I·SEOUL·U
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소통 713-0010

SEOUL
SMART CITY
CHAGING THE LIVES
OF THE CITIZENS

SEOUL SMART CITY
CHANGING
THE LIVES
OF THE CITIZENS

시민의
삶을 바꾸는
서울
스마트도시

2020

SMART SEOUL

SEOUL

Contents

Seoul Smart City, Changing the Lives of the Citizens

Introduction

Seoul, located in the center of the western part of the Korean Peninsula, is a metropolitan city endowed with a distinctive natural environment with 41.5km of Han River passing through the middle of the city. Seoul has been the Korean capital for over 600 years and the center of politics, culture and economy of Korea, accounting for 23% of the entire country's Gross Domestic Product (GDP). Just merely 60 years ago, Seoul was just recovering from the ruins and ashes of the Korean war. It was one of the poorest cities, as the GNP per capita was only 82 dollars. However, Seoul has risen from the ruins of the war, and went through rapid urbanization in an extremely short period of time. Now, the city became a world-class metropolitan city where over 10 million people call home and where about half the population of the entire country rides within the Greater Seoul Metropolitan Area. The city has now become a sustainable smart city striving to resolve diverse urban challenges such as housing, water and sewage, garbage, transportation and welfare.

Going Beyond the World's Best E-government to the Best Smart City

Seoul has been awarded the prestigious "Global e-Government Survey" seven years in a row, sponsored by the United Nations and ranked by Rutgers University. In addition, Seoul is the founding city of the World Smart Sustainable Cities Organization(WeGO) and a member of OGP(Open Government Partnership).
Seoul is a city of 10 million with a well-established urban management system. Through state-of-the-art ICT infrastructure, various civic participation channels are utilized to collect citizen opinions to help city officials respond to and solve urban problems.
These include Smart Complaint Reporting (https://smartreport.seoul.go.kr), Democracy Seoul (https://democracy.seoul.go.kr/), mVoting (https://mvoting.seoul.go.kr/), Eungdapso (https://eungdapso.seoul.go.kr/) and the Participatory Budgeting System (https://yesan.seoul.go.kr/). The entire city of Seoul is connected with an integrated network of advanced fiber optical cables and public Wi-Fi, allowing people to access public services 24/7. More than 8 million suggestions annually are converted into data and analyzed to set the direction, policies and priorities of the government. Seoul is ahead of the curve and leading the way, as many services that other cities are currently experimenting with are already part of everyday life in Seoul.

History of Seoul Smart City

The Seoul Metropolitan Government(SMG) has been implementing various projects to establish Seoul as a smart city, but "Smart City" was not the concept that the SMG originally pursued at the beginning. However, based on the initiatively adopted ICT infrastructure, Seoul has expanded communication channels, citizen's participation and public-private cooperation and it ultimately led Seoul to becoming a world-class Smart City.

From the perspective of using digital technology to improve the quality of life of citizens and to make the city and citizens smarter, Smart City Seoul started with the e-government development in the 1990s. Since the 1990s, the demand for computerization and digitization of the Seoul Metropolitan Government's administrative affairs has increased steadily. Therefore, e-government development has become prioritized and progressed at the national level. In particular, the central government designated information and communication business as the new generation policy direction of national growth. In 1995, as the Basic Informatization Promotion Law was passed at the National Assembly, the Seoul Metropolitan Government was empowered to accelerate the development in e-governance.

With this historic background, the Seoul Metropolitan Government established policies on "Regulations on Seoul City Basic Information" and the "Seoul Digital Administrative Promotion Ordinance". Every five years, the Seoul Metropolitan Government establishes a digital master plan, reflecting and developing the city's digital·smart city policies, taking into consideration the current needs of the citizens and the technological trends and advancements. With the enactment of the laws, the Seoul Metropolitan Government has gone through the rapid process of informatization, providing citizens with diverse range of services, encouraging participation and e-democracy. The following is a description of the gradual process of informatization of Seoul in the last two decades.

The Procedure of Smart Seoul
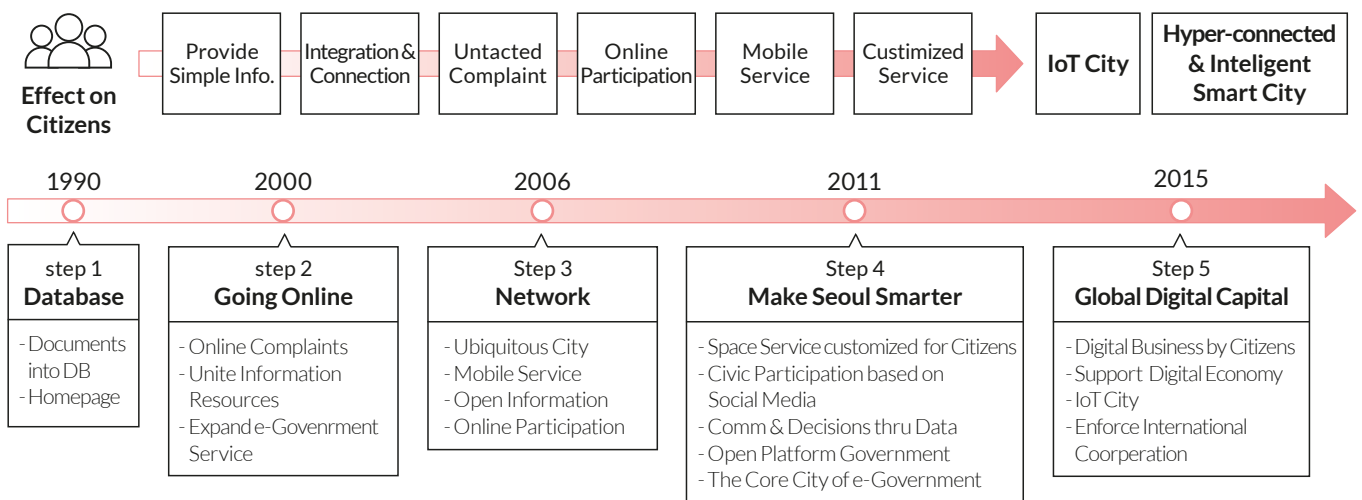
Computerization (1st phase 1990-1999): Seoul Informatization Basic Plan

With the introduction of computerized equipment, we have established a foundation to utilize information technology. We made a database based on administrative documents and created a webpage to provide administrative information and public services.

Online-based Services (2rd phase 2000-2005): Seoul Informatization Master Plan

Various information resources were integrated and provided online. City webpages were integrated into a single interface, based on the viewpoint of the citizens. e-Seoul Net, which connects the Seoul Metropolitan Government and 35 related organizations with high-speed optical cables was established in 2003. By opening Seoul Data Center in 2004, a project for establishing an integrated infrastructure for the Seoul information resources that unifies the computer rooms scattered across the organization, was pursued.

Interactive Citizen Participation (3rd phase 2006-2010): U-Seoul Master Plan

Web2.0, which aims at interactive participation, sharing, and opening, was introduced. Online citizen participation through '10 Million Imagination Oasis' and the like, was innovatively expanded. By integrating with the mobile environment, the mobile portal m702, with which one can participate at anytime and anywhere, was established. And, for the safety of the city, administrative services based on geo-spacial information and intelligent city management was pursued. The Seoul Metropolitan Government created a wireless infrastructure and a Security Control Center.

Making Seoul Smarter (4th phase 2011-2015): Smart Seoul 2015

'Smart Seoul 2015' has been launched within the scope of providing smart administration:
①World-leading city utilizing smart technology ' ②Smart administration for communication with citizens ③Futuristic infrastructure for urban lifestyles ④Creative Smart economy ⑤Various smart city projects aiming to become global culture city. As a result, public WiFi has been expanded and geospatial information on mobile has grown exponentially. Love PC donations(donations of equipment), education on smart information and services are continuing to reduce the digital divide between socially vulnerable, such as the elderly, handicapped and the unemployed.

Global Digital Capital (5th phase 2016-2020): Digital 2020

The five-year plan for Seoul to become the "Global Digital Capital" has been established. The following are the policies and programs by the Seoul Metropolitan Government to cover all the areas of municipal administration together with citizens through the digital technology.

① 'Social Seoul City', communicate and create with citizens
  Successfully completed 50% of digital projects led by citizens. Established the Big Data Campus in 2016 and cooperated with the private sector

② Invigorating the digital economy (diginomics) by supporting the digital industry
  Establishment of an IoT Incubation Center, Gaepo Digital Innovation Park, Seoul Digital Foundation and Traditional Industry Convergence in 2016.

③ 'Digital Social Innovation' changing the lives of the citizens by solving urban problems related with safety, transportation, environment and welfare
  Achieved a 97% rate in arriving at disaster sites within 5 minutes and established an integrated service linking with "Community Service Center to My House"

④ 'Global Digital Leader', leading the world utilizing cutting-edge IT technology
  - Create 50 IoT testbed areas and realize living-lab concept by connecting the whole city by 2020.
  - Established a Cloud Center in 2016, completed public WiFi network installation in 2018 and enhanced overseas exchanges and cooperation with other cities.

Smart Seoul, Changing the Lives of the Citizens (6th phase 2021-2025)

Seoul is developing a five-year master plan to become the world's leading smart city going beyond to evolve from e-Government to smart cities. Citizens, experts, entrepreneurs, and other stakeholders will develop a comprehensive master plan in accordance with Seoul's policy directions to rapidly adapt to a hyper-connected and hyper intelligent society. The 2021-2025 master plan for Smart Seoul includes the following plans.

① Establishment of integrated strategies to make data-driven Smart Seoul
  Establish strategies for solving urban problems and realizing an evidence-based city based on data by linking and utilizing Big Data Lake, Urban Data Storage, Spatial Information Platform, CCTVs etc.

② Apply intelligent services to city administration in multiple phases
  Provide customized services based on data analysis, other services using administrative and urban data, and services based on new technologies such as big data and IoT

③ Utilize spatial information to make Seoul smarter
  Utilize and manage urban data effectively with Virtual Seoul(3D), Map Information Platform(2D), and Spatial Data Warehouse (SDW)

④ Advance cyber security response
  Establish intelligent security strategies, develop urban safety services based on Smart Seoul CCTV Safety Center, and reinforce privacy and the protection of personal data

⑤ Establish participatory governance and bridge the digital divide among the digital needy
  - Promote participatory governance based on collective intelligence of the public, and facilitate public-private cooperation by means of open innovation such as citizen lab, hackathon etc.
  - Establish strategies to resolve the digital divide by using technology and find new business models to narrow the digital divide based on public-private cooperation

The Vision and Strategies of Seoul Smart City

Seoul, a City that Best Utilizes Data

In order to and proactively respond to complex urban problems, Seoul is installing 50,000 sensors throughout the city by 2022 and incorporating AI technology into administration. Seoul will integrate, store, analyze and share various urban phenomena and public data, and create new business models by combing private data to revitalize the digital economy. Seoul established an ecosystem where both the private sector and citizens can create services which meet the needs of the end-users by opening up socially and economically available public data. As of June 2020, 5,226 dataset have been opened in forms of API, Excel, graphs etc. with 8.4 billion records of use and 183 developed apps.

Based on the analysis of 3 billion records of call data, Seoul introduced optimized bus routes for its 'Owl Buses', in order to service the largest number of passengers and to maximize convenience. The Owl Buses operate at midnight hours when regular public transportation stops operating, and is now used by approximately 10,000 people per day. In order to protect people from online crimes, Seoul developed AI Detective, which tracks and analyzes online crimes such as the patterns of illegal loan advertisement and evidences of illegal activities.

Seoul Smart City, Sharing Resources and Creating values with Citizens

Seoul Smart City creates urban value by helping its members to share space and services based on ICT, rather than physically expanding infrastructures. The IoT-based Parking Lot Sharing Service not only provides real-time parking information, but also allow citizens to share their own parking space with others (http://parking.seoul.go.kr/). Seoul also provides 20,000 shared bikes spread across 1,540 bike stations (https://www.bikeseoul.com/). It allows 24/7 self-rental through a mobile app, making it the basis of Seoul's next transportation revolution, MaaS(Mobility As a Service) and resolving the last-mile conundrum.

Seoul, Innovative City Cooperating and Coexisting with Citizens and Corporations

Seoul Smart City is an inclusive smart city that creates an enabling environment and adapts the ideas and innovative technology from the private sector.
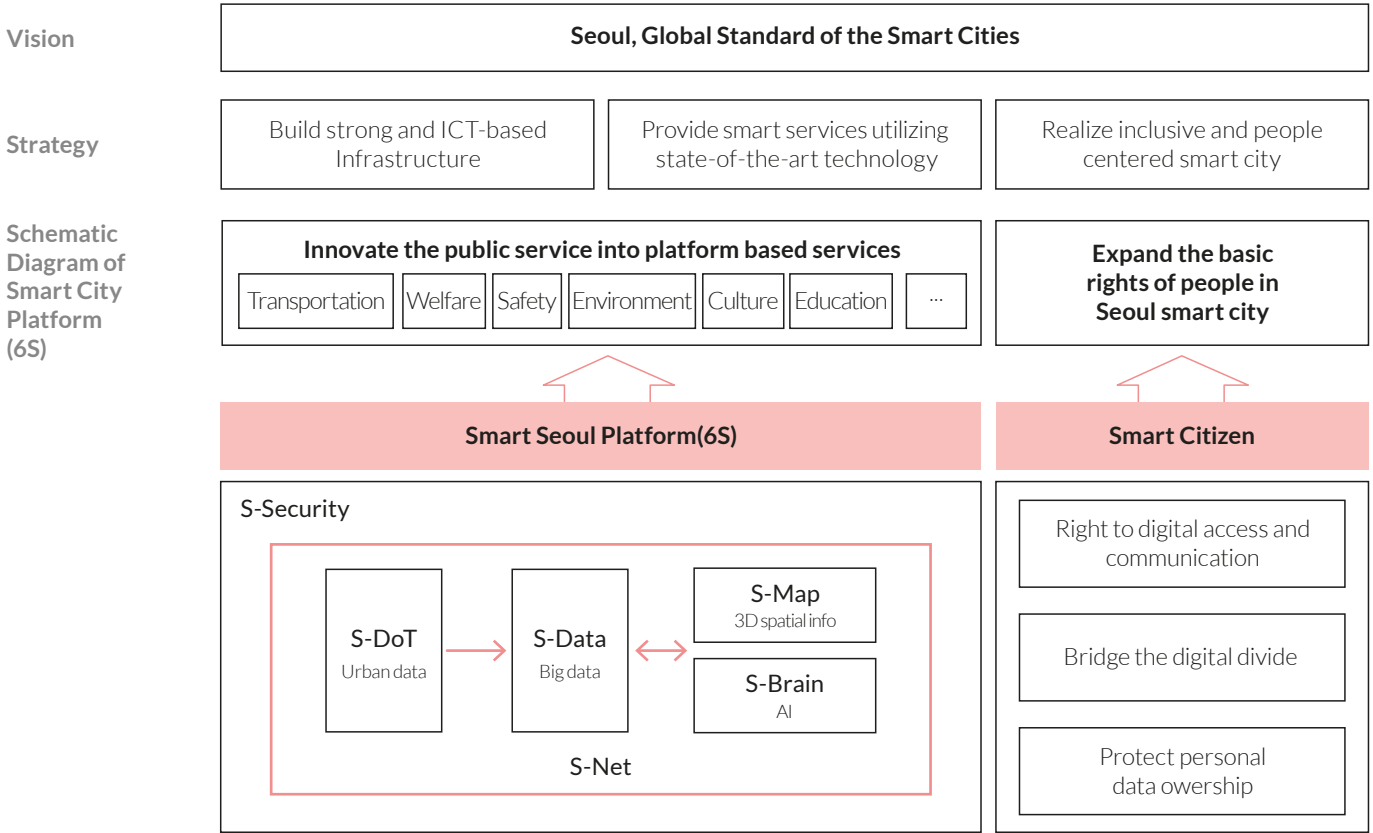Seoul serves as a test-bed for the private sector to test and improve their new services and technology in real life. Through the New Technology Submission Portal (http://www.seoul-tech.com), Seoul receives innovative ideas from companies and gives them opportunities to apply their services into city administration. Seoul developed the Commercial Area Analysis Service(https://golmok.seoul.go.kr/) based on private-public data, which provides information on 87 indexes such as survival rate, competition status, sales trends and floating population for each geographical area.

The Future of Citizen-Centric Smart Seoul

The SMG is currently pursuing its "6S Smart Seoul Platform" to set the global standard of becoming a truly inclusive smart city. This includes S-Net, which aims to bridge the digital divide via a hyper-connected city, S-Dot, digitizing citizen-driven data to provide value to the citizens, S-Data, a city that best utilizes data, S-Brain, a city that personalizes services through AI, S-Map, a 3-D virtual city, S-Security, a city that utilizes state-of-the-art security technology to truly change the lives of the citizens for the better.

Within the global realm, we truly aim to evolve into a city that will resolve current urban challenges, and hope that the know-how, knowledge and information provided in this publication will assist the readers in implementing a smarter and more sustainable city. We truly hope that we can all come together to bring about a smart city that is more inclusive and citizen-centric to ultimately improve the lives of the inhabitants.

Seoul, Global Standard for Smart Cities

Vision	Seoul, Global Standard of the Smart Cities

Strategy	Build strong and ICT-based Infrastructure	Provide smart services utilizing state-of-the-art technology	Realize inclusive and people centered smart city

Schematic Diagram of Smart City Platform (6S)

Innovate the public service into platform based services

| Transportation | Welfare | Safety | Environment | Culture | Education | … |

Expand the basic rights of people in Seoul smart city

Smart Seoul Platform(6S)

Smart Citizen

S-Security

S-DoT
Urban data

→

S-Data
Big data

↔

S-Map
3D spatial info

S-Brain
AI

S-Net

Right to digital access and communication

Bridge the digital divide

Protect personal data owership

Smart Seoul Platform 6S Introduction

S-Net
Smart Seoul Network

Establishment of Seoul equally for all the citizens, the base infrastructure of a future smart city

- Completed city-wide information and communication network(4,237km) → For the expansion of smart service
- Public Wi-Fi for the betterment of public life → Guaranteeing citizen's right to data and the Internet
- Built the new IoT network → Creating new values such as spreading Smart Services etc.

S-DoT
Smart Seoul Data of Things

Digitization of city data and citizen information, to create value for the citizens

- Installation of 2,500 city-wide sensors by 2022 to establish real-time monitoring and collection of city data
- Provision of a platform for the private sector to be able to compatibly install IoT sensors and collect data(IoT sharing) → Establishment of a testbed for the private sector
- Construction of a smart pole for city infrastructure → standardization of a city-wide smart pole

S-Data
Smart Seoul Data

Establishment of a system for data utilization, strengthening Seoul as a city best for data utilization

- Creation of value and innovation through the integration of 518 administrative information system data for the city
- Establishment of governance policy on integrated data management system
- Strengthening the standardization and quality of data

S-Brain

Smart Seoul
Brain

A customized service via intelligent AI administrative system

- Customized service for the citizens(chatbot, reservations), establishment of a AI data academy
- An AI-based minutes system for efficient administration
- Establishment of an intelligent AI system for basic administrative planning → an AI platform for the support of policies

S-Map

Smart Seoul
Map

3D virtual mapping of the entire City of Seoul

- Implementation of a virtual 3D map of the entire City of Seoul → utilization of spatial information for policy decisions
- Various personalized service for the citizens, development of services to resolve urban issues
- Expansion of business, innovation and models by digitization (datafication) of city space with and for the citizens

S-Security

Smart Seoul
Security

A safer and more secure Seoul for the citizens by utilizing state-of-the-art technology

- Operation of Smart Seoul CCTV Security Center → An integrated security control tower
- Implementation of an integrated AI security system
  → Pre-emptive protection system for various cyber and security vulnerabilities
- Strengthen protection of personal information → provision of a safe and secure online environment

01
S-Net
High Speed Communication Network

Introduction

S-Net is the world's first capillary-type, self-contained wired/wireless municipal broadband network that is built throughout the city. It is an innovative smart city communication infrastructure that supports stable administrative services, high-quality civil service, and diverse experience-oriented smart city services by connecting Seoul City Hall, Seoul Metropolitan Government's administrative agencies, 25 autonomous districts, and 400 community service centers with high-speed fiber-optical cables.

Background & Objectives

As the demand for communication infrastructure increases rapidly due to the expansion of smart city services such as public Wi-Fi, Internet of Things (IoT), and CCTV, the rental cost of utilizing telecommunication network has also increased. In order to reduce the inefficiency of utilizing telecommunication providers, Seoul Government plans to build Smart Seoul Network (S-Net). It will be the Groundwork for the future smart city of Seoul which will link and integrate communication networks scattered by various institutions.

