Smart Government Initiative:
ICT Enablers and Future Services in Korea

2018.9

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Agenda

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1. Smart Government – Korea
1.1 Concepts
1.2 Smart City Vs. e-Government

1.1 Concepts

E-government		Smart Government
People/Civil Servant Claim → Improvement	**Administrative Work**	Auto recognition of problems by AI (Artificial Intelligence)→ Self-suggesting alternatives → Improvement
Government leading policy management	**Policy Decision**	People/Citizens leading policy decision
Focusing on Simple tasks	**On-site Administration**	Solving Complex problems
Quantitative and Efficient Service	**Service Object**	More Qualitative ·Empathic Service
Customized Lifecycle service	**Service**	Everyday and lifetime assistant service
Online + Mobile Channel	**Delivery Method**	Demand-based On·Off multi/cross-channel

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☐ Transformation into Smart Nation – **A Two Track** Approach

Central Government ➡ Smart Government

ICT Infrastructure	**E–Government and Social Digitalization**	**In advance Digital Support for Nationwide Citizen Support**

United but Seperated

Local Administration Policy, Law and Ordinances	**IoT and Sensor Networks with Mobile Application for Smart city**	**Enhanced Citizen Interface for Welfare and Sustainability**

Smart Nation

Local Government ➡ Smart City
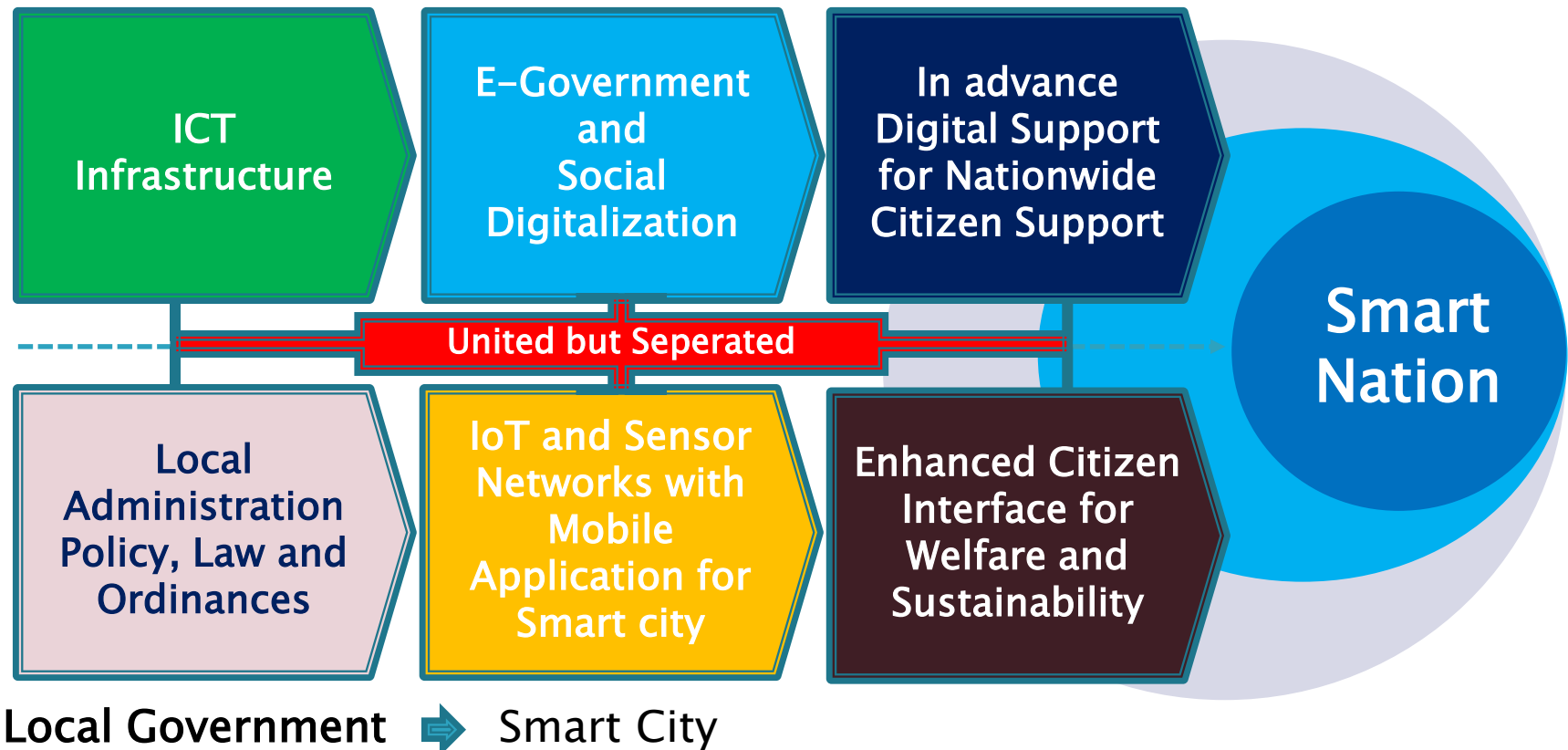
1.2 Smart City Vs. E-government (2) - Infrastructure

