characteristics of Service

- Total number of users: expected to be more than 30% of population
- Concurrent connected users: expected to be more than 38,000

## Volumes of Service Users

<table>
<thead>
<tr>
<th>Year</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
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<td>Examinee</td>
<td>76,577</td>
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</tr>
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</table>

## Significances of Applications

- Proves stability of G-Cloud system by processing of mass numbers of concurrent connections
- Saves costs through usage of system for certain purposes and then reusing resources for other tasks

## Ministry of Education

### Korean College Scholastic Ability Test

- Access with both PCs and mobile devices
- Submit application, print out test identification letter, choose test location, verify answers, provide sample questions, and check status of application and test result

### Characteristics of Service

- Heavy traffic congestion at times of announcement of successful applicants
- Tremendous increase in number of applicants

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### Volumes of Service Users

- Total number of users: 1,185,223
- Concurrently connected users: maximum of approx. 5,000 (number of expected concurrently connected users during five minutes of application receipt and result announcement periods)

### Significances of Applications

- Proves stability of G-Cloud system by processing of mass numbers of concurrent connections
- Allows efficient use of resources through rapid resource expansion and collection
continuous development of information systems by the government led to rapid increases in information resources to operate them, and thus their size and complexity also increased

1. The interoperability between hardware and software was made insufficient since several different information systems were constructed even within a single organization.

2. There were also problems of a lack of data standardization and of duplicate development of similar projects.

These issues needed to be dealt with at the government-wide level.

The Korean government therefore adopted EA (Enterprise Architecture) as a tool for this job.
Why Do We Need Enterprise Architecture?

**Unplanned IT Management**

1. Redundant system development
2. Lack of technical standards
3. Duplicated data among systems
4. Repeating similar components development

**Planned IT Management**

1. System development aligned with vision and business requirements
2. Ensured system integration and seamless information flows
3. Minimized redundancy in IT system investment

**Systematic method based on blueprints**
What Is the System Needed for e-Government Implementation (EA) and Pan-Government EA? What Are Its Effects?

**Enterprise Architecture**

A management system that identifies the informatization-related elements of an agency, such as its current tasks, tasks desired in the future, information systems and data; sets down a comprehensive informatization design based on the mutual relationships among these elements from the perspective of the agency; and helps build a system for managing informatization based on such design.

- Incorporating EA into the investment activities in informatization in the public sector can facilitate the effective management of the complex and vast information resources held by the agencies, and induce the planned and systematic promotion of informatization through analysis of differences in status and goals.
What is Enterprise Architecture?

- EA is a systematic framework formulated following the comprehensive analysis of the components of an entire organization, conducted based on specific guidelines and processes, and methodologies for optimizing the components through informatization, etc. based on such framework.
History

The Act on Efficient Introduction and Operation of Information Systems was enacted in 2005 which mandated that public agencies adopt the EA, which made it a government-wide EA system in 2009.

Statistics

A government-wide EA portal (www.geap.go.kr) was set up to prevent duplicate investment on e-Government projects, to integrate and link the systems by government service, and to improve interoperability by sharing, analyzing, and utilizing the EA information developed by each agency.

18,434 information systems and more than 330,000 information resources operated by more than 1,200 public agencies were registered in the government-wide EA portal as of the end of 2016.
Public agencies must use **Enterprise Architecture** to check for duplication, ensure feasibility, and review technology in advance when implementing e-Government projects.
2. Government-wide Enterprise Architecture

**Effect**

- Expedited and Integrated Service Quality Improvement

Since 2008, all services provided by the government have been analyzed step by step.

- The analysis has drawn finalized models for different services from the users’ point of view rather than from the service providers’.

- Such finalized models are managed through the target architecture of Pan-Government EA, and each agency works on its informatization projects, aimed toward these models, thus accomplishing gradual area-specific integration.
Chapter 07  2. Government-wide Enterprise Architecture

Effect

- Investment Budget Saving for National Informatization, and New Investment Opportunities

2009~2012

Application of Government-wide EA led to a total budget saving of KRW 438.6 billion

2013

In recognition of the outcomes of the government-wide EA, it received the **UN Public Service Award**
Continuous Efforts to Improve Service Quality and Transparency of National Informatization

GEAP (www.geap.go.kr) shows all kind of information including Nation Initiatives, IT plans, IT projects, HW, SW and etc. on a real time basis.

