Infrastructure for e-Government in Korea

Chapter 06

e-Government Interoperability and Standard Framework
Through this chapter, learners understand the importance of the e-Government interoperability and standard framework as the infrastructure to build an e-government, and look into the main contents and cases of eGovFrame in Korea.
Chapter 06

Objectives

- To understand the importance of the e-Government Interoperability and Standard Framework
- To learn about main contents of eGovFrame in Korea
- To learn about cases of eGovFrame in Korea
Chapter 06
Structure

1. Overview of the e-Government Interoperability and Standard Framework
2. Main Contents of eGovFrame in Korea
3. Case Study of eGovFrame in Korea
Background of e-Government Interoperability and Standard Framework

As each different government department provided e-Government services, the quality of administrative services continually improved.

However, because the main information systems in the country were built on the tools (basic software structures, developing tools and reuse modules; “development frameworks” hereafter) of specific companies, the systems had become subordinate to those companies. This increased cost of developing identical systems and as a result, worked as an obstacle to small businesses lacking technological skills, particularly in bidding.
1. Overview of the e-Government Interoperability and Standard Framework

Background of e-Government Interoperability and Standard Framework

The e-Government Standard Framework standardized the development frameworks that are used for building and operating information systems in the public sector, by engineering the basic environment and common modules that are needed for developing related software in advance.

Standardization of the development framework was aimed at strengthening the interoperability of information systems and preventing them from being technologically dependent on particular companies, thus increasing opportunities for small and medium-sized businesses to participate in the information industry.

In order to solve these problems, the government worked on establishment of an “e-Government Standard Framework”
When using the e-Government Standard Framework to build an information system, common modules (components) are reused and individual service-specific functions are developed on their own in the infrastructure provided by the standard framework, leading to increased interoperability and avoiding the subordination of certain technologies to specific companies.
Chapter 06 1. Overview of the e-Government Interoperability and Standard Framework

Concept of e-Government Standard Framework

- Human resource management (e-Saram)
  - Login
  - Time and attendance management (Self-developed)
  - Payroll management (Self-developed)

- Korea On-line e-Procurement system (G4B)
  - Login
  - Name verification
  - Procurement management

- Minwon 24
  - Login
  - Name verification
  - Issuance of certificates [self-developed]

- Mobile parking control
  - Login
  - Encryption
  - Fine imposition [self-developed]

Common modules (251)

Source: NIA(2019) All that Digital Gov. KOREA
Key Benefits of Software Framework

1. Enhance software development productivity
2. Increase component reusability
3. Increase interoperability by using standard interface
4. Easy-to-maintain system
5. Enhance software quality by exploiting pre-qualified source codes
eGovFrame, a Standardized Software Framework

- e-GovFrame is a standardized software framework for holistic e-Government

**e-GovFrame**

- **Basic functions** serving the need to develop e-Government systems
- **Composition** [eGovFrame + new functions] → e-Government system
- **Fair competition environment** where parties share common basis
Framework-based Development Method

The framework’s template-based programming maximizes development productivity, assures the quality and minimizes risk factors.

- Work Simplification
- Performance and Quality Assurance
- Cost Saving
- On-time Delivery
2. Main Contents of eGovFrame in Korea

**Standardized SW framework reduces costs and improves productivity**

- Standardized SW framework reduces costs and improves productivity

  1. Reduce program steps and man/month by using SW framework
  2. Improve Development Productivity with eGovFame

---

**Service application (without SW framework)**

- Development area (100% done by developers)

---

**Service application (with SW framework)**

- Development area (approx. 70~80%)
- SW framework used (approx. 20~30%)

---

- Middleware
- Operating system
- Hardware
Benefits of eGovFrame in Terms of G2G

- eGovFrame ensures interoperability which is necessary for information sharing and inter-linkage among agencies as they build applications based on eGovFrame
- This improves interagency collaboration
2. Main Contents of eGovFrame in Korea

Benefits of eGovFrame in Terms of G4C

- eGovFrame provides standardized screen and interface for various e-Government systems
- Easy inter-linkage among different e-Government systems increases citizens’ satisfaction, as it offers one-stop service, something that was unavailable in the previous system when each government agency provided different services
Benefits of eGovFrame in Terms of G4B