▪ Virtualization with Cloud Computing together herewith will be fortified with IoT and AI (Artificial Intelligence). However, public sector may be showing somewhat different paths - recommending **Two Track Approach** between e-government and smart city deployment.

| Virtualization and Cloud in Public Sector | Traditional e-Government **Functions Perspective** | Unix still works | Agility may not be the important factor for e-government; rather security is more important factor | Unix with legacy system cost may not be critical because e-government services and capacity needs can be easily forecasted | Enhancement of e-Government functions can be starting point of changing to U2L with X86 architecture |
| | Smart City Services **with IoT** | Open Data and API Initiative for Smart Services in cities | Competitiveness, Cost Saving, Agility for Time to Market service development can be still affecting Cloud service adoption | IoT and AI may produce tremendous data traffics and Cloud and SDx can be the only answers | Eventually IoT can be the driver for changing e-Government infrastructure in the future migrating to All Cloud Architecture |

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Source: KANG, Cloud Expo 2018

2. ICT Enablers and Services for Smart Government

2.1 IoT Network/Platform/Services
2.2 AI and Robots Services
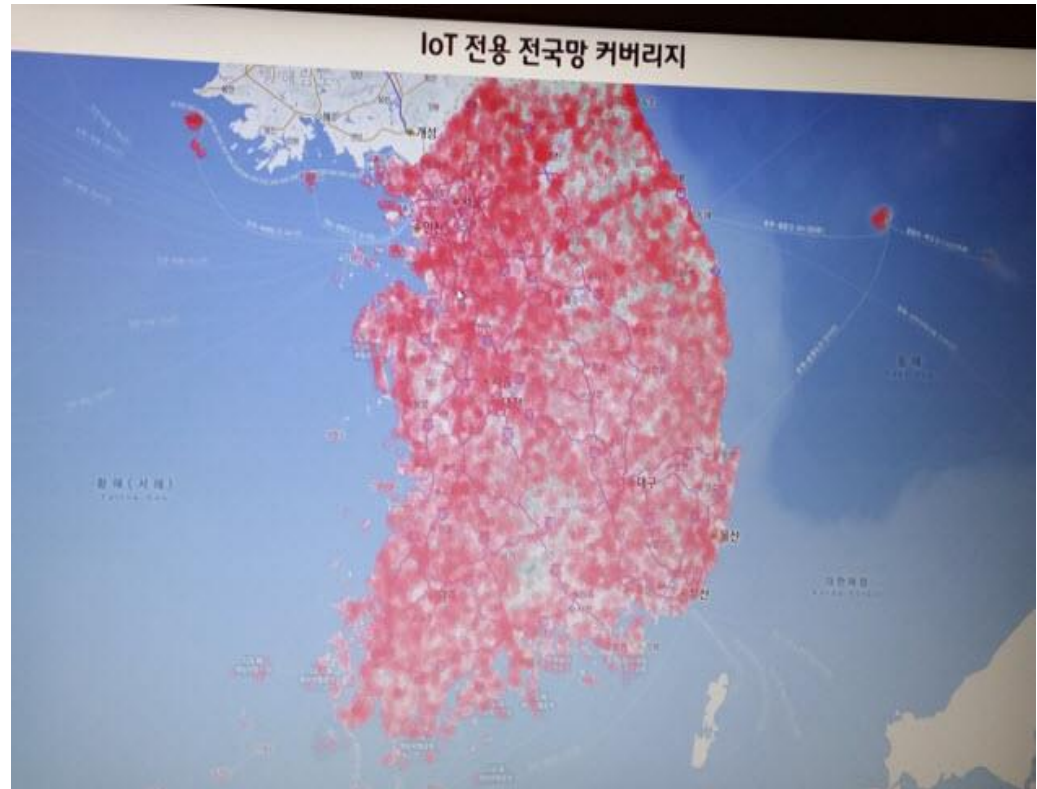2.3 Big Data Services
2.4 Other ICT enablers

