IoT Technology Trends and
Korean Efforts for the Next-Generation IoT

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The Internet of Things is an extension of
the current Internet further into the physical world

Short History of IoT

01

Interview with Colliers magazine

When wireless is perfectly applied, the whole earth will be converted into a huge brain. …*
the instruments through which we shall be able to do this will be amazingly simple compared with our present telephone. A man will be able to carry one in his vest pocket.

Nikola Tesla

1926

1950

Alan Turing

Computing Machinery and Intelligence

It is best to provide the machine with the best sense organs …, and then teach it to understand and speak English.
This process could follow the normal teaching of a child.

Understanding Media

...by means of electric media, we set up a dynamic by which all previous technologies -- including cities -- will be translated into information systems

Marshall McLuhan

1964

1966

Karl Steinbuch

The Information Society

In a few decades time, computers will be interwoven into almost every industrial product

Arpanet

1969

TCP/IP

1974

1982

Carnegie-Mellon University

Internet Coke Vending Machine

It was connect to the internet to check how many bottles were in the machine and whether they were cold or not.

DNS

1984

Short History of IoT

01

1989 — WWW

1990 — John Romkey
Internet Toaster
The toaster was connected to a computer with TCP/IP networking to turn on and off over the Internet.

1990 — Olivetti
Active badge system
using infrared signals to communicate a person's location

1991 — Mark Weiser
The Computer in the 21st Century
Ubiquitous Computing
The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it

1993 — University of Cambridge
Trojan Room Coffee Pot
It was used to monitor the pot levels with an image being updated about 3x a minute and sent to the buildings server

1998 — Ishii, MIT
inTouch
We present inTouch …to create a "tangible telephone" for long distance haptic communication.

1999 — RFID/USN

Neil Gershenfeld, MIT
When Things Start to Think
in retrospect it looks like the rapid growth of the World Wide Web may have been just the trigger charge that is now setting off the real explosion, as things start to use the Net.

Kevin Ashton
Auto-ID Labs, MIT
In the 20th century, computers were brains without senses - they only knew what we told them.
In the 21th century, because of the internet of things, computers can sense things for themselves.

Short History of IoT

HP Cooltown
MIT Internet 0
MIT Oxygen
CMU ARA
EU Disappearing Computer Initiative
...
PoC Projects

2001~

2005

ITU Report

ITU Report
The United Nations first mentions IoT in International Telecommunications Union report.
Three years later, the first international IoT conference takes place in Zurich, 2008

2006

The 1st European IOT conference

2008

IPSO Alliance launched

2010

IoT was "Born" in the market

Definition of IoT

WIKIPEDIA
The Free Encyclopedia

The internet of things (IoT) is the network of physical devices, vehicles, home appliances and other items embedded with electronics, software, sensors, actuators, and connectivity which enables these objects to connect and exchange data

Gartner

The Internet of Things (IoT) is the network of physical objects that contain embedded technology to communicate and sense or interact with their internal states or the external environment.

CISCO

The Internet of Things (IoT) is the intelligent connectivity of smart devices, expected to drive massive gains in efficiency, business growth and quality of life. In other words, when objects can sense each other and communicate, it changes how and where and who makes decisions about our physical world

BOSCH

The next generation of the internet is connecting things and devices: the Internet of Things (IoT). These devices range from sensors and security cameras to vehicles and production machines. Connecting devices results in data that open up new insights, business models, and revenue streams.

ITU

The Internet of Things (IoT) is a global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on, existing and evolving, interoperable information and communication technologies

IDC
Analyze the Future

Internet of Things (IoT) is a network of networks of uniquely identifiable end points (or things) that communicate without human interaction using IP connectivity - be it locally or globally.

IBM

Internet of Things refers to the growing range of Internet-connected devices that capture or generate an enormous amount of information every day. For consumers, these devices include mobile phones, sports wearables, home heating and air conditioning systems, and more. In an industrial setting, these devices and sensors can be found in manufacturing equipment, the supply chain, and in-vehicle components.