- e-Government providers are now able to improve their core competencies, technological capabilities, and productivity by utilizing eGovFrame.
- The project also helps small companies strengthen their competitiveness by offering an equal chance of bidding for e-Government projects to all companies including SMEs, solution providers, and venture companies.
2. Main Contents of eGovFrame in Korea

Open Innovation for eGovFrame

1. Collaboration
   - Open Sourcing ‘08~
     - Collaboration with 11 large companies and SMEs based on shared knowledge
     - Utilized 48 Open Source Software (OSS)
   - Open Outputs ‘09.6~
     - Applied to 812 projects
     - 9,938 developers trained free of charge
     - Open source codes and IPRs
     - Over 814,430 downloads

2. Communication
   - Open Process ‘08~
     - Collected extensive opinions from over 500 stakeholders
     - Ran over 20 public-private meetings
     - Open Conference and Discussions every year

3. Openness

4. Symbiosis
   - Founded eGovFrame open community with large and SMEs
   - Established public-private cooperation center
Open Sourcing: 48 open sources have been selected as the major sources

11 SW Vendors
Large & Small
- Samsung SDS
- SK C&C
- LG CNS
- Hyundai Information Technology
- C&iS
- Crossent
- utechus
- K4M
- Tmax
- Cyclone
- IL4U

SW Framework-specialized IT Companies

Final Result
48 open sources selected

[Major open sources]
- Biz. transaction: Spring & 23
- Data: MyBatis, ibatis, Hibernate & 1
- Development tool: Eclipse & 4
- Test tool: JUnit & 4
- Distribution tool: Maven & 4
- Configuration Management tool: Subversion & 1
- Mobile UX: JQueryMobile & 2
2. Main Contents of eGovFrame in Korea

Open Process: Various opinions and issues from stakeholders were collected

<table>
<thead>
<tr>
<th>NO</th>
<th>Date</th>
<th>Number of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2008.12.17</td>
<td>35</td>
</tr>
<tr>
<td>2</td>
<td>2009.01.14</td>
<td>29</td>
</tr>
<tr>
<td>3</td>
<td>2009.02.11</td>
<td>22</td>
</tr>
<tr>
<td>4</td>
<td>2009.05.11</td>
<td>21</td>
</tr>
<tr>
<td>5</td>
<td>2009.05.20</td>
<td>224</td>
</tr>
<tr>
<td>6</td>
<td>2009.07.14</td>
<td>26</td>
</tr>
<tr>
<td>7</td>
<td>2010.03.12</td>
<td>200</td>
</tr>
<tr>
<td>8</td>
<td>2010.05.03</td>
<td>11</td>
</tr>
<tr>
<td>9</td>
<td>2010.06.01</td>
<td>25</td>
</tr>
<tr>
<td>10</td>
<td>2010.06.15</td>
<td>6</td>
</tr>
<tr>
<td>11</td>
<td>2010.06.25</td>
<td>10</td>
</tr>
<tr>
<td>12</td>
<td>2010.07.08</td>
<td>13</td>
</tr>
<tr>
<td>13</td>
<td>2010.07.20</td>
<td>19</td>
</tr>
<tr>
<td>14</td>
<td>2011.04.27</td>
<td>26</td>
</tr>
<tr>
<td>15</td>
<td>2011.08.25</td>
<td>7</td>
</tr>
<tr>
<td>16</td>
<td>2011.10.04</td>
<td>7</td>
</tr>
<tr>
<td>17</td>
<td>2011.11.03</td>
<td>400</td>
</tr>
<tr>
<td>18</td>
<td>2012.07.30</td>
<td>22</td>
</tr>
<tr>
<td>19</td>
<td>2012.11.07</td>
<td>34</td>
</tr>
<tr>
<td>20</td>
<td>2012.11.23</td>
<td>350</td>
</tr>
</tbody>
</table>

Public Hearings (2009)

Public & Private Sector Meeting (2010)

Public & Private Sector Meeting (2011)

Public & Private Sector Meeting (2012)
Chapter 06  Main Contents of eGovFrame in Korea

3. Open Outputs: All source codes including outputs are provided at no cost

- Open Outputs
  - All source codes & IPRs made open (Apache License, Version 2.0)
  - Free training provided to more than 9,938 developers
  - Applied to over 812 projects
  - Over 814,430 downloads

- International Recognition
  - The eGovFrame swept three awards in the FutureGov Awards 2010, leading the field where more than 690 nominations were made from 20 different countries
    - The Government Organization of the Year
    - The Technology Leadership Award
    - The Award for Government Transformation of the Year

- CMMI Certificate

Ministry of the Interior and Safety
NIA
NATIONAL INFORMATION SOCIETY AGENCY
Open Ecosystem: eGovFrame Center provides technical support, training, compatibility verification and conducts major upgrades and R&D improvement.