☐ SK Telecom had implemented nationwide LORA IoT network in Korea

LoRa Base Stations

SK LoRa network coverage of Korean Peninsula

☐ SK Telecom's Monthly Amounts for IoT Services

Unit : 1,000 Won = 1 USD

Data	Monthly Base Amounts	Services	Etc.
100KB (1time per 1 hour)	35 cents	Gas/Water AMI and Monitoring	• Discount 2 year contract (5%), 5 year contract (20%), • Multi-lines (500, 2%) • Additional data rate 0.05cents/0.5KB
500KB (1 time per 10 minutes)	50 cents	Monitoring of facilities	
3 MB (1 time per 1 Minute)	70 cents	Asset management (public bicycles, etc.)	
10 MB	1 dollar	Safe watch for humans	
50 MB	1.5 dollars	Movable assets	
100 MB	2 dollars	Construction sites security management, Electricity AMI, etc.	

Source: SK Telecom, IoT homepage, 2017

☐ Examples of IoT services through IoT

IoT Meteorological Sensors

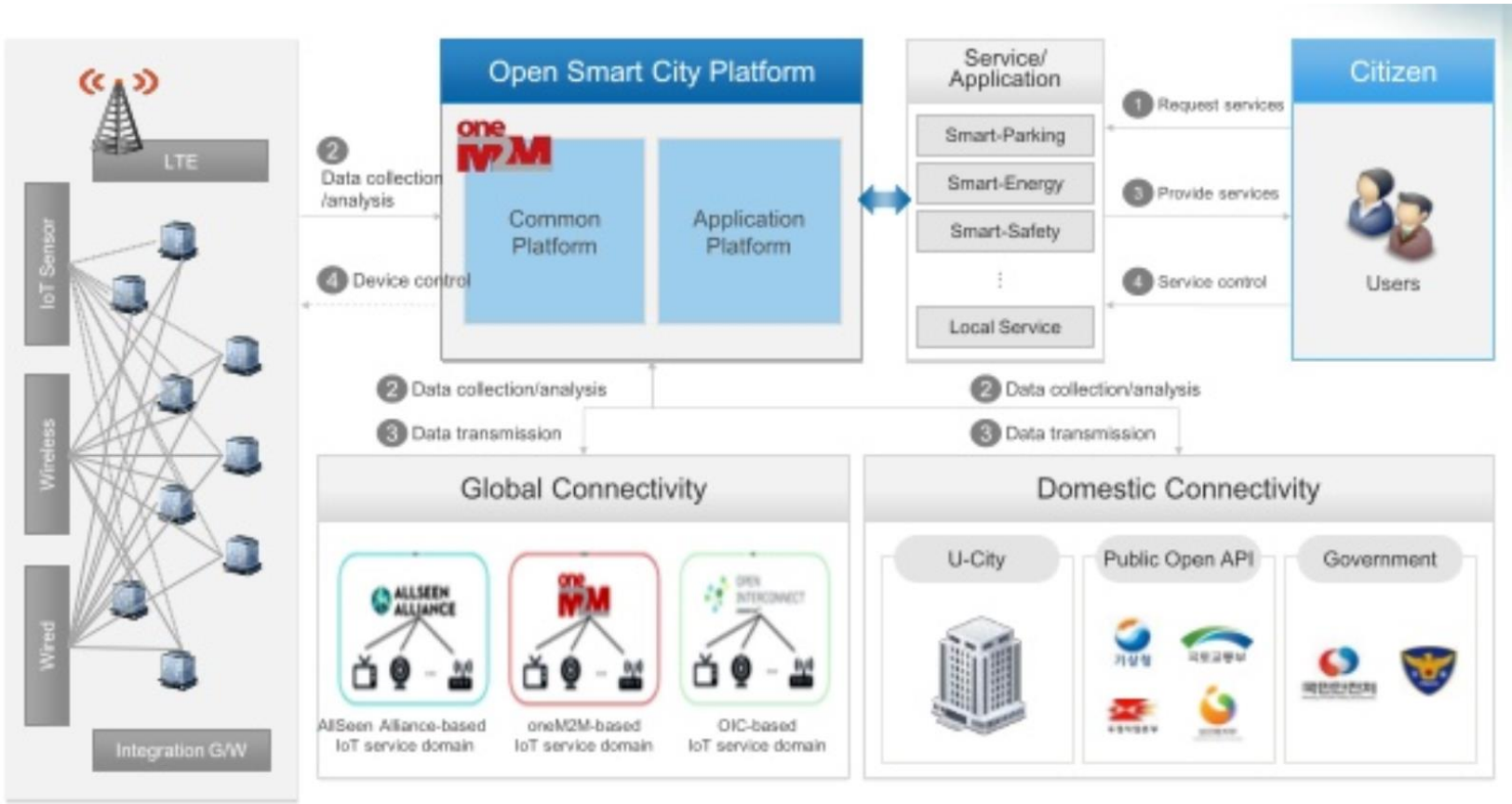IoT based Gas detectors
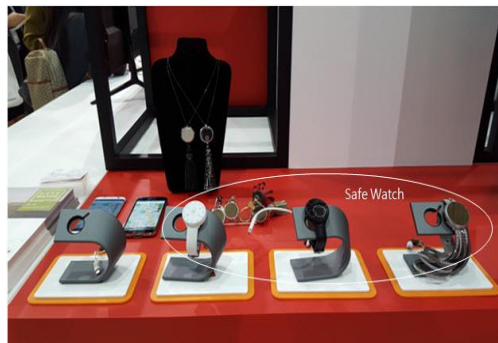
IoT based wearable watches

IoT based GPS tracker for babies and animals

☐ OneM2M based Smart City Platform named Mobius in Busan, Korea

Source: Busan city, 2015

□ Mobius Source Code = Download from Github or Ocean (http://www.iotocean.org)

☐ In-depth Mobius Manuals and Training for development supports available (examples)

```
mn-cse
 ├─ acp1
 ├─ adn-ae1
 │   └─ light1
 │       ├─ CI1
 │       ├─ CI2
 │       └─ sub1
 ├─ adn-ae2
 │   └─ light2
 │       ├─ CI1
 │       ├─ CI2
 │       └─ sub1
 └─ mn-ae
     ├─ group1
     └─ group2
```