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인터넷을 기반으로 물리공간 상의 모든 사물과 사람을 유기적으로 연결하고,
상황을 분석, 예측, 판단하여 지능화된 융합 서비스를 자율적으로 제공하는 제반 인프라

Definition of IoT

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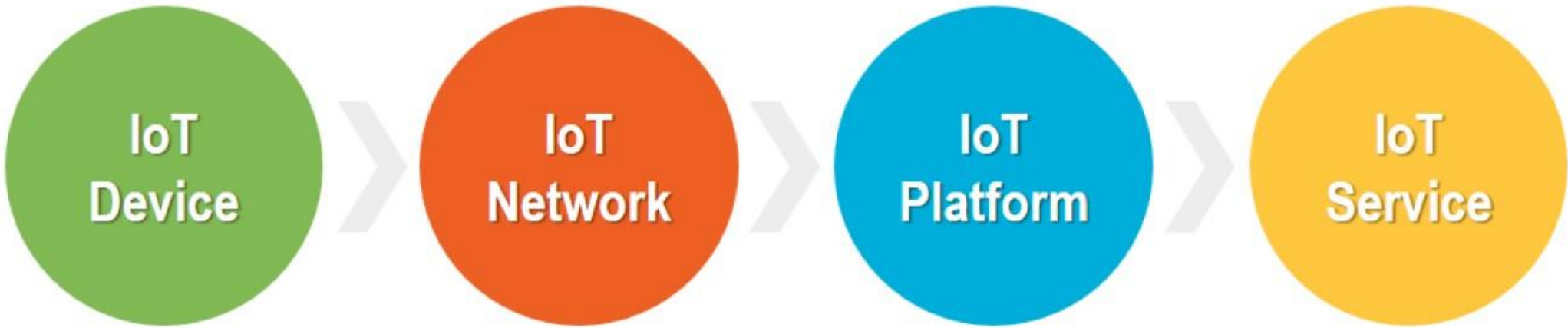
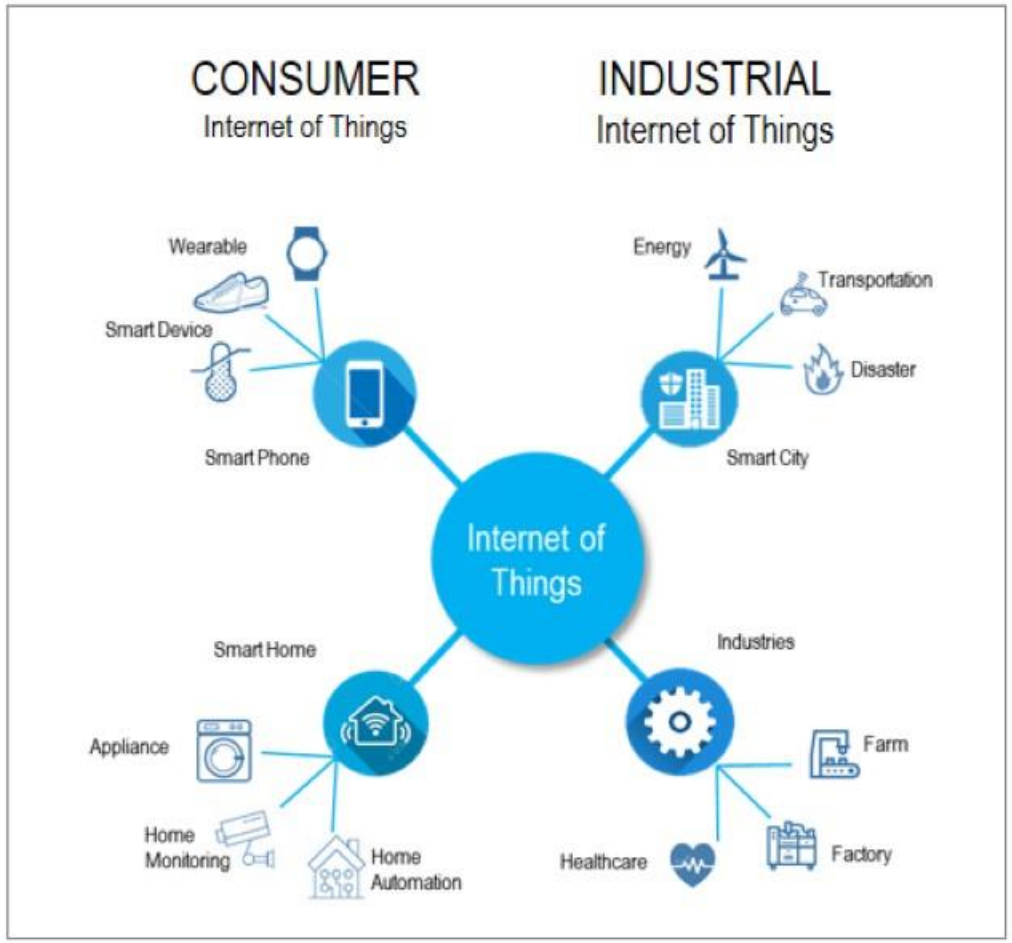
IoT is an infrastructure that proactively provides intelligent services by connecting different things, data, processes, and persons, and analyzing, predicting and decision-making the contextual situation.