The Government-wide EA Portal was integrated with the Advanced e-Government Consultation System in 2014 for greater prevention of duplicate development of similar systems.
Continuous Efforts to Improve Service Quality and Transparency of National Informatization

GEAP(www.geap.go.kr) shows all kind of information including Nation Initiatives, IT plans, IT projects, HW, SW and etc. on a real time basis

Real Time Government-wide Information Resource Management (GEA Portal provides information on all public agencies’ IT resources at a glance)
Overview

- A public information sharing platform

It is a service that allows a government employee in charge of providing a civil service to process the work involved by searching for and verifying the necessary information via the computer network, without any need for document submission by the person who needs the civil service or another government agency that possesses the information.
Overview

- Public Information Sharing Platform

By enabling administrative agencies, public institutions, financial agencies and educational institutions to share information and process the tasks electronically, it ensures citizens’ convenience in filing civil petitions and using public services while helping the government perform related administrative tasks more effectively.
Overview

Schematic Design and Key Services of Public Information Sharing

- Agency requesting public information
- Information Inquiry Service
- Information Distribution
- Electronic Civil Document Management Service
- Information-holding agency
- Related agency (e.g., supervisory agency, relevant agency)
- Information Location Guide
- New Administrative Service Proposal
- Public information sharing system establishment
- Stabilization and security monitoring
- Discovers and suggests new administrative services through public information sharing
- Establishes public information sharing system appropriate for work

Shows location of information among scattered information resources
Agencies consult and arrange plans for utilizing public information sharing system
Supports secure and convenient use of public information sharing
3. Public Information Sharing

Information Distribution Service

- Encrypts information to realize secure exchanges of information across agencies

Information Distribution Types

1. Agencies requesting information → Agencies holding information → Co-use → Transmission
2. Agencies requesting information → Agencies holding information → Co-use → Distribution
3. Agencies requesting information → Agencies holding information → Co-use → Collection
4. Agencies requesting information → Agencies holding information → Co-use → Collection and Distribution
5. Agencies requesting information → Agencies holding information → Co-use → Customization
3. Public Information Sharing

- **Civil Petitions Filing Without Visits: Electronic Civil Document Management Service**

When citizens prepare and submit documents needed to receive public services or file civil petitions on the internet, the service electronically processes the submitted documents or petitions and the responses from the agencies handling the requested services or issuing documents.

- **Simplification of Civil Petition Handling through Administrative Information Inquiry Service**

160 types of documents that are required for 2,500 public services, such as passport applications and basic pension benefit applications, can be viewed and verified through the information inquiry system.
To enhance personal information protection, only the items of information that are required in documents and absolutely essential to the service provision are extracted, and then provided on the screen.
Establishment of System for Customized Information Retrieval

Provision of Authenticity Verification Service

To prevent information leakage, misuse or abuse of information when verifying people's military service or tax payment status, the service only verifies whether the information is authentic or not.
Major Achievements

Continual Increase in Number of Agencies Using Public Information Sharing

- All administrative agencies [5]
- Public agencies [43]
- Financial institutions [16]
- All administrative agencies [92]
- Public agencies [76]
- Financial institutions [17]
- Educational institutions [16]
- All administrative agencies [118]
- Public agencies [106]
- Financial institutions [18]
- Educational institutions [171]
- All administrative agencies [121]
- Public agencies [121]
- Financial institutions [18]
- Educational institutions [186]
- All administrative agencies [141]
- Public agencies [141]
- Financial institutions [21]
- Educational institutions [191]
Open Data

Progress of Public Data Opening and Utilization Policy

- Enactment and enforcement of Public Data Act
- Establishment of Open Data Strategy Council
- 1st Annual Competition for Start-ups Using Open Data
- Establishment and Operation of Open Data Portal(data.go.kr)