MN-CSE Registration

HTTP Request:
POST /~/in-cse/server?rcn=0 HTTP/1.1
Host:http://in.provider.com:8080
X-M2M-Origin:/mn-cse
Content-Type:application/vnd.onem2m-res+xml;ty=16
X-M2M-RI: incse/88643
<?xml version="1.0" encoding="UTF-8"?>
<m2m:csr
xmlns:m2m="http://www.onem2m.org/xml/protocols"
rn="home_gateway">
<csi>mn-cse</csi>
<cb>mn.provider.com/mn-cse</cb>
<rr>TRUE</rr>
<poa>http://mn.provider.com:8080</poa>
47
<cst>2</cst>
<acpi>/~/in-cse/acp-666957710</acpi>
</m2m:csr>

HTTP Response:
201 Created
X-M2M-RSC: 2001
X-M2M-RI: incse/88643
Content-Location: /in-cse/csr-299409504

ADN-AE1 Light1 ContentInstance

HTTP Request:
GET /~/mn-cse/home_gateway/light_ae1/light/la HTTP/1.1
Host:http://in.provider.com:8080
X-M2M-Origin:/in-cse/Csmartphone_ae
X-M2M-RI: mncse/11223
Accept:application/xml

HTTP Response:
200 OK
X-M2M-RSC: 2000
X-M2M-RI: mncse/11223
Content-Type: application/vnd.onem2m-res+xml
<?xml version="1.0" encoding="UTF-8"?>
<m2m:cin
xmlns:m2m="http://www.onem2m.org/xml/protocols"
rn="cin-394798749">
<ty>4</ty>
<ri>cin-394798749</ri>
<pi>cnt-181049109</pi>
<ct>20150925T045938</ct>
<lt>20150925T045938</lt>
<et>20151107T154802</et>
<st>0</st>
<cnf>text/plain:0</cnf>
<cs>3</cs>
<con>OFF</con>
</m2m:cin>

2.2 AI and Robots Services (1)

☐ Personally Customized Lifetime Assistant Service
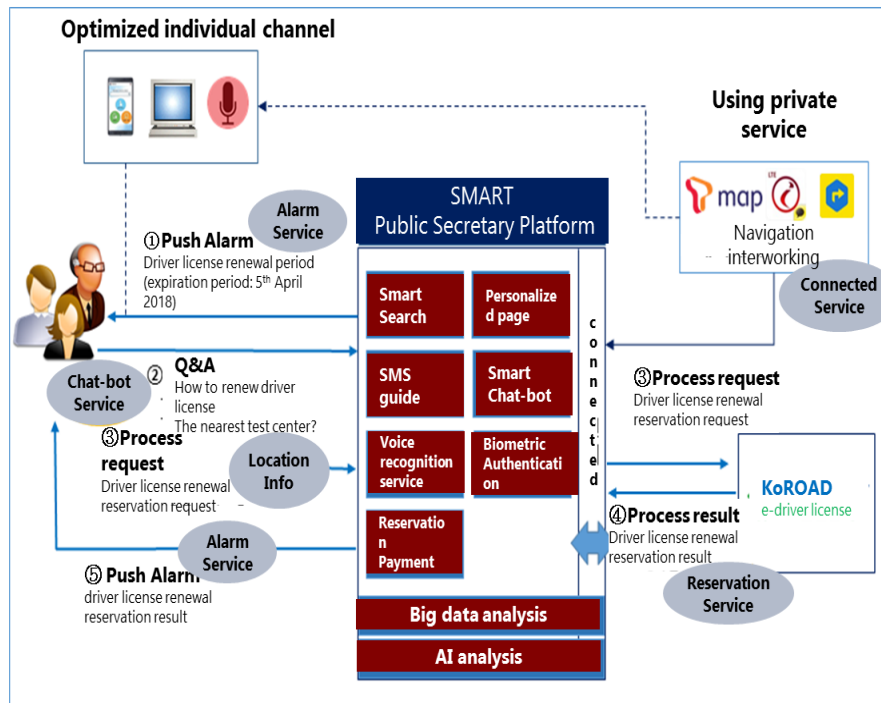
Picture: Smart Public Secretary Platform

- **Sophisticated Assistant Service**

① Responsive assistant service satisfying citizen needs by integrating personal characteristics, location information, city infrastructure, etc.

