



2014

# Korea Internet White Paper



# Notice

- The features and Top 10 Internet News contained in this white paper were selected based on the discussion of the Editing Committee consisting of experts from the industries, academe, and government.
- Since the figures in the statistics and tables are rounded off, the sum of all detailed items may not match the total.
- The 2014 Korea Internet White Paper put together the latest Internet issues and trends in Korea and abroad.



## 2014 Korea Internet White Paper



## Publisher's Message

Korea is recognized as the world's most advanced country in ICT developments as it has been ranked the 1<sup>st</sup> in both Development Index and E-Participation Index of the E-government Evaluation conducted by the UN in 2010, 2012, and 2014. It was also ranked the highest in the ICT Development Index by ITU among the member countries for 4 years in a row from 2010 to 2013. Based on the world's top-level ICT infrastructure, Korea is striving to secure the global competitiveness of key IoT (Internet of Things) technologies, which will be the growth engine for next generation ICT industry.

As the popularity of smart devices led to the increase in the use of the mobile payment, primarily due to the rise in consumption of contents such as mobile game and video, the e-commerce market is rapidly switching to the mobile environment. As such, global Internet companies such as PayPal and Alipay are leading the smart payment platform services. The Korean government is also trying to cement Korea's status as the world's most advanced ICT country by issuing the Master Plan for IoT and Roadmap for IoT Information Protection and by operating the Global K-Startup Program to lead the change of the ICT ecosystem based on the mobile environment and platform business.

Now on its 15<sup>th</sup> year, the Korea Internet White Paper for 2014 contains the trend and policy implications in the Internet sector, which plays a pivotal role in the development of IoT and ICT convergence technologies. It has a separate section covering the international trends considering the impending international competitive situation. The feature section contains the latest issues of IoT, Internet governance, and advancement of mobile SNS. Part 1 of the White Paper tackles the Internet infrastructure and new technology trend. Part 2 deals with the Internet services and converged service. Part 3 discusses the Internet industries, status of Internet use in Korea, and information protection. Part 4 covers the status of Internet use worldwide, Internet governance, and international organizations.

We expect this White Paper to be a useful reference material for policy making, research and efficient project implementation for the future Internet and ICT development. We sincerely thank the authors, members of the Editing Committee, and all those who participated in the publication of the '2014 Korea Internet White Paper'.

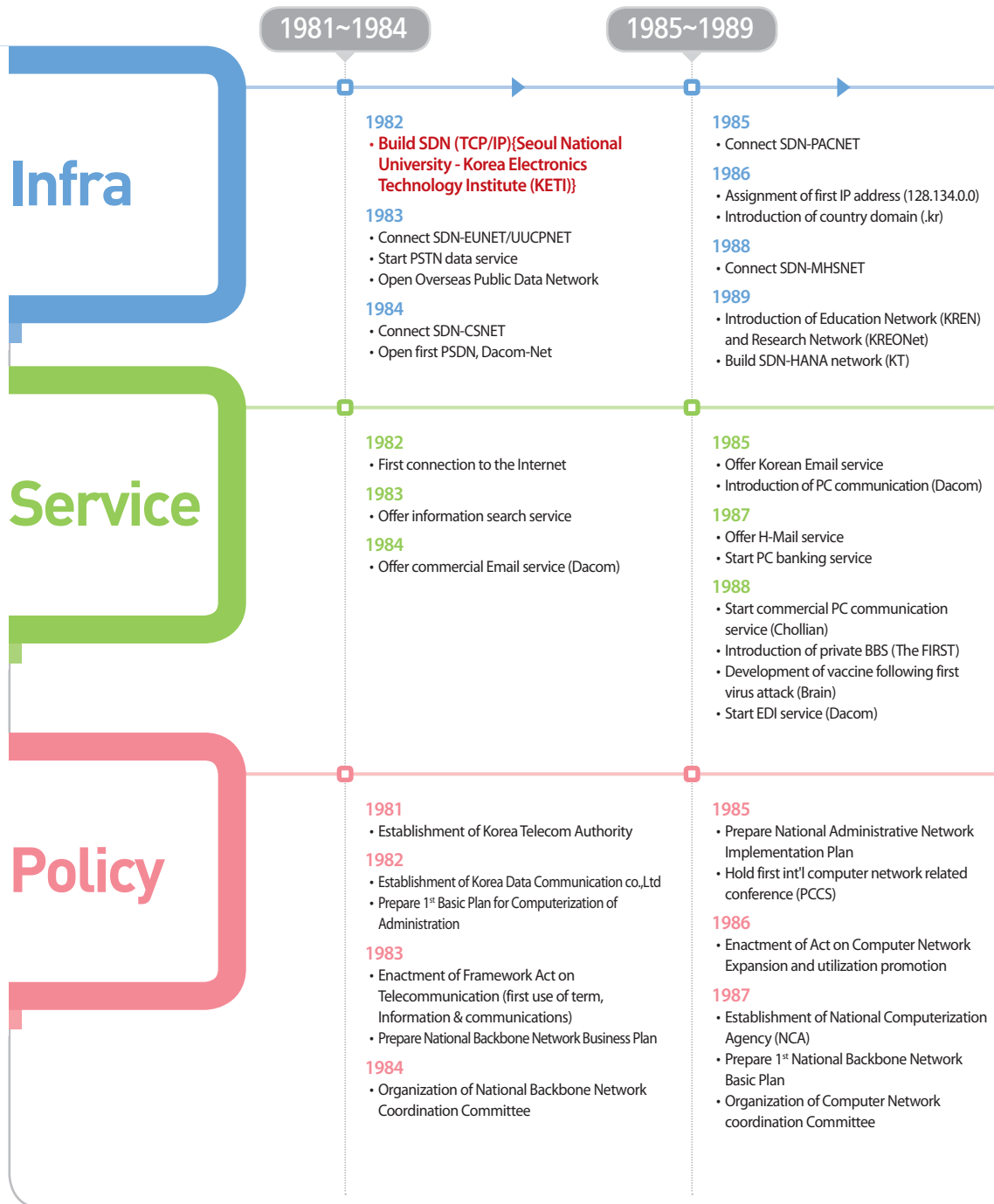
**Baik, Kee Seung**

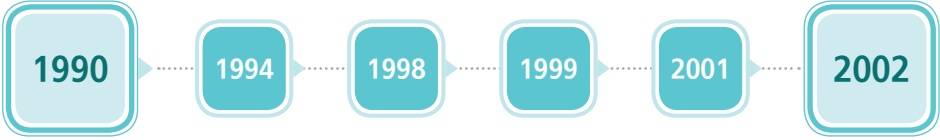
President, Korea Internet & Security Agency

A handwritten signature in black ink, appearing to read 'Baik, Kee Seung', written in a cursive style.

# History of the Korea Internet

Internet service began in Korea in 1982 when SDN (System Development Network) was built. Since then, it has grown rapidly, with broadband Internet subscribers reaching 40 million in 2013. Thereafter, Korea became first in the world to launch commercial WiBro and HSDPA services, reaffirming its position as an Internet powerhouse. As the highest ranked country in the 2013 ICT Development Index(2012), Korea strives to the 'smartest country' in the world.





- Introduction of Commercial Internet Service
- Establishment of Ministry of Information and Communication
- Introduction of commercial broadband Internet service
- Internet users exceed 10 million
- No. 1 in broadband networks
- Enactment of Act on Promotion of Information and Communication Network Utilization and Information Protection, etc.
- Broadband Internet subscribers exceed 10 million
- Development of 'e-Korea Vision 2006'



- 1990**
- Connect SDN-HANA to USA IP based Internet
- 1993**
- Open administration information network (NATISNET)

- 1991**
- Start online issue service of resident registration documents

- 1990**
- Prepare Master plan Information Society
- 1992**
- Prepare 2<sup>nd</sup> National Backbone Network Basic Plan
  - Enactment of Act on Promotion of Information and Communications Network Utilization, etc.
- 1993**
- Prepare National Information Super Highway Basic plan

- 1994**
- Introduction of Commercial ISP (KT, Dacom, iNet)
- 1995**
- Establishment of PC-Internet connection
  - Implementation of KIX Service
- 1996**
- Open ISDN public network

- 1994**
- **Introduction of commercial Internet service (KT)**
  - Start text based MUD game service
  - Open government authorities websites (Blue House, etc.)
- 1995**
- Start 'WWW' service
  - Start Internet café (Netscafé)
  - Open Internet news & broadcasting sites (JOINS, KBS)
- 1996**
- Start ISDN Internet service
  - Start e-Commerce and First webzine service
  - Introduction of first graphic based MUG game
  - Hold Information EXPO

- 1994**
- **Establishment of Ministry of Information and Communication (MIC)**
- 1995**
- Prepare National Information super highway master plan
  - Enactment of Framework Act on Informatization Promotion
  - Establishment of Korea Internet Safety Commission (KISCOM)
- 1996**
- **Prepare 1<sup>st</sup> Informatization Promotion Basic Plan**
  - Organization of Informatization Promotion Committee
  - Establishment of Korea Information Security Agency (KISA)

- 1997**
- Start leased line service
  - Start high speed national network Internet service
  - PC communication subscribers exceed 3 million
- 1999**
- **Internet users exceed 10 million**
  - First assignment of IPv6 address
- 2000**
- Open commercial ATM exchange network
  - Establishment of Korea ISP Association (KISPA)

- 1997**
- Start online stock trading service
  - First free Internet services for Email and search, etc.
  - Introduction of portal sites (Netsgo)
- 1998**
- **Introduction of commercial broadband Internet service (Thrunet)**
  - Offer e-Government service
- 1999**
- Start ADSL service (Hanaro Telecom)
  - Start online banking service

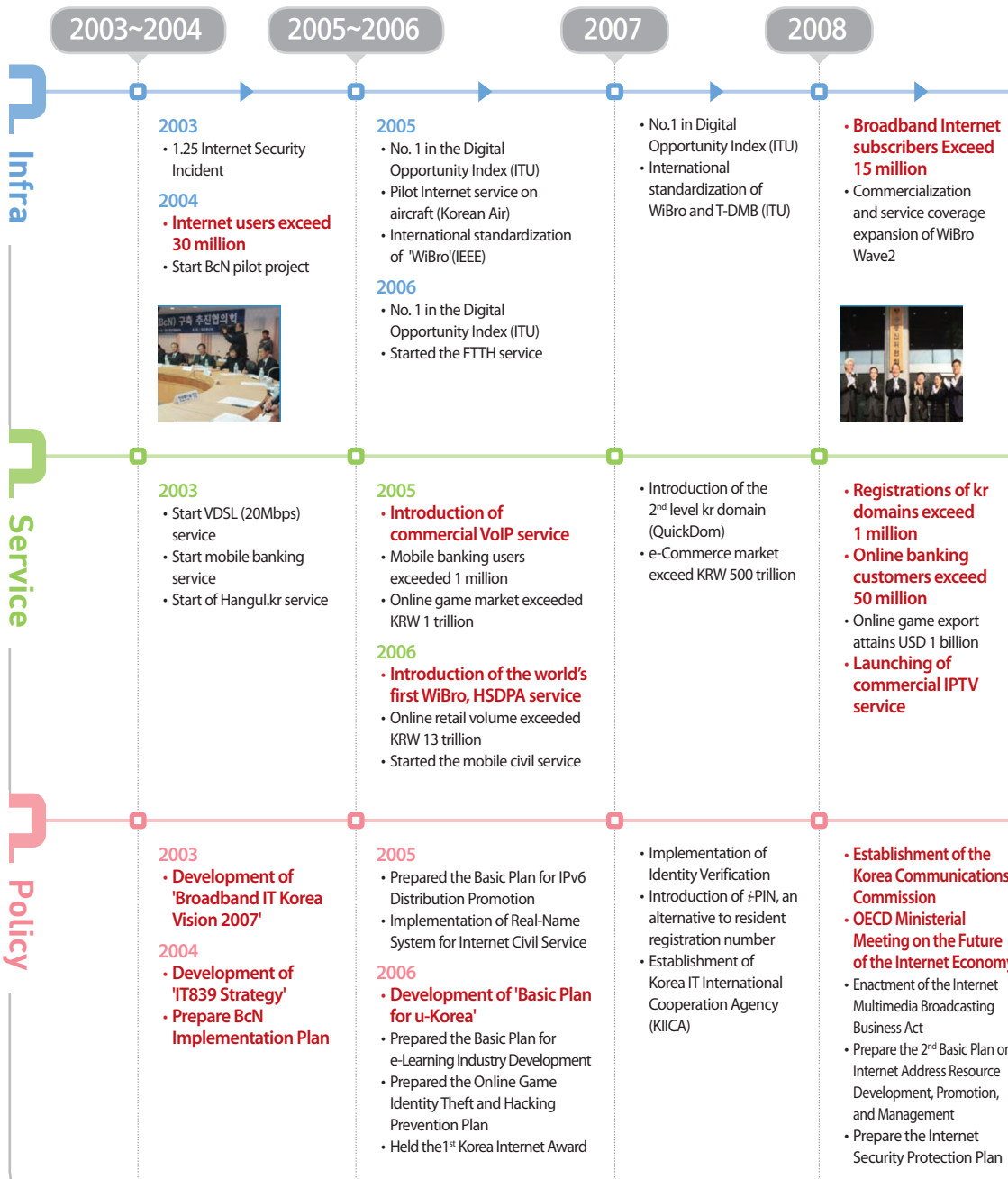
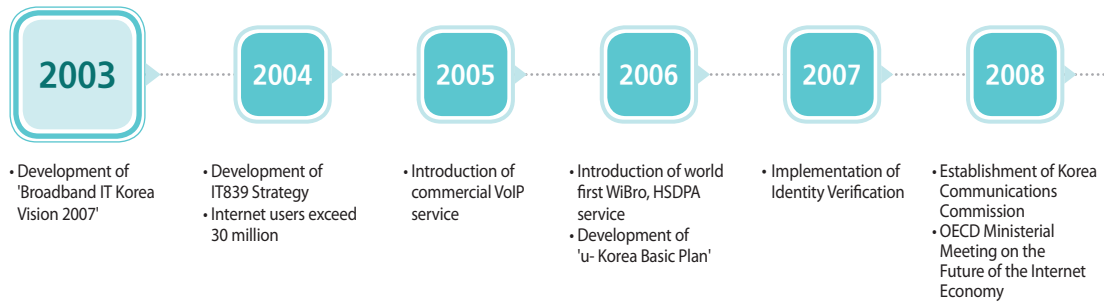
- 1998**
- Prepare Information and Communications Network Improvement Plan
  - Prepare PC Communication and Internet Utilization Promotion Plan
- 1999**
- **Development of 'Cyber Korea 21'**
  - Enactment of Framework Act on Electronic Commerce, Digital Signature Act
  - Establishment of KRNIC
- 2000**
- Completion of 2<sup>nd</sup> Stage National Information Super Highway Project
  - Enactment of Software Industry Promotion Act, Knowledge Information Resource Management Act
  - Prepare Personal Information Protection Guidelines
  - Implementation of 11 Initiatives for e-Government
  - Establishment of Korea SW Industry Promotion Agency (KIPA)

- 2001**
- **No. 1 in broadband networks (OECD)**
- 2002**
- Broadband Internet subscribers exceed 10 million
  - No. 1 in broadband Internet penetration

- 2001**
- Online banking subscribers exceed 10 million
  - Introduction of Internet content rating service
- 2002**
- Game market exceed KRW 3 trillion

- 2001**
- **Enactment of Act on Promotion of Information and Communications Network Utilization and Information Protection, etc.**
- 2002**
- Development of 'e- Korea Vision 2006'

# 2014 Korea Internet White Paper



2009

- No. 2 in ICT Development Index

2010

- No. 1 in UN e-Government Development Index and e-Participation Index
- Smartphone subscribers exceeded 7 million

2011

- Launch of the LTE Commercial service

2012

- 30<sup>th</sup> anniversary of the Korea Internet

2013

- Domestic Internet users exceeded 40 million

2009

- **No. 2 in ICT Development Index (2008)**
- Implementation of Giga-Internet Pilot Project
- 7.7 DDoS Attack



2010

- **No. 1 in UN e-Government Development Index and e-Participation Index**
- Completion of BcN project

2011

- **No. 1 in ICT Development Index (2010)**
- Opening of the LBS Business Support Center
- No. 1 in terms of the number of subscribers to wireless Broadband Internet per a population of 100 people (OECD)
- 3.4 DDoS Attack
- IPv4 assignment ended

2012

- **30<sup>th</sup> anniversary of the Korea Internet**
- Broadband Internet subscribers exceed 18 million

2013

- **Ranked no. 1 in the 2013 ICT Development Index(2012)**
- 3.20DDoS attack (financial sector and broadcasting companies)
- 6.25APT attack (government and public agencies)
- Bidding on LTE frequency

- Subscribers of VoIP exceed 6.5 million
- Mobile banking users exceed 10 million

- **IPTV service subscribers exceed 3 million**
- Smartphone subscribers exceed 7 million
- WiBro export attains KRW 1 trillion

- **Launch of the LTE commercial service (SKT/LG U<sup>+</sup>)**
- Launch of the '한국' domain service
- Smartphone subscribers exceed 20 million
- Internet banking users exceed 70 million
- Mobile banking users exceed 20 million

- Smartphone subscribers exceed 30 million
- IPTV service subscribers exceed 6 million
- LTE subscribers exceed 15 million

- **Domestic Internet users exceeded 40 million**
- Domestic mobile messenger (Kakao Talk) subscribers exceeded 120 million
- Foreign market entry of domestic mobile messengers (Line, etc.)