- **Open Community**
  - Open source projects
  - Supporting technology evangelists and committers activity

- **Education & Training**
  - SMEs developer course
  - Technical Seminar (Open Community)

- **Remote Help desk**
  - Tool
  - Emergency support
  - PC, Server

- **Compatibility Certificate**
  - Source code analysis and interoperability test
  - Compatibility Certificate

- **Technical support**
  - Project set up
  - Template guide
  - Issue support
  - Verification
  - Planning support

---

Chapter 06

2. Main Contents of eGovFrame in Korea
## Contents of e-Government Standard Framework

### e-Government Standard Framework Organization

<table>
<thead>
<tr>
<th>Mobile</th>
<th>Common mobile components</th>
<th>Conversion of existing common components into mobile components</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web</td>
<td>Common technology components</td>
<td>Elementary technology components</td>
</tr>
</tbody>
</table>

### Standard Framework

<table>
<thead>
<tr>
<th>Development environment</th>
<th>Implementation tool</th>
<th>Distribution tool</th>
<th>Test tool</th>
<th>Configuration tool</th>
<th>Mobile device API development tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Execution environment</td>
<td>Screen processing</td>
<td>Task processing</td>
<td>Data processing</td>
<td>Channel integration</td>
<td>Common base</td>
</tr>
<tr>
<td>Management environment</td>
<td>Service request management</td>
<td>Change management</td>
<td>Status management</td>
<td>Standard management</td>
<td></td>
</tr>
<tr>
<td>Operating environment</td>
<td>Monitoring tool</td>
<td>Operation management tool</td>
<td>Batch operating tool</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# 2. Main Contents of eGovFrame in Korea

## Achievement of eGovFrame

- eGovFrame has been applied to mission-critical projects that need improved delivery of public services

<table>
<thead>
<tr>
<th>Sector</th>
<th>Projects using eGovFrame</th>
<th>Sector</th>
<th>Projects using eGovFrame</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration</td>
<td>National portal</td>
<td>Media</td>
<td>Broadcasting-Telecom Convergence</td>
</tr>
<tr>
<td>Transportation</td>
<td>Seoul Metropolitan Rail Transit Management System</td>
<td>Patent</td>
<td>3rd Generation Patent Net System</td>
</tr>
<tr>
<td>Medical</td>
<td>Hospital Strategy Management System</td>
<td>Tax</td>
<td>National Tax System</td>
</tr>
<tr>
<td>Military</td>
<td>Warfighting Symbology Management System</td>
<td>Port</td>
<td>Incheon U-port System</td>
</tr>
<tr>
<td>Customs</td>
<td>Global High-tech Port Logistics System</td>
<td>Culture</td>
<td>National Assembly e-Library System</td>
</tr>
<tr>
<td>Land</td>
<td>Land Information Management System</td>
<td>Education</td>
<td>National Education Information System</td>
</tr>
</tbody>
</table>
2. Main Contents of eGovFrame in Korea

Achievement of eGovFrame

- Public IT Systems’ e-GovFrame Application Rate in Korea (per year)

![Graph showing the increasing application rate from 2012 to 2019. The rate increases from 18.17% in 2012 to 62% in 2019.]
Achievement of eGovFrame

- eGovFrame has been applied to e-Government services worldwide through global cooperation (25 e-Government projects in 11 countries)
Overview

Gyeonggi Smartfarm Information System

Growth Information

Farmhouse Data
- Sensor Info.
- Mgt. Info.
- Equipment Info.