② Establish customized data and provide preemptive citizen services by using AI, big data and categorized life/daily cycle.

③ Provide proper information and services by checking customized information suitability through beacon, etc.

☐ Robots in Public Administration Service

Guide Robot   Cleaning Robot

Picture: Robots in Incheon Int'l Airport

- **Intelligent Robots Everywhere!**

① Provide smart kiosks, humanoid robots to civil service centers, ward offices, etc. for tailored public services

② Introduce video call function in kiosk to enable 24-hour remote consultation and support, and connect to government service call center(110)

③ Deploy humanoid robots equipped with AI chat-bot engine in civil service centers, help citizen register waiting lists and support civil appeal procedures

- Welcome citizen, assist guide or apply civil appeals and give additional information on other public services
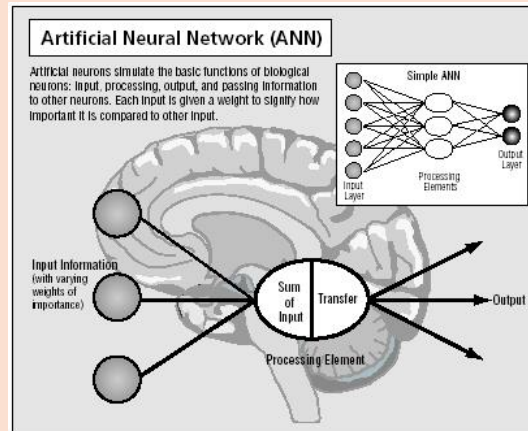
☐ Big Data Analysis with AI

Artificial Neural Network (ANN)

Artificial neurons simulate the basic functions of biological neurons: input, processing, output, and passing information to other neurons. Each input is given a weight to signify how important it is compared to other input.

AI

Machine Learning

Deep Learning

Big Data

Machines take Data and begins to learn for itself. Algorithms are programmed to learn and improve without the need for human data input

The science of making machines smarter, which in turn augments human knowledge and capabilities, Artificial intelligence is any computer program that does something smart

2.3 Big Data Services (2) -example services

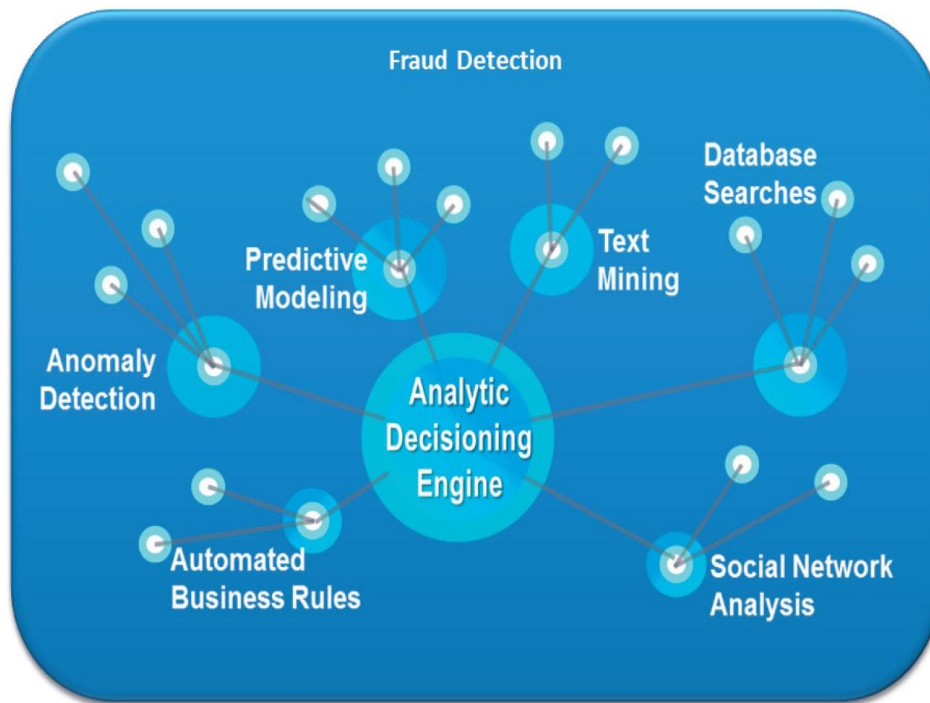☐ Big Data Analysis for Preventing Corruptions