- Establishment of Midlong-term Broadcasting Communication Network Development Plan
- Establishment of Mobile Internet Promotion Plan (Phase 1 & 2)
- **Launching of integrated Korea Internet & Security Agency**
- Hosting of 36<sup>th</sup> ICANN Meeting in Seoul
- Establishment of Cloud Computing Promotion Plan

- **Opening of 'ㄱ118' Counseling center**
- Development of IPv6 transition plan
- Establishment of the Internet Cooperation Forum
- Establishment of Internet Advertising Market Promotion Plan
- Organization of KIDS (Korea Internet Dream Stars)

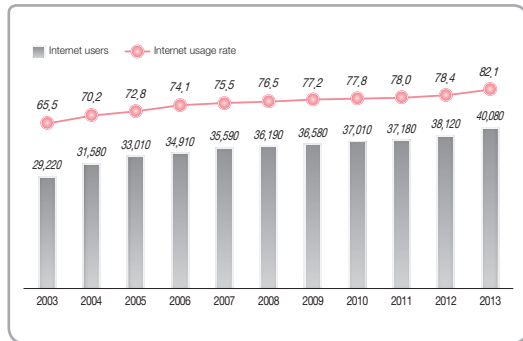
- Establishment of the Plans for Promotion of the NFC-based Mobile Smart Life service
- Opening of pan-governmental policy council on cloud computing
- Implementation of the Personal Information Protection Act
- Introduction of the Mobile Ad Platform Certification Law

- Implementation the global K-startup program
- Launch of the Korea Internet governance council
- Designate the Day of information security (2<sup>nd</sup> Wednesday of July)

- **Opening of the Phishing Response Center**
- **Establishment of MSIP**
- Enforcement of the Amended Information and Communication Network Act
- Launch of Internet Startup Alliance
- Announcement of the Guideline for Internet Search Service

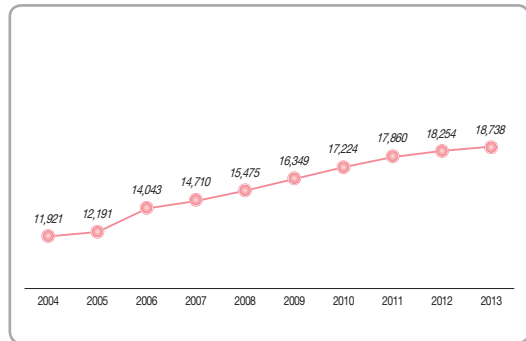
# Internet at a Glance

## Internet users and Internet usage rate (Unit: %, 1,000 persons)



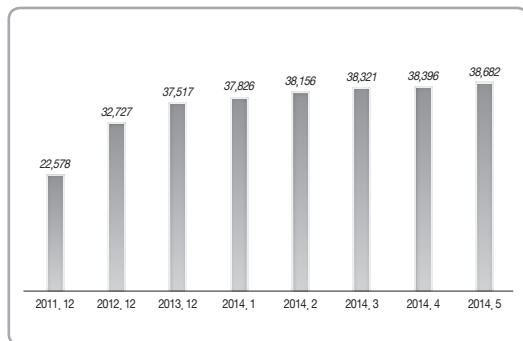
MSIP - KISA, 2013 Survey on the Internet usage, 2013

## Broadband Internet subscribers (Unit: 1,000 persons)



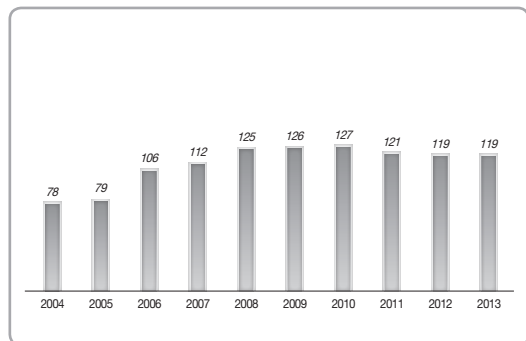
MSIP, Broadband Internet subscription (compiled), 2014

## Number of smartphone subscribers (Unit: 1,000 persons)



MSIP, wired and wireless communication service subscription statistics, 2014

## Number of ISPs (Unit: ea)



Internet Statistics Information System, isis.kisa.or.kr

## e-Commerce transaction volume (Unit: KRW 1 billion, %)

Type	2012		2013 <sup>p</sup>		Annual	
	Component Ratio	Component Ratio	Component ratio	Growth amount	Growth rate	Growth rate
B2B	1,051,162	91.7	1,095,696	91.0	44,534	4.2
B2G	62,478	5.4	70,649	5.9	8,171	13.1
B2C	21,160	1.8	24,331	2.0	3,172	15.0
C2C	12,006	1.0	13,414	1.1	1,408	11.7
Total	1,146,806	100	1,204,091	100	57,285	5.0

※ p: preliminary  
Statistics Korea, 2013 Annual and Q4 e-Commerce and Online Shopping Trend, 2014

## Online shopping transaction volume (Unit: KRW 1 billion, %)

Type	2012		2013 <sup>p</sup>		Annual		
	Component Ratio	Component Ratio	Component ratio	Growth amount	Growth rate	Growth rate	
Product Range	Total Store	25,858	75.9	29,804	77.4	3,945	15.3
	Specialty Store	8,210	24.1	8,691	22.6	481	5.9
Operation Type	Online	22,131	65.0	24,624	64.0	2,493	11.3
	On-Offline	11,938	35.0	13,870	36.0	1,933	16.2
Total	34,068	100	38,494	100	4,426	13.0	

※ p: preliminary  
Statistics Korea, 2013 Annual and Q4 e-Commerce and Online Shopping Trend, 2014

## · Internet Statistics ·

### ▶ Sales of the Internet industry

(Unit: KRW 1 billion, %)

Type	2009	2010	2011	2012	2013 <sup>p</sup>	CAGR	Annual growth rate
Infrastructure industry	18,785 (37.2)	28,945 (45.8)	42,437 (53)	43,632 (52.1)	47,299 (50.9)	26.0	8.4
Support industry	8,407 (25.2)	9,358 (25.9)	10,263 (26.2)	12,099 (29.3)	14,451 (30.9)	14.5	19.4
Utilization industry	23,289 (69.8)	24,958 (69.2)	27,345 (69.9)	27,973 (67.7)	31,161 (66.5)	7.6	11.4
Total	50,481	63,261	80,045	83,704	92,911	16.5	11.0

※ p: preliminary, ( ) is ratio

※ CAGR: Compound Annual Growth Rate for 2009~2013

KAIT, Broadcasting Communication Industry Report (Monthly/Yearly) (compiled), 2013

### ▶ Revenues of e-Learning service providers

(Unit: KRW 1 billion, %)

Type	2011		2012		2013		Annual growth rate
	Sales	Component ratio	Sales	Component ratio	Sales	Component ratio	
Contents	5,383	22.0	5,155	18.8	5,864	19.9	13.8
Solutions	2,352	9.6	2,366	8.6	2,705	9.2	14.3
Services	16,778	68.4	19,956	72.6	20,901	70.9	4.7
Total	24,513	100	27,477	100	29,470	100	7.3

NIPA, 2013 Survey on e-Learning Industry Trend (compiled), 2014

### ▶ Sales of the game industry

Type	Sales (KRW 1 million)	Added value (KRW 1 million)	Added value ratio (%)	Export (USD 1,000)	Import (USD 1,000)
2008	5,604,700	2,808,000	50.1	1,093,865	386,920
2009	6,580,600	3,348,867	50.9	1,240,856	332,250
2010	7,431,118	3,768,320	50.7	1,606,102	242,532
2011	8,804,740	4,184,893	47.5	2,378,078	204,986
2012	9,752,538	4,568,089	46.8	2,638,916	179,135
Annual growth rate	10.8	9.2	-	11.0	△12.6

Ministry of Culture, Sports and Tourism · Korea Creative Content Agency, 2013 content industry statistics, 2014

### ▶ Online Cartoon Production and Distribution Industry Revenue

(Unit: KRW 1 million, %)

Category	2010	2011	2012	Annual growth rate
Production and revision of Internet/mobile cartoon contents (CP)	13,641	15,262	15,644	23.9
Internet cartoon contents service	29,631	34,564	36,319	55.6
Mobile cartoon contents service	9,635	11,252	13,406	20.5
Total	52,907	61,078	65,369	100

KOCCA, 2013 Contents Industry Statistics, 2014

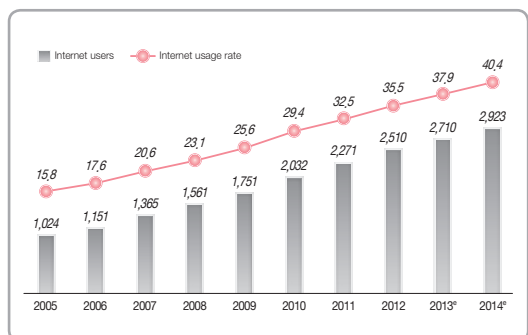
### ▶ ICT development index ranks (as of 2012)

Rank	Country (index)	Rank	Country (index)
1	Korea(8.57)	8	UK(7.98)
2	Sweden(8.45)	9	Luxembourg(7.93)
3	Iceland(8.36)	10	Hong Kong(7.92)
4	Denmark(8.35)	11	Australia(7.90)
5	Finland(8.24)	12	Japan(7.82)
6	Norway(8.13)	17	US(7.53)
7	Holland(8.00)	78	China(4.18)

ITU, Measuring the Information Society 2013, 2013

### ▶ International Internet users and Internet usage rate

(Unit: %, million persons)



※ e: estimate

ITU, ITU Statistics, 2014

# Top 10 Internet News

01

## Smishing Damage Grows

It is fair to say that the greatest factor behind people's anxiety and irritation was 'Smishing'. It is a compound word of 'SMS (Short Message Service)' and 'Phishing', which describes a new form of financial fraud using SMS message. Criminals deceive the victims with such phone scams as telling the victim that a family member was injured or tax can be refunded, demanding that the money be sent first. It is simply that voice phishing turned into a smartphone message. A smishing scam disguises itself as a free gift reward, a nude picture, or a new game to induce a smartphone user to tap a link attached in the message. When the user taps the link, a malware is automatically installed in the user's smartphone, and a small sum of money is paid. In 2013, more than 2,100 cases of smishing incidents were reported to the police, with total damage pegged at KRW 569 million. In 2014, 18,143 cases and total damage of KRW 3.53 billion were recorded up to July. The number of cases increased by 8 times, whereas the amount of damage grew by 6 times.

The scam is becoming more sophisticated every day. An international smishing group operated from April to July 2014 had detailed, systematic assignment of duties. When a victim falls for the scam and taps the link, he/she is forced to buy a game item without being aware of it, and the game item is exchanged with cash in the item trade sites. The cash is then exchanged with gift voucher and sent to China. The group reportedly gained illicit profits by operating servers not only in Korea and China, but also in the US and Japan.



## Rapid Increase of Mobile Service

02

With the smartphone becoming widely popular, mobile services also increased sharply, forming a huge mobile ecosystem. Although games were most popular at the early stage of smartphone distribution, smartphones are now doing most of the jobs that were processed in PCs. The leading cases are online shopping and banking. Among the shopping apps, 20 million copies of the '11Street' mobile app were installed, whereas the accumulated downloads of 'Coupang' and 'GS Shop' apps exceeded 10 million in 2013. Social commerce services such as 'TicketMonster' and 'WeMakePrice' and open

markets like 'G Market' and 'Auction' also became popular. According to the National Statistics Office, mobile shopping grew sharply, with its total transaction amount increasing from KRW 1.127 trillion won to KRW 2.894 trillion in 2013. Likewise, its share in the total online shopping increased from 10% in early 2013 to 27.6% in the first quarter of 2014. The number of people who registered the Internet banking service is expected to surpass 100 million in the 3rd quarter of 2014, and 45.5% of them would be mobile banking users. This means that 45.5 million people or most of the population are using smartphone banking. Although the anxiety grew with the recent outbreak of smishing, smartphone banking will most likely be the general trend.



Experts selected O2O (Online to Offline) as a mobile service with the greatest potential in the future. Handling what used to be offline in the online space, O2O was selected as the biggest emerging field in a recent survey of 10 domestic venture capitals by ET News.com. The food delivery app and parking space search are examples of currently available O2O services.

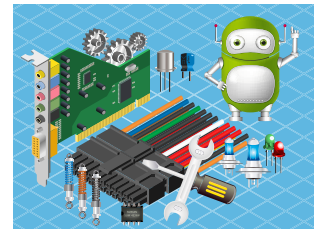
# 03

## ICT DIY Effect and 3D Printing

The DIY (Do It Yourself) fever, which allows consumers to plan and make things for themselves, has expanded to ICT sector: Although ICT was regarded as a typical supplier-led market because of its technical nature and high deployment cost consumer-led market has been growing due to the proliferation of open source SW, appearance of open source hardware such as Arduino, introduction of low-priced 3D printer, and sharing of information among users.

In keeping with such trend, MSIP (Ministry of Science, ICT and Future Planning) is spurring the implementation of ICT DIY by establishing the 'Implementation Plan for Promotion of ICT DIY' and launching the related forum. The plan calls for increasing the DIY users from the current 40,000 to more than 500,000 by 2017 through the expansion of ICT DIY creative culture, support for creative activities, development and distribution of open standard platform, and support for international cooperation. The ministry is paying a particular attention to the fact that there are many cases of experience of personally created ICT products leading to business startup.

3D printing is also in the limelight as a tool for realizing ICT DIY. Luxury sports car brand Lamborghini produces prototypes with a 3D printer. Nike, the world's largest sporting goods maker, manufactures American football shoes with 3D printers. Even NASA's rocket fuel-injection system and Boeing's aircraft parts are made with 3D printers. The WEF (World Economic Forum) selected 3D printing as one of the 10 emerging technologies, and SERI (Samsung Economic Research Institute) named it one of the 7 innovative technologies to change the future decade.



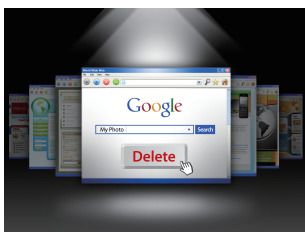
## Right-to-be Forgotten vs. Right-to-Know

# 04

In May 2014, the ECJ (European Court of Justice) decided that the users can demand Google to delete records of past personal information search results that are irrelevant to the users' current situation. The decision was made for the lawsuit filed by a Spanish lawyer in 2009, claiming that the article appearing in the Spanish major newspaper 'la Vanguardia' in 1998 and Google search link violated his right to privacy. It is regarded as the first case acknowledging the right-to-be forgotten.

The decision by ECJ has great ripple effect, with Google receiving 70,000 requests to delete data as of July 2014. There are growing concerns that the decision would greatly hamper the 'freedom of expression' and 'right-to-know'. The media such as BBC and Guardian are complaining that their contents are unfairly deleted from Google search, and some are concerned that the court decision can be abused as justification to delete the information needed for public interest such as records of sex crimes against children.

In Korea, a bill that obligates a service provider to immediately delete a post containing personal information upon request is currently pending before the National Assembly. The KCC (Korea Communications Commission) believes that discussions on the right-to-be forgotten are needed in Korea as well after the ECJ decision. Currently, a portal can take the 'temporary measure' of blocking the content to make it invisible for 30 days when an individual or an organization requests the portal to delete the content even when it is not clear whether the content violates the right. The temporary measure increased from 92,638 cases in 2008 to 240,000 cases in 2013.



# Top 10 Internet News

05

## Internet Surveillance and Security

In June 2013, former CIA employee Edward Snowden disclosed that the US government collected the Internet and phone data of its citizens through NSA. All major Internet service providers such as Google and Facebook were under surveillance. It is fair to say that the most of the users all around the world were monitored by the US Government. The heads of states were no exception. The US government is said to have tapped the embassies and international meetings to figure out the strategies of its negotiation partners. The international society vehemently objected, with EU considering establishing its own intelligence unit to counter NSA. It is also demanding the reform of the US Government as part of FTA negotiations.