IoT Enabling Technologies

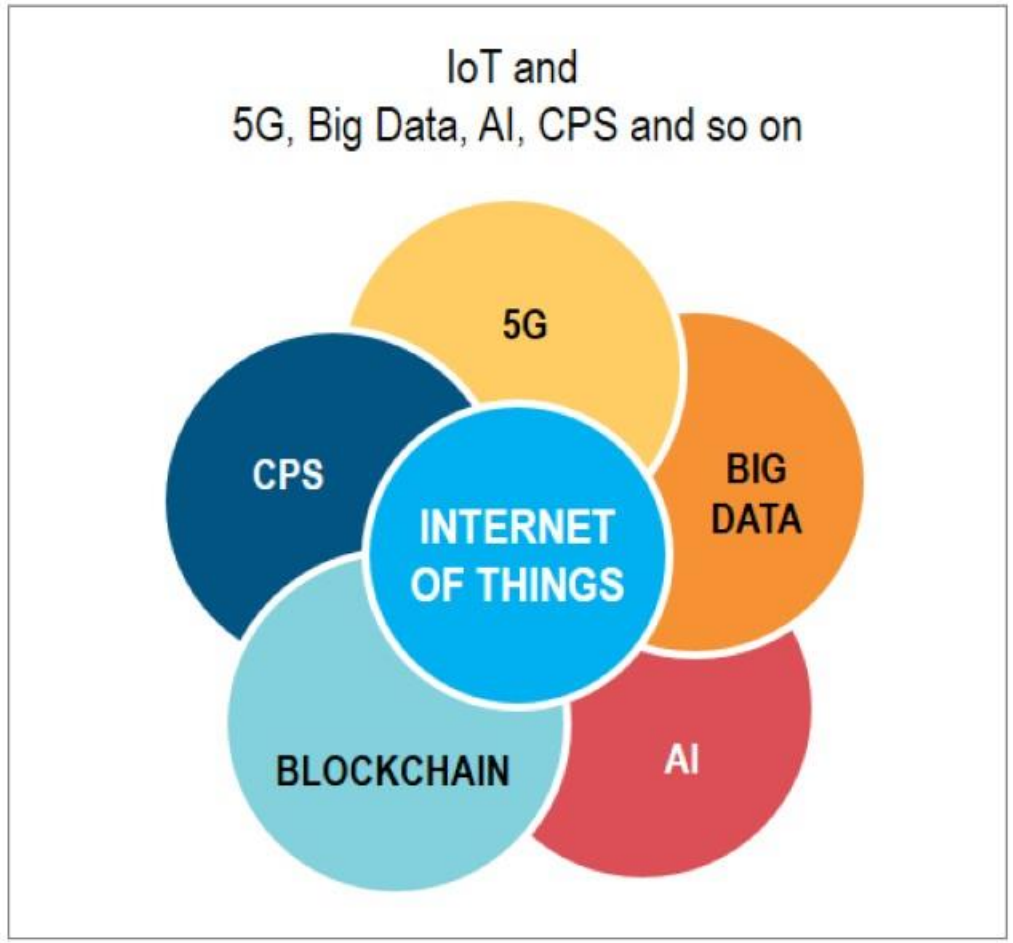


Current State of IoT

Expansion of Application Domains



Convergence of New Technologies



Consumer IoT

Google Glass

Withings Scale

Sen.se Mother

Nest Thermostat

Trackdot

Fitbit

LIFX light bulb

Smart Diapers

Mouse trap

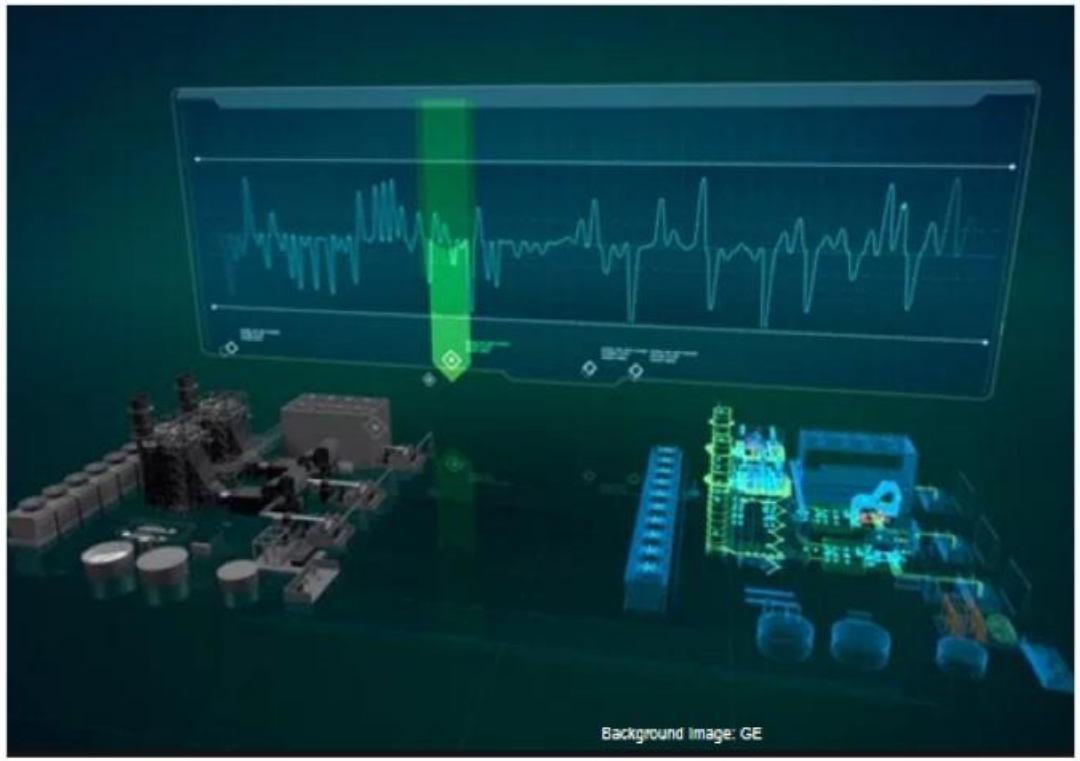
Smart Condom

Alexa

Zibo

Industrial IoT

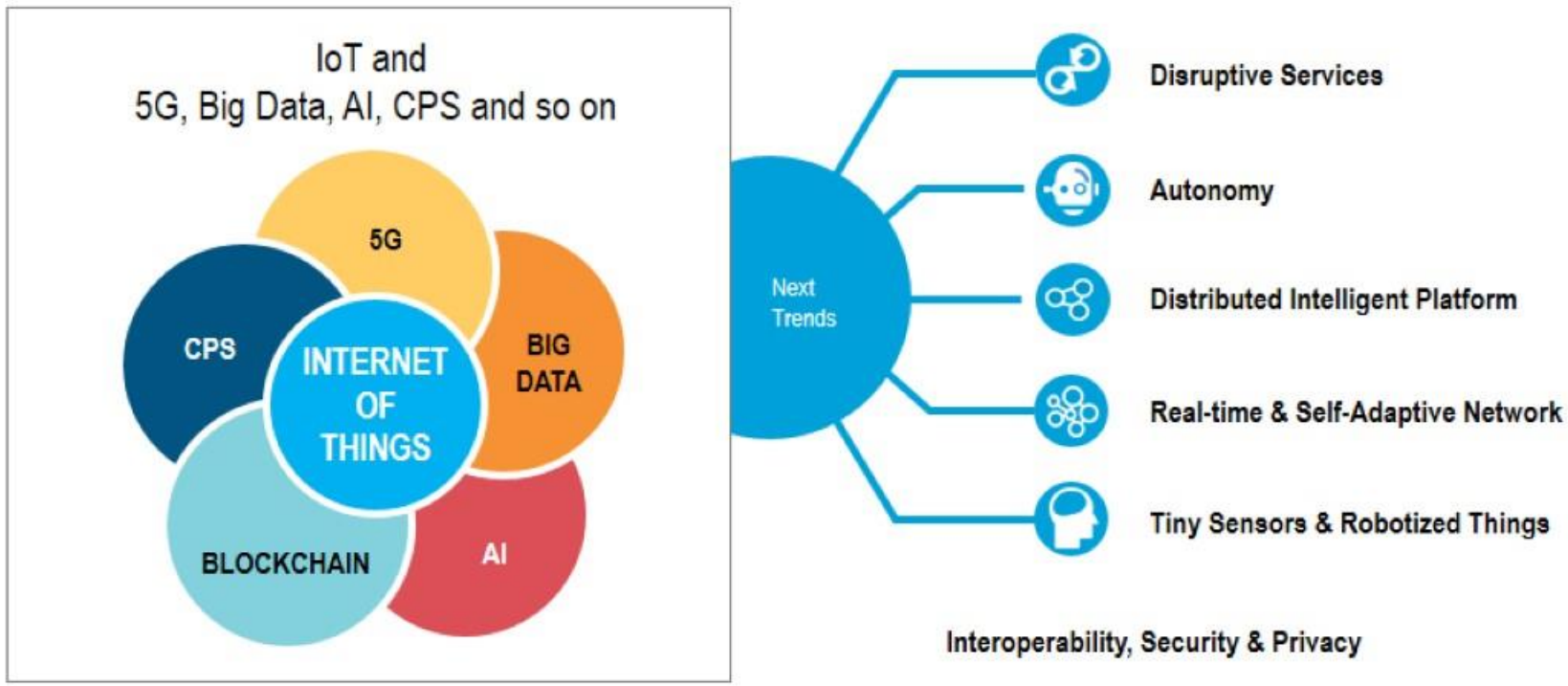
Consumer IoT	Industrial IoT
Average use of wearables life: 6 months	Lifespan of turbine: 25+ years
Biggest cell phone complaint: Dropped Calls	Mission critical, rough & remote
Day's worth of real-time feeds on Twitter amounts to 80GB.	Single flight generates 500GB
Time to Hack Most Smart Home Security Devices: Minutes.	24/7 Mission Critical
Privacy no longer a "social norm". *Mark Zuckerberg*	HIPAA, ITAR, ...



PREDIX cisco Jasper IBM Watson IoT ARMmbed IoT Device Platform SAP Leonardo

IoT Technology Trends

Convergence of New Technologies



IoT-related Strategies in Korea

2017

I-Korea4.0 Strategy

2016

Master plan for in Preparation for the Intelligent Information Society

The IoT strategy moved from Connectivity to Intelligence

2015

Strategy on the promotion of IoT

Invested in IoT demonstration projects to adopt and diffuse the IoT technologies into industries