Fraud Detection

Image source: SAS

- **Big Data Analysis and Prevention of Corruptions**

① Predict and prevent corruptions and system error by real-time integrated big data analysis regarding administrative processing, budget, etc.

② Detect and block high-risk tax evaders and illegal recipients by developing possible scenarios through public-private cooperative big data analysis of tax, finance, etc.

③ Detect and monitor corruption signals in advance by data analysis of government budget, auditing, procedures

  - Cheongbaek-e system: connects data from local governments and credit card companies, detects abnormal signs, notify authorities concerned

2.3 Big Data Services (2)- example services

☐ Big Data Analysis for Apple Production in Korea

• Graph of Apple Production Amount in Youngju City
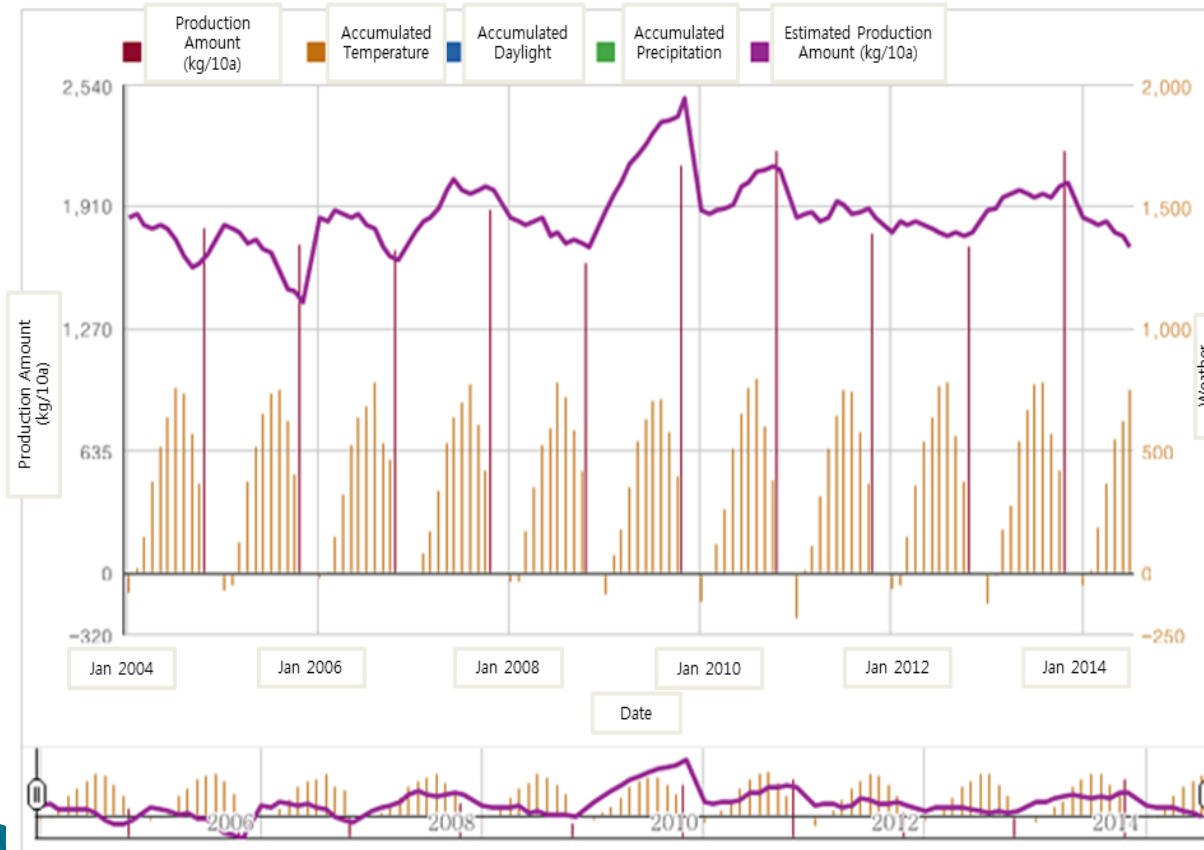
- **Intelligent demand-supply forecasting system of agricultural and livestock products on Big Data Analysis**