Main Composition & Function

The Seoul Metropolitan Government established e-Seoul Net, a first-generation self-owned network connecting city hall and 25 autonomous districts in 2003. Since 2013, u-Seoul Net, which is the second-generation network, has been extended to the community service centers providing administrative services, public Wi-Fi, CCTV and many other citizen services to citizens.

Category	Area	Content
e-Seoul Net	Administrative and Civil Affairs Service	Back office (185 types including administrative portal) and administrative information system of the city and district offices(23 types)
	Internet Service	Internet for employees, VoIP phone, video conference
u-Seoul Net	u-Service Network	Website (25 districts in Seoul, city councils, etc.)
	Wireless Network	Public Wi-Fi
	CCTV Network	58,493 CCTVs by the Seoul Metropolitan Government and 25 district offices are linked through the CCTV network

Results

Ranked 1st in 7 consecutive e-government evaluation among the World's Top 100 cities

Seoul is leading the global e-government based on its infrastructure of excellent information and communication, laying the Groundwork as the world's best smart city.

Establishing an advanced multimedia work system by connecting various e-government services

It is possible to conduct emergency meetings, civil complaints and other tasks in real-time anywhere and anytime by utilizing large-capacity data transmission through an ultra-high-speed communication network. It also provides GIS information, traffic, culture, Internet broadcasting, city security and many other electronic government services.

Reduce telecommunication costs by 173.5 billion won compared to rental networks

Through the use of its own networks, we reduced the budget for renting of Internet and dedicated lines by each institution every year.

Next Generation Communication Network
Smart Seoul Network (S-Net)

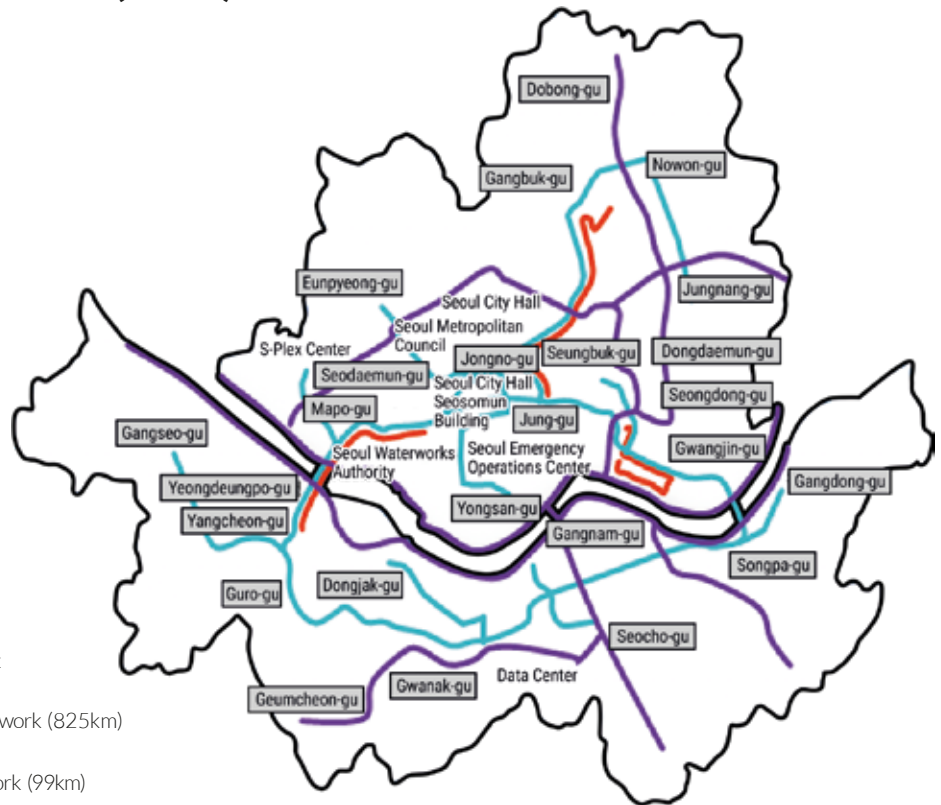S-Net of 4,237km all over Seoul

=

Existing high speed communication network of 2,883km

+

Additional communication network of 1,354km by 2022

- Seoul's own high speed communication network(1,958km) e-SeoulNet, u-SeoulNet
- Connected with transportation service network (825km)
- Connected with waterworks service network (99km)

District Office

Future Plans

As the first phase of the Smart Seoul Network (S-Net) project, we will integrate and link individually operated networks such as the city, districts, investments and funding agencies to establish an integrated network of 2,883 km lines throughout Seoul. As a second step, we will newly expand 1,354km of new communication network that stretches to every corner of Seoul.

Title	Total	2019	2020	2021	2022
Establishment of wired/wireless communication network (extended length of optical cable)	4,237km	2,883km	2,977km (94km)	3,607km (630km)	4,237km (630km)

01
S-Net
Public Wi-Fi

Introduction

Seoul provides public Wi-Fi services that anyone can use for free in public areas such as downtowns, traditional markets, plazas, parks, welfare facilities, public buildings, city buses, village buses, and bus stops.

Background & Objectives

Following the advent of the mobile era due to the rapid proliferation of mobile devices such as smart phones and tablet PCs, wireless data traffic is increasing by more than 30% every year, and communication services have become indispensable public commodities. Seoul City is creating a mobile infrastructure environment where information can be accessed anytime, anywhere through public Wi-Fi to ease the growing burden of communication costs and to bridge the mobile information gap between regions and classes.

Main Composition & Function

In 2011, the first public Wi-Fi in public buildings was installed and opened to citizens. Free Wi-Fi is provided to about 12,000 places such as village buses, bus stops, and welfare facilities (as of December 2019).

Wi-Fi Network Management System (WNMS) user interface

Results

Public Wi-Fi installation areas are selected through big data analysis of the living population of Seoul and regional demand surveys, and APs are first installed on the ctiy's own communication network according to the communication environment of the area, and those without a private communication network are installed through the network of the mobile carriers.

Status of Public Wi-Fi Installation by Locations (Measure : AP unit)

Total	Fixed type 13,844 units								Mobile 7,582 units	
	Outdoor 7,928 units					Indoor 5,916 units				
	Major Street	Trad. Market	Square	Park	Culture & Tourism	Bus Stop	Welfare Facilities	Public Institution	City Bus	Town Bus
21,426	2,156	692	114	114	2,674	167	3,373	2,543	6,000	1,582

How to use

- General connection (open type): Turn on Wi-Fi function and select "PublicWiFi@Seoul"
  → Click general connection button on the landing page
- Safe secure access: Turn on Wi-Fi function and select "PublicWiFiSecure@Seoul"
  - Android & iPhone: Enter 'seoul' as the ID (user name) and 'seoul' in the password field
- City Bus Wi-Fi: After selecting "PublicWiFi@Bus_Secure_(route number)", enter ID 'wifi' and password 'wifi'

Future Plans

The Seoul Metropolitan Government recognizes the basic right of citizens to communicate as a right that everyone should be entitled to and will complete the installation of 23,750 public Wi-Fi access points in the public area by 2022 to make Seoul a free Wi-Fi city where anyone can connect to data anytime, anywhere.

01
S-Net
Public Internet of Things (IoT) network
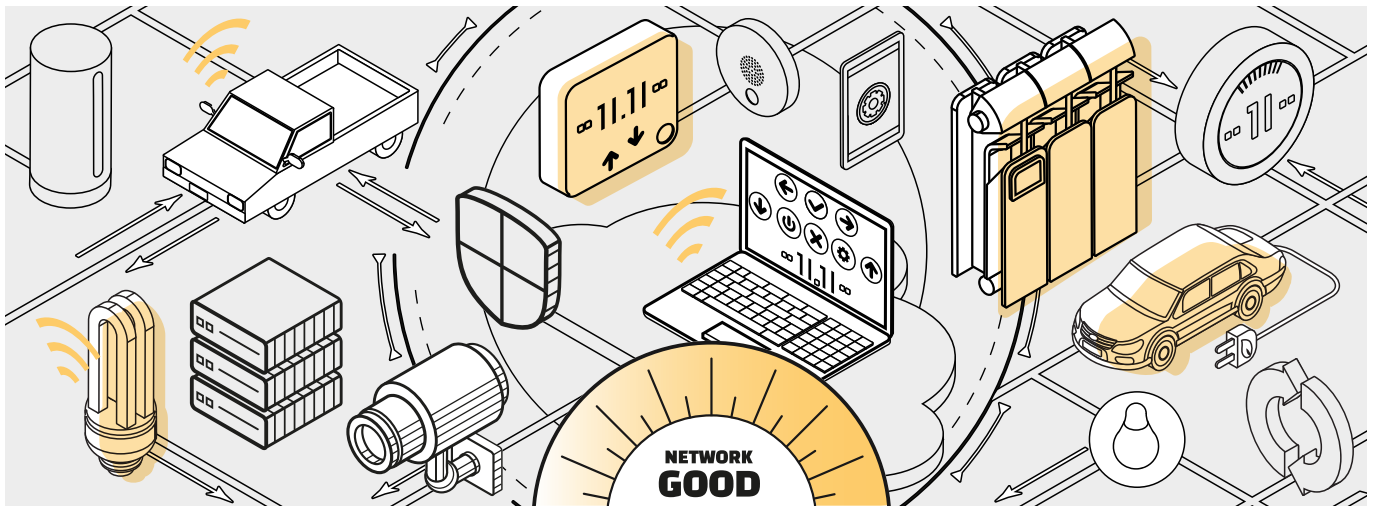
Introduction The Public Internet of Things (IoT) network is part of Smart Seoul Network (S-Net) construction project that collects various city data such as traffic, safety and environment through IoT sensors and diagnoses and resolve urban problems.

Background & Objectives Urban challenges are rapidly increasing due to global population growth and the demand for low-power wide-area network (LPWAN) is naturally emerging as the demand for objects with communication function escalates.
The Seoul Metropolitan Government intends to lay the groundwork for providing tailored smart city services which utilize accurate sensor-based information by establishing 1,000 new LoRa networks(Internet of Things Base Stations) by 2021.

Main Composition & Function By utilizing U-Seoul Net(Internet network) which is being used for the city's webpage, public Wi-Fi and CCTV, we plan to install Internet of Things base stations at major points so individual institutions can save cost and maximize business potentials by using public IoT.
When projects are completed, many services will be provided such as 'Shared parking' where IoT sensors will be attached to the floor, 'Smart Street Light' which will automatically report to the police when an emergency is detected and 'IoT missing persons prevention' utilizing the location information of the senior with dementia and children. It is expected to accelerate the collection and utilization of city data to establish citizen-oriented policies.

Smart Fire Detection	Shared Parking Service	Water Supply Meter Inspection	Smart Crosswalk	Senior Care Service

C City Hall
DO District Office
D Data Center
S S-Plex
C Community Center
☐ Site
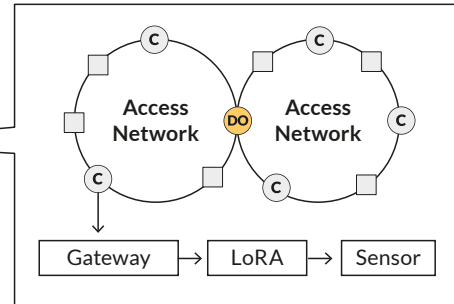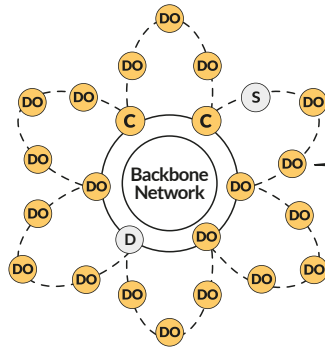
2020 : **Build IoT Backbone Network**	2021: **Build IoT Sensor Network**
Utilization of existing infrastructure : optical cables, communication pipelines, CCTV poles	Expanding all over Seoul
Connecting Seoul and all other districts with the network	Establishing 24/7 monitoring system
Testing IoT services and analyzing the effects	Collecting and transmitting various data from IoT sensors

As the first phase of the public IoT network construction project, 120 new IoT base stations(gateways) will be installed by 2020 and a total of 1,000 base stations will be installed throughout Seoul by 2021 to establish an infrastructure that can solve various urban problems.

Future Plans

Created through S-Net
SMART CITY SEOUL

Smart traffic management

Shared parking based on IoT

IoT solutions for seniors living alone

Safe home escort

3D based Virtual Seoul

Smart Seoul Portal
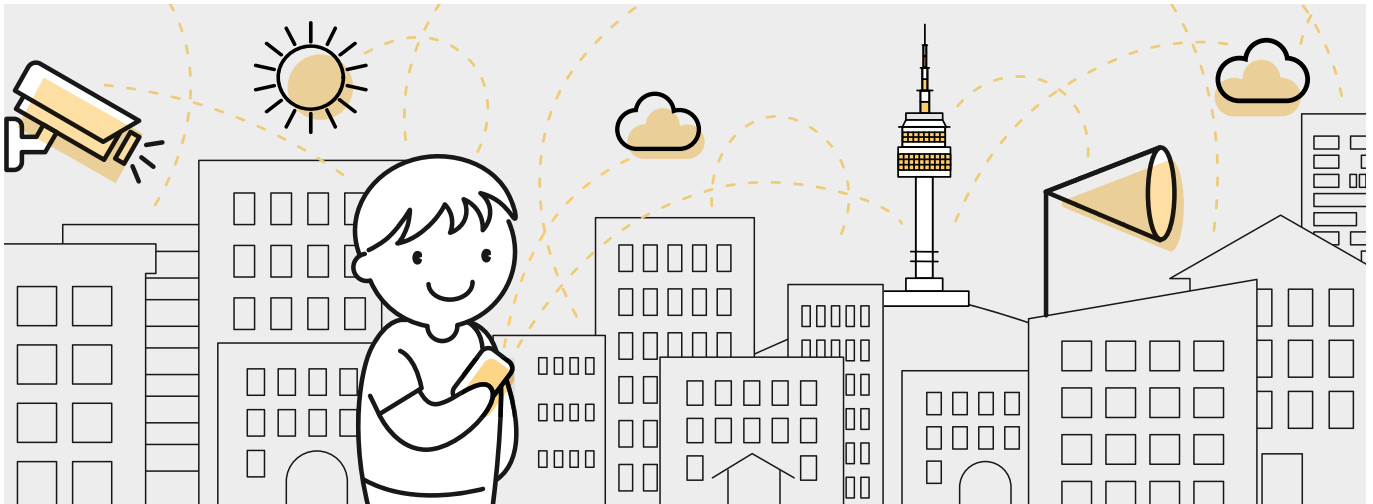
Smart fire detection

MaaS Mobility as a Service
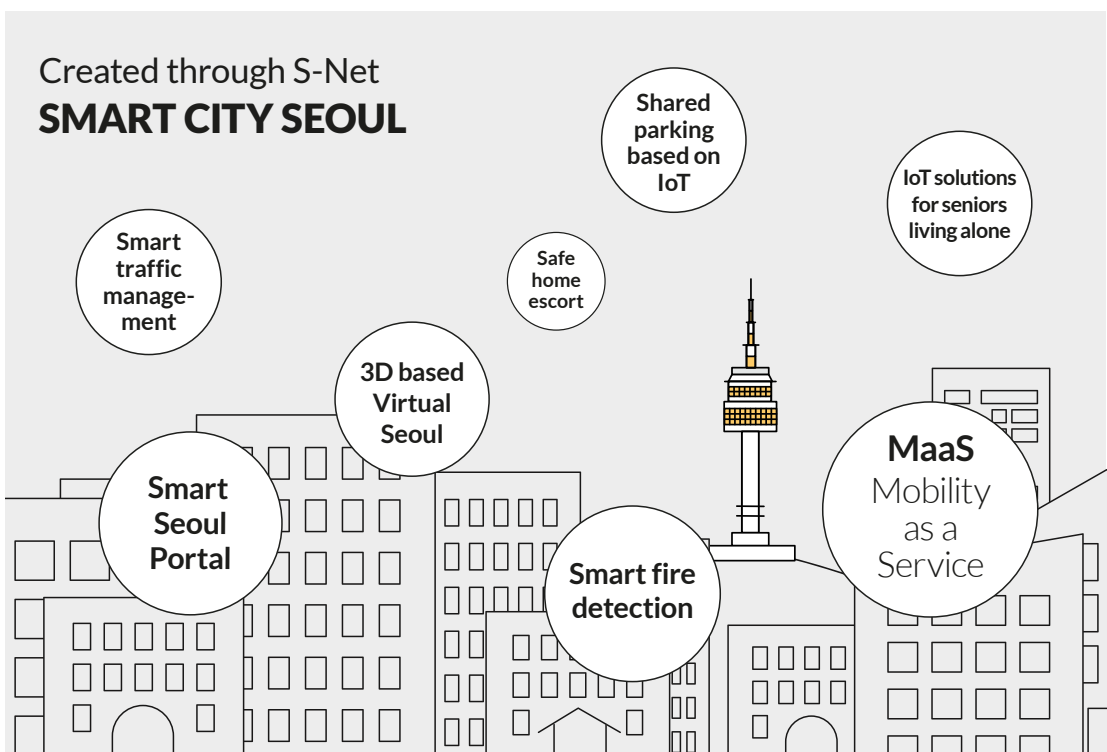
02
S-DoT
Smart Seoul Data of Things

Introduction S-DoT is a Smart Seoul city Data Sensor which collects various urban phenomena data such as fine dust level, temperature, humidity and population flows in real-time.

Background & Objectives As cities become increasingly complex and diverse, it is necessary to collect more detailed data and do systematic analysis of urban phenomena. By implementing the S-DoT project, the Seoul Metropolitan Government intends to proactively secure and analyze environmental and urban data, make evidence-based policy decisions and develop customized services that benefit citizens' everyday life.

Main Composition & Function
- 10 types of data: Fine dust(PM10, PM2.5), temperature, humidity, illumination, noise, UV light, vibration, number of visitors, wind direction and wind speed
- Data collection period: Every 2 minutes
- Location: Installation of S-DoT box on CCTV poles, building walls, residential, commercial and open areas, riversides, etc
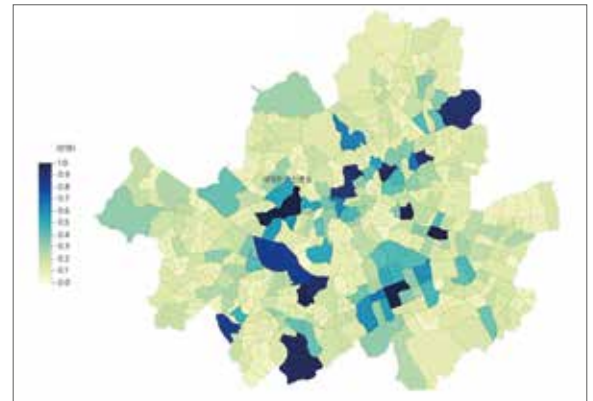

Actual Installation
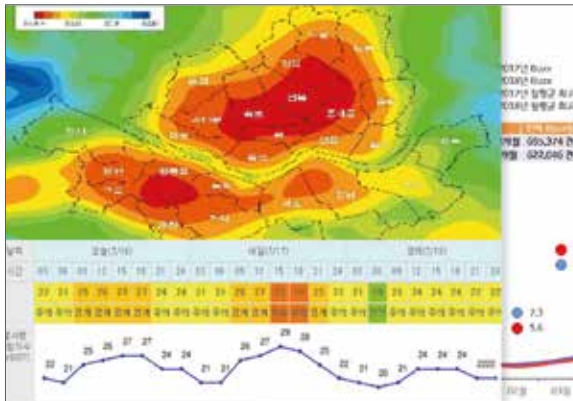
Heat Wave forecast
Suggesting shelter and evacuation locations through heat wave index data analysis, providing heat wave forecast service

Visitor Forecast
Developing customized services by specific time and implementing policies to revitalize local markets by analyzing the time and traffic of citizens visiting local markets. (By tracking consumers' route, duration of stay and visiting days of the week, optimal policies can be designed to revitalize local markets)
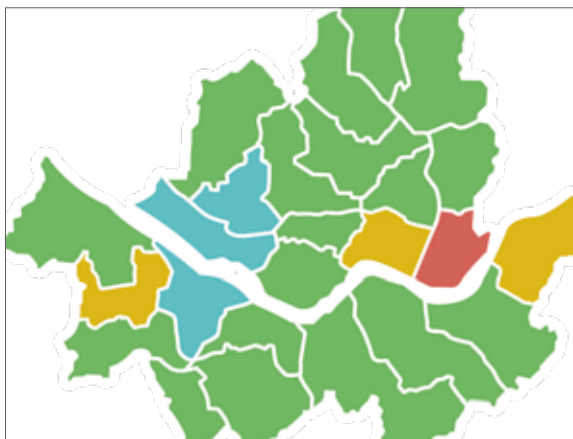
Detailed Environmental Data
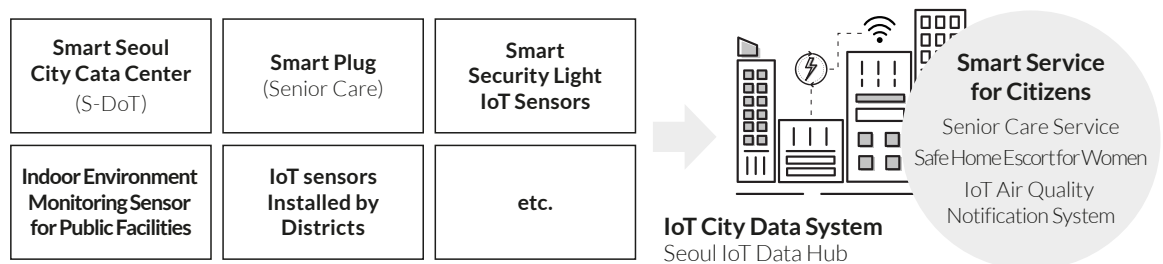City data sensors are strategically installed to provide real-time data on environments such as fine dust level

UV Forecast
Providing ultraviolet light info by district, advise on step-by-step actions, prevention of skin-related diseases and providing daily updates

Results

- Completed the installation of 850 S-DoT in Seoul (as of April 2019)
- The data collected through S-DoT is being shared through Open Data Plaza (http://data.seoul.go.kr), GitHub(https://github.com) and Seoul Smart City Platform(http://scpm.seoul.go.kr)

Smart Seoul City Cata Center (S-DoT)	Smart Plug (Senior Care)	Smart Security Light IoT Sensors
Indoor Environment Monitoring Sensor for Public Facilities	IoT sensors Installed by Districts	etc.