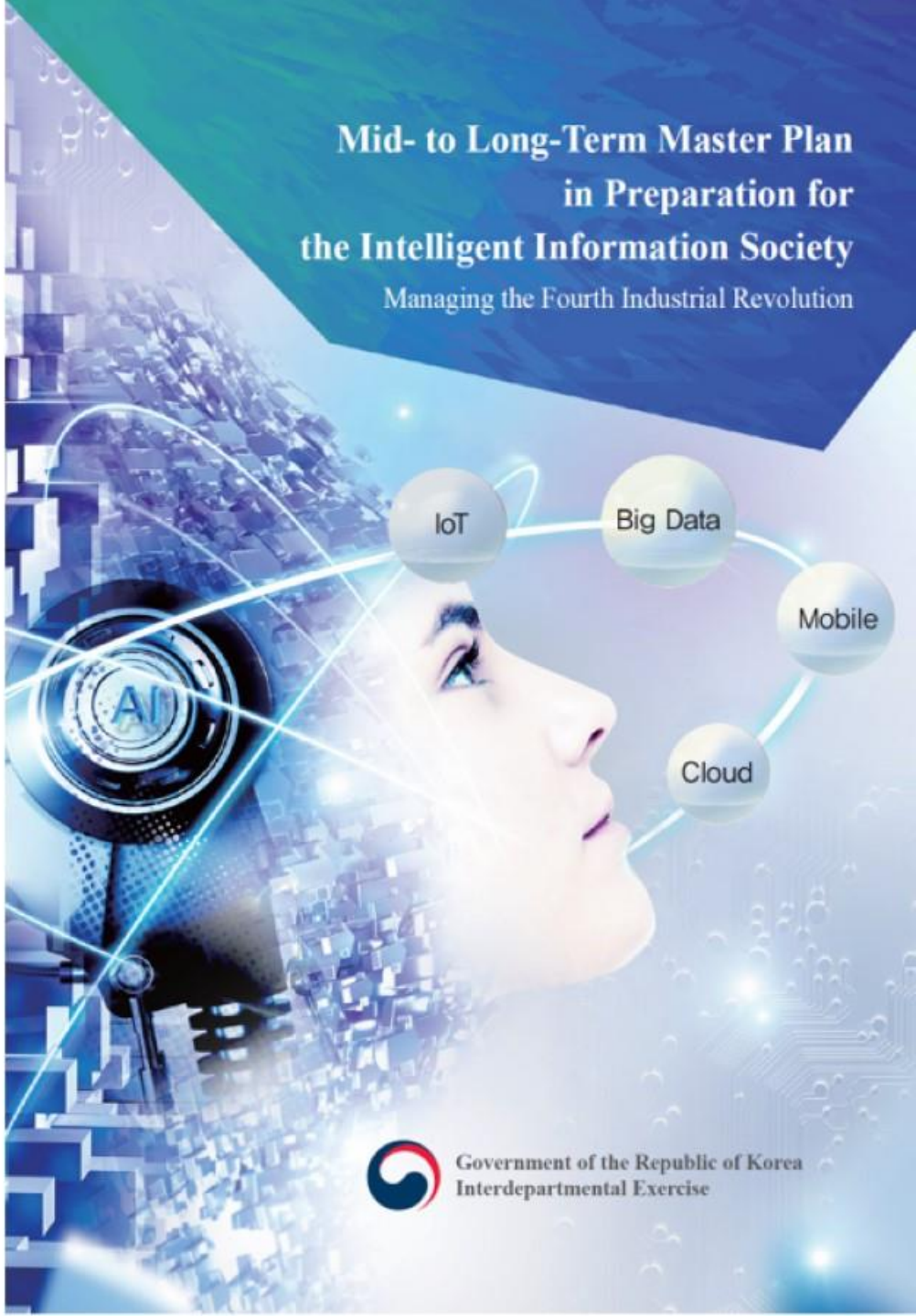
2014

Master plan for building IoT

that leads the hyper-connected digital revolution.
Invested in national R&D projects to strengthen IoT technology competitive and establish an open IoT ecosystem.

Mid- to Long-Term Master Plan in Preparation for the Intelligent Information Society

Managing the Fourth Industrial Revolution



Government of the Republic of Korea
Interdepartmental Exercise

Achievement

With the Korean government's efforts, the IoT industry has achieved great growth

Domestic IoT Market Size

Total market size increased from $ 41B in 2015 to $ 76B in 2018.

Amount of Export

Exports increased from $ 234M in 2015 to $ 641M in 2018.

Domestic IoT Companies

The number of IoT-related companies increased from 1,212 in 2015 doubling to 2,204 in 2018.

Employers

In 2015, the number of IoT-related employees was 70,411, and in 2018 it increased to 75,077.

IoT Adoption

In 2013, only 8% of companies adopted IoT, but it has increased to 19.3% in 2018.