① Solve demand-supply imbalance by predicting products according to regional focal points considering various types of internal/external data

② Develop supplies prediction model of agricultural and livestock products considering various factors such as national dietary habit change, agricultural and livestock products import/export trends, regional weather forecast data, major diseases
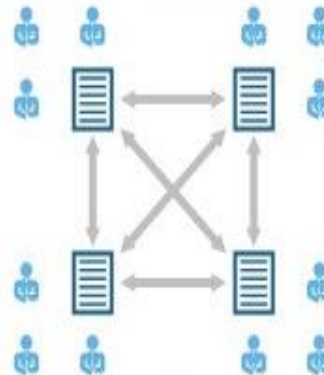
2.4 Other ICT Enablers: Block Chain and 5G (1)

☐ Block Chain in Public Sector

Blockchain
Block
Transaction
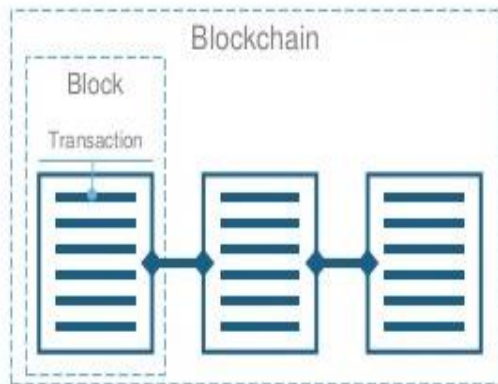
- Block = all transactions within a certain time period
- Blockchain = links all blocks together

Peer to Peer = No central authority

Distributed peer-to-peer network ensures the data integrity

- **Block Chain technology may affect public sector smart features**

① Needs strong reference sites and stability

② May start from Record Management, Value Transfer, and Smart Contracts

③ ID Management, Land Registration, Voting, etc. can be applied but needs to overcome some of pain points to replace current systems

2.4 Other ICT Enablers: Block Chain and 5G (1)

☐ 5G in Public Sector

Image source: IEEE.org

- **5G will be changing citizen daily life – but public sector's direct adoption of 5G may needs some time.**

① Autonomous Driving, Remote healthcare/ surgery, 4K media streaming, wearable sensors, virtual education, real-time translation, etc. can be 5G basis and impact citizen daily life.

② Cannot replace fixed line backbone and radio frequency jamming can be also an issue.

③ IoT+5G can be a big driver for new types of WAN application

3. Discussions

   3.1 Implications and a Way Forward

3.1 Implications and a Way Forward

- **Two Track Approach (E-Government and Smart City) between Local and Central government is recommended**

- **Clear vision and mission for smart government deployment in the different context of a country**

- **Enhancing central and local governance by maximizing ICT advancement in the market (AI, Robots, Big Data, etc.)**

- **Power of IoT in citizen daily life: IoT Platform? IoT services? IoT network? Rather - how we can make citizen values from IoT is the key question!**

- **Smart Government Big Planning - systemized development strategy incorporating all the technology advancement in local vs. central framework**

- **Information security issue is ever increasing – needs solid preparation**

Thank You!
Questions and Comments

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