IoT City Data System
Seoul IoT Data Hub

Smart Service for Citizens
Senior Care Service
Safe Home Escort for Women
IoT Air Quality Notification System

Future Plans
We will install and operate 2,500 S-DoT all over Seoul by 2022 to collect more accurate real-time data. We will also conduct analysis on S-DoT data with Seoul National University and Seoul Digital Foundation to use it as an evidence for new policies and improve the quality of public services.

03

S-Data

Big Data Lake

Introduction Big Data Lake is a project to unify public data integrated management system and establish a large data infrastructure to collect, store, and utilize data generated by various administrative information systems. This will include, but not limited to, transportation, environment, and safety, conveniently all in one place, including city data generated by IoT sensors throughout Seoul.

Background & Objectives Until now, the Seoul Metropolitan Government has achieved quantitative results by opening a total of 5,100 data sets through Seoul's Open Data Plaza. (http://data.seoul.go.kr/). In the future, the priority is to continue to improve the quality of public data by integrating and managing public data that is currently managed by each institution and department.

Main Composition & Function Big Data Lake consists of a 'total collection interface' and '3-stage storing process' to collect data.
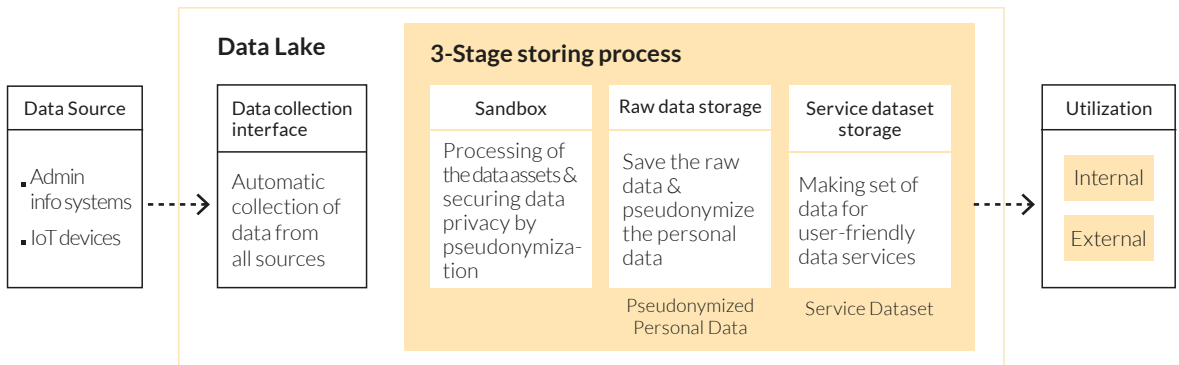
Total Data Collection Interface

It performs the function of securing, retaining and processing city-related and administrative data. Since it collects large amount of data, it is mostly automated to minimize manual input and to streamline the process.

3-Stage Storing Process

Data storage space is built with special attention to security as sensitive and personal information may be stored. A 'Sandbox' is an area that processes sensitive information to non-identifiable (aggregate and anonymous) data that does not get stored. The non-identifiable data is then stored at the source. Lastly, the processed data is stored in the service dataset to meet the needs of different utilization of data.

Big Data Lake(S-Data) Infrastructure Diagram

• S-Net

Collection, Storing and Utilization of Data

Big Data Lake (S-Data)

Administrative Data	→ Collect →	Integrated Data Governance	→ Opening & Utilization →	Open Data Plaza
Urban Data **S-DoT**		Big data Infrastructure · Data Sharing		Smart City Platform
				Big Data Campus
				Virtual Seoul

Source System — Data Lake — Opening & utilization

City Hall, Offices, Affliated agencies

| Transportation | | | | | | |
Energy		Collecting Area	Safe Zone	Source Data Storage	Service Dataset Storage	Open Data
Environment	Access		De-identification			
Taxes			Standardization			Internal Utilization
etc.			Meta Data			
			Security Level			

Citizens

Data Analyst

Internal staff

Future Plans   Big Data Lake will be implemented from 2020 for the next 3 years and in the first year, the plan is to collect data that is in high demand such as transportation and environment and expand it to all areas in Seoul. Structured data will be collected first since it is easier for processing, such as data stored in the administrative information system. The next stage is to collect unstructured data such as documents, voice (audio), and images. In addition, we plan to build a data provision and utilization platform that supports data visualization and advanced data analysis function so that citizens can utilize data from the big data lake.

04

S-Security
Smart Seoul CCTV Safety Center
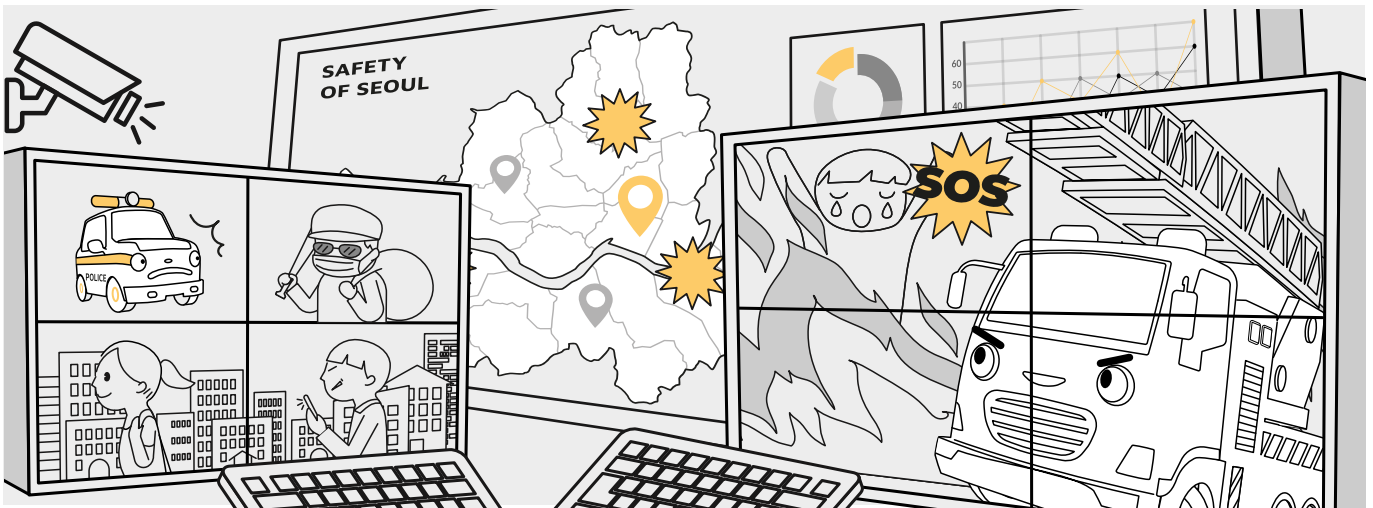
Introduction

The Seoul Metropolitan Government has been establishing and operating a Smart Seoul CCTV Safety Center to integrate and link CCTVs of related organizations such as 25 autonomous districts, police department, fire department and disaster centers. By operating a comprehensive Smart Seoul CCTV safety control tower, we aim to enhance the efficiency of control and strengthen the protection of citizens' safety by enlarging the 'golden time' of effective emergency response.

Background & Objectives

The CCTV control center was operated individually by the Seoul Metropolitan Government and 25 autonomous districts, making it difficult for mutual cooperation. In order to improve and solve these various urban problems, we have established the Smart Seoul CCTV Safety Center where it efficiently links autonomous districts with related agencies such as 112(Police department), 119 (Fire department) and others.

Main Composition & Function

Establishment of Smart Seoul CCTV Safety Center

Smart City Integrated Platform

Smart City Integrated Platform is needed in order to link and exchange video information between the city and the district through CCTV Integrated Control Center. Plan to construct in 25 autonomous districts by 2020.

6 types of smart city safety net service support

- 112 Emergency video
- 112 Emergency dispatch
- 119 Emergency dispatch
- Emergency response
- Socially vulnerable
- New service (electronic anklets etc.)

Integrating small-scale CCTV control centers
- Women Safety Integration Center
- Cultural property Management CCTV Control Center

Integrated connection of CCTVs to the city's affiliated agencies

Total of 1,861 units integrated

Integration with Seoul Smart City Platform

Built a cloud-based system operating environment

The composition and view of the Smart Seoul CCTV Safety Center

Districts (25 units)	**Smart Seoul CCTV Safety Center**	**Safety Network**
	Videos of the Information/Control	112 Emergency video
Organizations in the City	Smart City Integrated Platform	112 Emergency dispatch
	Integrated control / Management	119 Emergency dispatch
Women Safety/ Cultural property	Connect in/external / API Platform for sharing info of City's Safety	Emergency response to disasters
	Message Routing	Socially vulnerable
Seoul Smart City Platform	Integrated DB	New service (electronic anklets etc.)
	GIS System / Facility Control System / Video cast system	

Results

① Connected district office, police department, fire department, disaster responsive department and others centering around Seoul

② Established a disaster safety net system for disaster relief, crime prevention and protection of the socially disadvantaged

③ Provided prompt and the enlargement of 'golden time' of safety for citizens

④ Established a low-cost high-efficiency infrastructure by making the most of the existing information and communication networks of the Seoul Metropolitan Government and related agencies

⑤ Built a cloud-based infrastructure in order to enhance extension of storability and security

Future Plans

The Seoul Metropolitan Government will discover and introduce new urban safety net services such as 112 wanted vehicle support services and link private security companies and etc. Furthermore, we will strengthen its role as a comprehensive CCTV control tower by expanding and promoting future-oriented projects such as dangerous goods handling facilities and AI deep learning-based smart search services.
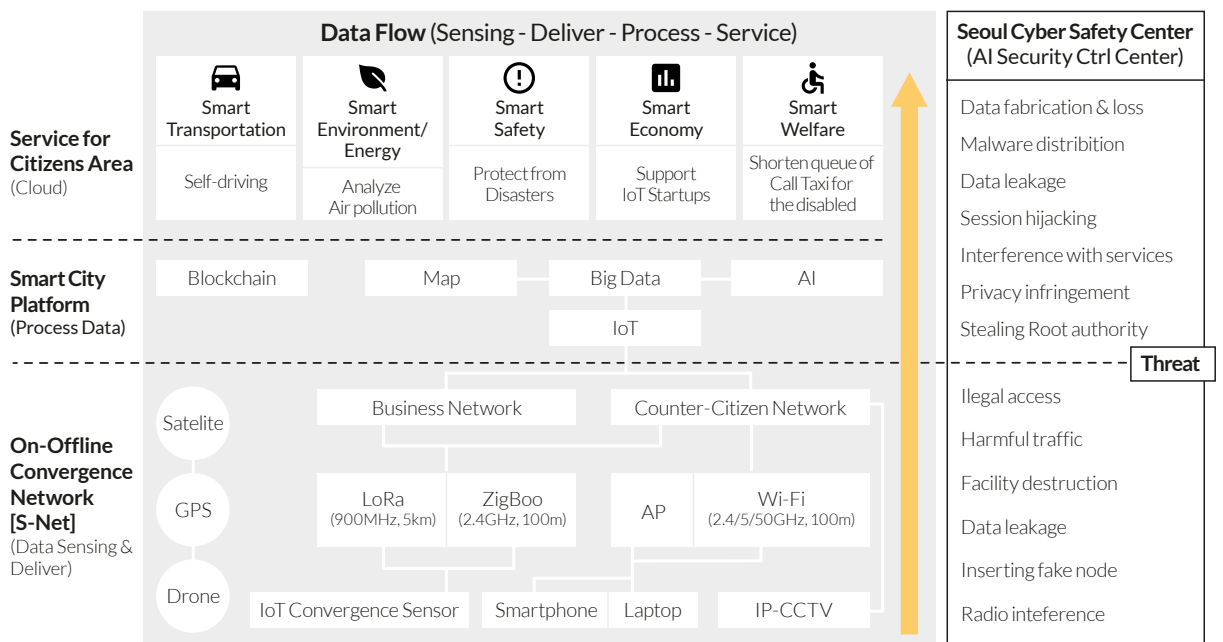
04

S-Security

AI Security Control System

Introduction   AI security control system is a system that uses artificial intelligence technology to securely control and to respond quickly and accurately to the rapid increasing number of intelligent cyber threats.

Background & Objectives   With the full-scale implementation of a smart city, the Fourth Industrial Revolution advanced connection technologies (IoT, big data, cloud, etc.) have been applied to all areas of municipal administration(traffic, environment, safety, economy, welfare, etc.). Due to these changes, we needed to innovate security control method to preemptively respond to the rapid increasing number of intelligent cyber threats.

Main Composition & Function

Advanced cyber threat response with AI security control system

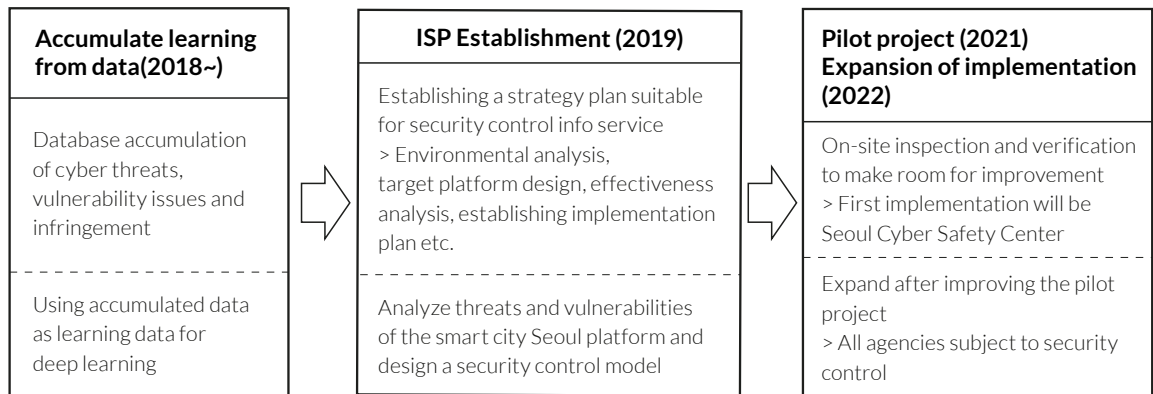|	Data Flow (Sensing - Deliver - Process - Service)					Seoul Cyber Safety Center (AI Security Ctrl Center)
Service for Citizens Area (Cloud)	Smart Transportation — Self-driving	Smart Environment/ Energy — Analyze Air pollution	Smart Safety — Protect from Disasters	Smart Economy — Support IoT Startups	Smart Welfare — Shorten queue of Call Taxi for the disabled	Data fabrication & loss / Malware distribition / Data leakage / Session hijacking / Interference with services / Privacy infringement / Stealing Root authority
Smart City Platform (Process Data)	Blockchain	Map	Big Data — IoT	AI		**Threat**
On-Offline Convergence Network [S-Net] (Data Sensing & Deliver)	Satelite / GPS / Drone	Business Network — LoRa (900MHz, 5km) / ZigBoo (2.4GHz, 100m) — IoT Convergence Sensor	Counter-Citizen Network — AP / Wi-Fi (2.4/5/50GHz, 100m) — Smartphone / Laptop / IP-CCTV			Ilegal access / Harmful traffic / Facility destruction / Data leakage / Inserting fake node / Radio inteference

Main functions of AI security control system

① Predict and respond to the possibility of infringement

② Internet of Things (IoT) threat prediction and response

③ Public Wi-Fi network threat prediction and response

④ Website phishing/hacking e-mail type classification and response

⑤ Automatic diagnosis and countermeasures for the six major platforms of smart cities in Seoul

6 major platforms for the Smart Cities in Seoul:
Big data, IoT, Artificial intelligence, Blockchain, Geo-spatial information, Communication infrastructure

Results

Project timeline by stage (2018~2022)

Accumulate learning from data(2018~)	**ISP Establishment (2019)**	**Pilot project (2021) Expansion of implementation (2022)**
Database accumulation of cyber threats, vulnerability issues and infringement	Establishing a strategy plan suitable for security control info service > Environmental analysis, target platform design, effectiveness analysis, establishing implementation plan etc.	On-site inspection and verification to make room for improvement > First implementation will be Seoul Cyber Safety Center
Using accumulated data as learning data for deep learning	Analyze threats and vulnerabilities of the smart city Seoul platform and design a security control model	Expand after improving the pilot project > All agencies subject to security control

Future Plans

Main Function

For continuous update and development of AI security control models, the system has been made to mount AI security control-related models in the form of modules

To Be

2020
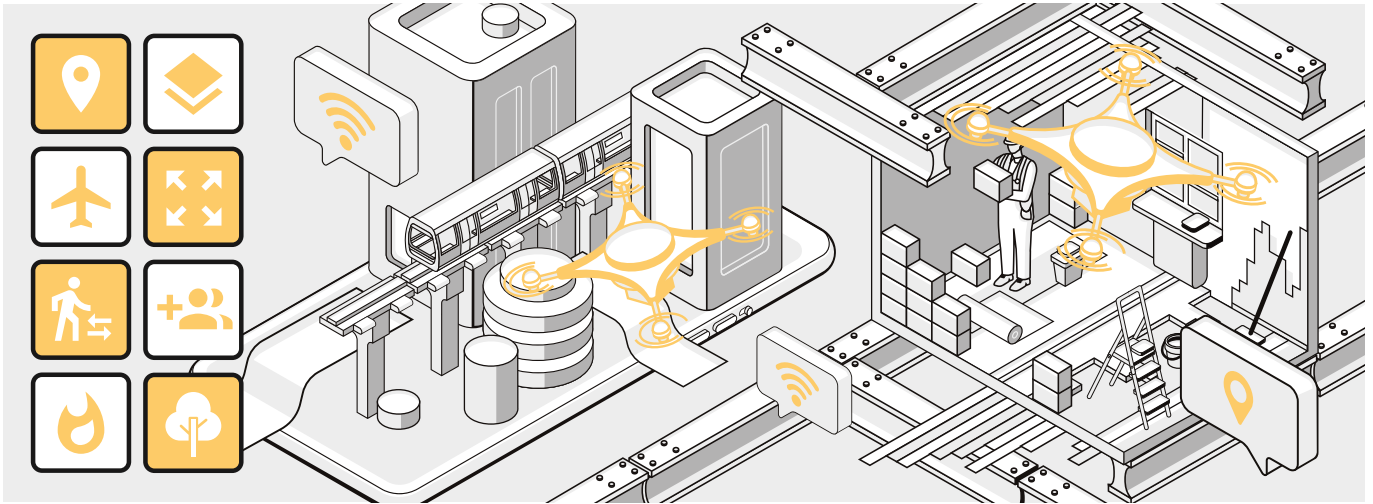Detailed design of AI-based security control system reflecting ISP implementation results

After 2021
AI-based security control system construction pilot project and expansion

05

S-Map

3D based Virtual Seoul Platform

Introduction   It is a platform-based project to increase the efficiency of city planning through various simulations in cyberspace by establishing the entire Seoul as a virtual Seoul based on 3D spatial information.