- Establishment of Open Data Strategy
- First Development of Open Data Standards
- 2nd Annual Competition for Start-ups Using Open Data

- First-phase[2015-16] Promotion of Opening of Public Data
- Korea Ranks #1 in 2015 OECD OUR Data Index
- 3rd Annual Competition for Start-ups Using Open Data

- Launch and Operation of Open Square-D(Seoul)
- 4th Annual Competition for Start-ups Using Open Data

- Launch and Operation of Open Square-D(Busan)
- Launch of Open Data Forum
- Korea Ranks #1 in 2017 OECD OUR Data Index [ranking #1 in two consecutive surveys]
- Collaboration project with private start-ups to :
- 5th Annual Competition for Start-ups Using Open Data
Open Data

- **Job Creation and Contribution to Sales Through Open Data**

  **Employment Expansion in 545 companies**
  **8,655 (employed persons until 2017) [15.9 persons in average]**

  **New employment in 679 companies**
  **2,359 (to be employed in 2018) [15.9 persons in average]**

**Contribution of Open Data to Sales**

- 2015: 17.10%
- 2016: 21.40%
- 2017: 26.70%
  
  +4.3%  
  +5.3%
Open Data

Key Performances in Utilizing Open Data

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment Expansion</td>
<td>85.3%</td>
<td>579</td>
</tr>
<tr>
<td>Business Expansion</td>
<td>66.9%</td>
<td>454</td>
</tr>
<tr>
<td>New Service and Product Development</td>
<td>58.2%</td>
<td>395</td>
</tr>
<tr>
<td>Cost Saving/Efficiency</td>
<td>51.0%</td>
<td>346</td>
</tr>
<tr>
<td>Customer-base Expansion</td>
<td>49.8%</td>
<td>338</td>
</tr>
<tr>
<td>Social Contributions</td>
<td>37.8%</td>
<td>257</td>
</tr>
</tbody>
</table>

Major results of a survey on companies using open data (total 679) [2017]
History of Big Data Analysis Policy Development

2011

The concept and use of big data began to be applied to Korea’s e-Government systems when the Ministry of Interior and Safety reported to the President on its “Plan to Implement Smart Government Using Big Data” in November.

2012

Later, in April, the government opened the Big Data Strategy Research Center under the National Information Society Agency.

2013

In July, the government launched the first ever “Project to Establish Common Infrastructure for the Use of Big Data and Launch a Pilot Project.”

2014

This project executed a series of tasks, including the sophistication of the existing big data platform and storage and accumulation of big data for shared use, as well as 11 occasional analytical tasks.
A high-capacity data storage system was built in such a way that various types of information can be accessed and used by different parties.
The collection of social media data in the private sector has increased dramatically, and data produced through simple statistical analysis, including spatial information-based analysis and on-line analytical processing (OLAP), have been added for real-time retrieval.
By using the common big data infrastructure, central ministries and local governments now have the capability to analyze urgent social issues at any time.
The launch of new pilot services has made it possible to provide various analysis-based services.
Overview

The National Archives of Korea, the central institution for records management, oversees the management of public records in Korea.

As a permanent records management institution, the National Archives of Korea collects and systematically preserves major national records so that all citizens may utilize them easily and conveniently.
Overview

- The National Archives of Korea performs the following tasks

1. Collection and systematic preservation and management of records worthy of more than 30 years of preservation

2. Support for the realization of a knowledgeable information society through provision of its recorded information to the people

3. Upgrading of public records management systems and procedures in line with changes in the digital environment
Chapter 07  5. Records Management

Records Management Process

Three stages of public records management process in Korea

- Current and semi-current records management
- Non-current records management

Records processing division (production)
- Electronic Records Production System
  - Production of records
  - Drafting, approval and distribution
  - Registration, categorization and binding
  - Decision on disclosure
  - Production status report
  - Transfer

Transfer in two years

Repository interim preservation (interim preservation)
- Records Management System
  - Receiving and reporting production status
  - Collection and transfer of records
  - Management of records management standards chart
  - Scanning of records
  - Library management
  - Public reclassification and utilization