US-based cloud companies are directly hit by the NSA crisis. The Brazilian government is considering legislation to force foreign companies to install the servers within the country borders. Many companies are concerned about losing customers out of fear of lack of information security.

In the meantime, major personal information leak incidents occurred continuously in Korea. In early 2014, 140 million personal information data were leaked from KB Card, Lotte Card, and Nonghyup Card credit card companies, and 12 million personal information data, from KT. Personal information data known to have been leaked after 2011 exceed 230 million cases. This means the personal data was leaked more than four times per a citizen. In other countries, the POS of US retailer 'Target' was hacked, leaking 40 million credit card data and 70 million customer information data at the end of 2013. Incidents of personal information leak have become the concern of countries all over the world.



## Commercialization of LTE-A

06

LTE-A, which is twice as fast as LTE, was launched in June 2013, - merely two years after the commercialization the 4<sup>th</sup> generation LTE service in July 2011. Later, in June 2014, three times faster broadband LTE-A service was introduced.

Broadband LTE-A service is the technology of bundling the broadband frequency band with another frequency band. The data transfer speed can be as fast as 225Mb per second. With early LTE technology, it took nearly two minutes to download a 1GB movie; now, it takes only forty seconds. The four times faster LTE, the band3 LTE-A service will soon be introduced as well. It bundles the broadband frequency band with two other frequency bands, and the expected speed is 300MB per second. The band3 LTE-A can further evolve into band4 and band5.

When LTE was introduced by SK Telecom and LG U+ in July 2011, and by KT in February 2012, LTE was a brand new word. After three years of evolution, LTE has become a major part of daily life. The number of domestic LTE subscribers exceeded 10 million at the end of August 2012, one year and two months after it was commercialized. The number breached the 20 million mark seven months later in April 2013 and the 30 million mark ten months later in February 2014.



The traffic explosion remains a problem to be solved. As of April 2014, the 4G traffic volume reached 69,402TB Which is 77% of the total wireless traffic of 90,172TB and twice the total volume in July 2012.

07

## Proliferation of Big Data Service

One of the most frequently mentioned words in the IT industry in 2013 was 'Big Data', which is the technology of converting the huge volume of data into useful information. There was a field such as data mining in the past, but big data can be considered a new industry because of the volume of data processed and diversity of data application areas.

Big data were brought to the fore after they were used as marketing means. Amazon analyzes big data to combine the personal information that customer agreed to disclose and purchase pattern to recommend merchandise that the customer may be interested in. Analysts point out that the optimum use of big data is the main reason customers are fiercely loyal to Amazon. While distribution was the industry that first realized the potential of big data, the financial industry has been sharply increasing its application lately. In the second half of 2014, Daeshin Securities and Mirae Asset Securities launched a project to apply big data technology to prevent securities fraud. Likewise, Korea Investment and Securities applied the big data technique for asset management and marketing.

Although the big data service began in the private sector, its effectiveness has gained more attention in the public sector.

The 'Citizen Health Warning Notification Service' launched by the National Health Insurance Service in May 2014 notifies people of the risk of 4 disease types - influenza, eye disease, food poisoning, and allergic dermatitis-based on the treatment data and SNS data owned by the service. In particular, with the 'Enforcement Decree of E-Government Act', based on Government 3.0 passed by the Cabinet Council in July 2014, full-fledged disclosure of public data and consumer-customized application of big data are expected.



## Acceleration of Cloud Computing

08

Cloud computing came into full bloom in 2013. As the speed of mobile internet rapidly increased, cloud service that allows users to save or retrieve files anytime, anywhere became widely popular. As cases of saving cost using cloud computing instead of operating in-house servers are continuously introduced, more enterprises are also subscribing to the service.

According to IDC, the size of public cloud service markets worldwide reached USD 45.7 billion in 2013. The market is expected to grow sharply at an annual average of 23% until 2018, or five times the growth rate of all IT services. Such is the result of the recognition that cloud computing helps save on the cost of IT system deployment and improve productivity and has great ripple effect of Internet-based value creation in terms of IoT and big data.



Whereas the global cloud computing industry is growing explosively, the growth of cloud computing in Korea is slow because of the lack of legal grounds. The 'Act on Cloud Computing Development and User Protection' outlined in 2013 is still pending in the National Assembly.

# Top 10 Internet News

09

## Intensified Mobile Stress and Addiction

While smartphones improved business efficiency and convenience of daily lives, it has also caused stress and even addiction problem. According to a survey by KISA on the status of smartphone use, 77.4% of smartphone users answered that they 'checked their smartphones often even when there is no reason to do so'. The 35.8% of the respondents answered that they have felt anxious when there is no smartphone around, with 29.4% experiencing disruption in daily life with excessive smartphone use.

Some users suffer from the anxiety resulting from addiction to smartphone. Stress from increased SNS use is also growing. At least 40.1% of domestic SNS users were reported to have experienced stress related to SNS. Many users suffer from anxiety of leak of personal information (27%) and annoyance from the flooding of information (26.5%). To cope with such, the phrase 'digital detox' was coined in 2013. Digital detox is an act of 'healing' the body and mind from the adverse effects of various information devices. For digital detox, it is more important than anything to put aside electronic devices for a certain period.

The 'Joint R&D of Internet and Game Detox' project will kick off in 2015 to find out the cause of Internet and game addiction and develop customized preventive treatment measures.



## Promotion of Internet Startups

10

The Park Geun-hye administration, which assumed office in February 2013, proclaimed the 'Creative Economy' as the key engine for economic development. One of its driving forces is startup. The recent startup boom is no less than the venture boom in the early 2000s. The background of boom for business startup is the smart revolution. As more people used smartphones and tablet PCs, new business models were continuously introduced. Such was particularly aided by the successful first-generation venture entrepreneurs who played the role of accelerators through financing and incubation. A total of 74,162 businesses were started in 2013, and the trend was accelerated in the first half of 2014. Success cases of Internet startups have been concentrated on games and mobile services. SundayToz, BaedalMinjok and 5Rocks are the leading cases. According to Platium, the digital media for startup, 41 domestic Internet startups raised KRW 68.8 billion (excluding 6 cases that did not disclose the amount), averaging KRW 1.9 billion per case in the first half of 2014.



Although the startups showed quantitative expansion, qualitative growth is another hurdle that they must overcome. According to the national entrepreneurship activity indicators announced by GEM (Global Entrepreneurship Monitor), Korea is categorized as an innovation-led economy. However note that the ratio of improvement-driven entrepreneurial activity to the necessity-driven opportunity entrepreneurial activity was only 0.9, which is far below the average(3.2) of innovation-led economies such as Norway (16.4), Sweden (11.1), US (2.8), Japan (2.6), and Taiwan (2.8).

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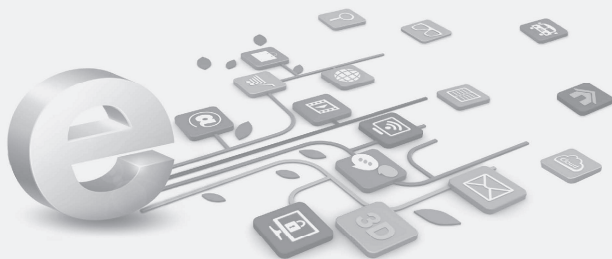
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# 2014 Korea Internet White Paper



□ 2014 Korea Internet White Paper □

# Special Report

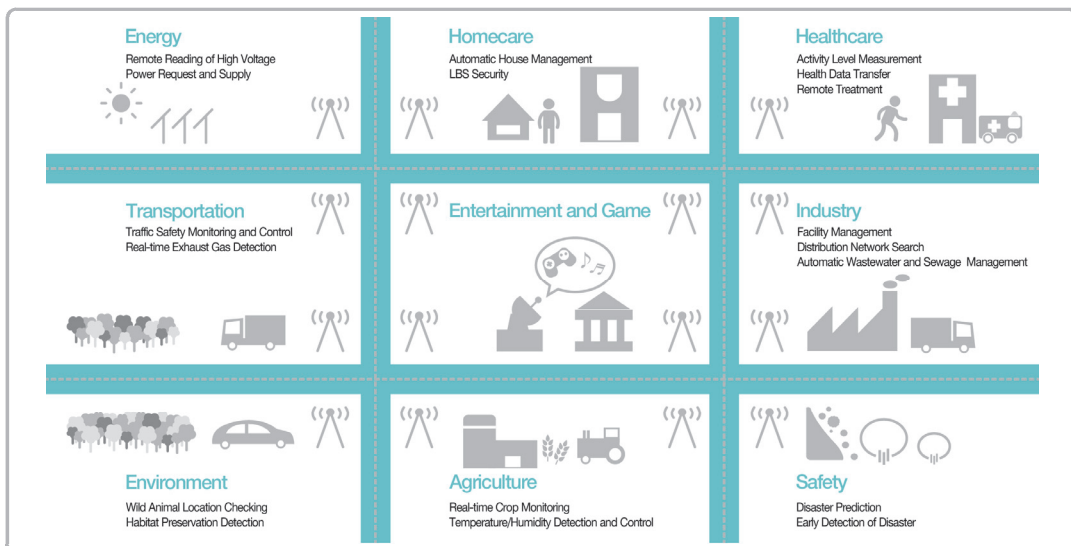
- 1. Internet of Things
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# 1. Internet of Things

The era of Web platform has been in full swing since computers were connected to the Internet in the 2000s; the era of mobile platform dawned when smartphones were connected to the Internet in the 2010s. When a new device (hardware) is connected to the Internet, a new IT platform is formed, and such changes the paradigm. Recently, IoT (Internet of Things) has been drawing attention as the next IT platform following the Web and mobile.

Just like the Web and mobile, IoT consists of hardware, network, and software; a service is completed based on these elements. Unlike the Web and mobile, however, the hardware of IoT can come in various types. PC and smartphone are the typical hardware for Web and mobile, respectively, but the hardware for IoT can include wearable devices such as glasses, watch, and band as well as home appliance, toy, automobile, door, and boiler temperature control. In short, all things are the hardware for IoT.

Figure Special Report-1-1 Areas of IoT



Daum Communications, Status of IoT, 2013

IoT is not a thing of tomorrow but today, and many companies have already introduced various devices. Although the distribution is not yet expanded to general consumer goods, they are widely applied in various industries such as transportation, environment, agriculture, medicine, and energy.

An industry change to take note of in the era of IoT is the convergence of manufacturing and service. During the time of PC, there were clear boundaries among PC manufacturers, software companies developing the operating system, telecommunication carriers, and Internet service providers; an industry does not intrude in other industries. In the smartphone era, however, the boundaries between the smartphone manufacturers and operating system developers became unclear. Apple is developing iPhone and iOS, whereas Amazon and Xiaomi also manufacture the smartphones and develop operating systems. Microsoft is ready to develop the mobile operating system and manufacture smartphones after it acquired Nokia.

In the era of IoT, even services will be converged following the convergence of manufacturing and software. Dash, a device developed by Amazon, recognizes the bar code attached to real-life objects even without smartphone or PC so that they can be stored in the Amazon shopping cart. If an item does not have a bar code, the user can speak directly to the built-in microphone of Dash to put it in the shopping cart. It also has built-in Wi-Fi to enable storing of all items in the Internet shopping cart. It is not just a product but a provice (product + service) closed linked with Amazon's shopping service.

Fitbit and Pebble are the IoT band and smart watch worn on the wrist. The manufacturers that developed the devices are also providing the services to use the devices effectively. They are the leading cases of linking manufacturing and service. Manufacturers of IoT devices generally provide the services as well for the efficient use of the devices.

In the future, manufacturers must consider how they will provide the services linked with the devices. A manufacturer interacts with the consumers and makes money only when its products are sold. Note, however, that a service provider interacts with the consumer each time a user uses its service and makes money for each use. Galaxy S5 by Samsung Electronics brings money to Samsung Electronics only when it is sold. Google makes money through its Play Store and advertising each time a user uses Galaxy S5. As such, manufacturers of IoT must change and innovate to interact with consumers continuously through their services even after the sale of their devices.

## 2. Internet Governance

In the 1990s, the concept of Internet governance was used to mean the distribution of Internet address resources such as allocation of domain or IP addresses. Note, however, that the concept of Internet governance is changing as the Internet advances and the situation changes with time. Currently, the definition of Internet governance that is most widely accepted worldwide is as follows: ‘the governments, private sector, and civil societies playing their roles to develop and apply the common principle, standard, rule, decision-making procedure, and program for the advancement and application of Internet’. Although the definition is relatively broad, it was adopted by WSIS (World Summit on the Information Society) held in Tunisia in 2005 and accepted worldwide.

The most widely used means of categorizing the various components of Internet is to consider the Internet to be structured in different layers. The Internet can be mainly divided into the infrastructure layer which is physical networks, code or logical layer which defines the rule or principle of information interchange, and contents layer which contains the information distributed through the network. Recently, some have added a ‘social network layer’ as the network of users.

Table Special Report-2-1 Categorization of components of Internet governance

Layers of Internet governance	Description
Content Layer	Cybercrime, intellectual property rights, and obscene material
Logical Layer	Network standard, domain name system, and IP address allocation
Infrastructure Layer	Mutual connection, universal access, and next-generation network

Kapur, Akash, Internet Governance : A Primer, 2005

The main participants of Internet governance are governments, business entities, civil societies, and technical and academic communities. Governments are involved in Internet governance through the enactment and enforcement of various policies, business entities, through various

business activities related to the Internet. Civil societies are involved in Internet governance through the formation of public opinion and social movements. Technical and academic communities are involved in Internet governance through Internet related researches or technical development.

The NETmundial conference was held on April 23~24, 2014 for the i\* organizations led by ICANN to strengthen cooperation with countries that have neutral position on the issue of Internet governance. Considering factors such as time of the meeting, host country, and change of governance structure, it was a very significant meeting for many reasons.

First, it was jointly held by Brazil. The cooperation of Brazil, which opposed the US by signing WCIT ITR in 2012, with the US-influenced ICANN strengthened the international status of ICANN. Moreover, since Brazil is one of the emerging BRIC (Brazil, Russia, India, China) countries and is consequently likely to align with Russia and China with regard to international affairs, the country's hosting of the meeting helped ICANN expand its reach. Moreover, CGI.br's practice has resonated with ICANN's multistakeholder model in the sense that it is comprised of the representatives of government, business entities, academie, civil societies and they are responsible for making internet governance policy.

The ITU Plenipotentiary Conference, which is expected to initiate the movement to strengthen the role of ITU for Internet governance, was held in Busan at the end of October 2014. The meeting was significant since a Korean representative was elected Director of ITU's Telecommunication Standardization Bureau. Korea was also elected member of the ITU Council for the 7<sup>th</sup> year in a row, and it proposed 3 agendas - IoT, ICT application, and Connect 2020 vision - all of which were accepted.

However, the Internet governance related agendas proposed by countries such as Russia and India - and which were mostly related to the management and allocation of IP address resources and Internet security and safety - were mostly rejected by the meeting. Therefore, rejection of the proposals that strengthen the role of ITU of government in Internet governance indicate that the role of the western world led ICANN will be solidified through the transfer of IANA in the future.

### 3. Advancement of Mobile SNS

In Korea, the number of smartphone users has exceeded 40 million. This means that 4 out of 5 Korean citizens are using smartphones. SNS, which began with school alumni networks such as Damoimm and I Love School in the early 2000s, has become the means of recording life and communication after the fever associated with Cyworld, which became wildly popular with the wide distribution of digital cameras.

When iPhone was introduced in Korea in November 2009, Korean users were able to use the foreign SNS service without difficulties, and PC Web-based Korean SNS services were threatened. Global services such as Facebook and Twitter attracted domestic users by featuring mobile functions ahead of the domestic services. As more smartphones are distributed, and since SNS services have been around for more than 10 years, however, users became less active, and they began to get tired of SNS.

That was when closed SNS services - which allow communication only with a closed group - such as 'Band' by Naver and 'Kakao Group' by Kakao - and vertical SNS services that involve information only in an area, such as 'Instagram', appeared.

Whereas a closed SNS service solves the problem of 'too many relationships', a vertical SNS service solves the problem of 'too much information.'