Background & Objectives   Infinite possibility of simulation is possible when you combine environment data with spatial data across Seoul in 3D. This not only maximizes the efficiency of urban planning, redevelopment and reconstruction, but it also provides various customized map services to citizens, thus establishing the Virtual Seoul platform.

Main Composition & Function

City analysis business support

Providing analysis for city planning decision, city wind-direction road simulation and time series analysis

Providing information such as amount of sunshine and landscape view in a three-dimensional space
- Amount of sunlight: Check the amount of solar energy received according to time
- Visibility range: Check the visibility range at the desired location, such as by floor, rooftop and etc.
- View landscape: View topography and landscape using 3D buildings

Real-time fire protection management and safety rating analysis of old facilities
- Providing fire hazard information and fire equipment locations (fire sprinklers, fire hydrants, etc.)
- Analysis of facility safety hazard (cracks, weakened ground etc.) and history through connection with IoT sensors

Transforming virtual Seoul into realistic cultural contents
- Providing information on irrecoverable historical heritage information such as Seoul Fortress Wall and Seoul Baekje remains in addition to virtual experience
- Making affiliations with cyber museum and other VR companies to expand cultural contents

Website   3D-based Virtual Seoul System homepage- http://virtual.eseoul.go.kr

Results

Established 3D database based on aerial photography

Topographic information(605.23km²), building(600,000 building units), underground facilities(49,748km)

**Created 3D precision maps using new technologies such as drones and mobile mapping systems**

Main attractions: Gyeonghuigung Palace, Seonjeongneung Royal Tombs, Bukchon Hanok Village, Naksan Fortress Wall, Seoul City Wall, Cheonggyecheon etc.

※ Cost reduction through joint cooperation with companies that have new 3D outdoor information technology (Naver Labs)

Simulation of policy decision through convergence of spatial information

- Monitoring in real-time of fire-fighting facilities (fire hydrants, elevator locations and etc.) by linking fire-fighting platform
- Providing fire safety simulations such as virtual fire drills and predicting fire hazard buildings
- Analyzing the effect of improving fine dust reduction policies, mitigating heat islands and utilizing in areas of urban planning etc.
- Utilizing in fire and disaster fields and provide information on 'Walking home safe'

Future Plans
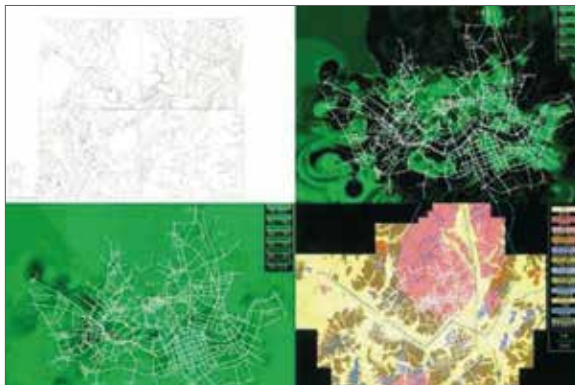
Advance simulation of urban safety and climate environment
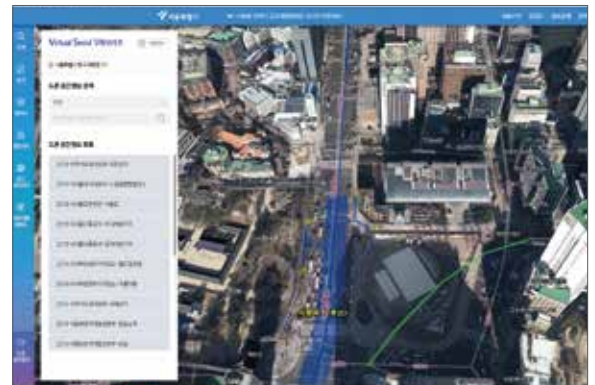
Provide Open API

Operate Virtual Seoul in a digital twin environment and expand Civic Participation
Provide the function of Wikimapia
(Civic Participation spatial information renewal environment)

Build and operate 'Virtual Seoul' by linking 3D realistic spatial data with real-time sensing information

06
S-Brain
Seoul City's representative chatbot, Seoul Talk

Introduction

Seoul Talk is a chatbot representing the city of Seoul. It is an artificial intelligence (AI) counselor that automatically provides 24-hour consultation on various inquiries about municipal administration that citizens frequently ask.

> **Chatbot**
>
> A compound word of chat and robot, an interactive messenger where artificial intelligence communicates with people and gives answers based on big data analysis.

Background & Objectives

The Seoul Metropolitan Government operates the '120 Dasan Seoul Call Center' (☎02-120), where counselors answer all kinds of questions in Seoul 24 hours a day. Although Dasan Call Center takes pride in assisting many citizens by taking many calls, high fatigue rate is inevitable due to simple repeated inquiries. In order to reduce exhaustion and call-waiting, the Seoul Metropolitan Government has introduced 'Seoul Talk' to reduce the burden of work and enable immediate response without any waiting time.

Main Composition & Function

Q&A via chat window

Enter a question or select the menu available in the chat window to guide you through the relevant information

Range of Services

Providing 332 types of administrative information that are high in demand such as 46 types of on-site complaints including illegal parking and reports of illegal dumping of garbage, passport issuance, tax payment, Seoul Bike etc.

• Transportation (illegal parking, car registration, public transportation, Seoul Bike etc.)
• Administration (certified documents, passport issuance, tax payment etc.)
• Welfare (supportive information on life such as pregnancy, infants, children, youth, middle-aged and senior citizens)
• Environment (fine dust, residential environment, garbage collection etc.)
• Economy (business registration, jobs, Zero pay, eco-friendly farm application etc.)
• Culture (events, major festivals and events of the month)
• Safety (facilities, life-style safety, disaster response instructions etc.)
• Housing (road, sidewalk, real estate information etc.).

Image displayed after inquiry

Improving user-friendliness by combining images and text when providing menus and answers

How to connect: Add Kakaotalk friend (※Service name: Seoul Talk)

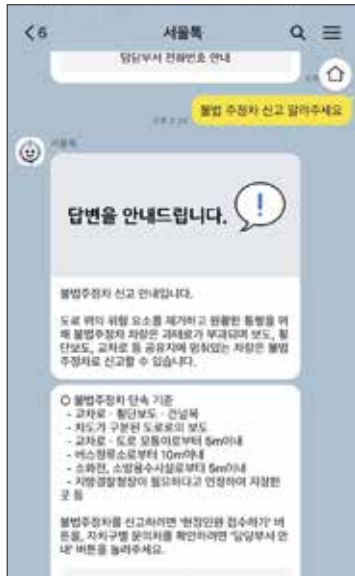| Kakaotalk friend > click [search]	Search 'Seoul Talk'	Add as friend and chat

Q&A (Example: Reporting illegal parking)

Administrative information guide inquiry	On-site complaint screen	Department in charge

Results
- Pilot operation of '120 Counseling Chatbot', artificial intelligence interactive service (5.20 2019~1.31 2020)
- Seoul's representative chatbot 'Seoul Talk' launched (2.1 2020)
- 3 times more users compared to pilot operation (based on 2.1 2020~4.12)
 (Plus Friends subscriptions 36,290 / Daily average users of 630 with 2,889 cases of conversations)

Future Plans

We will continuously analyze the details of unanswered responses and improve the accuracy of Seoul Talk's responses through AI learning. Currently, the service range is limited to 332 types of administrative information, but we will gradually expand the range of chatbot services focusing on information that were frequently asked by citizens.
In 2020, we will develop into an intelligent chatbot that can easily process reservation applications for various public facilities such as renting a soccer field, renting a conference room, educational programs, and cultural events through a chatbot.

07

C-ITS Demonstration Project
Next Generation Intelligent Traffic System
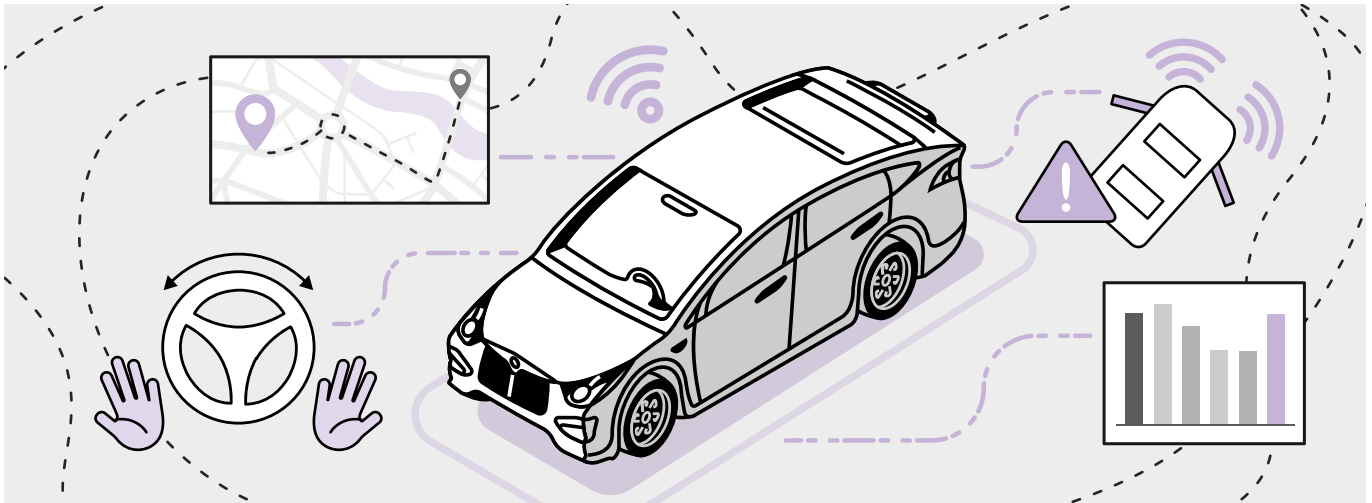
Introduction

C-ITS (Cooperative-Intelligent Transport Systems) is an integrated, comprehensive system that provides the driver/operator with real-time information on the risk of accidents such as surrounding traffic conditions, sudden stops, and road debris. The Seoul Metropolitan Government intends to contribute to the prevention of traffic accidents through the construction of the next-generation intelligent transportation system(C-ITS), and to lead the future of transportation by creating the basis for autonomous and cooperative operation of vehicles such as 5G-based connected cars and self-driving test beds. In addition, we aim to strengthen industrial competitiveness and help lead the way for businesses by creating the foundations for autonomous cooperative driving in which cutting-edge technologies(A.I, 5G, IoT) + vehicles + social overhead capital are taken into account.

Connected Car	**Self-Driving Car**
It is a car that can communicate bidirectionally with other systems outside of the car. This allows the car to share internet access, and hence data, with other devices both inside and outside the vehicle.	It is a vehicle that is capable of sensing its environment and moving safely with little or no human input, which combines a variety of sensors to perceive their surroundings, such as radar, lidar, sonar, GPS, odometry and inertial measurement units

Background & Objectives

As the mortality rate of traffic accidents and traffic accidents related to senior citizens increase, C-ITS was introduced to improve safety and mobility. The Seoul Metropolitan Government intends to set the stage for the future transportation market by implementing Korea's high-tech, next-generation cutting-edge technologies such as 5G communication networks to autonomous vehicles.

Main Composition & Function

① Creating the world's first 5G convergence self-driving test bed to be implemented within real-life traffic conditions

② Supporting and encouraging the testing and implementation of practical solutions such as self-driving shuttle bus, shared vehicle, and autonomous parking

③ Creating advanced traffic infrastructure to support self-driving and connected cars

④ Develop an all-in-one platform that includes state-of-the-art technologies such as advanced operator support system, bus operation management, digital transportation card, and vehicle communication technology. The device will be equipped in 1,700 buses to support traffic safety.

⑤ By opening up traffic data, future traffic control/sharing/analysis platforms can be implemented

Results

Hosted Sangam autonomous driving festival (A joint event organized by the Ministry of Land, Infrastructure and Transport and the Ministry of Science and ICT, June 2019)

- Demonstrated the world's first future of autonomous driving based on 5G technology and provided opportunities for autonomous driving in downtown Seoul
- 17 companies and institutions participated, including SK Telecom, Samsung Electronics, Korea Telecom, Yonsei University, and Kookmin University
- The world's first 5G autonomous driving demonstration and autonomous vehicle, with 300 passengers

Creation of the world's first 5G convergence autonomous driving test bed in Sangam (Sept 2019)

The world's only 5G convergence self-driving test bed was created on a real-life city road. The length of the road is expected to be expanded to 19.7km²

Korea's largest public-private partnership on the future of transportation (Sept 2019)

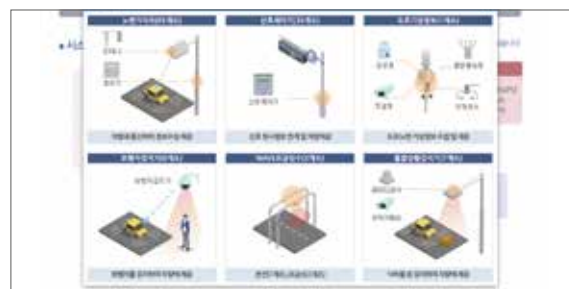The SMG partnered with 25 companies/institutions/schools related to the future of transportation.

Demonstration of self-driving shuttle bus operation (Nov 2019)

A total of 120 trial runs over five months

Future Plans

Expansion of regular operation of self-driving shuttle bus in the city

Expansion of advanced transportation technology, based on smart road infrastructure

The size will be expanded to 121.4km which includes central bus lanes and Sangam autonomous driving testbed etc.

Installing and distributing the world's first all-in-one 5G connected car terminal unit

- Number: 1,700 units (as of 2020)
- Components: Bus operation management, transportation card, vehicle to vehicle communication(V2X), traffic safety sensor(ADAS)

Verifying demand-responsive autonomous shared vehicle, chauffeur taxi service, courier service

08

TOPIS

Seoul Transport Operation and Information Service

Introduction

TOPIS is an all-integrated and comprehensive traffic control center that operates and manages all traffic-related operation in Seoul. TOPIS collects traffic information from traffic-related entities such as the Bus Management System (BMS), Transportation Card System, Surveillance System, Seoul Transportation Broadcasting System, Seoul Metropolitan Police Agency, and Korea Highway Corporation to manage traffic conditions. It also quickly determines and responds to possible traffic problems through big data analytics.

Background & Objectives

TOPIS was established to systematically manage complex transportation systems due to the rapid increase in various public transportation methods since the 1980s to ensure and create a safer transportation environment. TOPIS is designed to collect bus operation information, the number of public transportation users, traffic density, traffic speed, incidents such as traffic accidents and protests, highway conditions and personal traffic information to resolve congestion and prevent unforeseen traffic problems.

Main Composition & Function

Integrated Center System
Managing traffic, disaster and security around the clock. Minimizing secondary and additional disruption by monitoring and responding promptly to traffic, disaster and safety-related incidences in Seoul 24 hours a day, 7 days a week using advanced, cutting-edge technology.

Bus Information System
Gathering real-time bus operation information (late-night bus route optimization, bus-stop location, bus traffic guidance service etc.) and displayed through various mediums (BIT, internet, mobile web, app etc.)

Traffic-related Big Data Analysis System
Forecasting, re-adjusting bus routes and intervals between public transportation based on big data such as utilizing approximately 85 million traffic card data per day, real-time operation data, de facto population analysis and socio-economic indicators.

Road Traffic Management System
Integrated monitoring of real-time traffic conditions on major roads in Seoul, providing information on traffic forecast, Seoul Bike Ttareungyi(rental location and availability) and parking lot/car sharing (provides parking lot number and fare/cost information by name search).

Automated Enforcement and Monitoring System for Infractions
Monitoring of violation of traffic by-laws using CCTV to automatically issue fines and notices for bus lanes, bicycle lanes, auto-spotting illegal parked vehicles and illegal idling vehicles.

Green Transport Promotion Zone-Automobile Traffic Management System
Total traffic volume management and real-time monitoring to automatically issue fines to those that violate traffic restriction(Eco-friendly 5th grade vehicles) in the green transport zone(Fortress Wall of Seoul/Seoul City Wall)

Website

- **TOPIS Tour Registration** http://topis.seoul.go.kr/visit/openVisitInfo.do
- **Homepage** https://topis.seoul.go.kr/   **English Website** http://topis.seoul.go.kr/eng/english.jsp
- **TOPIS Twitter** https://twitter.com/seoultopis   **Mobile Web** http://m.topis.seoul.go.kr

Results

Real-time traffic information service through various channels

- 85 million cases of transportation card data collection per day
- 4,506 installations of Bus Information Terminal (68% installation rate)
- GPS data collection from 70,000 taxis

Providing comprehensive transportation information

- Optimal route guidance through collection of data from passenger cars,
- buses, subways and bicycles. Providing the fastest transportation combination route and guidance by time comparison

Creation of private services through the utilization of open API

Contributing to the development of various traffic information services to the private sector by opening and sharing traffic information in the form of an open API

Status of Providing Traffic Informations   Measure : Cases

Homepage	Mobile App	Social Media (Twitter)	Open API	Tour (Visit)
3,183,821	12,230,943	81,387	105,583,220	251/4,001 people

Status of Tours in the Last 5 Years

| Year	2016	2017	2018	2019
Cases / People	217/3,038	227/3,284	224/3,363	251/4,001

Future Plans

TOPIS will be further integrated with future state-of-the-art technologies such as C-ITS feasibility projects, IoT (Internet of Things), autonomous driving, 5G connected car terminal installation, big data, electric vehicles, various eco-friendly vehicles, fintech, sharing economy, and MaaS (Mobility as a service, bundle service will be provided if needed) so that the citizens of Seoul can utilize transportation in Seoul in a safer and more convenient manner.

09
Squirrel Bus & Owl Bus
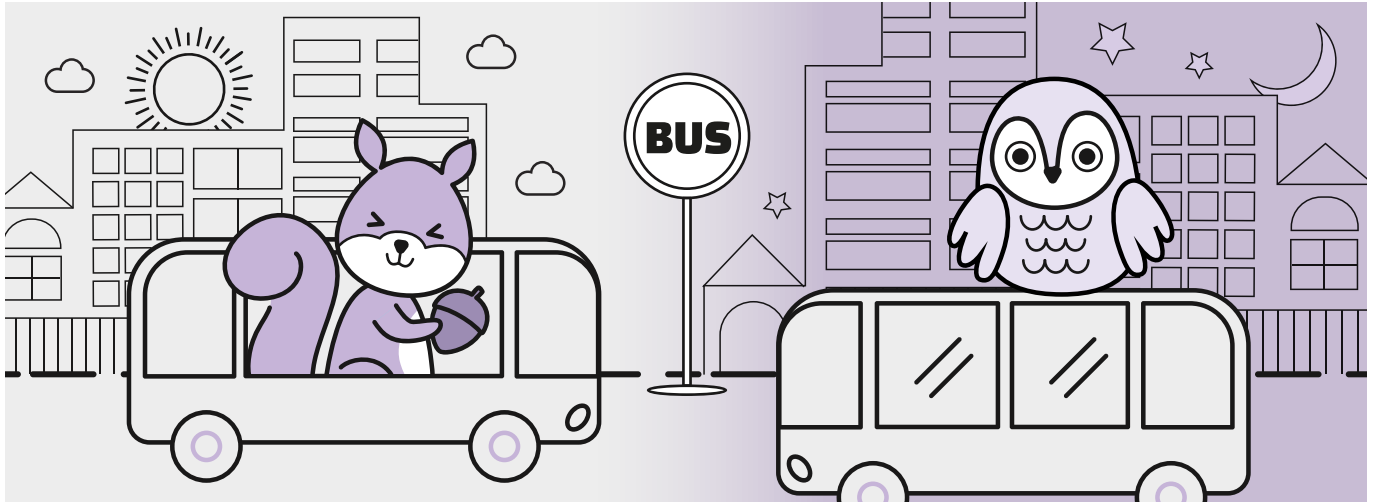
Introduction   Squirrel Bus is a bus that runs only on a certain section of congested traffic to reduce traffic congestion during rush hour. Owl buses run from midnight to 5 a.m. and they are currently operating in 9 routes as of 2020.

Background & Objectives   During rush hour, congestion increases only on certain sections of the route and increasing the number of buses as a solution will be inefficient since buses will be empty on less congested routes. Therefore, the Seoul Metropolitan Government began operating Squirrel Buses that only operates in congested sections. Owl Bus is a late-night bus that allows Seoul citizens to travel at night and has become a service that meets the needs of late-night workers and self-employed individuals.