Transfer after seven years

Permanent records management institution
- Central Archives Management System
  - Collection of records from repositories
  - Collection of private or overseas records
  - Permanent preservation of records
  - Descriptions of records
  - Inclusion of records in preservation media
  - Public reclassification and utilization
  - Management of records management standards
Future Directions for Records Management

To build a future-oriented system for the nation's major records, Korea is aiming to achieve:

- Cloud-based Transformation of Records Management Systems
- Arrangement of the Electronic Records Management System
- Restoration of Key Records

Integrated records management governance of the Electronic Records Production System and Records Management System, based on ICT technology
Future Directions for Records Management

To build a future-oriented system for the nation's major records, Korea is aiming to achieve:

- Cloud-based Transformation of Records Management Systems
- Arrangement of the Electronic Records Management System
- Restoration of Key Records

Arrangement to facilitate management of various types of electronic records (data sets, video records, etc.) and prepare long-term preservation policies.
Future Directions for Records Management

To build a future-oriented system for the nation's major records, Korea is aiming to achieve:

- Cloud-based Transformation of Records Management Systems
- Arrangement of the Electronic Records Management System
- Restoration of Key Records
- Restoration of damaged key records and records that are unrecognizable due to media transformation
Traditionally, Koreans have used stamps or signatures in their processing of civil documents or in business transactions.

It is the same with electronic civil documents and business transactions.
Electronic Signature Certificate Management

In 1999

Before the internet had become popularized, the government enacted the “Digital Signature Act” and the “Framework Act on Electronic Commerce”

It prescribes the electronic signature authentication system for securing the safety and reliability of electronic transactions through identification of the transaction counterparties, the verification of electronic documents to check for forgeries or modifications, and the non-repudiation of the written documents.
Electronic Signature Certification

- Compared to traditional identification methods based on user IDs and passwords, electronic signature certification is characterized by excellent security of personal information and a nonrepudiation function in electronic business transactions.

2002~2003

The use of electronic signature certification was thus made mandatory for internet banking in September, and for use of the online stock exchange in next March.

2005

A system was implemented for revitalizing the use of electronic signature certification for electronic transactions via credit cards.
6. Electronic Signature Certificate Management System

Electronic Signature Certification

Since then electronic signature certification has proliferated to all kinds of electronic transactions including as follows:

- Electronic civil petition filing
- Tax returns
- Electronic procurement

In line with the increase in mobile devices and IoT, certification is utilized in building and operating the device authentication systems for identity authentication of various information and communications equipment such as diverse devices and network cameras.
Integrated Certificate System

Certain crucial systems had been protected only by usage of user IDs and passwords, because the various administrative agencies or transaction systems used different user certificates and access management, and danger thus remained of exposures of important data while workloads were increasing as people needed to change their account and access information every time they changed positions during personnel reshufflings.
In order to alleviate the inconvenience of having to log on for every use of the e-Government systems and to enhance reliability, the Single Sign On (SSO) system was established for government services.

Agencies systemized their Single Sign On and accessibility management through the Integrated Accessibility Management System (Single Sign On Gateway).

The government is set to abolish the mandatory use of the public accredited certificate of authentication which was introduced in 1999 in line with the internet boom.

The Electronic Signature Certificate Management System has been cited as one of the most outdated regulations in the financial industry due to its complex usage.

The years-long controversy over the system ended in May 2020 when the National Assembly passed a revision to the Digital Signature Act.

- The rapid rise of biometric identification systems with higher security also boosted the discussion on the abolishment of the existing public system.

  Banks are moving to adopt fingerprint, face or iris scan recognition systems for users to access their banking apps.

- A four-digit password system is also widely in use.
• NIA(2018), Government-wide Enterprise Architecture in Korea
• NIA(2019), All that Digital Gov. KOREA
• MOIS(2020), The Heart of Smart Digital Government NIRS
• Revocation of accredited certificate and the opening of the digital certificate era, https://www.koreatimes.co.kr/www/biz/2020/07/175_292375.html