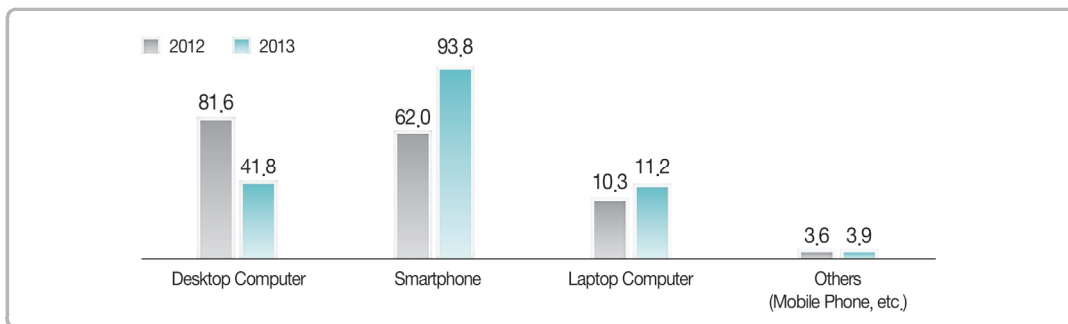
In the existing closed SNS, there was no problem of showing different content types such as pictures, videos, and texts, but it can be a serious problem in the mobile environment characterized by a small screen since users will have difficulties viewing the contents of SNS at a glance. The new SNS services became popular among users since they address such inconvenience and ideally support the characteristics of mobile. Closed SNS and vertical SNS services are expanding their basis by taking advantage of the characteristics of mobile devices.

According to the survey titled 'Internet Usage in 2013' conducted by MSIP and KISA, more people

have used SNS with mobile devices than desktop PCs since 2013. The number of people who answered that they used SNS with a desktop PC was less than half of that in the previous year, whereas the number of those who used SNS with a smartphone was more than 94% higher compared to the previous year. Such suggests that most people use SNS with a smartphone.

To cope with such change, most service providers introduce a service in the mobile platform first, and then add the PC version later. The mobile-first strategy has become a must.

Figure Special Report-3-1 Devices used for SNS (Multiple responses allowed, SNS users 6 years or older) (unit : %)



MSP·KISA, 2013 Survey on Internet Usage, 2013

Going beyond smart devices such as smartphone and tablet, the wearable device market has drawn attention. A wearable device can be worn like glasses, watch, and clothes, enabling the users to use it easily as if it were a part of the body. It can be categorized into the accessory type such as watches and glasses and textile/clothes types such as sensor-embedded shoes and hats. Commercial wearable devices include Apple Watch and Google Glass.

The era of IoT involves not only wearable devices but also all kinds of objects that can be connected to networks and which share information in various areas such as healthcare, smart home, and smart car. It is a brand new era. SNS as well as other services in contents, media, cloud, and commerce cannot survive if they focus only on mobile. Foreseeing the future more quickly and more accurately than others and checking what the users need, how to implement it, and whether the technology is available are the necessary conditions.

PCs, which required users to sit in front of the computer and use the keyboard to record and share their lives, relinquished its leadership status to the mobile device for the simple reason that the individuality, mobility, and instantaneity of mobile fulfilled the human desire, which the PC could not. That is why many SNS services highlight 'mobile only' beyond 'mobile first'. Many SNS services were introduced but disappeared. Only those services that fulfill the human desire beyond simple communication and recording will survive in the coming new era.



2014 Korea Internet White Paper

## Part 1. Infrastructure

- 1. Internet Infrastructure
- 2. Internet Resources
- 3. Internet Technology

# 1. Internet Infrastructure

## A. Backbone Networks

### 1) IX (Internet eXchange)

These days, the Internet is used as a medium for distributing vast amounts of information and connecting diverse users. To achieve this, there must be direct and indirect connection among ISPs that provide connection services. As Internet use has increased, many ISPs have come into being; if there are many ISPs, excessive line costs are incurred, and too many lines will hike up investment costs and increase traffic. To ensure efficient networking, the IX (Internet eXchange) has emerged.

IX is an Internet interworking service for efficient traffic communication between ISPs. For the purpose of connecting ISPs, each provider (ISP, etc.) interfaces its lines to major IX NOCs (Network Operations Center) so that line costs are lowered and network paths are provided. Looking at the IX operations in Korea :

- KTIX is connected to 18 ISPs and 2 IXs (total connection capacity of approx. 1,886Gbps),
- DIX is connected to 25 ISPs and 2 IXs (total connection capacity of approx. 1,709Gbps),
- SKBIX is connected to 12 ISPs and 4 IXs (total connection capacity of approx. 2,416Gbps),
- KINX is connected to 15 ISPs and 1 IX (total connection capacity of approx. 631Gbps), and
- 6NGIX, which operates on a non-profit basis for IPv6-based traffic exchange, is connected to 75 ISPs (total connection capacity of approx. 14.7Gbps).

Table 1-1-1 Connections by IX (as of June 2014)

(unit : ea., Gbps)

Classification	IX	Operating agency	No. of connected ISPs	Total connection capacity
Commercial	KTIX	KT	18	1,804
	DIX	LG U+	30	1,500
	KINX	KINX	15	371
	SKBIX	SK Broadband	12	1,795
Non-profit	6NGIX	KISA	5	4

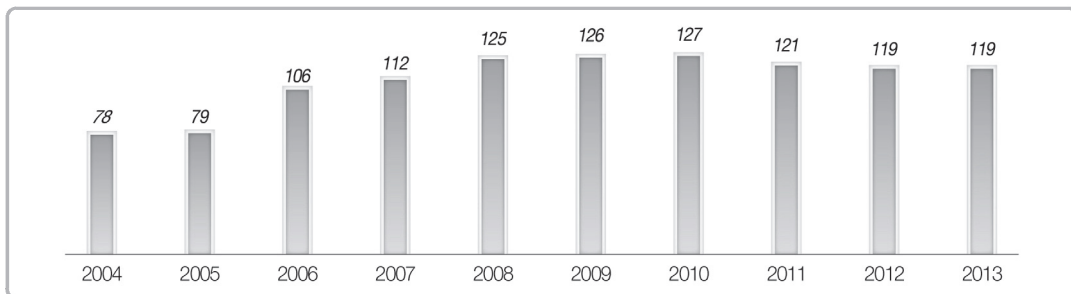
KISA

## 2) Commercial Internet Networks

A total of 119 Korean Internet commercial services including Kernet (KT), Boranet (LG U+), B-Net (SK Broadband), Sejongnet (Sejong Telecom), and Dreammax (Dreamline) receive IP addresses from KISA and provide services such as leased lines and high-speed connectivity for institutions and individuals using the Internet.

Figure 1-1-1 Number of ISP services

(unit : ea.)



ISIS, isis.kisa.or.kr

As a domestic infrastructure network for Internet connection, KORNET is a high-speed information network that is short for 'KORea-telecom-interNET'. From June 1994 until now, KORNET has installed 2.5G~10Gbps high-speed networks in 90 or so locations across the country and built approximately 100 international lines including the 260Gbps line connecting with the US and

provided service. Beginning 2008, it distributed FTTH (Fiber To The Home) - which connects high-speed Internet to the households of individual subscribers - nationwide. Moreover, it expanded the premium network and greatly added backbone capacity to the conventional best-effort network to promote the IPTV service.

BORANET is the Internet communication network of LG U<sup>+</sup>. It launched a service to lease Internet lines for enterprises in October 1994, and then expanded the service to home users. It also provides high-speed Internet customers with triple play service, i.e., voice, Internet, and broadcasting.

BORANET consists of more than 800 backbones and subscriber access node in dual-broadband transmission network nationwide to provide high-quality, high-speed Internet access service anywhere in the country. It merged with LG Dacom and Powercom in January 2010 to continue TPS, e-Biz, IDC, and line leasing business and provide wired/wireless integrated services. It completed the nationwide LTE (Long-Term Evolution) network in March 2012 and introduced broadband LTE-A in June 2014 to strengthen its wireless network competitiveness.

As the Internet network of SK Broadband, B-Net launched commercial service in April 1999, introduced Korea's first IPTV service (Btv) in July 2006, and subsequently released the first TPS product in Korea (B Set) in January 2007. Currently, 130 or so nodes accommodate subscriber section traffic around the country, and B-Net is connected to numerous foreign and major Korean service providers to provide high-quality Internet service.

Currently, there are a total of 8 domestic submarine cable relay stations in Korea (Busan, Geoje, Taean, Jeju, Goheung, Namhae, Hosan, and Ulleung) and a total of 9 international submarine cables. The total capacity of the entire network is about 27Tbps.

The geostationary satellites owned by Korea include Mugunghwa Nos. 5 and 6 and Koreasat 8, which are used for communication and broadcasting. It plans to launch Mugunghwa Nos. 7 and 5A additionally in 2016. Another satellite, Chollian, is used for weather and oceanographic observation as well as communication. Korea also has low earth orbit satellites - Arirang Nos. 2 and 3 - for observation. Earth stations are located in Seoul, Yongin, Geumsan, Boeun, Asan, and Yeosu, and satellite control centers are in Yongin and Daejeon. These earth stations target satellites such as INTELSAT, INMARSAT, Asiasat, SES, JSAT, Apstar, etc.

## B. Subscriber Networks

### 1) Fixed Line Networks

A subscriber network is the communication and broadcasting infrastructure that connects service networks such as wired telecommunication network, mobile telecommunication network, Internet, and broadcasting network through the backbone network and relay network, and then finally to the subscriber.

A wired telecommunication subscriber network is the network connecting the voice signal transmitted by the switchboard and transit switch to the subscriber using the local switch and copper wire. A mobile telecommunication subscriber network connects the signal to the subscriber through the radio wave using the local switch (mobile phone switch), base station repeater, and antenna connected to the wired network. The wired Internet subscriber network is a data network connecting the terminal (PC) of the subscriber - including the household, business entity, and school using the Internet - to the IP device such as router via methods such as xDSL (xDigital Subscriber Line), LAN (Local Area Network), FTTH (Fiber To The Home), HFC (Hybrid Fiber Coax), etc., to allow the subscriber to use the Internet through an IDC (Internet Data Center).

An Internet wireless subscriber network is a wireless data network that connects - through wireless means such as satellite, wireless LAN, or microwave - the signal to a subscriber located in an area where wired connection is not available. In addition, wireless Internet networks such as Wi-Fi (Wireless-Fidelity) and LTE are actively constructed as the use of smartphones increased explosively in the past few years.

In the past, key telecommunications business operators adopted the xDSL technology using the conventional phone line or HFC technology using coaxial cable to construct Internet wired subscriber networks; now, however, they use FTTH technology using optical cable, which enables construction of 100Mbps or higher BcN (Broadband convergence Network) and offers the best

transmission efficiency and quality, in most parts of the country except some rural areas. Bidirectional Internet using the Mugunghwa satellite and VSAT (Very Small Aperture Terminal) is offered in some island areas or backwoods where the FTTH-type wired Internet subscriber network cannot be constructed; on the other hand, subscribers are connected to the large MW (Microwave) system or small wireless backhaul system with repeater station or steel tower for the wireless Internet network.

## 2) Wireless Networks

Wired communication uses the wireless medium such as electromagnetic waves like radio wave, micro wave, infrared ray, visible ray, ultraviolet ray, x-ray, and gamma-ray and sound wave or ultrasonic wave to transmit data. Radio wave is most widely used in wireless communication. People usually use the term wireless communication to mean telecommunication with a mobile phone.

Since various technologies were developed and are used according to the purpose or environment of use in wireless communication, there are also different criteria for categorizing these technologies. In the cell-based, wireless communication environment, the categories are usually based on the coverage of the base station. It is classified as WPAN (Wireless Personal Area Network) if the coverage of a base station is several meters, WLAN (Wireless Local Area Network) if the coverage is tens or hundreds of meters, and WWAN (Wireless Wide Area Network) if the coverage is several kilometers or more.

2014 marks the 30<sup>th</sup> year of the introduction of mobile communication service in Korea. It is now time for both service providers and government to be fully ready to provide wireless communication service for the next 30 years. If every party cooperates and strives to build a virtual cycle under the paradigm of changed wireless communication market, Korea will be able to realize its full potential as a communication powerhouse.

## C. Research Networks

### 1) Domestic Networks

To develop the creative economy as well as identify and foster the source of future national competitiveness, advanced countries are implementing the development of R&D network and operation of testbed such as Internet2/GENI (Global Environment for Network Innovations) in the US, GEANT/FIRE in Europe, and JGN-X in Japan as a national strategic project.

In Korea, the project to develop and operate KOREN (KORea advanced REsearch Network) began with a pilot test network in 1995 followed by a broadband integrated R&D network and the future network research test network at present. KOREN provides the environment for R&D and broadband, high-quality, open testing and verification of cutting-edge ICT equipment and application services linked with future Internet, and broadcasting-communication convergence technologies to colleges, research institutes, and industries. It faithfully played a pioneering role to construct the ICT infrastructure in the country.

The main purpose of KOREN is to support ICT R&D and provide the test infrastructure to colleges, research institutes, and industries to secure original technology in the cutting-edge ICT area and strengthen the national technical competitiveness in keeping with the government's ICT policy. With the KOREN project, the Korean government is laying the foundation for industrial promotion by creating the virtual cycle of the R&D ecosystem - 'next-generation network R&D - testing and verification - field test - pilot project - commercialization' - and playing the role of the link between technology development and industrialization.

From 2013 to early 2014, the government increased the speed of the backbone network of 16 regional network centers in Daejeon, Seoul, Daegu, Gwangju, Changweon, etc., and constructed the key research infrastructure in the metropolitan regions to build cutting-edge wired/wireless research network backbone infrastructure and ensure stable operation and strengthen the service system. It also expanded 'Eduroam', the wireless network-based global smart roaming service. In

addition, it provided integrated, cutting-edge support service (infrastructure + platform + application contents) to enable the application of KREONET and build a customized support system in order to minimize the time and cost of building the environment needed for the use of cutting-edge research network and application of technology.

## 2) International Networks

The TEIN (Trans Eurasia Information Network) project is an ASEM (ASia Europe Meeting) project participated in by 23 Asian countries including Korea and 34 European countries to promote cooperation for joint research.

Korea has participated in the TEIN project by directly investing in the international line in the Korea-Hong Kong and Hong Kong-Singapore section since 2009. For network operation, it is also cooperating in the TEIN NOC (Network Operation Center) and operation of the international research network backbone.

The APII (Asia-Pacific Information Infrastructure) testbed is an APEC (Asia-Pacific Economic Cooperation) joint project that began in 1998. Currently, a 10G line between Korea and Japan is operated and mostly used as the test environment for next-generation network technologies and to measure remote medicine and network performance.

In August 2013, 'APII (Asia-Pacific Information Infrastructure) Workshop 2013' was held at KAIST in Daejeon. The workshop is held jointly by Korea and Japan every year to discuss cooperative measures by sharing the current status and activities of research network in each country and identifying opportunities for joint research.

At the 2013 event, the current status and main plan of the Korea/Japan research test network (KOREN/JGN-X) infrastructure were presented, and various research programs such as SDN based on KOREN and JGN-X, mobile testbed, application, sensor network, and VLBI (Very Long Baseline Interferometry) were introduced.

In addition, there was a discussion on the 100Gbps transmission test between Korea and Japan

using the APL international research test network. The APL Workshop will allow continuous joint researches on network technologies between Korea and Japan.

GLORIAD (GLObal Ring network for Advanced application Development) is a 10G class global cutting-edge research network infrastructure participated in by Korea, US, China, Russia, Canada, and Netherlands to connect the world by a ring network to support the increasing number of large global collaborative researches in high-energy physics, astronomy space, bio, weather and climate, nuclear fusion energy, and medical science, which require large-capacity, high-performance data transmission in real time. GLORIAD is part of IRNC (International Research Network Connection) supported by NSF (National Science Foundation) and is participated in by 14 countries. Korea's KISTI has been actively participating since 2005, and it is continuously supporting various global cutting-edge collaborative researches by building and operating the International research network backbone between Korea and US and Korea and China as well as the Korea Lambda Exchange Node (KRLight) located in Daejeon, Seattle, and Hong Kong.

From 2013 to mid-2014, Korea constructed and enhanced the international research network backbone (10Gbps) of GLORIAD between Korea and US and directly linked it to StarLight, the international cutting-edge research network infrastructure located in Chicago, US, to secure outstanding research basis to enable close collaboration with various leading research networks and cutting-edge research institute (CERN, etc.) in Europe. To improve the user service system of GLORIAD, it developed a new state of the art monitoring tool, provided the international research network dynamic resource allocation service, and built the global map-based flow monitoring visualization environment (GLORIAD-Earth).

## 2. Internet Resources

### A. IP Addresses and AS Numbers

Korea has been making efforts to secure IP addresses and AS numbers stably since 1990. As of the end of June 2014, The country has approximately 112,290,000 IPv4 addresses - the 6<sup>th</sup> largest in the world - and 5,246 IPv6 addresses (/32, 2<sup>96</sup>) as the world's 9<sup>th</sup> largest. Korea has 1,018 AS numbers as the 13<sup>th</sup> largest in the world.