Main Composition & Function   The routes of Squirrel Buses and Owl buses are placed in the most frequently used routes by passengers. The Seoul Metropolitan Government cooperated with mobile carriers, collected and analyzed more than 3 billion call data and taxi route data to utilize practical data. By analyzing these data, the Seoul Metropolitan Government forecasted the major favorable destinations to places those buses for the citizens.

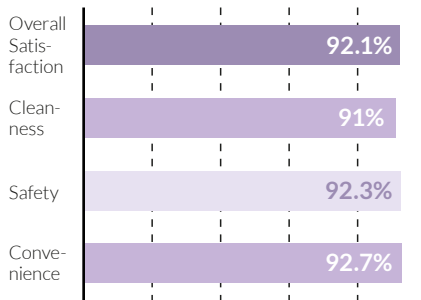**The Route Map of the Squirrel Bus**

The Route Map of the Owl Bus

Website   Owl Bus Webpage : http://bus.go.kr/nBusMain.jsp?tr_code=theme

Results

Citizens' Satisfaction toward Squirrel Bus

Overall Satis-faction	92.1%
Clean-ness	91%
Safety	92.3%
Conve-nience	92.7%

Total Passengers of Squirrel Bus

1,439,109 ppl

17,132 ppl/week (avr)
(as of 2019.2.8)
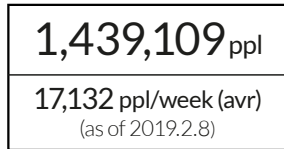
Total Passengers of Owl Bus

16,871 ppl

(2013.9 ~ 2018.12)
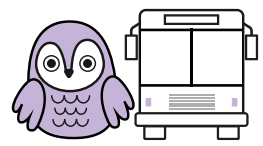
Squirrel Bus

Selected as the best transportation policy by the Ministry of Land, Infrastructure and Transport

Owl Bus

- The 1st Ministry of Public Administration and Security Award for 'Local Government Policy' in 2016
- Award for "Presidential Award of Local Informatization Association" for setting good example of innovatively using administrative data
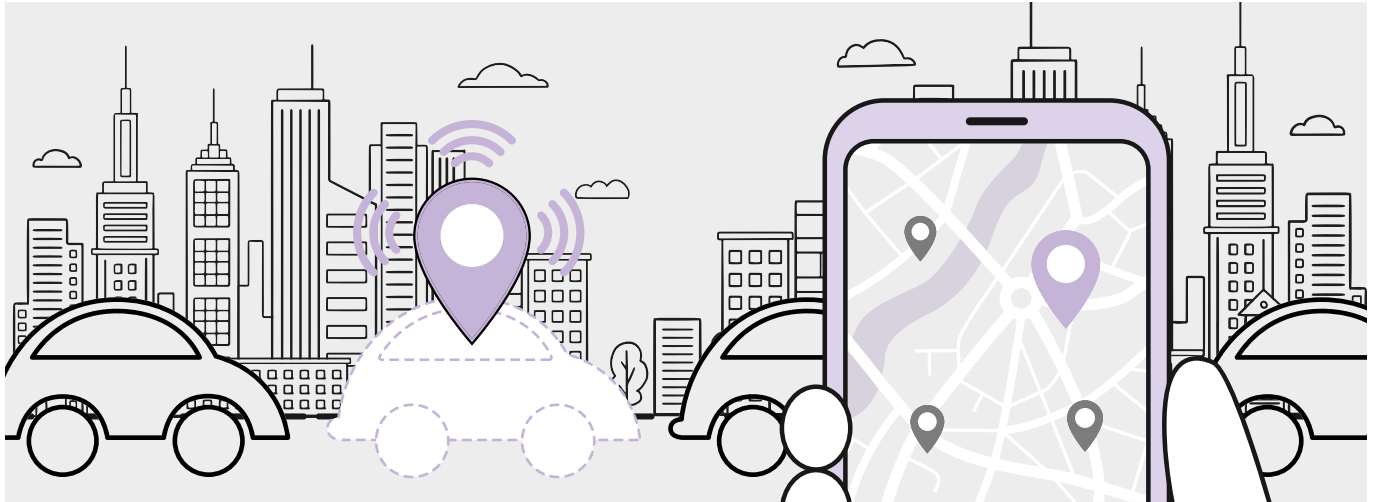
Future Plans   **Provide demand-driven customized city bus service**

We will continue to make efforts to dramatically improve bus services by improving operations that reflect the voices of citizens.

10
Shared Parking based on IoT

Introduction   The Seoul Metropolitan Government intends to solve the problem of illegal parking and promote the sharing of parking spaces by creating a shared parking space policy using IoT technology for residents' priority parking space (private parking space). In addition, we aim to improve the convenience of parking by allowing citizens to easily search available shared parking space by guiding and linking real-time information on the IoT-based shared parking space to the 'Seoul Parking Information' app.

Background & Objectives   The construction of public parking space to solve the parking shortages in Seoul is difficult to initiate due to expensive land and construction cost. In addition, illegally parked cars in shared parking space is an issue since this information is not based on real-time and goes against policy. As a way to overcome the physical limitations of the supply of parking spaces, we are working on IoT-based shared parking project to check the parking status in real-time.

Main Composition & Function   IoT-based real-time shared parking system is a service that automatically detects parking status by installing an IoT sensor on the floor of a shared parking space, and it allow real-time parking information to be checked, booked, and paid through a mobile app. The shareable time can be set by the owner of the parking space via the mobile app.

The role of the Seoul Metropolitan Government
• Building an IoT-based shared parking system
• Developing and distributing standard OPEN APIs
• Establishing parking policies using big data

The role of Autonomous District
• Selecting IoT shared parking spaces
• Securing budget for expanding IoT-based parking
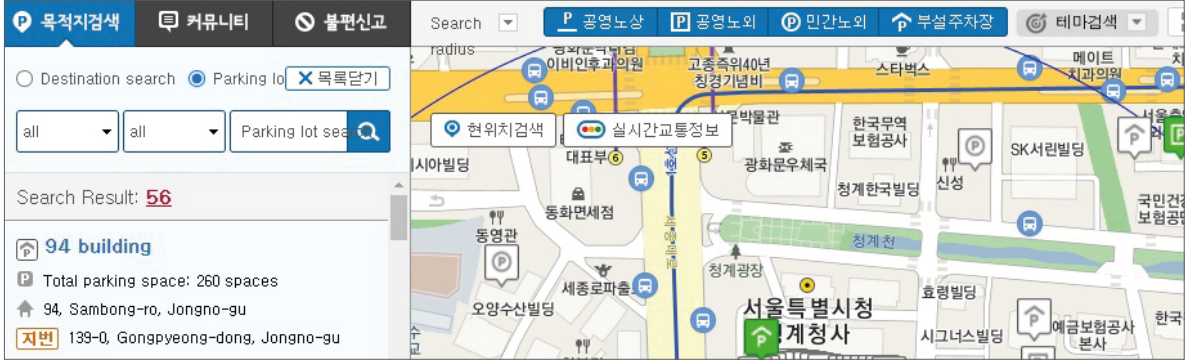• Promoting IoT-based shared parking spaces

The role of Private Parking Space Business
• Installing IoT parking sensors
• Providing real-time parking information to Seoul Metropolitan Government and autonomous districts
• Maintenance of IoT-based shared parking spaces etc.

App & Website

• Seoul Parking Information App - Downloadable via Google Play Store and App Store
• Seoul Metropolitan Government Parking Information System homepage - http://parking.seoul.go.kr

Results

The Seoul Metropolitan Government is expanding IoT-based shared parking spaces across Seoul in collaboration with private parking space providers and available residents' priority parking spaces by providing people with real-time information via 'Seoul Parking Information' app.

Possible to check real-time parking space info.

Possible to check illegally parked cars

IoT Parking Sensor

Future Plans

The Seoul Metropolitan Government will make an effort to spread the parking sharing culture and improve the quality of parking services. We plan to establish a parking policy with meaningful statistical analysis using big data built through IoT parking sensors

11
Seoul Public Bike (Ttareungyi)
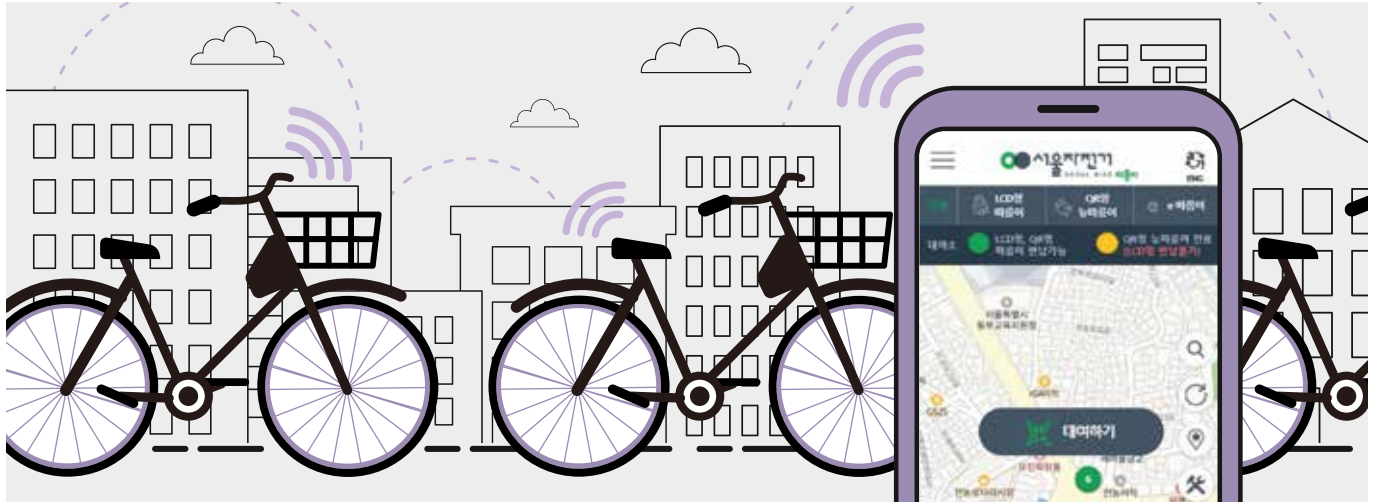
Introduction Seoul Public Bike (Ttareungyi) is a system that allows you to rent and return bicycles 24 hours a day using a smartphone app, so you can use bicycles at your convenience for low cost at rental locations throughout the city.

Background & Objectives Citizens were hesitant to buy or ride a bicycle due to many reasons such as portability while riding public transportation, parking problems before and after use and maintenance problems. Seoul Bike has reduced the burden by creating an environment where bicycles can be used conveniently at any time. This will significantly lower the barrier of bicycle use as a means of transportation.

Main Composition & Function

Rental Place
Rental places were installed after reviewing the demand forecast and regional balance such as floating population, public transportation, and slope based on big data analysis. There are 25,000 bicycles built in 1,540 rental places in every 500 meters on average in Seoul.

Bicycle
Bicycles are convenient for women, the elderly and the physically challenged because it's made of light and durable materials. Bicycles can be rented and returned using a mobile app since bicycle has an attached terminal which is linked to bicycle operating center servers.

Mobile App
You can download the mobile app to your smartphone and use all services related to Seoul Bike anytime and anywhere.
This includes registration of membership, purchase of a pass, rent and return, and reporting of any other issues.

QR type New Seoul Bike
Since March 2020, Seoul Bike has been equipped with a smart lock type QR terminal using IoT technology. When you run the Seoul Bike app and scan the QR code attached to the bike, the lock is automatically unlocked making it easier and quicker to rent.

App & Website
- Seoul Bike App - Downloadable via Google Play Store and App Store
- Seoul Bike Webpage- www.bikeseoul.com
  ※ You can rent Seoul Bike by signing up for a membership and purchasing a pass using your mobile or PC.

Results

Expanding the usage of Seoul Bike

The average daily use of Seoul Bike has more than doubled over the last four years with 1.74 million members (as of 2019) using an average of 52,000 bikes daily (one out of six Seoul citizens subscribed to the Seoul Bike). The introduction of Seoul Bike has enabled the use of bicycles as a *First-last mile transportation.

Increase in Brand Value

Seoul Bike has established itself as the city's representative brand by being ranked No. 1 for three consecutive years (2017~2019) according to the top 10 news outlets in Seoul, selected by citizens.

> **First-Last Mile**
> A means of transportation that fills the gap between major means of transportation such as cars, subway and buses.

Future Plans

Plan to enhance access locations of bikes in public transportation areas and residential areas

By 2020, we will build 40,000 bicycles and 3,040 rental locations, improving accessibility so that you can find rental locations anywhere in Seoul within 5 minutes.

Service upgrade of public bikes to make it user-friendly and to increase brand image

We will enhance the convenience of Seoul Bike by providing various services such as suggesting fastest route to destination using mobile map app and providing various paying methods as well as bringing electric bikes in the future.

Pilot operation of Seoul Bike for kids, which can be used safely by elementary and middle school students

Since Seoul Bike is for citizens age 15 years or older who have sufficient knowledge of traffic laws and safe riding, we plan to introduce Seoul Bike for Kids after reviewing various opinions from current experts and citizens regarding bicycle specifications and fares.

12
Solar City Seoul

Introduction

"Getting Solar in Seoul" 'Solar City, Seoul 2022' is a project to install solar power facilities by 2022 at 1GW, which is equivalent to the capacity of a single nuclear power plant. We will build the best solar city in the world by installing and providing solar energy to 1 million households. This will foster new industries as we plan to install 100% of solar power facilities on public properties.

Background & Objectives

Under the new climate change framework that began with signing of the Paris Agreement in 2015, Korea and other countries around the world are making efforts to change their energy policies to reduce greenhouse gas emissions. Solar power is a new growth project that is highly likely to be used in conjunction with the Fourth Industrial Revolution without worrying about greenhouse gases and fine dust. It has been evaluated as an optimal renewable energy source suitable for a large city like Seoul and this is the reason why this project was started.

Main Composition & Function

The main composition of 'Solar City Seoul 2020' are as follows.

① **Provide solar power to 1 million households**
In order to produce their own solar power for one out of every three households in Seoul, 'mini-solar power generator' will be placed in small spaces such as apartment balcony, house rooftops, private building rooftops and walls to a total of 1 million households.

② **Provide solar power to all public buildings and sites that can be installed**
Municipality, autonomous district and government facilities will be examined and installed on an annual basis. Citizen funds are issued to get citizens to participate in installing public solar power so that benefits can be shared.

③ **Solar power landmarks and specialized zones**
Build solar power landmarks that citizens can experience in various parts of Seoul. We install solar power with specific design considering the landscape of each places in Seoul World Cup Park, Ttukseom Han River Park, and other locations.

④ **Promote solar power and establish operation/support center**
Seoul Energy Corporation, private entities and citizens can cooperate to carry out large-scale solar power projects for the betterment of improving the solar power system. Operation/support center operates to provide consultation and after sales service as all-in-one service.

⑤ **Foster solar power industry and system improvement**
Support for the expansion and distribution of solar power in the private sector via Seoul-type FIT[Feed-in-tariff], low-interest loans for installing solar power, New Renewable Energy Act and other methods to foster solar power utilization.

Website Seoul Solar Map - http://solarmap.seoul.go.kr

Results

After the declaration of 'Solar City Seoul 2022', 99.4MW of solar power was installed in the last two years (from 2018 to 2019) and supplied mini solar power facilities to more than 122,000 households. By the end of 2019, the accumulative distribution achievement was 250MW based on installed capacity and 284,000 households.

Won an Awrd for Cities that are Demonstrating Climate Action Leadership.
[C40 Cities Bloomberg Philanthropies Awards] Renewable Energy Category (2019.10)
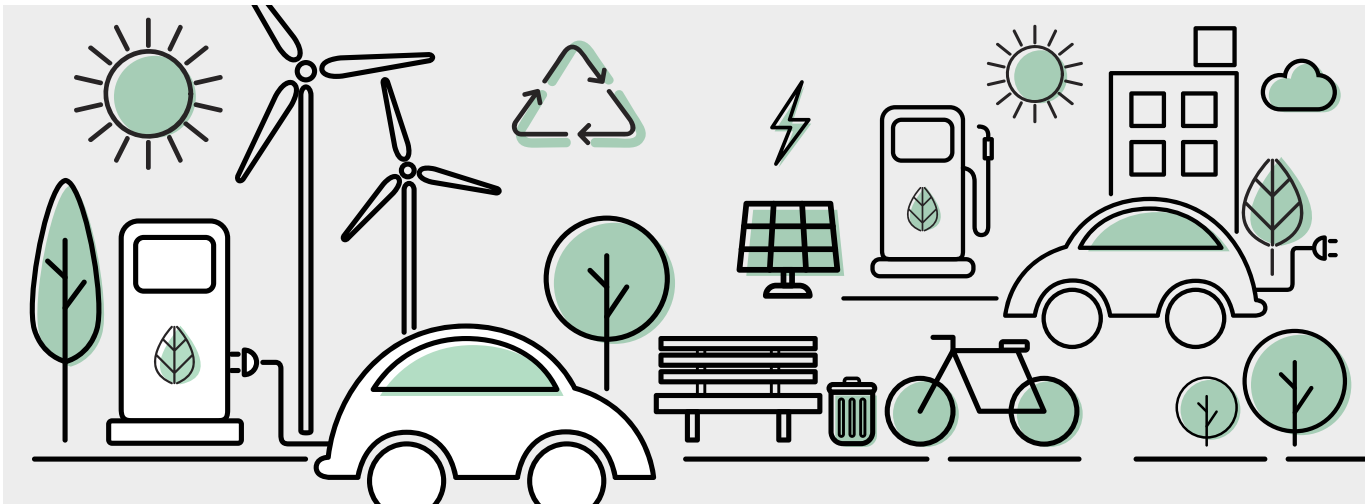
Future Plans The Seoul Metropolitan Government aims to reduce environmental social costs by providing 1GW of solar power facilities by 2022. This will reduce greenhouse gas emissions and fine dust as this will provide healthy and sustainable lives. Following the completion of "Solar City Seoul", it is expected that about 310,000 households (9% of all households in Seoul) will have the effect of reducing greenhouse gas by 540,000 tons per year and ultrafine dust (PM2.5) by 1.35 million tons.

13
Supply of Electric & Hydrogen Vehicles

And Establishment of Charging Infrastructure

Introduction   The Seoul Metropolitan Government is distributing electric and hydrogen vehicles to reduce fine dust and greenhouse gases in downtown Seoul. In the public transportation sector such as buses and taxis, we will gradually convert the vehicles to electric · hydrogen vehicles to reduce the sources of pollution on the roads.

Background & Objectives   The world is trying to phase out internal combustion engines and make its transition to eco-friendly cars. The world needs to reduce CO_2 emissions by 60% by 2050 ('World Economic Forum, November 2017'). Countries such as France, the UK, Norway and the Netherlands announced that they would ban the sale of fossil fuel vehicles from 2025 to 2040.
The Korean government expanded its goal of distributing eco-friendly electric vehicles from 350,000 to 430,000 and hydrogen vehicles from 15,000 to 65,000.

Main Composition & Function

Seoul-specific Intensive EV Charging Stations

Seoul-specific intensive EV charging stations and public charging stations are conveniently located in the city which consist of 328 quick charge units and 293 low charge units, for a total of 721 units. Five units or more of quick charging stations are installed to reduce charging times and they are installed in malls and commercial complexes for convenience.

Hydrogen Bus

The nation's first hydrogen bus was bus #405, running from Yeomgok-dong garage to Seoul City Hall and it started operation from November 21, 2018. We currently operate two charging stations at Sangam and Yangjae.