Smart Farmhouse

- Sensor Control
- Temperature, Humidity
- Wind direction & speed
- Rainfall
- Solar radiation
- Ceiling Opener
- Ventilation fan
- Side opening and closing Insulation Curtain
- Shading Curtain
- CO2
- Temperature, Humidity
- CO2 gas Supplier
- Irrigation Suppliers
- EC
- pH
- Air conditioner & Heater

Nationwide Smartfarm Info.

smartfarmkorea.net

Ministry of the Interior and Safety
NIA
NATIONAL INFORMATION SOCIETY AGENCY
Chapter 06  3. Case Study of eGovFrame in Korea: Big Data in Smart Farming

Enhanced Support for Smart Farmhouses

Gyeonggi Smartfarm (Gsmartfarm.net)

API link

Provides refined data

Gyeonggi-do real-time data collection from farmhouse

**GIS-based**

**Consulting Support**

Management

Facility

Cultivation

Education/Guid

**Real-time**

Farm Monitoring

Excellent Farming
3. Case Study of eGovFrame in Korea: Big Data in Smart Farming

System Main Screen and Introduction Page
Software Diagram

WAS Server
- EZS Chart
- CROWNIX Report6
- SecuveTOS (Server Security)
- eGovFrame
- JEUS Standard7
- CentOS 6.7

WEB Server
- TCP/IP
- SSL
- SecuveTOS (Security)
- WebtoB Standard
- CentOS 6.7

DB Server
- Edge DB
- SecuveTOS (Server Security)
- MySQL Std
- CentOS 6.7

eGovFrame Runtime Environment
- Presentation Layer
- Business Logic Layer
- Persistence Layer
- Integration Layer
- Batch Layer
- Foundation Layer
# Categories

<table>
<thead>
<tr>
<th>Common Technical Components</th>
<th>Common Components</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security</td>
<td>Real name authentication and authority management, encryption/decryption (3 services)</td>
</tr>
<tr>
<td>User authentication/directory service</td>
<td>General login and certificate login (2 services)</td>
</tr>
<tr>
<td>User support</td>
<td>User management, Consultation management, Survey management, FAQ, Q&amp;A (4 services)</td>
</tr>
<tr>
<td>Collaboration</td>
<td>Board, Club management, Community management, Address management</td>
</tr>
<tr>
<td>System management</td>
<td>Common code management, Menu management, Log management, Institution code receiving etc. (4)</td>
</tr>
<tr>
<td>Integration</td>
<td>Link status management, Link Institute management, etc.</td>
</tr>
<tr>
<td>Statistics / Reporting</td>
<td>Article and connection statistics</td>
</tr>
<tr>
<td>Digital asset management</td>
<td>Knowledge management</td>
</tr>
</tbody>
</table>

| Common Utility Components   | Calendar, Format conversion, Validation check, etc. (13) |
### eGovFrame Training and Q&A

<table>
<thead>
<tr>
<th>Title</th>
<th>Applied items</th>
<th>Effects of application</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Productivity</strong></td>
<td>- Applying common components of eGovFrame&lt;br&gt;- Applied 15 out of 42 menus</td>
<td>- Reinforced developer competency with eGovFrame training in the early stage of the project&lt;br&gt;- Improved development productivity by leveraging common components of eGovFrame</td>
</tr>
<tr>
<td><strong>Standardization</strong></td>
<td>- Internal training with web development security guide and compatibility/accessibility training materials</td>
<td>- Reduced costs for setting up development standards&lt;br&gt;- Unified source code by complying with the internal project development standards</td>
</tr>
<tr>
<td><strong>Enhancement</strong></td>
<td>- Planning to carry out the 2nd and 3rd stage upgrade project in the future</td>
<td>- Reduced business and operational dependencies through eGovFrame application</td>
</tr>
</tbody>
</table>

**Internal training with web development and standard guide**

**eGovFrame Portal Q&A**
Before and After

- Differences between before and after

**Before**

- Redundant development of similar functionalities in each project
- Strong dependency on the certain system providers caused by technological reliance
- Disadvantages to SMEs who cannot afford a SW framework
- High degree of maintenance difficulty caused by lack of standards
- Significant amount of time and manpower for operating between information systems

**After**

- Redundant development cost and time reduced by reusing common components
- Technological dependency resolved through open source-based standardized development
- SMEs competitiveness improved by using free, open SW framework
- Convenient maintenance ensured through standardized modularization
- Interoperability enhanced between systems via standardized framework
• NIA(2019), All that Digital Gov. KOREA
• NIA(2020), e-Government Standard Framework in Korea
• NIA(2020), eGovFrame Case Studies