Table 1-2-1 Domestic and overseas Internet address resources (as of June 2014) (unit : ea.)

IPv4 addresses by country			IPv6 addresses by country			AS numbers by country		
Rank	Country	Count	Rank	Country	Count (/32)	Rank	Country	Count
1	US	1,592,429,696	1	US	32,052	1	US	22,942
2	China	330,613,504	2	China	16,694	2	Russia	5,169
3	Japan	201,656,064	3	Germany	12,335	3	Brazil	2,674
4	UK	123,563,048	4	France	9,516	4	Ukraine	2,002
5	Germany	119,223,712	5	Japan	9,365	5	UK	1,952
6	Korea	112,292,608	6	Australia	8,681	6	Poland	1,950
7	France	95,995,120	7	EU	6,282	7	Germany	1,723
8	Canada	80,937,472	8	Italy	5,534	8	Canada	1,687
9	Brazil	80,510,720	9	Korea	5,246	9	Australia	1,633
10	Italy	53,308,736	10	Argentina	4,358	10	Romania	1,439
11	Australia	48,288,256	11	Egypt	4,105	11	Japan	1,047
12	Holland	45,764,576	12	UK	3,436	12	France	1,026
13	Russia	45,448,736	13	Poland	2,817	13	Korea	1,018

KISA

## B. Domains

A domain is an Internet address consisting of alphabet, Korean, numbers, and hyphen and which can be easily memorized by users to specify the address of a computer connected to the Internet. Since a domain used over the Internet must exist uniquely with an address that is not duplicated anywhere in the world, its address is created in accordance with the given system and cannot be arbitrarily created or changed. All domains in the Internet have an inverted tree structure under '.' or domain called 'root'.

A top-level domain is divided into ccTLD (country code Top Level Domain) and gTLD (generic Top Level Domain) according to the operational purpose. A ccTLD is operated with autonomously decided registration policy for the communities of the country. As of June 2014, there are 247 English country domains (.kr, .cn, etc.) and 34 multilingual country domains (.한국, .中國, etc.).

A gTLD is a domain that can be used for the purpose of the registerer regardless of country. There are 23 gTLDs such as .com (business entity) and .net (network-related organization) and 332 gTLDs created by the new policy of ICANN. Because of the new gTLD program, the number is expected to increase to up to 1,000 by 2017.

Table 1-2-2 Domain status (as of June 2014)

Classification	ccTLD (country code Top-Level Domain)	gTLD (generic Top-Level Domain)
Administration Agency	Administrative agency such as KISA, which is delegated by ICANN, to manage the address in each country	For profit or non-profit organization such as Verisign and US Government delegated by ICANN
Concept	Top-level domain expressing the country name in English abbreviation or multiple languages (other than English) in accordance with ISO 3166-1	The top-level domain expressing the organization, purpose, category, etc., in English or multiple languages (other than English)
Form	2-digit English country code or multilingual country name	More than 3-digit English alphabet or more than 2-digit multiple languages
Status	247 ccTLDs including .kr (Korea) and .cn (China) and 34 multilingual ccTLDs including .한국 (Korea) and .中國 (China)	23 widely used gTLDs including .com (business entity) and .org (organization) and 322 new gTLDs (total of 345) including .삼성 and .cab (many gTLDs including multilingual domains have been created since October 2013)

KISA

## C. Domain Name System

The DNS (Domain Name System) is a key system that converts the domain name (e.g., kisa.or.kr) used by users on the Internet into an IP address (121.156.115.59) recognized by computers.

A domain name is an information system expressed in characters easily recognizable by users to find a specific information system on the Internet. On the other hand, an IP address is the information system expressed as a combination of numbers and characters to allow computers and information and communication appliances to identify and access a specific information system on the Internet.

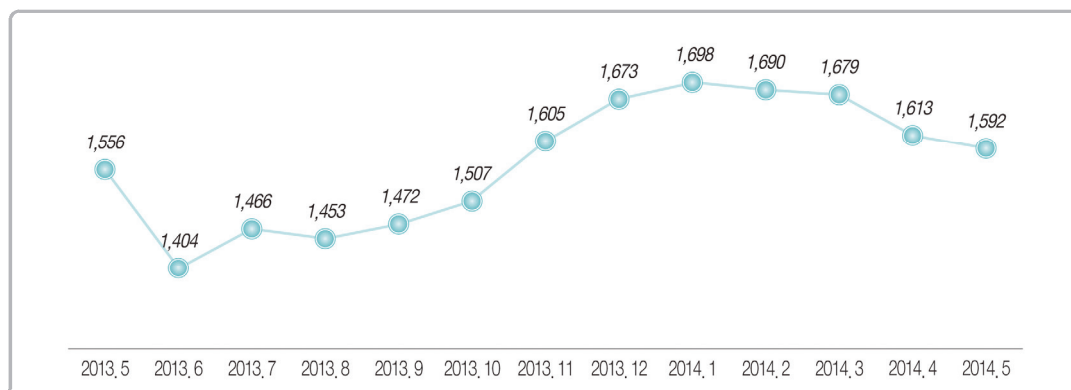
DNS is divided according to the operating mode into a cache DNS that asks the query of the users and temporarily stores the usage record and an authoritative DNS that has the information such as the domain name and IP address.

When an Internet user intends to access a domain name, the user's computer queries the IP address to the cache DNS, which then makes queries in sequence from the root to TLD and user domain DNS according to the authority system until the IP address is found.

The national DNS is distributed and operated in 15 sites (10 in Korea, 5 in other countries) to ensure stable Internet service. Beginning 2010, it deployed the DDoS (Distributed Denial of Service) counter system in different sites in step to strengthen its security against DDoS attacks. As of June 2014, 5 out of 15 sites are operating it.

Figure 1-2-1 Daily average queries of national DNS each month

(unit : million cases)



KISA

## 3. Internet Technology

### A. Technology Trends

SDN (Software-Defined Networking) is the technology of controlling the network setting through the opening and virtualization of network resources. While the existing network technology is based on rigid architecture wherein the control of distributed hardware is individually managed, SDN technology separates the control function and centrally manages it to provide flexible network architecture wherein the distributed hardware responsible only for data transfer can be controlled in a timely manner.

NFV (Network Functions Virtualization) is the technology that transforms the existing hardware-oriented networking technology into the abstraction of computing, server, and network functions so that it can be controlled with the software. For that, it defines the architecture to support the abstraction of network functions and the main function blocks as well as the interface between them. Products developed in accordance with the standardized interface are converted into open networking technology that can be mutually connected and operated. Although there are different ways of implementing NFV, the usual way is to separate the functions of the network equipment into the large-capacity server, large-capacity storage unit, and large-capacity switch in the data center to be accessed through standard means, enabling automatic installation, operation, and transfer of the needed network function developed in software. In other words, it is reorganized into open network infrastructure architecture.

5G (Fifth Generation) is the next-generation mobile communication technology being developed as the 5<sup>th</sup> generation. Its goal is to provide realistic service based on high-speed, ultra-low latency, and ultra-high reliability with less energy consumed and at low network construction cost. The discussion on international standardization of 5G has just begun. In January 2013, UN ITU began

the work of discussing the 5G vision and dedicated frequency with country representatives. The proposal on detailed technology specification will be accepted around 2016, and many countries are striving to seize leadership at the time.

IoT (Internet of Things) is the concept of technologies and services wherein all things including humans, spaces, and data are connected over the Internet to create, collect, share, and use information. IoT consists of IoT service/common platform that interfaces and collaborates with physical and virtual objects to provide intelligent service, IoT network that interconnects all things over the Internet for communication, and IoT device that adds intelligence to things to provide smart sensing and actuation.

The proliferation of Web technology was greatly aided by HTML (HyperText Markup Language), which expresses information in a device-independent language so that an application program called browser can access and use the information. It has the benefit of allowing users to access the Web with a standard browser regardless of platform.

The significance of HTML5 standard is the addition of functions widely used by developers and users so that users can do many things that were not available before without using non-standard expanded programs such as ActiveX.

Cloud computing is the technology of providing 'IT resources as a service' using Internet technology. Users can rent and use only the needed IT resources (SW, storage, server, and network); they are guaranteed real-time scalability according to service load, and they pay only for what they used.

ICT DIY is the concept of users - not ICT professionals or companies - freely selecting, reconfiguring, or creating ICT products or services. DIY (Do It Yourself) generally means users making what they want and turning an idea into a creation. Popular in handicraft and furniture, it is now applied in ICT. ICT DIY is being proliferated worldwide in keeping with the distribution of open source HW and SW, popularity of 3D printers, and IoT. Such changes are expected to bring about big change throughout society by allowing the imagination and creativity of people in all walks of life to be integrated with ICT.

## B. Standardization Trends

Considering the fact that the current Internet standardization was begun by IETF (Internet Engineering Task Force) in 1986, and that preparations were made in the late 1990s when Internet usage actually increased, to distribute the future Internet expected after 2015~2020, discussions on the standardization of future Internet should begin now. The SDN and NFV technologies proposed at the early phase of the future Internet research program have captured the attention of telecommunication operators, and they are considered the leading network technologies to change the current Internet; thus, their standardization is actively in progress.

Big Data Forum was founded in 2012 as the centripetal body wherein professionals gather for productive application, standardization, and promotion of big data to develop the industries and strengthen competitiveness. The Standard Development Committee was formed in February 2013 to develop the big data standard. In 2014, TTA formed STC (Special Technical Committee) to develop the standard for cloud computing and big data and created Big Data PG (SPG22) under it.

Cloud computing standardization activities in Korea can be divided into organizational standardization through TTA, private sector-led standardization through the Cloud Computing Standardization Forum, and domestic committee activities to support international standardization programs. TTA created the Cloud/Big Data Special Committee (STC2) in 2014 to strengthen standardization activities and transferred the existing Cloud Computing Project Group (PG420) to be a project group (SPG21) under STC2. Moreover, the Cloud Computing Standardization Forum formed the Standard Development Committee to develop the private market demand-based standard. Organizations supporting international standardization include ITU-T SG13 Study Group under the Korea ITU Research Committee supported by TTA and SC38 Advisory Committee under KATS.

In November 2013, TTA formed the IoT Special Technical Committee and 3 project groups under it to standardize the IoT/M2M technology. In April 2014, the existing RFID (Radio Frequency Identification)/USN (Ubiquitous Sensor Network) Convergence Forum and M2M (Machine to

Machine)/IoT (Internet of Things) Forum were merged into the IoT Forum. Its domestic industry-led Standard Subcommittee is focusing on the development of standard. Domestic standardization in IoT is noted for its efforts to mediate the positions of domestic industries and business entities and create the ecosystem instead of focusing on standardization to pursue the interest of an individual industry or a business entity. MSIP announced the Master Plan for IoP in May 2014, and it is preparing the IoT R&D Strategic Report as a follow-up.

The IPv6 Project Group and Internet Address Resource Project Group (PG211) of TTA worked on the IPv6 address issues and IAR (Internet Address Resource) issues, respectively, but they were merged into the IPv6 Address/Internet Address Resource (PV222), which has been working on the standardization of IPv6 address conversion technology and DNS technology as well as policy support under the leadership of ETRI and KISA since 2014. With SK Telecom recently formalizing the commercialization of pure IPv6 address under LTE technology, the development of domestic standards such as IPv6 address conversion technology, DNS security technology, and guideline for IPv6 address distribution is well underway.

## C. Future Internet

In April 2013, MSIP formed the 'Future Internet Business Council' to increase the effectiveness of future Internet technology development and establish the groundwork for strengthening industrial competitiveness. The council is participated in by telecommunication operators, manufacturers, and academe to establish a virtual cycle from future Internet technology R&D to commercialization. Consisting of experts from industries, academe, research, and government including MSIP, KISA, NIA, KCA, and ETRI, it plays the role of gathering and interchanging various opinions related to future Internet R&D and testing/verification, pilot projects, and linked policies.

There are active movements in the private sector as well. As a future Internet research

organization led by the academe and research institutes, the Future Internet Forum has been holding the 'Global Future Internet Summit' to invite international experts in future Internet for lecture and discuss an overview of future Internet technologies and policy direction since 2011. It also formed study groups for each main areas of future Internet such as architecture and testbed, and it has been publishing a technical report on the latest issues. Last February 27~28, 2013, it held an open forum on future Internet to discuss publicly the future Internet technologies and future policy direction. The 4<sup>th</sup> Summit to be held in October 2014 plans to discuss the international cooperation for future Internet testbed, overall cooperation with Africa, and establishment of direction for future Internet.

## D. Cloud Computing

Cloud computing is the technology of providing 'IT resources as a service' using Internet technology. Users can rent and use only the needed IT resources (SW, storage, server, and network), and they are guaranteed real-time scalability according to service load; they also pay only for what they used. There are various definitions of cloud computing as described below.

Cloud computing technology introduces the concept of cloud to various existing computing technologies for new advancement. In particular, virtualization can be considered the key technology specific to cloud computing. Virtualization technology is being advanced as it is expanded to storage, handset hardware and platform, SW service, and network. Moreover, the concept of mobile cloud has recently drawn attention. It is a service such as iCloud, which allows users to share various contents freely (e-mail, multimedia, document, etc.) in different platform environments. Nonetheless, it is still considered to be the early stage of the data sharing service and is expected to be expanded in various forms by providing the collaborative function between platforms and services in the future.

## E. Big Data

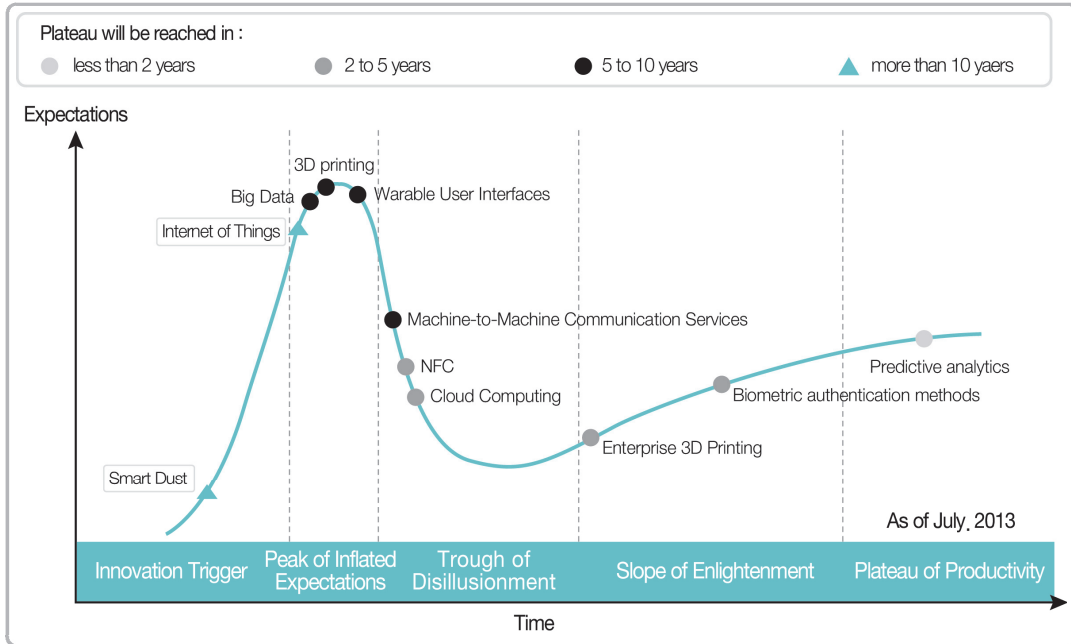
Big data are defined as a large volume of data having various data types and high creation velocity. It has the limitation of not being stored, managed, or analyzed with conventional databases and includes both typical and atypical data such as Web, image, video, SNS, and sensor stream. While the size of big data exceeding the range that can be stored, managed, or analyzed with conventional databases was highlighted in the past, nowadays, it focuses on 'creation and use of value' as the 'technology to create value at low cost from various types of data and support ultra-high speed analysis'.

Big data technology is divided into data acquisition technology, data storage and management technology, data processing technology, and big data analysis and visualization technology. For data acquisition, the technology to collect the data being generated explosively from various areas and data sources is essential. Note, however, that most of the data are semi-typical or atypical data; hence the many difficulties of collecting and storing the data. According to the location of data source, data collection is divided into external data collection and internal data collection, and there is a need for a process of collecting the data manually or automatically. In general, the typical data existing internally are collected with a log collector, with external atypical data collected with crawling, RSS (Really Simple Syndication) reader, or program using the open API provided by an SNS service.

## F. Internet of Things

Civilization has progressed through industrial revolution (offline) and informatization revolution; today, it is in the ultra-connection revolution (on and offline convergence). In the process, IoT, which interconnects all things including humans, objects, spaces, and data over the Internet to create, collect, share, and utilize information, is expected to play an important role.