Electric and Hydrogen Vehicle Subsidies and Other Benefits

Subsidies are provided to eco-friendly vehicles according to vehicle performance and the effect of improving the air quality. The Seoul Metropolitan Government will provide KRW 1,206-13.5 million won for electric cars, KRW 27 million won for electric freight vehicles, KRW 20-2.3 million won for electric motorcycles, and KRW 35 million won for hydrogen electric cars. In addition to the purchase subsidy, there are various benefits such as tax reduction of up to 5. 3 million won for electric vehicles and 6.6 million won for hydrogen vehicles, 50% discount on public parking lot parking fees, and 100% exemption for tollgate fees at Namsan Tunnel. By using electric and hydrogen cars, you can save KRW 600,000 won (USD 560 dollars) per year compared to diesel cars and 1.2 to 1.5 million won per year compared to gasoline cars. By 2022, Seoul plans to expand the supply of hydrogen vehicles by up to 4,000, and increase the number of hydrogen charging stations from 11 to 15.
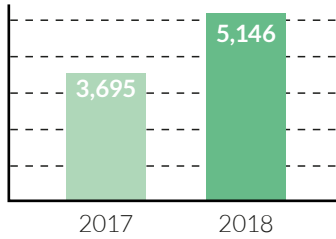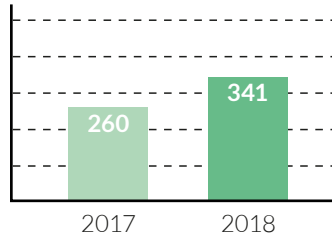
| App & Website | • App for hydrogen charging station- H2Care |
| | • Ministry of Environment electric vehicle integrated portal- www.ev.or.kr |

Results

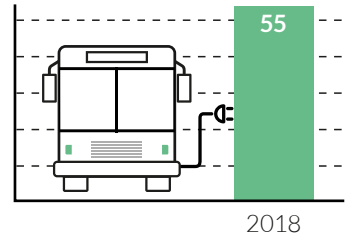**Number of electric cars**

2017	2018
3,695	5,146

Number of public charging stations

2017	2018
260	341

Number of hydrogen cars

2018
55

Future Plans

The Seoul Metropolitan Government is moving towards an eco-friendly city by expanding the supply of eco-friendly vehicles. The Seoul Metropolitan Government endorsed 'Achievable plan of electric vehicle era Oct 2017' and 'Plan for the implementation of hydrogen vehicles as a leading city of Seoul Oct 2018'. It aims to supply 80,000 electric vehicles and 3,000 hydrogen vehicles by 2022. Electric vehicles will gradually expand from 20,083 units in 2019 to 30,383 units in 2020 and 80,000 units by 2022. Additionally we will install 2,000 chargers by 2022.

14
Green Transportation Area
Vehicle Traffic Management System for Improving Air Quality

Introduction

In order to reduce traffic volume and fine dust, the Seoul Metropolitan Government has established a system to recognize vehicle numbers and car emission ratings by designating the Seoul City Wall as a green transportation area. Trial operation started in July 2019 and from December, fines have been imposed on emission-grade 5 vehicles that generate large amounts of pollution such as greenhouse gases and fine dust.

Background & Objectives

Studies have indicated that vehicles are the direct cause of 25% of ultra-fine dust in Seoul. As part of the transportation policy to protect citizens' health from fine dust, the government designated a green transportation area (Seoul City Wall) in March 2017. By operating a new type of vehicle traffic management system through the integration and linkage of vehicle eco-friendly ratings using ICT technology, air quality can now be significantly improved in green transportation areas and reduce traffic volume of vehicles, especially high-polluting vehicles.

Main Composition & Function

On-site Facilities

On-site surveillance cameras (45 locations, 119 units), Notification sign of surveillance (166 signs)

Center system

Consists of, but not limited to 46 collection of traffic servers and DBMS such as 26 types of commercial software

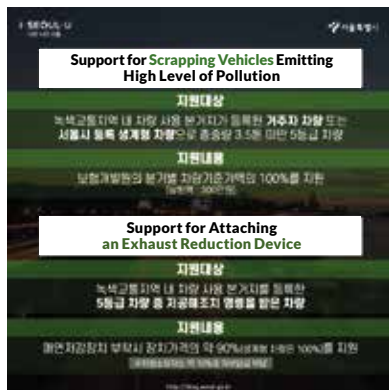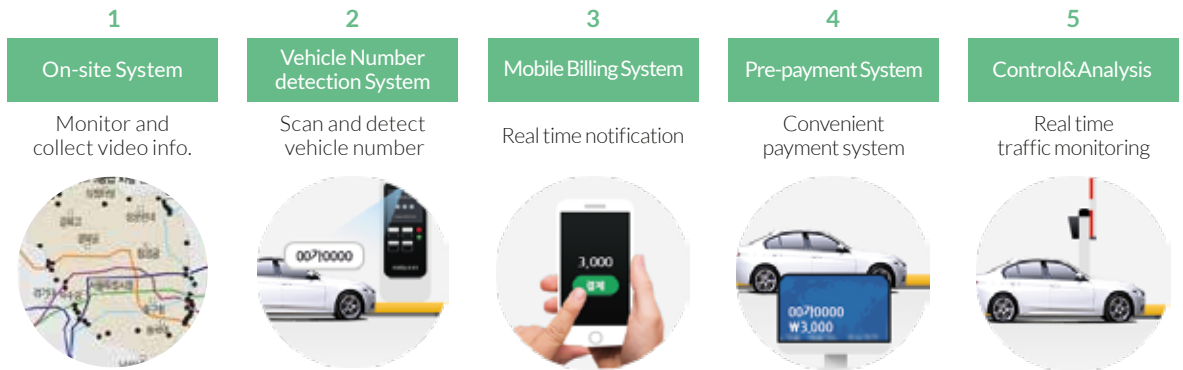### Vehicle Number Automatic Identification System

Automatic vehicle number recognition via ANPR camera

Establishment of Mobile Notification System

Real-time mobile push notification to the violator to issue fines after the recognition of vehicle number

Establishment of Pre-payment System

Implementing automatic payment set-up for pre-registered vehicles. Automatic payment as "pay-as-you-go"

1	2	3	4	5
On-site System	Vehicle Number detection System	Mobile Billing System	Pre-payment System	Control&Analysis
Monitor and collect video info.	Scan and detect vehicle number	Real time notification	Convenient payment system	Real time traffic monitoring

Able to monitor and analyze traffic volume of vehicles.
Automatic detection of vehicles in violation and impose fines

Significant improvement of efficiency by notifying the violator of fines in real-time via mobile
(SMS, Kakao Pay)

Reduction in traffic volume after imposing fines as well as reduction in vehicles with Grade 5 level of emissions

App & Website
Direct Green Payment Website (PC, Mobile web)- http://oksign.seoul.go.kr
※ Able to check your usage/fines via mobile or PC and convenient payment process

Future Plans
A plan to upgrade on-site facilities, center systems and related programs in accordance with the expansion of green transportation areas centered on Seoul City Wall, Gangnam and Yeouido is currently being implemented. An integrated platform for vehicle traffic management to improve air quality and traffic will be developed.

15
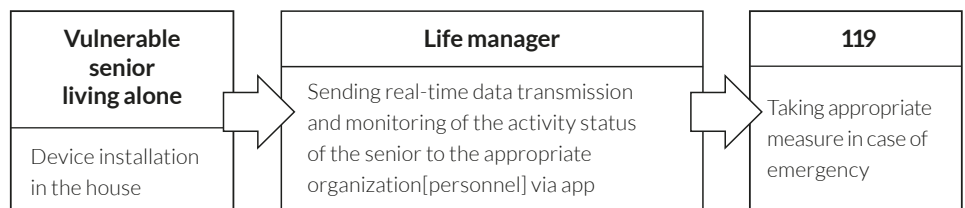# Health & Safety Solution for Seniors Living Alone (IoT)
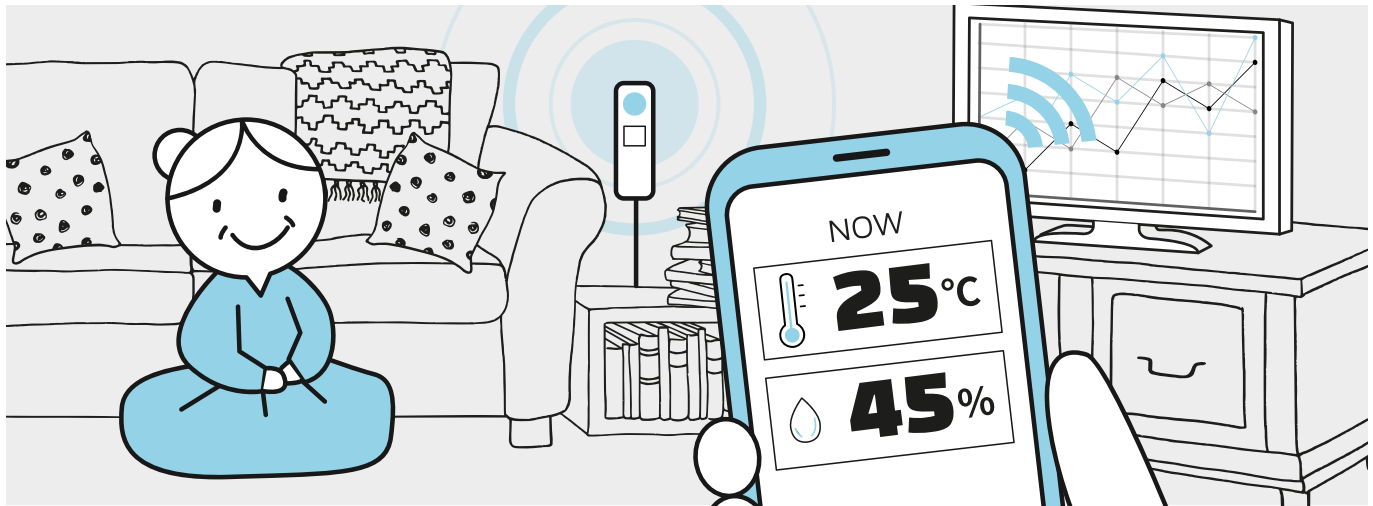
Introduction	It's a system that checks the activity and safety status of seniors in real time by measuring movement, temperature, humidity, and light using Internet of Things (IoT) technology

Background & Objectives	We have decided to implement this senior health safety solution in order to take care of seniors in Seoul. This solution provides an innovative service by checking in on seniors in real-time. Through the project, we hope to prevent loneliness among the elderly and provide efficient and effective care.

Main Composition & Function

Targeted seniors under supervision
Senior citizens who are vulnerable to safety and health problems
(5,000 households in 2019 → 12,500 households in 2022)

Real-time safety check of seniors living alone at home
Checking for movement (making sure they are actively moving),
cold and heat wave (temperature, illumination, humidity), fire and gas safety detection etc.

Operating parameters
Device distribution [Step 1] → Provide solution-based customized services [Step 2]

Vulnerable senior living alone	Life manager	119
Device installation in the house	Sending real-time data transmission and monitoring of the activity status of the senior to the appropriate organization[personnel] via app	Taking appropriate measure in case of emergency

| Website	https://wis.seoul.go.kr/senior/service/care.do

Results

Establishing a smart senior care service system using IoT technology to manage the health of high-risk seniors (heart problems, diseases, impaired physical mobility and etc.) living alone who need constant supervision.

We will put priority on supporting citizens to improve living standard by using big data(basic living data) to respond to heat waves, cold waves, and residential environment.

Total of 118 cases of responding to danger with real case scenarios (65 life-saving cases, 21 prevention of death from loneliness of seniors, 31 other cases)
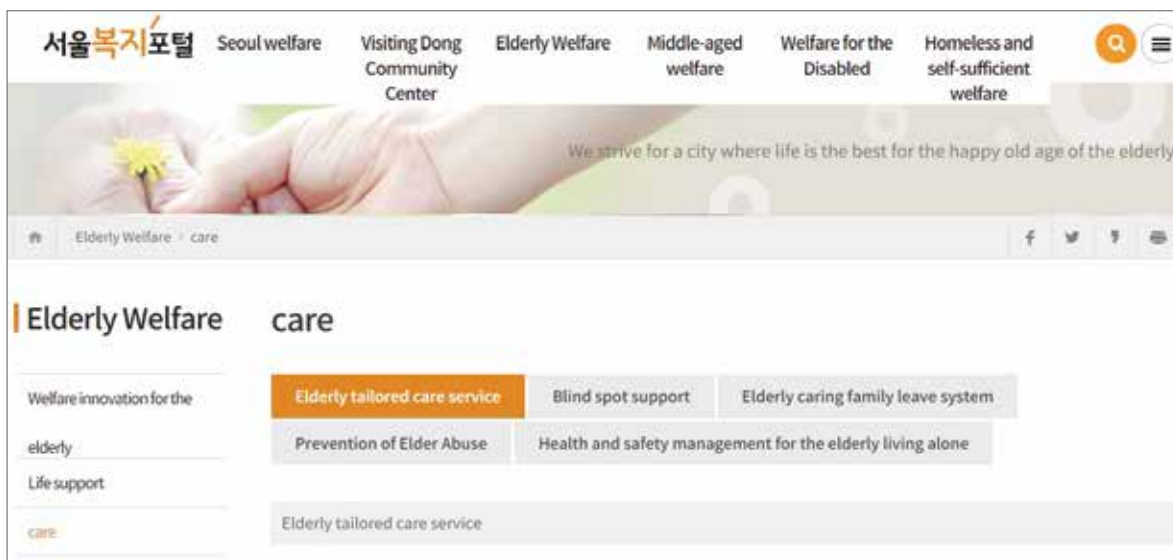
Future Plans

Build Solutions

Health and safety solutions will be installed in 12,500 households by 2022.

Enforce Protection

Expanding IoT devices to strengthen the protection of vulnerable seniors by actively linking those who are vulnerable to heat waves and cold to welfare institutions.

16
Women's Safety Self-defense App, Ansimi

Introduction Ansimi is a safety system that links smart phone app to CCTV in Seoul and local government's integrated control system so that police can monitor in real-time to ensure safety in case unexpected situations arise. It creates a safe environment for women since it provides various services such as emergency reporting, monitoring the route to final destination, safe home escort and protection from illegal hidden cams.

Background & Objectives The increase in the number of victims of sexual violence as well as violence against women in the last 5 years has made it crucial to expand and take necessary steps. In order to provide a variety of safety services through smartphones since it's widely used, we are actively utilizing social safety infrastructures such as the local district's integrated control center and CCTVs to operate a leading model of urban safety services.

Main Composition & Function

Service

Reporting for Emergency
In case of an emergency, when you run the app (shake or touch the screen), it is automatically reported to the local district control center and the control center controls the CCTV around the reporter to provide a police dispatch service.

Safe Return Monitoring
If requested by a woman returning home late-night, the local district control center monitors the return route

Safe Return Scout
If requested by a woman returning home late-night, an escort crew can escort her home

Safe Facility Information
Provide safe courier service, CCTV, police patrol division, safe guardian house information

Request for illegal hidden cam inspection and rental of hidden cam detection equipment
Request can be made for an inspection for illegal hidden cam and application can be made online for a rental of detection equipment

> **Gender violence response information is provided separately**
> Provide measures against dating violence and cyber sexual violence

Operating Parameters

Seoul Metropolitan Government
Seoul Metropolitan Government is in charge of operating and maintaining the whole of 'Ansimi' system.

Local District
Taking actions accordingly to support and promote 'Ansimi' in each respective local district, CCTV control center and linking directly to police

National Police Agency (Police on duty)
Supervising and take appropriate measures in case of an emergency

App Seoul Ansimi App – Downloadable via Google Play Store and Apple App Store

Results

Presenting a leading model of urban safety services and expanding operation to entire local districts (11. 2018 ~ 12. 2019)

• Download: 115,712 times

• App Usage: 48,909 cases
- 12,683 emergency calls
- 32,607 cases of safe return home
- 3,619 cases of escorts

Awards from media agencies and app awards

• Awarded '2019 Consumer Choice Best Brand Award' hosted by Forbes
• Awarded '2019 Korea's Most Loved Brand Awards' hosted by The Chosun Ilbo
• Awarded '2019 Good Brand Trusted by Consumers Award' hosted by Dong-A Ilbo
• Awarded 'App Award Korea 2019 App of the Year' hosted by Digital Chosun Ilbo

Sex offender was arrested through an emergency report from 'Ansimi app' (6.10. 2019)
Emergency report received at the Eunpyeong-gu Control Center and arrest was made in 10 minutes

Future Plans

The Seoul Metropolitan Government is improving the service catering to the users' needs. We will create a tight control environment by working with the 'Ministry of Gender Equality and Family' and 'Ministry of Land, Infrastructure and Transport' to expand the Ansimi app nationwide. The Seoul Metropolitan Government plans to expand the use of Ansimi not only to women but also to the seniors with dementia and children.

17
Smart Healthcare System

Introduction

Smart healthcare is an industry that combines health-related services with medical IT technology and know-how. It deals with information, devices, systems, and platforms about personal health. Personalized health care is supported via portable devices based on the results of a comprehensive analysis of lifestyle, physical examination, and medical history. Medical institutions and individuals can intelligently monitor and manage health conditions conveniently and securely in real-time, anytime and anywhere. Furthermore, disease information is analyzed and provided in real time.

Background & Objectives

The Seoul Metropolitan Government has introduced smart health care system in 'Metabolic Syndrome Management' so citizens can manage their own health. One out of every three Seoul citizens aged 30 or older suffers from metabolic syndrome (abdominal obesity, high blood pressure, high blood sugar) due to irregular eating habits and stress. For citizens who have difficulty visiting health care clinics due to their busy lifestyle, the Seoul Metropolitan Government has installed U-health zones where you can obtain accurate measures of body fat, blood pressure, etc. in apartment complexes, workplaces, community centers, and parks. Citizens are able to check and manage their health status in kiosks or via smartphone apps.

Main Composition & Function

Monitoring Health Status and Provision of Information

- Health Zone: Installed in places frequency accessed by citizens, such as apartment complexes, businesses, supermarkets, traditional markets, community centers and parks.
- Provided Service: Based on the health information provided (height, weight, blood pressure, obesity, stress, cholesterol, etc.), customized health information (exercise, nutrition, etc.) is provided to the user. All health-related information is managed in conjunction with metabolic syndrome DB system.
- Information Collection and Provision: Mobile App CADY is utilized through the user's personal phone.

PHR : Personal Health Record

- Identifying trends in lifestyle by securing accumulated records of individual users through previously developed health care apps (WalkON, My Check Up, LIBIT, Medilam, MyCADY, and apps developed from different districts).

- Providing cumulative basic records of health conditions measured in the past rather than relying on personal memory when visiting medical clinics

Confirmation of Medication Time: Medication alarm etc.

- Providing information on medications through medication alarm app (Medilam) so that patients can take medications at the right time.

How Smart Healthcare System Works
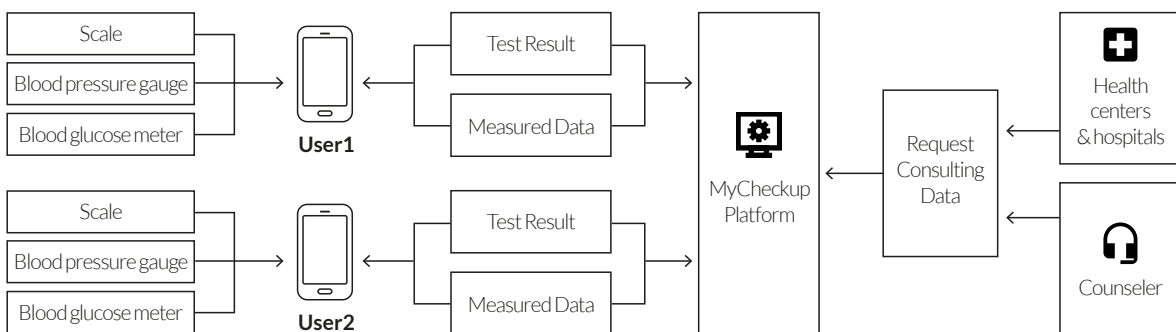
Personal health information is stored on the user's smartphone, and the system is built in a way that the user can provide personal health information to the public health center or medical institution only with the user's informed consent.

Results
- Total number of users: Approx. 7,000 people (Sept 2019 ~Mar.27th 2020)
- In order to increase accessibility, we have increased the number of installations of health zones in apartment complexes, businesses, community centers, parks, supermarkets and traditional markets. (N=50 units, As of end of Feb 2020)
- It is easy to identify changes in health status by monitoring individuals' health conditions and view history of accumulated health information. In addition, it motivates the individual to live a healthy lifestyle by setting a customized goal.
- For patients with chronic diseases, medical counseling is provided based on accumulation of personal records. Also, medication alarm function increases the efficacy of medicine intake.

App
Download health apps such as Walk-On, My Check-up, Libit, Medi-Ram, and My Caddy through the App Store and Google Play Store for personal health management

Future Plans
We are currently monitoring the effectiveness of U-health and health care smart apps developed mainly from the private sector. In the future, we plan to expand and develop into a Seoul ICT-based metabolic syndrome management system by utilizing the features of ICT-based smart healthcare.

18
mVoting

Introduction

mVoting is a combination of the word mobile and voting. It is a communication platform for everyone; citizen, the Seoul Metropolitan Government(SMG) and its officials. In 2019, SMG applied blockchain technology into mVoting to prevent the fabrication and forgery of voting information and results. With mVoting, SMG reliably collects public opinions and use the results in policy-making.

Background & Objectives

Since over 90% of Seoul citizens use smartphones, the Seoul Metropolitan Government developed the mVoting to accept citizen's opinion in 'real-time' in establishing policies. In addition, blockchain technology was applied to mVoting to prevent fabrication and forgery of voting information and results. Through mVoting, the Seoul Metropolitan Government seeks to gain creditability and a high level of 'cooperative governance' with citizens.