Related Industry Market by IoT Adoption

In 2018, the total service revenue of the companies adopting IoT is $ 1.7B.

a survey conducted by Korean IoT Association in 2018.

The new Korean government has announced a new growth strategy to cope with the fast-paced industrial transformation, dubbed the 4th industrial revolution.

The strategy included the policy to find new growth engines for the Korean economy by cooperating advanced ICT technologies into all parts of industry including smart cities, smart factories, smart farms, autonomous vehicles, medical services and so on.

To this end, new technology development would be required, so the government planned to invest a total up to 2 billion USD by 2022 in R&D.

IoT is considered a very important core ICT technology for the 4th Industrial Revolution, along with 5G, Big data, and AI.

The Korean government is now planning to develop the next-generation of IoT technologies.

IoT

Moving from Connectivity to Intelligence

1 CONNECTED THINGS

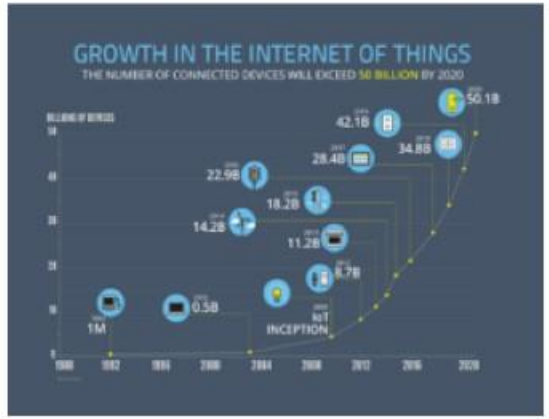
Connected IoT Things connected to the Internet have the ability to sense, communicate and interact with their environment, and be remotely controlled.

2 SMART THINGS

Intelligent IoT Things become intelligent and create new values through machine learning and big data analytics in the cloud.

3 AUTONOMOUS THINGS

Autonomous IoT Smart things can communicate with each other, understand their surroundings and people and make decisions on their own to control the physical world with minimum human intervention.



Cloud-based Centralized Intelligent IoT

In the cloud-based centralized architecture

To connect and manage a variety of physical things

To centrally collect data under the predefined conditions

To execute applications according to user-defined logics and rules

To implement digital transformation in different domains

Edge-based distributed Autonomous IoT

In the edge-based distributed architecture

To adaptively connect and self-organize smart things

To decentralize data collection and processing

To perceive, make decision and respond autonomously through things' collaboration

To solve complex problems in the real world

Project Overview

TITLE

Development of core technologies for autonomous IoT to realize the hyper-connected intelligent information society

PURPOSE

To secure technological and business competitiveness at the global level through by taking the initiative on future IoT core technologies

GOAL

- To develop core technologies for the next-generation IoT
- To raise the IoT technologies to the world's top level
- To test, verify and implement target application services for the autonomous IoT

BUDGET

400 million USD for 7 years ('21 ~ '27)

Project Details

4 AREAS	8 MAIN PROJECTS	27 CORE TASKS
Autonomous Collaborative Things	1. Intelligence in things	4
	2. Distributed collaborative intelligence among things	3
	3. Ambient interaction between things and humans	3
Autonomous IoT Networks	4. Capillary IoT network for the autonomous IoT	4
Autonomous IoT Platform	5. Distributed knowledge platform for the autonomous IoT	2
	6. Autonomous IoT service platform based on digital twins	3
Technology Qualification and Verification	7. Application services for technology verification	4
	8. Technology qualification and diffusion	4

Together KOREA

THE REPUBLIC OF KOREA RIDES ON THE BIG ROAD OF THE 4TH INDUSTRIAL REVOLUTION.

Korea Efforts for IoT Technology Development

Korea has considered the IoT as a new growth engine and has made great efforts for technology development and innovation.

Evolution of IoT

The IoT is evolving with the convergence of 5G, data analytics and AI.
Korea is trying to change R&D strategies from "fast follower" to "first mover".
The autonomous IoT project is being prepared to go forward as a technological leader for the next-generation of IoT.
It will make it possible to achieve the massive transformation and innovation required in all economic, social, and other related systems of the Korean nation.