Figure 1-3-1 Hype-Cycle for emerging technology



Gartner, Hype Cycle (compiled), 2013

An IoT service is provided through the IoT platform that interfaces and collaborates with physical and virtual objects to provide intelligent service, IoT network that interconnects all objects to communicate over the Internet, IoT device that makes the network and object intelligent to provide smart interaction, and IoT security that guarantees the protection of devices and privacy as well as safe system operation.

Table 1-3-1 Components of IoT technology

Classification	Description
IoT Service	<ul style="list-style-type: none"> <li>IoT-based service specializing in each application area such as industrial IoT, individual IoT, and public IoT</li> <li>Applications in health, construction, manufacturing, agriculture, energy, environment, tourism, and defense; open service market and application platform</li> </ul>
IoT Platform	<ul style="list-style-type: none"> <li>Service framework and platform to support efficient opening, sharing, and application of objects</li> </ul>

Classification	Description
	<ul style="list-style-type: none"> <li>and services</li> <li>• IoT service framework : IoT cloud support, IoT mesh-up support, and IoT service support</li> <li>• IoT-based platform : Context recognition and prediction, recognition-type cooperation, and virtual/physical interface</li> </ul>
IoT Network	<ul style="list-style-type: none"> <li>• High-reliability IoT communication and IoT service creation-oriented network system</li> <li>IoT connection technology, IoT service support technology, and IoT management and control technology</li> </ul>
IoT Device	<ul style="list-style-type: none"> <li>• Platform that adds intelligence to objects and provides smart sensing and actuation</li> <li>Sensing and actuation/communication module, smart thing platform, and PT/VT autonomous control platform</li> </ul>
IoT Security	<ul style="list-style-type: none"> <li>• Security technology to provide safe and reliable IoT service with no threat of privacy leak</li> <li>IoT analysis-based security, IoT operation and management security, security domain boot strapping, and IP-based IoT security</li> </ul>

MSIP, IoT R&amp;D Execution Plan, 2014

## G. Near Field Communication

NFC (Near Field Communication) is a non-contact-type wireless communication technology for data transfer between devices within 10cm from each other using the 13.56MHz frequency. Operated in the shortest distance among the wireless communication technologies generally available to the public, it is more applicable to high value-added application services such as device control, payment, and authentication than the large-volume data transfer or online service. Nowadays, most manufacturers embed the NFC functions into the smartphones; thus, the NFC market is expected to grow even more.

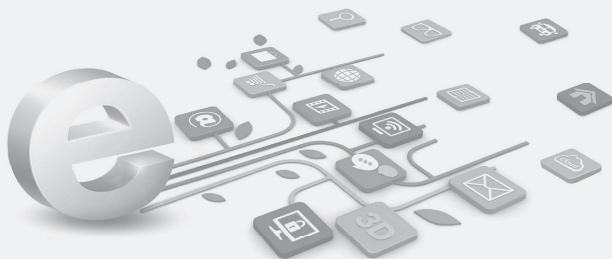
Although wireless communication technologies such as Wi-Fi and Bluetooth were embedded in smartphones and applied in various applications prior to the NFC technology, NFC is based on active action called tagging unlike other technologies, and it can recognize the intention of users. Owing to such characteristics, it can be applied in sync with offline or by linking offline and online such as payment, smart key, and identification.

NFC is generally compared with RFID (Radio Frequency IDentification) technology. In terms of frequency range, NFC can be considered part of RFID, and they are technically similar. Unlike RFID, however, NFC is bidirectional: thus, it can enable data transfer between devices and exchange of contact points. Moreover, RFID requires a separate reader, and it is mostly used in industrial applications, whereas NFC does not need a reader, and general users can use the service with the smartphone; thus, it is highly usable for personal services.

Table 1-3-2 Use of NFC and main cases of application service

Classification	Service form and examples
Distribution	<ul style="list-style-type: none"> <li>• Mobile payment, advertising, data exchange, etc.</li> <li>- Google Japan, 'application vending machine'</li> </ul>
Transport	<ul style="list-style-type: none"> <li>• Public transportation charge payment, arrival information guide, etc.</li> <li>- NFC pre/deferred payment transport card, KT 'Gyeonggi Province NFC Bus Arrival Information Guide'</li> </ul>
Medicine	<ul style="list-style-type: none"> <li>• Self-healthcare service using NFC device</li> <li>- SD biosensor 'Gluconavi NFC'</li> </ul>
Security	<ul style="list-style-type: none"> <li>• Personal authentication, mobile door opening/closing, check-in, etc.</li> <li>- KT-Gateman 'NFC Mobile Key'</li> </ul>
Advertising	<ul style="list-style-type: none"> <li>• Discount coupon, reward, merchandise information guidance, etc.</li> <li>- SK Planet-Japan KDDI, Softbank 'NFC Coupon Service'</li> </ul>
Tourism	<ul style="list-style-type: none"> <li>• Tourist facility, lodging information, exhibition information guidance, etc.</li> <li>- UK London Museum 'NFC Exhibition Information Guide Service', Suwon Hwaseong 'NFC Tourism Guide'</li> </ul>

KISA



# 2014 Korea Internet White Paper



## Part 2. Services

- 1. Internet Information Services
- 2. Internet Transaction Services
- 3. Internet Convergence Services
- 4. Internet Services in the Public Sector

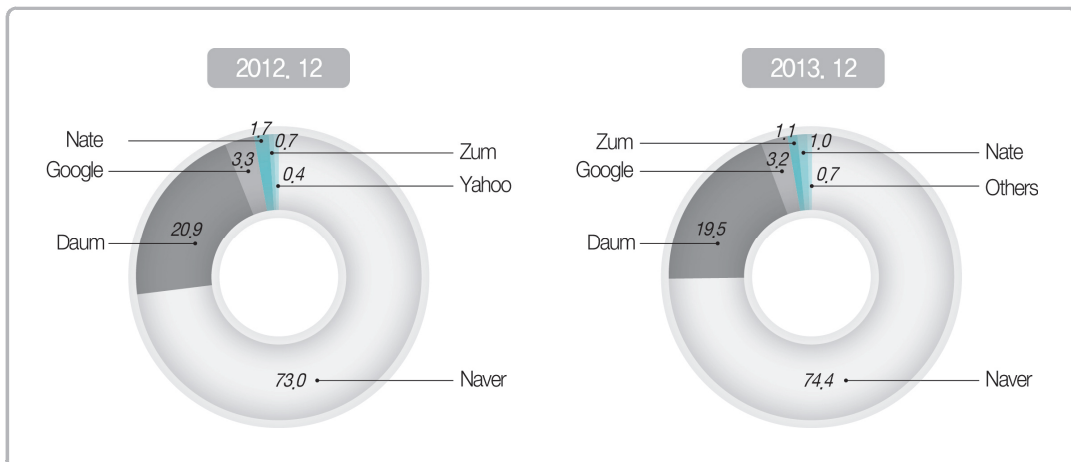
# 1. Internet Information Services

## A. Information Search

In 2013, the survey of QC (Query Count) of major search portals in Korea revealed that Naver and Daum were the dominant players in the PC search market with market shares of 74.4% and 19.5%, respectively. Zum overtook Nate to clinch the no. 4 spot with market share of more than 1%. Naver recorded a market share of 74.4%, which is 1.4% higher compared to the end of 2012, whereas that of Daum declined by 1.4%p. Google held on to its no. 3 position with market share of 3.2%, with Zum recording 1.1% market share in weekly unit and overtaking Nate, which recorded 1.0%, to become no. 4 in the first week of 2012.

Figure 2-1-1 QC market share of major domestic PC-based search engines

(unit : %)



Nielsen Korean Click, www.koreandclick.com

The mobile popular search keywords for 2013 announced by Naver are based on volume of search by users for the year. The search keywords that ranked high were familiar words such as Daum, Google, G Market, and Nate rather than the new words that gained attention. The new search keyword that gained the most attention in Daum in 2013 was ‘Attack on Titan’ followed by ‘Psy Gentleman’. ‘Witch’, a web comics series authored by Kang Pool and which recorded accumulated queries of 100 million when it was published, was ranked no. 3. iPhone D5 and Optimus G2 also made it to the top 10, indicating the steady interest of users in IT handsets. ‘Attack on Titan’ was also ranked no. 1 among the popular search keywords by Google; Psy’s ‘Gentleman’ and ‘Gangnam Style’, which were popular worldwide, were also ranked high. Keywords related to entertainers such as ‘Si Hoo Park’, ‘Clara’, and ‘Crayon Pop’ were ranked among the top 10 as well.

Table 2-1-1 Top 10 search keywords of domestic portals in 2013

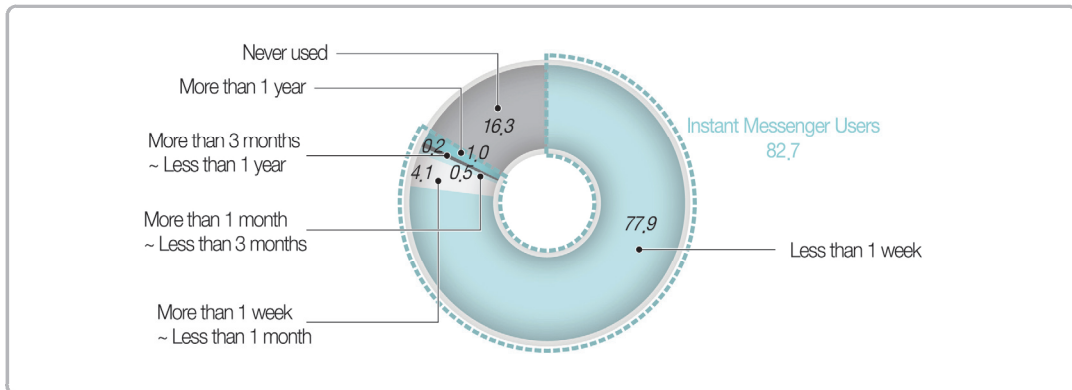
Rank	Naver (Mobile)	Daum	Google
1	Daum	Attack on Titan	Attack on Titan
2	Weather	Psy Gentleman	Gentleman
3	Facebook	Witch	Hyun-Jin Ryu
4	Google	Yong Pil Cho Bounce	Sun of Lord
5	G Market	iPhone 5S	Si Hoo Park
6	Lotto	Gangbuk Stylish Man	Chang Jung Yun
7	Prince Aurora	Optimus G2	Snowpiercer
8	Coupang	Intermittent Diet	Gangnam Style
9	Alba Heaven	Vega Iron	Clara
10	Nate	Les Militaires	Crayon Pop

Data by each portal (compiled), 2014

## B. Communications

According to KISA, 82.7% of Internet users used instant messaging in the past year. This is 22.6%p higher compared to last year. At least 7 out of 10 (77.9%) used instant messaging 'in the past week'.

Figure 2-1-2 Most recent time of instant messaging use (Internet users 6 years or older) (unit : %)



MSIP·KISA, Survey on Internet Use in 2013, 2013

Although there was no change in rank of the domestic SNS usage rate in 2013 compared to 2012, the usage rate of Kakao Story by Kakao increased by 23.9%p compared to the previous year, with that of all other services decreasing; thus indicating the increased dominant position by the no. 1 service. Kakao Story became the largest SNS service in Korea with the number of members surpassing 50 million in October 2013, a mere 18 months after the service was introduced.

Table 2-1-2 Usage rate of domestic SNS services

(unit : %, %p)

Rank	Service	2012	2013	Growth rate
1	Kakao Story	31.5	55.4	23.9
2	Facebook	28.0	23.4	△4.6
3	Twitter	19.4	13.1	△6.3
4	Cyworld	17.0	5.5	△11.5
5	Others	4.0	1.3	△2.7

KISDI, Analysis of SNS Usage Trend, 2013

## C. Contents

### 1) Video and Music

The era of smartphone and proliferation of Internet media have changed the pattern of using contents such as TV, and the number of users watching broadcasting and video contents through the Internet is increasing as the network environment advances. In Korea, Internet services such as poq, tving, hoppin, and PANDORA.TV are providing broadcasting contents or VOD over the Internet; the Internet VOD service also has high potential for growth. The VOD contents among the Internet traffic worldwide are expected to increase gradually to 73% of all traffic in 2017.

The dispersion of TV contents to different media accelerated in 2013. With the number of smartphone users in Korea growing to 37.51 million people and it's 81.5% of PC Internet users, the number of 3-screen users who use TV, PC, and mobile also increased. According to a complete enumeration survey by AGB Nielsen Korea among 40 million Koreans aged 7~69 on the usage of 3-screen in September 2013, 25 million people or 58.1% were 3-screen users.

In 2013, the digital music market emerged with the improvement of mobile Internet environment, proliferation of smart devices, and change of consumer behavior in owning and using music files. The digital music distribution platform is categorized into download, streaming, and mobile

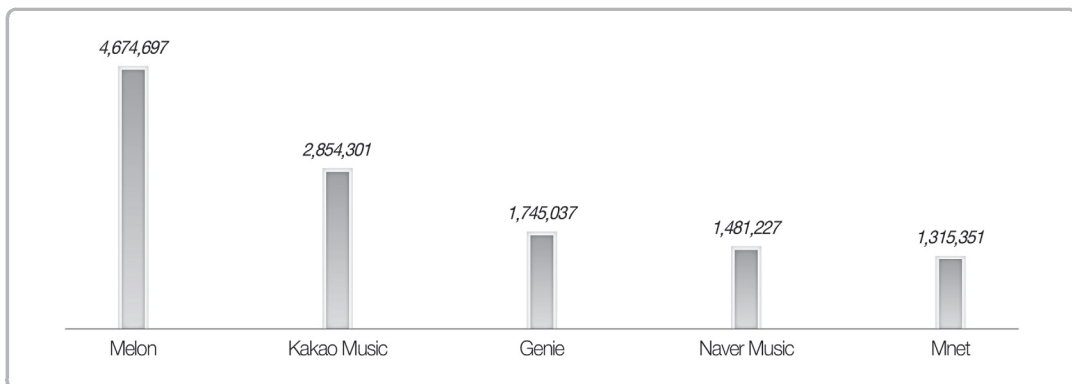
distribution platform according to service type. Digital music distribution is switching from download service to streaming service, meaning the consumption of contents is changing from owning to renting, as a reflection of the worldwide trend. Market survey company Gartner forecasts that the streaming market will grow by 41%, and that sales will grow by 400% or more by 2015.

The digital music market has already overwhelmed the physical distribution market, and the trend is expected to strengthen. The competition is intensified as SNS platform-based companies are entering the new market in addition to the 7 existing music file distributors. Kakao Talk, the powerhouse in mobile platform in Korea, is seeking to extend its influence to the music file market following its success with the messenger-based game platform. In the future, the heated competition between the Internet-based music file business and mobile business is expected to intensify, with user-friendliness, community utilization, and openness of information access expected to be the key success factors.

With mobile music app users increasing in particular, the competition in the market will be very intense. According to data by Nielsen Korean Click, there were 4.67 million users of Melon, 2.85 million users of Kakao Music, 1.75 million users of Genie serviced by KT Music, 1.48 million users of Naver Music, and 1.32 million users of Mnet.

Figure 2-1-3 Mobile music app usage (as of February 2014)

(unit : persons)



Nielsen Korean Click, 2014

## 2) Games

According to the '2014 Survey Report of Game Users in Korea and Japan' issued by KOCCA, Korean game users used mobile games the most with 87.2% as of March 2014, followed by online games with 61.5%, package games for PC with 25.5%, portable console games with 14.2%, video console games with 11.1%, and arcade games with 11.0%.

Table 2-1-3 Game usage (multiple answers allowed)

(unit : %)

Game type	Mobile game	Online game	Package game for PC	Portable console game	Video console game	Arcade game
Usage	87.2	61.5	25.5	14.2	11.1	11.0

※ Survey period : March 18 ~ 25, 2014

KOCCA, 2014 Survey of Game Users in Korea and Japan, 2014

※ Survey targets : 1,000 men and women aged 10~60 who have experience of using a game after July 2013

(Individual face-to-face interview for people aged 10~12, online panel survey for others)

The portion of usage for each game area was as follows : mobile game with 55.1%, online game with 31.9%, package game for PC with 6.7%, portable console game with 2.8%, video console game with 2.1%, and arcade game with 1.4%.

More females used the mobile game, which had the highest portion, with 68.9% compared to the males with 41.8%. On the other hand, the portion of males using the online game was twice that of females. In terms of age, people in 10~18 years old and in their 50s had similar portion of mobile games and online games, whereas the portion of mobile games was generally higher in all other age groups.