Main Composition & Function

Classification by Voting Type

**Policy Votes
(Results may reflect the policy or used as reference)**

Votes by the Seoul Metropolitan Government (City Hall, District offices, Education offices, etc)

On-Spot Votes

Only the people who are on-spot (physical locations such as festival place, meeting place, institution and etc.) are eligible to vote (Using GPS).

General Votes

A vote in which Seoul citizens ask and answer questions related to their daily lives and policies

Classification by Voting Target

Open-to-Public votes

A poll open to public

Private(Only selected people are allowed to vote)

Only for selected people in certain locations, residential area, current location(GPS), people on the list to vote(list of phone numbers) and password protection to only allow selected people to vote etc.

App & Website

• The mVoting App - Available on Google Play Store and App Store
• The mVoting webpage- https://mvoting.seoul.go.kr
  ※ Access with a mobile phone or PC, participate in votes with a simple registration with mobile phone or social media.

Results

Performance

- 7,732 voting cases (2,433 policy votes, 5,299 citizen votes, policy reflected 664 votes)
- Blockchain embedded voting: 261 cases (3. 2019 ~ 12. 2019)
- Number of subscribers: 960,000 people in total and 2.57 million people participated in voting (as of 12.31 2019)

Citizen's participation in budgeting system using mVoting

The city of Seoul is operating the "Citizen Participation Budgeting System," in which citizens directly select the projects that will spend 100-billion-won worth of budget each year. Since 2015, mVoting has been used to reflect citizen's opinions. Every year, more than 150,000 citizens participate in the vote for the citizen participation budget project through mVoting.

Domestic and overseas evaluations

Selected as the representative and leading project of Governance 3.0
(Dec. 2014)

Grand Prize on Public Services, Digital Chosun "App Award Korea 2014"
(April 3, 2014)

Selected as the finalist of Barcelona
"Smart City Expo World Congress Awards"
(Nov. 19. 2015)

IDC Smart City Asia Pacific Awards Finalist
(9.2019)

Berlin Metropolitan Solution, Indonesia's Sidoarjo case presentation (June 2016).

Netherland Einthoven (EU World City Project) Participation of e-Government Case Announcement
(Nov 2017)

Future Plans

The Seoul Metropolitan Government will promote mVoting as a channel for encouraging citizens to participate in establishing policies and for citizens to express their various opinions and views. The Seoul Metropolitan Government will also develop and improve mVoting to encourage departments of government, district offices and schools for active usage. We will continue to develop mVoting as a direct democratic platform with the advice from "'mVoting Citizens' Participation Group" made up those who have extensive experience in public relations, IT, general collaboration and education.

19

Democracy Seoul
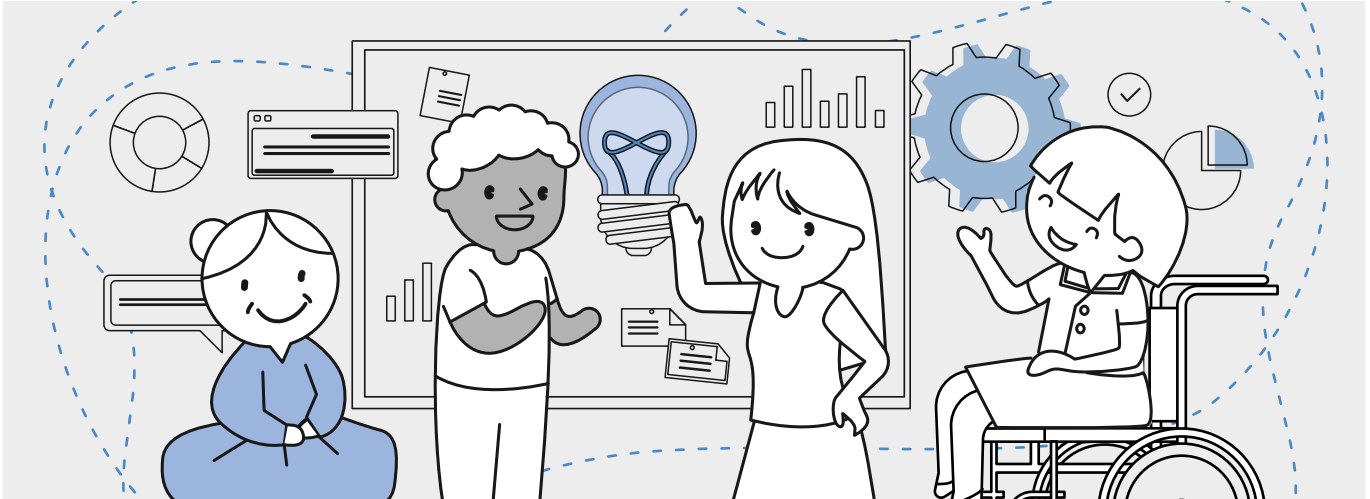
Introduction

'Democracy Seoul (democracy.seoul.go.kr)' is a citizen participation platform where citizens propose their own daily issues and discuss with the city of Seoul to participate in the creation and enactment of policies. The process is fully transparent and open in terms of proposals and decisions so that citizens' thoughts, ideas and participation can bear the fruit of establishing good policies.

Background & Objectives

While the former "Democracy Seoul" just focused on receiving civic proposals, "The New Democracy Seoul" further expanded its citizens' authority by allowing citizens to participate in policy implementation along with participating in public debates.

Main Composition & Function

Civic Proposal

Proposal

Civic proposals consist of online platform 'Democracy Seoul' and offline proposals such as 'Discovering Citizen's Proposals through Workshop' and 'Visiting Democracy Seoul'. Citizens' proposals can be freely proposed in relation to the overall policy of Seoul through the website 'Democracy Seoul'. In order to provide diverse participation of opportunities to citizens with low online access, we are operating a "Visiting Democracy Seoul" where citizens can freely propose in person. We are also operating 'Discovering Citizen's Proposals through Workshop' where citizens can discuss topics of high interest offline. The proposed policy goes through a deliberation process for 30 days and if more than 50 people support the proposal, then the relevant department responds to the proposal. Rewards are awarded to those with excellent proposals that have gained a lot of public support through "Good Proposal Selection Meeting".

Public Opinion

If more than 100 people agree with the proposal, 'Proposal Selection Group' will go through a process of selecting and planning for a public debate. Participants of the public forum will consist of citizens and experts. For 30 days after the opening of the public forum, it will go through a deliberation process to gain public support.

Policy implementation

When more than 1,000 people participate in a public forum, the mayor will respond to the plan and the policy. Through the linkage with the Citizen Participation Budget, the proposal is then set up as a feasibility stage into the next year's budget. This enhances the effectiveness of participation for implementing policies.

Seoul City Proposal (Seoul Inquires)

It is a communication channel for inquiring citizens' opinions before and after the Seoul Government establishes policies. Through the participation of citizens, we set the stage for social consensus and make policy decisions based on citizens' opinions

Website

Democracy Seoul Homepage- http://democracy.seoul.go.kr/
Access via mobile or PC. Policy can be proposed after registration.

Results

Citizen proposals received
6,550 cases since October 2017
(as of April 2019)

Opened Online /Offline public forum
27 cases (2019)

Blockchain technology
Blockchain technology will be in effect from
March 2020 to prevent forgery and alteration

**Introducing real-name authentication
to prevent duplicate voting**

Examples of policy implementation through civic proposals and deliberation processes

**Mandatory measures to protect stray cats
in community planning areas**

Contents below are policies that have been implemented for protecting stray cats in community planning areas.

• Revised Seoul Metropolitan Government's Animal Protection Ordinance and created a protection manual in community planning areas
• Plan to execute animal protection pilot project
• Creating Seoul Animal Care Center by region
• Reflecting budgets related to stray cats

**Financial support for couples suffering from
infertility in Seoul**

• Supporting treatment of fertility injections in a health care center
• Provision of financial support for couples suffering from infertility in Seoul
• Establishing Pregnant Women & Maternity Information Center in Seoul

Future Plans

The Seoul Metropolitan Government will attempt to establish effective policies that better reflect the daily needs of citizens by leading citizens through 'Democracy Seoul'.

20

Citizens' Participatory Budget
Citizens' Deliberation Budget

Introduction	The Citizens' Participatory Budget is designed to enhance transparency in financial management and fairness in allocating financial resources by getting citizens to directly participate in budget compilation, project proposals, and project evaluation. Citizens' Deliberation Budget is a budgeting process that contributes to fiscal democracy through deliberation, public opinion, and planning by various citizens participating in the budgeting process. Citizens from various entities including ordinary citizens, organizations, stakeholders, and experts participate in the budgeting process. In addition to citizens' proposals for new projects, they also participate in existing projects that have been planned and organized by the administration to establish a thorough budgeting process.
Background & Objectives	The Seoul Metropolitan Government has practiced participatory democracy by introducing the Citizens' Participatory Budget in 2012 to ensure citizens participate in the budgeting process. In order to implement real fiscal democracy, Citizens' Participatory Budget has been expanded to 1 trillion won, which is 5% of the city's budget. In addition, we introduced 'Citizens' Deliberation Budget' in 2019 so citizens can deeply get involved in the process of new and existing projects.
Main Composition & Function	The types of budget for Citizens' Deliberation Budget are largely divided into deliberation type and proposal type (former Citizens' Participatory Budget). Under the proposal type, there is the broad proposal type, broad cooperative type, Democracy Seoul connection type, District(Gu) planning type and Local(Dong) planning type. Citizens' participation is guaranteed for a total budget of 600 billion won.

Broad Proposal Type

It is for citizens to propose, examine, and select citizens' projects to improve citizens' convenience in two or more autonomous districts and to make budget for next year. Final selection of the proposal will be done by mobile voting(mVoting) at the Hanmadang general assembly.

Broad Cooperate Type

It is where the public and government participate in the entire process of selecting and executing projects to solve urban problems in two or more autonomous districts.

District(Gu) Planning Type

It solves district issues by participating in innovative businesses at the district level and provide incentives for proceeding the budget projects.

Democracy Seoul Connection Type

It is taking citizen's proposal to public debate and public deliberation through Democracy Seoul (democracy.seoul.go.kr) so it can be budgeted and implemented.

Local(Dong) Planning Type

It finds projects that can solves issues at the local level.

Deliberation Type

It is a pilot project that was first introduced in 2019 and was already implemented by the administration to prepare for the next year's budget of the existing project through deliberation and public discussion with citizens.

Website

The Seoul Metropolitan Government Citizens' Participatory Budget(Deliberation Budget) webpage- https://yesan.seoul.go.kr
Connect via mobile or PC. Participate in the budget project and leave an opinion via real-name verification

Results

Diversity of citizen participation & Deliberation project selection

- Proposal: 4,383 cases, 441.6 billion won (2012~2019)
- Deliberation: 68 projects, budgeted for 190.9 billion won (2019)

Projects such as the expansion of public Wi-Fi zones across Seoul, the designation of Jongno Street Art Zone (Busking Zone) and the bicycle road expansion have been implemented as part of the project.

Selection of citizen participation budget using mVoting

After implementing mVoting(Mobile voting) in 2015, the number of voters increased dramatically with 167,000 people in 2019.

Future Plans

We plan to fulfill citizen's participation by 2021 with the city's budget of 5 percent which is 1 trillion won. What's more important is not the figure itself, but the actual width and depth of citizen's participation. The Seoul Metropolitan Government will offer more opportunities for citizens to participate in all areas of the city to enhance financial transparency and administrative credibility.

21
Seoul Smart Complaint Report
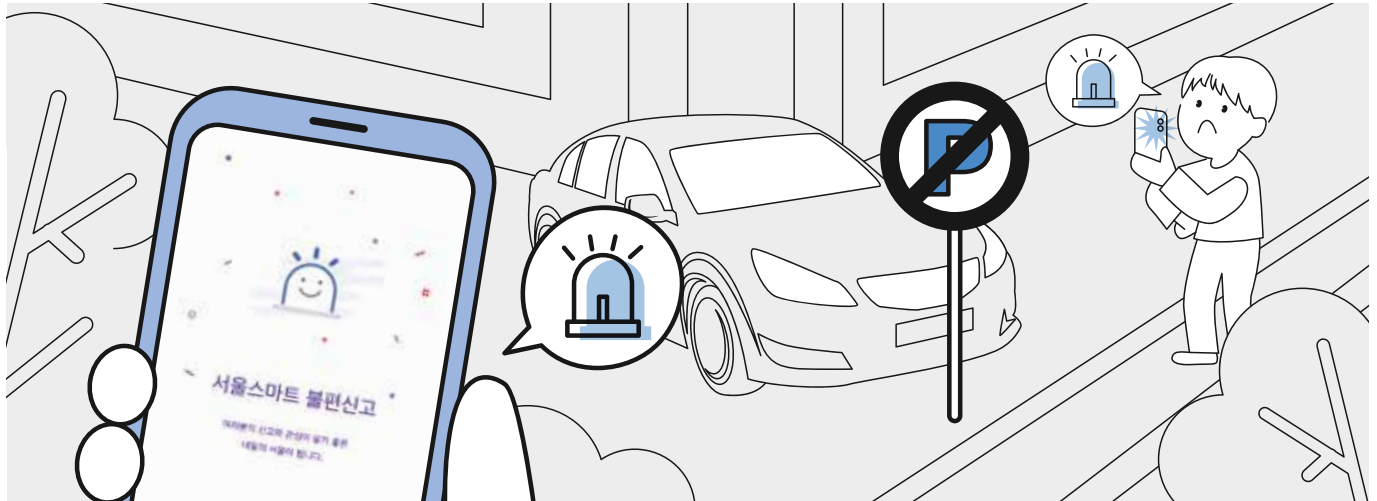
Introduction

Seoul Smart Complaint Report is a civil complaint handling system that allows citizens to report their inconveniences in Seoul in real-time through smartphone apps or websites to receive quick feedback.

Background & Objectives

In August 2012, the Smart Complaint Report was introduced so that citizens can report the flaws and inconveniences of public facilities such as parking violations, illegal advertisements and damage to sidewalk blocks. Local citizens can quickly file a report as they understand where attention is needed.

Main Composition & Function

Location-Based & Photo Reporting
You can report inconveniences and issues via web or smart phone app and pinpoint the exact map locations for quick and accurate processing. You can also upload photos as needed.

Check the result of civil complaint via phone text
Confirmation notice will be sent via text when report is received. Text message and photo will be sent after complaint has been solved.

Check the status of civil complaint
Click the report list to view the report contents and processing results.

Request to issue illegal parking fines
If you submit 2 or more photos (photo time difference of 1 minute or more) or 1 minute or more of video that can prove illegal parking violation, then ticket will be issued immediately without parking control officer physically going to the site.

App & Website	• Smart Complaint Report App: Downloadable through Google Play Store and App Store • Smart Complaint Report website: http://smartreport.seoul.go.kr

Results

Improving the local environment through citizen participation

An average of 2,000 complaint reports is received per day and local citizens can directly discover and report inconveniences around their lives. This has a positive effect in the community since it increases the participation of the local citizens as they contribute to the environment.

Increase of users due to convenience

Due to the convenience of being able to report directly on the spot with a smartphone, the number of users are continuing to increase.

App Splash Screen

Seoul Smart Complaint Report

Your attention and reporting
makes a better tomorrow of Seoul

Reporting

① Reporting location
(GPS is needed)

② Attach on-site
picture or video
(3 or less pictures,
1 video attachment)

③ Input reporting
Contents

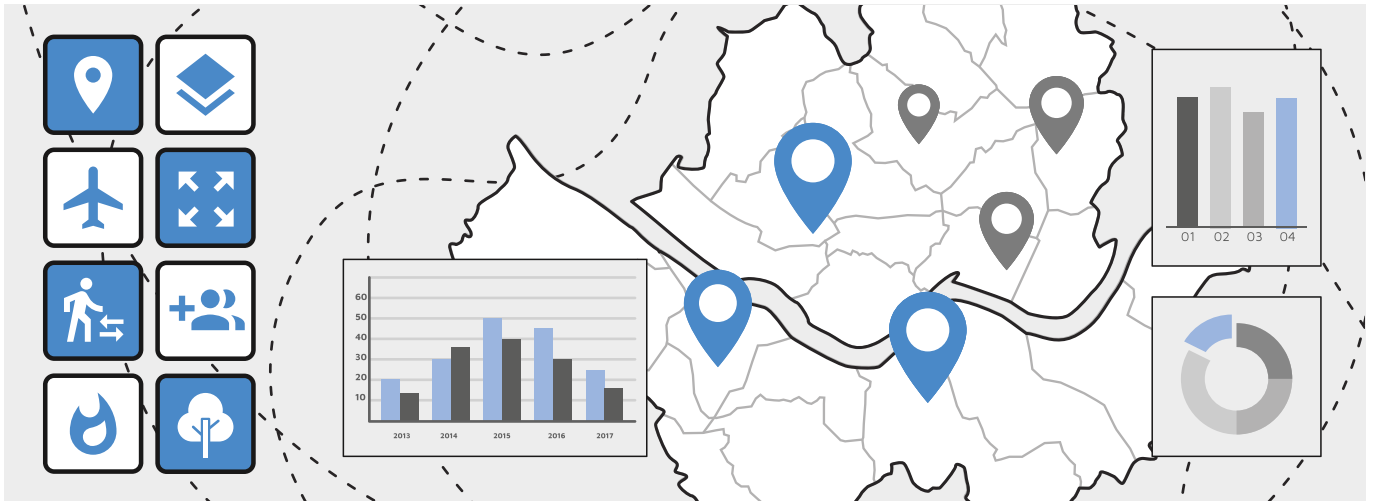④ Send
(Complaint
registration)

Processing result

Future Plans

With the latest technology, we will improve the system so users can conveniently use the app or the website. An example would be minimizing inputs while reporting an illegal parking by automatically recognizing the license plate number and the location from the photo.

22

Smart Seoul Map

Introduction

Smart Seoul Map is a customizable service platform that is easy to use and to input information for a personalized map infographic. Public officials can utilize this technology to input administrative and policy data to create a smart map to communicate with the citizens, and the citizens can utilize this technology to promote and share events and other high-lights happening in their neighborhood to effectively communicate with their neighbors.
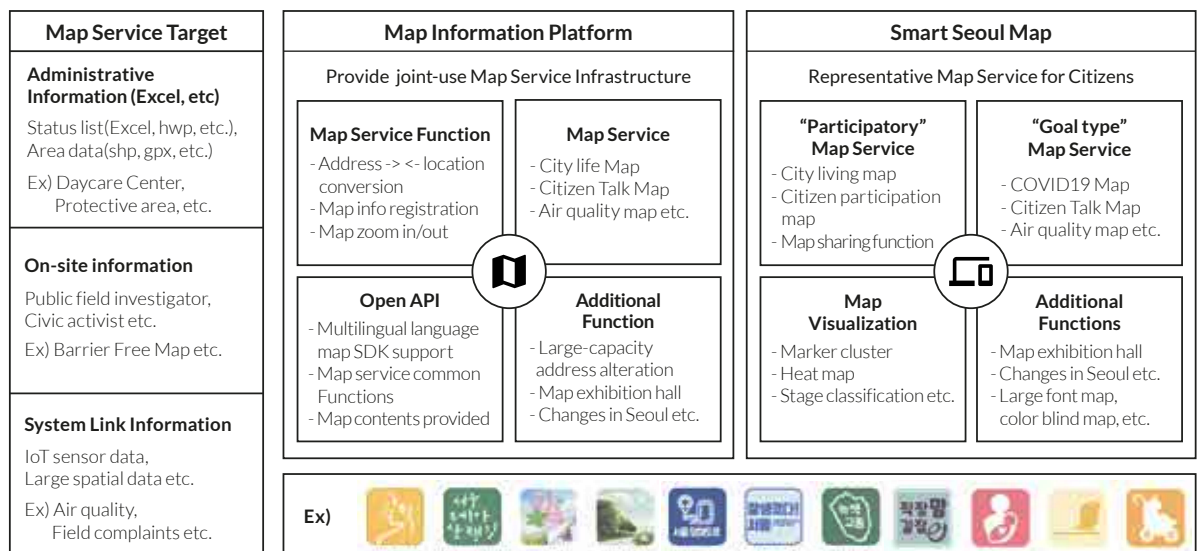
Background & Objectives

95% of all Koreans own a smartphone with GPS functionality(2018 Pew Research) and among those using a smartphone, 76% conduct transportation and location-based searches (2018, KOSIS). 80% of search queries and information are related to location and the information can be combined on a map. The Seoul Metropolitan Government aims to map out documented administrative data to provide an easy-to-read and comprehensive map for effective communication with the citizens.

Main Composition & Function

Service Overview

A standardized map service environment that is easy to use for anyone

Map Service Target	Map Information Platform	Smart Seoul Map
Administrative Information (Excel, etc)	Provide joint-use Map Service Infrastructure	Representative Map Service for Citizens

Map Service Target

Administrative Information (Excel, etc)

Status list(Excel, hwp, etc.), Area data(shp, gpx, etc.)

Ex) Daycare Center, Protective area, etc.

On-site information

Public field investigator, Civic activist etc.

Ex) Barrier Free Map etc.

System Link Information

IoT sensor data, Large spatial data etc.

Ex) Air quality, Field complaints etc.

Map Information Platform

Provide joint-use Map Service Infrastructure

Map Service Function
- Address -> <- location conversion
- Map info registration
- Map zoom in/out

Map Service
- City life Map
- Citizen Talk Map
- Air quality map etc.

Open API
- Multilingual language map SDK support
- Map service common Functions
- Map contents provided

Additional Function
- Large-capacity address alteration
- Map exhibition hall
- Changes in Seoul etc.

Smart Seoul Map

Representative Map Service for Citizens

"Participatory" Map Service
- City living map
- Citizen participation map
- Map sharing function

"Goal type" Map Service
- COVID19 Map
- Citizen Talk Map
- Air quality map etc.

Map Visualization
- Marker cluster
- Heat map
- Stage classification etc.

Additional Functions
- Map exhibition hall
- Changes in Seoul etc.
- Large font map, color blind map, etc.

Ex)

Website

Smart Seoul Map Webpage : https://map.seoul.go.kr

Service contents

"City Living Map" that expresses administrative information on a map and shares it with citizens

• Providing map information about lifestyle services such as Seoul Trail, COVID19 screening clinic, Handsome Seoul
• Providing map visualization (marker cluster, heat map, stage classification)
• You can create a web link of the desired map so you can share with your friends on your blog and homepage

Provide citizen participation map, map exhibition hall, Map Open API etc.

• "Citizen's Participation Map" that citizens directly decide on a theme, research, make a map, and share it with their neighbors
• "Map Service by Field" that allows you to view various sites providing map services at a glance
• "Map Exhibition Hall" where you can view old paper maps and tourist maps together with an internet map
• "Open API service" of city life maps and multilingual maps provided by the map information platform

Specialized service by subject

"Citizens' Talk Map," which contains the status of local complaints and citizens' policy demands

• Visualization of complaints reported by citizens every day by classification and location
• Shows the current status of the annual citizen participation budget project by neighborhood on the map

"Air quality map" to share and diagnose air quality status

• Check air quality information from all parts of the city by pinpointing the location of the air quality indicator
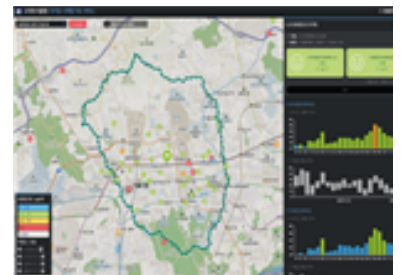
On-site Complaint Map
(Citizens' Talk Map)
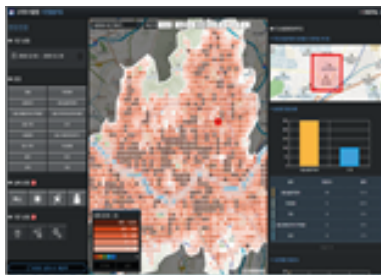
Participation Budget Map
(Citizens' Talk Map)

**Air Quality
Time-series Map**

Developed 313 types of city living maps (as of 2019)

• Able to quickly process administrative work by establishing a map service in a short period of time without any cost
• Seoul Metropolitan Government and local district: 221 types
  (Seoul Trail, Autumn Trail, Old stores, Self-serve vending machine, etc.)
• Developed with citizens: 92 types
  (Working Mom Supporting Map, Campus Best Friend Map, 4 Gate Modern History Sites, etc.)

Providing public-private partnership guidance services

• Provided 25 themed maps of Seoul through private map platforms such as Naver, Kakao, and T Map.

Advanced map visualization for various services
• Providing visualization of large spatial objects (point, line, area) maps
• Providing a function to visualize the direction of the route (start → destination)

Plan to expand visualization of the city's global air quality information map
• A total of 1,450 additional integrated sensors displaying based on existing national measuring air quality station and simple measuring air quality station
• Information provided: 2 existing measuring stations (fine dust, ultrafine dust), 10 integrated sensors (noise, vibration, etc.)

Provide visualization of street trees and management status on the map
• Provide visualization variety of street trees and its location
• Visualization based on street tree location and administrative district statistics provides convenient service
• Multilingual mapping service for city life maps web links

23
Open Data Plaza

Introduction   Open Data Plaza is a service that enhances public interest and transparency through the opening of public data and allow citizens to create new services directly by utilizing public data to create economic and social values.

Background & Objectives   The Seoul Metropolitan Government keeps various information such as transportation, culture, and space in the form of a database that are closely related to the lives of the citizens in Seoul. But prior to open data plaza, public data was legally provided only when citizens made a request, thus limiting citizens' right to access this information. In addition, with public data not being automatically disclosed, citizens, businesses, schools, and research institutes had difficulty using the city's public data in various ways. The Seoul Metropolitan Government thought of ways to serve accurate public data easily accessible to the citizens and opened public data plaza in May 2012.

Main Composition & Function

Public Data

12 categories of data sets (health, general administration, cultural tourism, industrial economy, welfare, environment, transportation, urban management, education, safety, population households, housing construction) are provided in 6 types (OpenAPI, LOD, sheet, chart, file, link) of services

Open Data Plaza for autonomous districts

Data can be directly registered and managed by 25 autonomous districts and data can be searched according to the interest of each autonomous district

Application gallery

Citizen-developed apps, web, and visualization content are released. Currently, more than 800 are registered

Integrated data search

Search data and content by keywords and related fields

Providing public data application

Undisclosed data can be requested among data held by the Seoul Metropolitan Government

Website   The webpage of Open Data Plaza - http://data.seoul.go.kr

Seoul open data square public data open status

(As of Jan 31 2020/ Unit: single)

Total	Seoul City		Autonomous district	Private sector
	Main office / Centers	Invested institutions		
5,197	2,654	188	2,352	2,352

※ Private data: Availability of reservation/location of 'Nanum Car'(Shared car) and information on partner company 'Da-doong Happy Card' (Credit card eligible for families with more than 2 dependents).

Public data usage status by category (May 12 2012~ Jan 31 2020)

(Unit : 10,000 Cases)

Total	Transportation	Environment	General administration	Cultural tourism	Safety	Health
	714,841	269,072	4,368	3,677	2,468	2,436
1,001,604	Industrial Economy	Housing Construction	Population Household	Urban Management	Welfare	Education
	1,238	1,049	874	609	521	451

Future Plans

The Seoul Metropolitan Government will open various types of data to grasp new technologies for new industries such as the Internet of Things and artificial intelligence. We will analyze and disclose generated data through the convergence of public and private data. We will also continue to strengthen quality control by standardizing the data to help produce quality services.

24

Big Data Campus
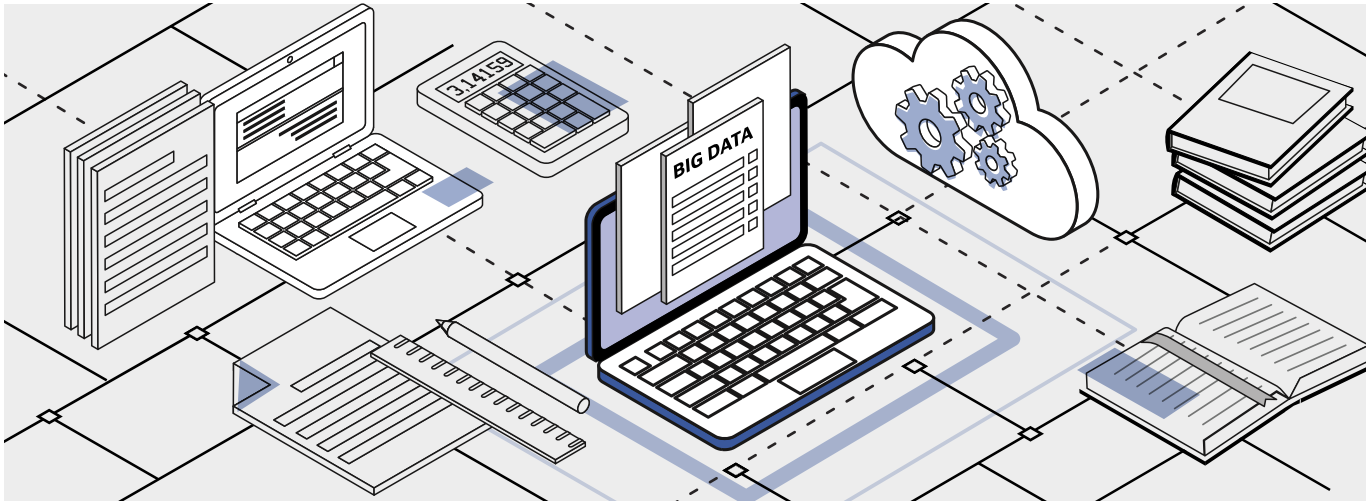
Introduction Located at the S-plex Center in Sangam-dong, Mapo-gu, Seoul, the Big Data campus in Seoul provides cloud-based big data analysis infrastructure using open source and data held by the public and private sectors. The Seoul Metropolitan Government aims to solve urban problems with citizens by sharing, converging and analyzing big data resources through the big data campus.

Background & Objectives The Big Data Campus of Seoul is widely gathering various civic proposals and opinions from civic groups and supports the development of sharing ideas through transparent and open contests. With voluntary participation and mutual co-operation of members from society, we are preparing solutions to social problems through the process of exploring big data, analyzing big data and discovering insights. Big data analysis results are posted on the Seoul Big Data Campus website. We aim to further expand our value by sharing knowledge and information with citizens.

Main Composition & Function

Facilities

Analysis room - Capable of 32 people - For Big Data Analysis		**Analysis support room** - Capable of 7 people - For Management and support	
Meeting room - Capable of 16 people - For Meetings		**Seminar room** - Capable of 32 people - For Lectures	

Big Data Services

Big Data Campus provides 42 types of big data collected by the city since 2013 which includes information on credit card usage and public transportation usage that are difficult for individuals to access. (473 types of geographic information data from integrated spatial information system and 5,100 types of data from Open Data Square)

Analysis Environment Service

We provide individual system resources and open source-based analysis solutions to enable large-scale data analysis in an environment separated from external network on the campus.

Other Services

As part of the university's regular course, we have conducted big data analysis classes and provide online and offline courses for residents and citizens. Big data experts are stationed to assist visitors with big data analysis technology.

|	
How To Use the Campus	You can gain access after submitting the application form with analysis plan and the submission is approved
Hours of Operation	Open all year round. Weekdays from 09:00 am to 06:00 pm (closed on Saturdays & holidays)
Website	Seoul Big Data Campus website - https://bigdata.seoul.go.kr
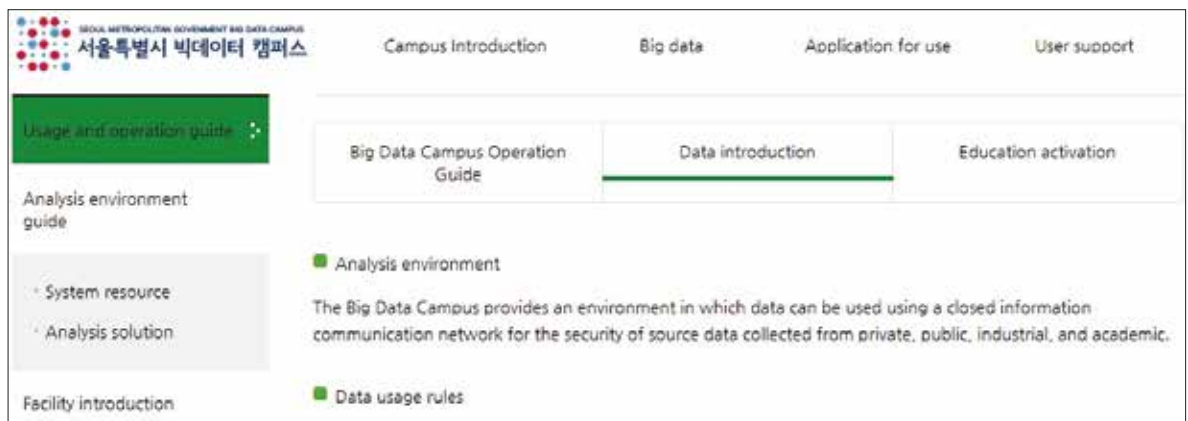
Results

- Since Seoul Big Data Campus opened in July 2016, 977 cases were analyzed, 3,453 users visited with a total of 6,416 times. (as of December 31, 2019).
- In order to solve urban problems, 11 joint research projects were analyzed. (vulnerable areas related to heat-illness, monitoring of false information on agricultural and livestock origin, consumer complaint data analysis, etc.).
- From 2017~2019, a big data contest was held and data analysis results were disclosed to relevant departments and to the citizens. (20 cases including analyzation of vulnerable areas of fire hazard, dispersion of vulnerable senior groups in Seoul and analysis of senior welfare services)
- Big Data Campus are open to be used at The Seoul Institute (June 2019), Gangnam Tipstown (July 2019) and the University of Seoul (April 2020).

Future Plans

We will stay ahead by discovering new data, improve user convenience by updating the analysis environment and reorganizing the website. In addition, we will expand the utilization of big data campus infrastructure to universities, small and medium-sized enterprises, startups, and citizens to create synergy with external partners and environment. We will select a topic based on big data in our big data campuses and hold unique contests.

25
Seoul Smart City Platform
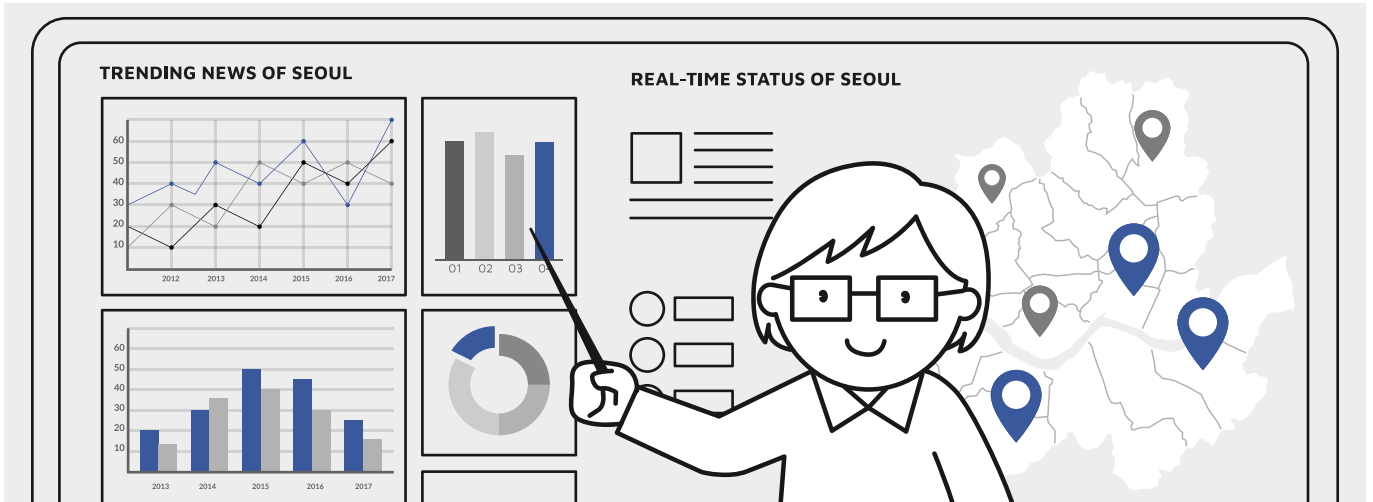
Introduction

Seoul Smart City Platform(Digital Mayor's Office) provides visual information on major policies and projects of the Seoul Metropolitan Government in real time by integrating 32 million data managed by 300 systems from each department along with 2,800 CCTVs (as of April 2020). Citizens and mayors have an overview of all administrative data through the 'Digital Mayor's Office', enhancing security and accountability of public administration.

Background & Objectives

Prior to launching Seoul Smart City Platform, administrative data was distributed by departments and provided individually, making it difficult for citizens and mayor to analyze comprehensively. In addition, the practice of the mayor physically inspecting on-site and handing out/receiving business reports by paper (hard copies) still existed. In order to eradicate these inefficiencies, we have established the Seoul Smart City Platform so that we can grasp the current state of the city without physically going to the site and thus being able to promptly respond and make decisions based on integrated data.

Website	Click on the The Citizen is the Mayor menu in the Seoul Social Mayor's Office (mayor.seoul.go.kr) to access the Seoul Smart City Platform ※ Or, go directly to http://scpm.seoul.go.kr

Main Composition & Function

Through an interactive screen, you can see all the current status of Seoul, ranging from disasters and safety status such as fire to traffic. Interaction can be made with a keyboard, touch screen, voice command, motion sensor using tablet and laptop.

Category	Composition & Function
Contents	Composed of real-time city status, utilization of city data, citizen's opinion, city status index, city projects and city policy contents
Support	Provides voice recognition, motion recognition, video conferencing and voice call using smart technology

Results

300 system connections, 32 million data sets and 230 visual contents and CCTV links of 2,800 units

Installation of Seoul Smart City Platform's touch screens in mayor's room and public places
(3 subway stations, 6th floor in City Hall)

Received spotlight from domestic and foreign media as well as enormous interest from foreign cities trying to benchmark this concept: more than 200 times

※ Seoul Smart City Platform demonstration was held in CES2020 Seoul Hall as well as in other countries such as the US, China, Uzbekistan, Argentina, etc.

Future Plans

The Seoul Metropolitan Government will develop Seoul Smart City Platform into a smart city platform that provides interactive communication services. It will also be possible for citizens to present their opinions as a mayor's partner. The Digital Mayor's Office will continue to improve and expand existing data of real-time city status, city data utilization, citizen opinion, businesses, and key indicators to develop new visual contents.

26
My Neighborhood Analysis Service

Introduction

My Neighborhood Analysis is a web and mobile service that provides various commercial real-estate related information such as average sales in the specific area, average rent cost, opening rate by each category/area of business etc. It analyses 100 business categories which are closely related with citizens' lives in order to support decision-making of entrepreneur-to-be and existing business owners.

Background & Objectives

According to the Ministry of SMEs and Startups(MSS), only 29% of small businesses last for five years in Korea. Because of the diversification of businesses by big corporations, the local small businesses are at risk of collapsing. The local self-employed business owners are suffering from gentrification. The Seoul Metropolitan Government made My Neighborhood Analysis service to protect and nurture local alley commercial districts and the self-employed by providing them with evidence-based commercial information based on big data analysis.

Main Composition & Function

Provide big data-based commercial analysis information by an area, business type and designated area
In order to reduce risk and maximize business potential for startups, we are providing analyzed information (sales, floating population, survival rate etc.) based on big data. Business type, density and risk are expressed in four stages in the form of 'Start-up Traffic Light' so that users can easily use information prior to starting their businesses. In addition, various types of commercial districts (alleys, urbanizing area, traditional markets) are provided in categories of different administrative districts (area/industry category). You can specifically receive information on a specified area ('Analyze my store').

Provide additional functions such as chatbots, visualization service for changes in commercial areas and data studio
Users who are not familiar with services such as 'Start-up Traffic Light' or 'Analyze my store' can instead ask questions and find information using the chatbot. In addition, it provides additional functions such as changes in commercial district that allows you to visually see changes in a time series format of the commercial district and data studio where you can download data related to commercial district analysis.

Mobile service with improved user convenience
For those who want to check the commercial area information anytime and anywhere, we provide a mobile version of My Neighborhood Analysis. Users can easily check the start-up information in the area where they are located by using the location info from their smart phones.

Website   My Neighborhood Analysis Service Webpage- https://golmok.seoul.go.kr/

Results   In order to diversify the type of data and increase the consistency of the data, the SMG has cooperated with not only the public institutes such as the Korean Appraisal Board and Korean Electric Power Corporation, but also private institutes such as banks and credit card companies, thus improving the quality of data. In terms of technology, we are continuously pursuing efforts to improve user convenience by introducing a mobile version and other functions such as a chatbot. In addition, we are providing data (Zero Pay related information) so that policy makers can make references when making future policies.

Future Plans   The SMG will continuously strive to improve data integrity and secure various quality data as the top priority. We are currently developing a function that provides information in a 3D form so that users can intuitively understand the information. This service will be used as evidence to implement small business owner related policies and will further advance to a comprehensive platform to provide better analytical services.

Seoul Smart City, Changing the Lives of the Citizens