## 3) e-Learning

e-Learning means education that enables level-by-level learning regardless of time and place using information and communication technology. It refers to all kinds of learning utilizing electronic means, ICT, radio, and broadcasting technologies. It is also called Internet learning, web-based learning, cyber learning, remote learning, and electronic learning. Unlike traditional education,

e-Learning provides customized education for learners.

Whereas traditional learning methodology was one-sided learning by route in limited time and space, e-Learning is a new method of education focusing on openness, flexibility, and dispersibility. E-Learners can learn what they want regardless of time and space.

The domestic e-Learning market has grown by about 10% per year on average since 2004, with 1,649 companies recording a total of KRW 2,947,100 million in 2013. Moreover, about 57.1% of the population 3 years and older are currently engaged in e-Learning.

Table 2-1-4 Domestic e-Learning industry

(unit : ea., KRW 100 million, %)

Classification	2009	2010	2011	2012	2013	Annual growth rate
No. of companies	1,368	1,549	1,656	1,614	1,649	2.2
Total sales	20,910	22,458	24,514	27,478	29,471	7.3
Personal e-Learning utilization rate	43.8	49.0	52.8	53.3	57.1	3.8

National IT Industry Promotion Agency, 2013 e-Learning industry status survey (compiled), 2014

#### 4) Publishing and News

Although its portion in the entire publishing industry is currently far from high, the online publishing and distribution is the only publishing sector that records significant growth. The Internet & mobile electronic publishing works business grew by 19.7% compared to the previous year, with the Internet & mobile electronic publishing service business growing by 17.6%. The online publishing and distribution sector is expected to continue its growth for some time.

Table 2-1-5 Estimated size of the electronic publishing market

(unit : KRW 100 million, %)

Classification		2010	2011	2012	CAGR (2010~2012)
Online publication and distribution	Internet & mobile electronic publishing works	113,267	159,348	190,671	19.7
	Internet & mobile electronic publishing service	79,251	104,782	123,246	17.6

Ministry of Culture, Sports, and Tourism, 2013 Contents Industry Statistics (Restructured), 2014

## 5) Animation

Webtoons not only became more popular through portal sites; they are also evolving further with the emergence of independent webtoon startups such as Lezhin Entertainment that seek differentiation through their own strengths. In addition to the increasing number of portal sites featuring webtoon series, there are independent webtoon services with subscribed charged model with adult-oriented pieces, with some trying to export the domestic webtoon model to other regions such as North America. Since the webtoons are the original source of OSMU (One Source Multi-Use), they are reproduced into movies, plays, and games or featured as character merchandise. To stabilize the domestic market, a PPS (Page Profit Share) program was introduced to share the advertising revenue of portal sites featuring webtoons for the improved treatment of authors.

While the domestic webtoon market is dominated by portal sites Naver and Daum, T Store began the service in April 2013, and KT Olleh Market Webtoon, on July 17; thus showing the vitality of the market. According to Nielsen Korean Click, 3 portals featured a total of 230 series as of May 2013. Including the concluded series, a total of 917 series were featured for 8.2 million users of webtoons.

Table 2-1-6 Webtoon service by 3 major portals

(unit : volumes, persons)

Classification	No. of works	Incl. concluded series	No. of visitors
Naver	128	405	5,476,538
Daum	66	434	2,416,487
Nate	36	78	304,920
Total	230	917	8,197,945

Nielsen Korean Click

## D. Location Based Services

LBS (Location Based Service) refers to any service that provides location based information such as location tracking, public safety, and navigation information using the GPS of a mobile device such as smartphone or base station data of mobile carriers. In other words, it encompasses all types of service related to collection, usage, and delivery of location based information. Here, location based information means the information collected using the telecommunications equipment and facilities and telecommunications line equipment and facilities as per the provisions of Items 2 and 3, Article 2 of the Telecommunications Business Act.

Google introduced the indoor map service when it upgraded Google Maps v6.0 for Android at the end of November 2011. It is currently providing the indoor map service for around 10,000 premises such as shopping mall, airport, and department store in 10 countries including US and Japan. Microsoft added the indoor map service to its Bing Map in 2010, and it is currently providing the indoor map service for 3,100 premises in 13 categories.

In Korea, KT and Lotte Department Store launched the 'Lotte Inside Eye' to provide the indoor path guide and parking place guide services based on the user location using the Olleh Wi-Fi zone. SK Telecom and Shinsegae Department Store also developed the smartphone base customer care system using positioning technology with Wi-Fi positioning to provide the service around Centum City department store.

## E. Mobile Apps

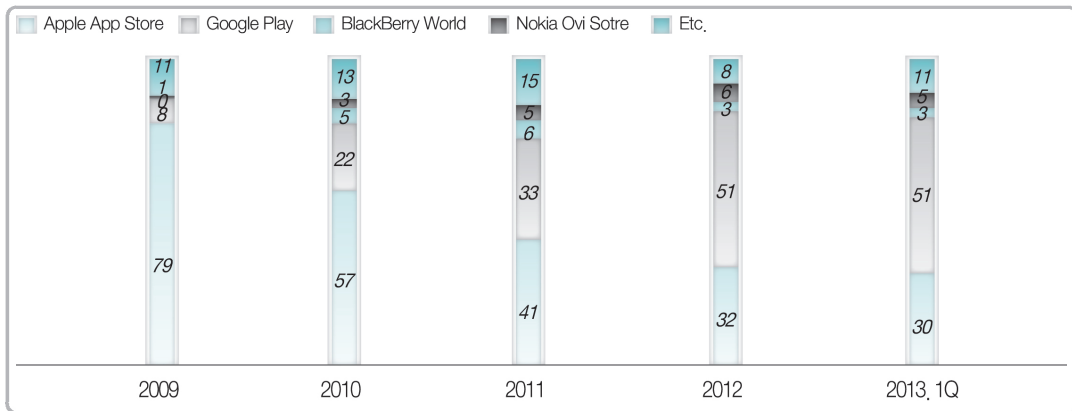
Mobile app made waves particularly in 2014. In June, Amazon, the world's largest online retailer, introduced 'FirePhone' to appeal to many smartphone consumers and app developers. It is regarded as the first step to developing the large app ecosystem beyond the simple platform

and device industries. Going beyond the hardware differentiation of existing smartphones, Amazon succeeded in establishing the self-competitiveness of 'cloud + contents + distribution'. Of course, there is the problem of 'FirePhone not being able to use Android apps' as some point out. Nonetheless, Amazon is expected to invest heavily in strengthening its Amazon App Store operation as disclosed by Amazon CEO Jeff Bezos. For one, Amazon decided to provide 31 apps worth USD 100 for free for a specific period.

With the Android platform greatly increasing its share in the smartphone market, it is also expanding its presence in the mobile app market. Even in 2009, the market share of App Store was close to 80%, but Apple yielded its top position to Google as Google Play quickly made inroads into the market after 2012. As of January 2013, the market is divided into these two major companies, collectively accounting for 81% of the app market.

Figure 2-1-4 App download share of each platform (as of March 2013)

(unit : %)



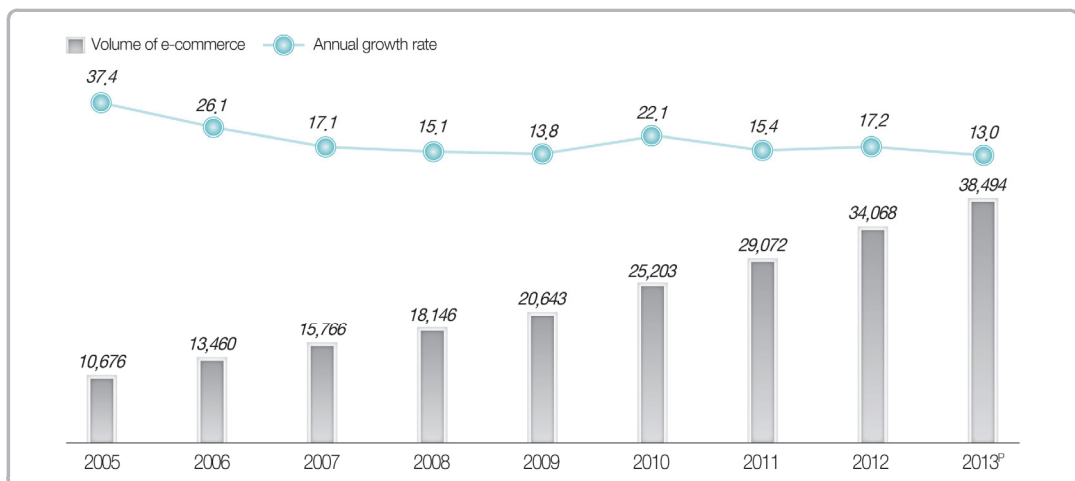
research2guidance

## 2. Internet Transaction Services

### A. e-Commerce

The total annual transaction volume of cybershopping in 2013 was KRW 38.496 trillion, which was 13.0% higher compared to the previous year.

Figure 2-2-1 Volume of cybershopping transactions each year (unit : %, KRW billion)



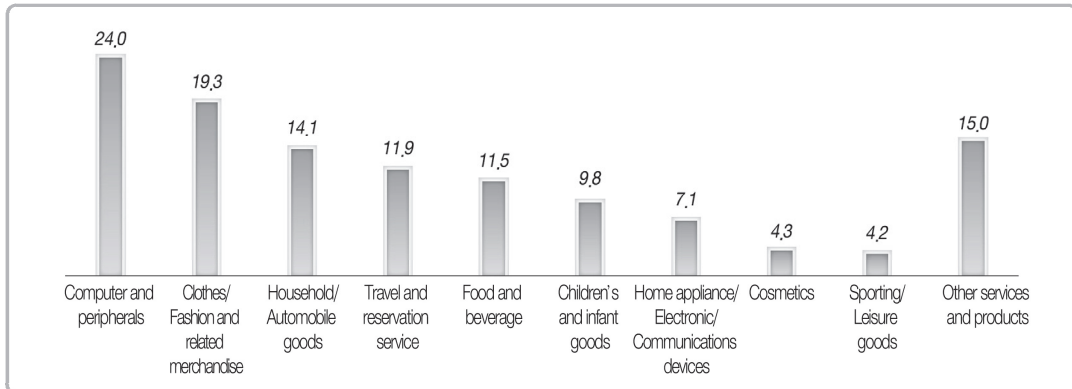
※ P : Preliminary

National Statistical Office, Survey of e-commerce, and cybershopping trend for 2013 and 4<sup>th</sup> Quarter of 2014

Focusing on the social commerce, the total transaction volume of social commerce in 2013 was KRW 2.957 trillion, which was 72.6% higher than KRW 1.713 trillion in 2012. By product category, computers and peripherals accounted for the biggest portion with 24.0%, followed by clothes, fashion, and related merchandises with 19.3%, life and automobile goods with 14.1%, travel and reservation service with 11.9%, food and beverage with 11.5%, children's goods with 9.8%, home

appliance, electronics, and communications device with 7.1%, cosmetics with 4.3%, and sporting and leisure goods with 4.2%.

Figure 2-2-2 Portion of transaction volume of each social commerce merchandise group (unit : %)



※ 2013 transaction amount is preliminary National Statistical Office, Survey of e-commerce, and cybershopping trend for 2013 and 4<sup>th</sup> Quarter of 2014

## B. e-Finance

As of the end of December 2013, there were 95.49 million and 49.93 million registered or users customers of Internet banking and mobile banking, respectively. The figures represent increases of 10.5% and 34.6%, respectively, compared to the previous year. The number of Internet banking transactions and amount in 2013 increased by 18.7% and 1.3%, respectively, to 54.29 million transactions and KRW 33.687 trillion, respectively. During the same period, the number of mobile banking transactions and amount increased by as much as 66.7% and 47.0%, respectively, to 21.58 million transactions and KRW 1.413 trillion, respectively.

Table 2-2-1 Internet banking and mobile banking service usage (unit : 1,000 persons, 1,000 cases, KRW billion, %)

Classification		2010	2011	2012(A)	2013(B)	Rate of increase/ decrease (B - A)	Growth rate
Internet banking	Registered customers	66,502	74,817	86,430	95,492	9,062	10.5
	Transactions (Daily average)	33,355	39,023	45,728	54,285	8,557	18.7
	Amount (Daily average)	29,571	31,917	33,239	33,687	448	1.3
Mobile banking	Registered customers	15,748	23,737	37,092	49,934	12,842	34.6
	Transactions (Daily average)	3,736	7,697	12,946	21,583	8,637	66.7
	Amount (Daily average)	415.6	652.6	961.5	1,413.3	452	47.0

Bank of Korea, Internet banking service usage in 2013, 2014

## C. Online Advertising

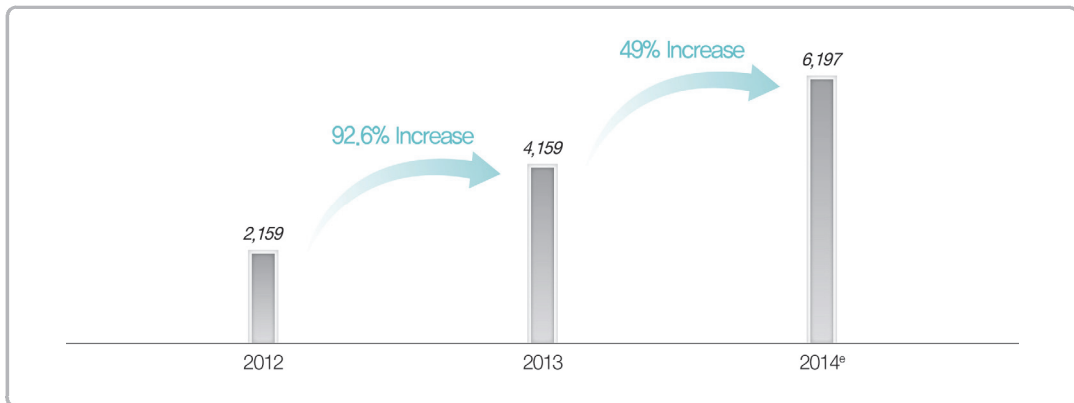
With mobile advertising becoming a significant part of daily life with the wider distribution of smart devices, it played an important role in the growth of other industries and served as the key marketing means. According to the 2013 Survey of Mobile Internet Usage by KISA, 48.2% of users have experienced mobile advertising. Experience with mobile web DP advertising (29.6%) and search advertising (28.0%) was also high. At least 57.1% answered that they actually clicked the mobile advertisement to check it or obtained the information.

During the period when feature phones were widely used, mobile advertising was mostly SMS-based given the low use of wireless Internet. Note, however, that it has evolved into various kinds of media advertising with the introduction of smartphones and advancement of wireless Internet. In recent game apps, various forms of advertising such as advertising using characters,

banner advertising using 3D technology, and compensatory advertising that gives away points whenever a user views the advertisement have appeared. The advertising industry pays attention to mobile advertising (excl. message advertising), which accounted for 4.2% of the total advertising market with KRW 416 billion in 2013, since the power of the medium is growing as smartphones become more popular; the characteristics of mobile advertising also allow user-customized advertising using the user's location or behavior.

Figure 2-2-3 Mobile advertising market volume

(unit : KRW 100 million, %)



※ e : estimated

KISA, 2013 Survey of Mobile Advertising Industry Status, 2014

## 3. Internet Convergence Services

### A. Convergence of Broadcasting and Communications

IPTV (Internet Protocol Television) is a system of providing digital TV service to consumers using the Internet protocol on the broadband network. It can also offer additional Internet services such as VOD, web information search, shopping, and VoIP. It is mostly serviced to households, and VoIP may be provided as additional Internet service.

According to the Internet Multimedia Broadcast Service Act (IPTV Act), which is the special act enacted for IPTV broadcasting services, IPTV is an Internet protocol-based platform whose technical strength is being integrated with high-speed communication network services such as VoIP.

Smart TV is a multi-functional TV with Internet access function so that various apps can be installed to provide services such as web surfing, VOD viewing, SNS, and game. It means the convergence of TV and Internet and the realization of Google's announcement that the company will provide search function, personalized communication function, and social networking function to smart TV users. The prerequisite of a smart TV is that the TV must be connected to the Internet, and that is why smart TV terminals are called connected TV. According to a report by KISA issued in 2012, the accumulated sales of connected TVs in the global market as of 2012 were pegged at 160 million units, and TV manufacturers such as Samsung Electronics and LG Electronics led the market growth with a 42.7% share of the global connected TV market. Global media ZDNet forecasts that the accumulated sales of connected TV will reach 1.1 billion units by 2017. Moreover, according to a report issued by ETRI in November 2013, the global TV apps of Samsung Electronics increased 6.6 times from 380 in January 2011 to 2,500 in April 2013; the smart TV apps of LG Electronics also increased to more than 1,800 worldwide.

Mobile Internet telephony (mVoIP) service provides voice service at low cost by combining the

mobile communication service (3G, Wibro, etc.) and VoIP technology. It is rapidly becoming popular with the proliferation of smartphones that began with the introduction of iPhone in Korea at the end of 2009 and resolution of quality and stability problems as the communication technology advanced. In Korea, Kakao Talk, Daum, Skype, etc., are providing mVoIP service. Foreign service providers such as Viber are also providing the service based on the openness of Internet in Korea without requiring separate approval.

## B. SNS Convergence

SNS is one of the keywords of future Internet, and its impact on daily life is steadily increasing as the types of smart devices are being diversified from smartphones and tablet PCs to various wearables and the environment where these devices are always connected to the Internet has become the norm. The strength of SNS is that it has several millions of unique users; thus, it is being converged with various business models such as advertising and games targeting the users.

Kakao, which counts most of the Korean smartphone users as subscribers, is moving beyond the simple mobile messenger and expanding its business to services closely related to the daily lives of users after its merger with Daum. 'Following the introduction of Stock Plus for Kakao', a stock application linked with Kakao Talk, in August 2014, 'Kakao Simple Payment', which allows users to buy items at shopping malls with the certificate, and 'Kakao Taxi', which is similar to the 'Uber Taxi' that directly connects a taxi where the user is, were introduced in September 2014. On the other hand, the mobile money transfer service 'Bank Wallet Kakao' was introduced in November.

Kakao is relentless trying to find new profit models based on its stable profit structure and its own platform even as it already occupies 90% of the mobile game market and steadily generates advertising revenue. Such steps by Kakao are said to be rooted from its advantageous position to create new business models through the search, local, and news services enabled after the merger with Daum.

## C. Cloud Service

Domestic cloud service providers entered the cloud market from other areas according to their birth and competitive environment; hence their strengths in different areas. Telecommunication operators have been operating the cloud business most actively based on their network assets, and they are extending the domain from IaaS and SaaS of public cloud to private business. As the specialized in-house IT service providers of leading business groups in Korea, SIs have been supporting the development of private cloud services of group affiliates and participating in cloud projects in the public sector. They are now paying attention to the public cloud market. Portal operators began with personal cloud services for their members, and they are expanding the services to the business market. Data center business-based cloud service providers are strong in IaaS, providing virtual servers and storage.

Table 2-3-1 Services by leading cloud service providers

Business type	Company	Main service
Communication	KT	• olleh uCloud (personal use), olleh uCloud Biz (server, DB, storage, security, network, etc., for businesses)
	SK Telecom	• T Cloud (personal), T Cloud Biz (various enterprise solutions such as mobile game pack and computing solution)
	LG U+	• U+ Box (personal), U+ Biz Cloud N (computing, storage, network, etc., for businesses)
SI	Samsung SDS	• Web cloud, R&D cloud, bioinformatics, etc.
	LG CNS	• Virtual data center (VPDC) service and virtual desktop (VDI) cloud service (Desk Cloud), etc.
	SK C&C	• Mi-Cloud (private cloud development solution), etc.
Portal	NHN	• nDrive (personal), nCloud (enterprise)
	Daum Communications	• Daum Cloud (personal), Daum Smart Work (enterprise)
Data Center	Hostway IDC	• FlexCloud Server (IaaS), private cloud development, etc.
	KINX IDC	• ixCloud Server, ixCloud Storage, etc.
	Smileserv	• Cloudv (virtual server), etc.

Business type	Company	Main service
Established specialist company	Haancom	• Thinkfree Cloud (online/server/mobile) Office
	Duzon	• D-Cloud (IaaS), I-Plus Cloud (accounting SaaS), etc.
	Clunet	• Cloud-based streaming solution CLOM, etc.
	Tilon	• elcloud (virtualization development solution), eldesk (VDI), etc.
	Innogrid	• Cloudit (IaaS), SLP (SaaS solution), etc.
	Nowcom	• Second Drive (personal cloud)
	Solbox	• SB Cloud Server (cloud computing solution)
	APEX CNS	• Private cloud development solution
	AhnLab	• AhnLab MDS (analysis engine), V3 MSS (for SME), etc.

Homepage (reconstructed)

## D. IoT Service

The IoT-based application service is still mostly at the testing or sporadically executed pilot project stage. Note, however, that steadily developed innovative solutions are widening the application scope and increasing the actual proving cases in various industries; thus, many commercial services are expected soon. Among the domestic companies, Hyundai Automobile and KT partnered to introduce the BlueLink Telematics service to provide vehicle parking location, air conditioner and heater control, and theft prevention functions in 2012; IoT specialist company Telit introduced the remote medical data service jointly with global medical company CardioNet in May 2012.

In March 2013, SK Telecom and Seoul National University Hospital launched the ‘HealthOn’ service, a personalized health management program measuring data such as activity, exercise, and diet with a wearable device and presenting the information in the mobile phone for the first time in the world, enabling health status analysis and counseling.

In 2014, LG Electronics introduced ‘Alljoyn’, an IoT service developed by Qualcomm, to provide smart home service interfacing various mobile devices with home appliances such as washing

machine, refrigerator, air conditioner, and lighting so that home appliances can operate smartly. Samsung is providing home sync service connecting the smartphone with CCTV, camera, etc., to share the contents, group play service that connects multiple smartphones with Wi-Fi, etc., to allow users to listen to music and use the contents at the same time, and smart home service.

Table 2-3-2 Main services of IoT

Type	Goal	Area	Description
Individual IoT	User-centered, comfortable and convenient living	Automobile	Safe, comfortable driving environment by connecting automobiles to the Internet
		Healthcare	Improvement of personal health by presenting bio data such as heartbeat and exercise
		Home Appliance	Living convenience and safety improvement through the residential environment-integrated IoT control
Industry IoT	Improvement of productivity and efficiency and creation of new added values	Factory	Work efficiency and safety increase through process analysis and facility monitoring
		Agriculture	Productivity increase and safe distribution by combining production, processing, and distribution IoTs
		Merchandise	Commercialization of high value-added services by combining consumer products and IoT
Public IoT	Realization of comfortable, safe society	Public	Prevention of disaster by providing real-time information through CCTV, senior citizen GPS, etc.
		Environment	Minimization of environmental pollution by providing environmental information such as atmospheric quality, amount of waste, etc.
		Energy	Improvement of energy management efficiency by providing energy-related IoT information

MSIP, Master Plan for IoT, 2014

## E. Big Data Service

IDC forecasts that the worldwide big data market will grow by 40% annually on average from USD 3.2 billion in 2010 to USD 9.7 billion in 2013 and USD 16.9 billion in 2015. That means 7 times the growth rate of the entire information and communications technology market. Moreover, the ratio of big data service to the entire big data market was highest at 39%.

Table 2-3-3 Big data market forecast

(unit : USD million, %)

Classification	2010	2011	2012	2013	2014	2015	Portion
HW	919	1,371	2,269	3,368	4,474	5,756	34
SW	1,062	1,415	1,851	2,476	3,376	4,625	27
Service	1,236	1,979	2,721	3,883	5,099	6,538	39
Total	3,217	4,765	6,841	9,727	12,949	16,919	100

IDC, Worldwide big data technology and service market forecast, 2011

Among the big data infrastructure, the hardware area is led by equipment manufacturers such as Cisco, Dell, and HP, the service area, by consulting companies such as Accenture, Deloitte, and IBM, and the solution area, by IBM and Infomatica. Other leading companies specializing in big data include Splunk, Palantir, Opera Solutions, and Mu Sigma.

In Korea, large IT companies such as LG CNS, Samsung SDS, SK C&C, KT, and SK Telecom are entering the big data market. Big data-specializing venture companies such as Wisenut, Daum Soft, 2e Consulting, WiseiTech, Data Streams, Saltlux, Altibase, and Gruter are emerging in various specialized areas.

## F. ICT and Convergence of Industries

The Korean government is implementing the ‘convergence of science/information and communications technology and industries’ that it selected as the driving force for economic development for the next 5 years. Main industries such as automobile, shipbuilding, textile, aviation, and energy also selected convergence with ICT (Information & Communication Technology) as the breakthrough to overcome the difficulties of technology advancement. It means that the factor of additional value creation is being switched from labor/capital (industrial economy) and knowledge/information (knowledge economy) to ‘innovative science/ technology and creative idea (creative economy)’. As smart services converged with various ICTs - such as smartphone, location-based

technology, and augmented reality technology - are enabled, the demand and expectation with regard to products and services converging the traditional industries such as automobile and shipbuilding with ICT are increasing explosively. As the original technology for the convergence era, ICT will not only promote the convergence of technology and industry through networking, intelligence, and internalization but also lead the development of the ICT industry and other industries at the same time. Moreover, such convergence can contribute to the creation of the inductive effect of production, employment, added value, and export, attainment of continued superiority of industrial competitiveness, and implementation of new growth engine.

As a result of the immense interest in ICT convergence, and with the establishment of strategy and proliferation of grounds to promote ICT convergence being implemented in Korea the related market is growing considerably. Despite the market potential of ICT convergence, however, the fact that the market is formed slowly and core competency in system semiconductor and software is lacking in Korea has become the limiting factor for securing ICT convergence leadership in the global market. For example, it takes 2~3 years or more to commercialize ICT for the automobile and shipbuilding industries and subsequently test, certify, and verify the stability (simulation, etc.) of the products. To overcome such limitation, support for various ICT convergence programs such as main industries and ICT convergence program, IPTV program and manufacturing process, and ICT convergence program is needed: the expansion of organizations and functions in municipalities, colleges, research institutes, and business entities is also essential.

## 4. Internet Services in the Public Sector

### A. G2C Services

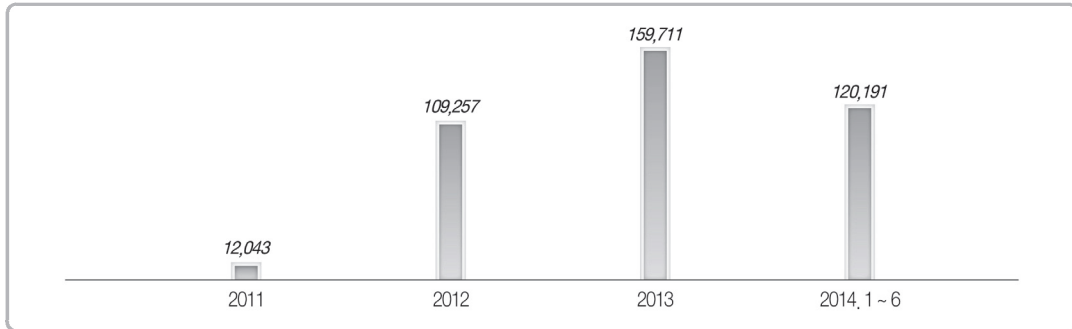
The service to citizens of e-government began with providing the service of guiding citizens in the administrative procedure as well as form request, issuance, and access without having to visit the office. As the e-government advances, its services are evolving to reduce drastically the documents needed to be submitted by allowing the sharing of information among administrative agencies, opening all information owned by the government, and providing the needed administrative services in customized form to citizens.

The information disclosure portal ([www.open.go.kr](http://www.open.go.kr)) is the one-stop information disclosure service that integrates the information disclosure services individually provided by each agency and provides it from a single window. The Official Information Disclosure Act was amended in 2013 to disclose in advance the information categorized as public information even without petitioning by citizens to expand the citizens' right to know and increase the transparency of government operation. As a result, the government operation system (On-nara) is disclosing the information of the central government agencies as well as the metropolitan and municipal governments beginning May 2014, with the information disclosure gradually expanded to offices of education and public agencies.

The public data portal ([www.data.go.kr](http://www.data.go.kr)) is an information disclosure service portal that opens the public information owned by the government to citizens so that they can easily utilize it. A total of 9,483 data sets of 700 agencies are disclosed as of July 2014, and 1.20191 billion cases of public data were utilized in the first half of 2014. The demand has steadily increased from 1.0926 billion cases in 2012 to 1.5971 billion cases in 2013.

Figure 2-4-1 Public data usage

(unit : 10,000 cases)

Public Data Utilization Portal ([www.data.go.kr](http://www.data.go.kr))

## B. G2B Services

The government's G2B (Government to Business) services are designed to improve enterprise-related services, such as approvals and information provided to businesses, in order to enhance efficiency and consequently help enterprises boost their competitiveness. As documents have been standardized and simplified, the time and cost of delayed administrative services have been greatly reduced. Typical examples are the provision of an integrated information service that links related agencies so that the administrative procedure for business startup and factory construction and provision of integrated logistics, trade, and customs clearance services - which used to be provided by separate agencies - are now linked from the viewpoint of businessmen. Moreover, comprehensive policy information services are provided to SMEs, e.g., policy information related to the management of SMEs, prices of raw materials, or overseas market information, and procurement processes of agencies and public institutions, went online for transparent procurement and to provide civil service to suppliers. Moreover, the patent service enables electronically handling all patent procedures, such as intellectual property right application, evaluation, registration, judgment, and communication, without having to visit in person.

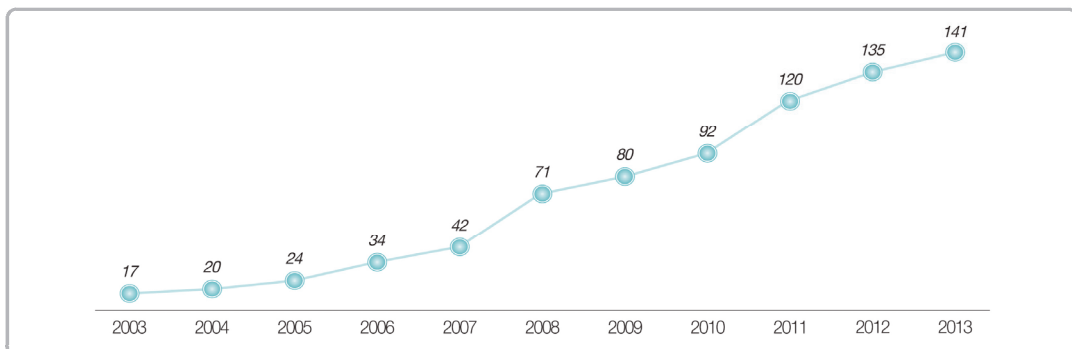
## C. G2G Services

e-Government is generally defined as the new government innovation strategy for improving administrative efficiency by utilizing ICT to make it easier for citizens to access government information and services. Among the various e-Government services, the G2G service utilizes ICT to improve the efficiency and transparency of inter-administrative agency processes and ultimately enhance the quality of government services for citizens and businesses; thus improving national competitiveness.

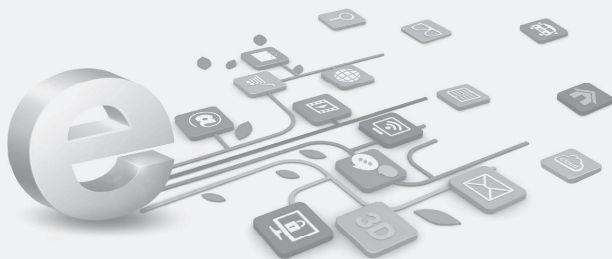
To develop the government interface or integrated service, the Citizens' Government selected 11 programs including electronic petition and electronic procurements; the Participatory Government selected 31 programs including the On-Nara System and implemented them. The Park Geun-Hye administration is implementing the e-government strategy centered on key programs to support the Citizen-Centered Service Government 3.0.

Administrative information means the data on business as generated or acquired by an administrative agency and the signal, text, sound, and video processed through electronic means. Therefore, the administrative information public usage service is the service that enables an administrative agency to receive the administrative information owned by another administrative or public agency through the information and communications network to operate its business.

Figure 2-4-2 Number of administrative information types for public usage (accumulated) (unit : type)



e-Nara Index, [www.index.go.kr](http://www.index.go.kr)



# 2014 Korea Internet White Paper



## Part 3. Utilization

- 1. Internet Industry and Usage
- 2. Internet and Society
- 3. Promotion of the Internet
- 4. Internet Security
- 5. Internet Related Laws

# 1. Internet Industry and Usage

## A. Internet Industries

The Internet industry covers the overall economic activities created by the Internet based on information technology, and it can be mainly categorized into infrastructure industry, support industry, and application industry. The infrastructure industry establishes the lower structure so that individuals and business entities can enter the Internet business. The support industry is the communications industry that operates the telecommunication systems to support other industries and includes the system software, system management, and maintenance needed by the infrastructure industry and application industry. The application industry is an industry that provides new products and services over the Internet and includes wired/wireless access service, network access service, application service, and contents delivery service.

Table 3-1-1 Domains and categories of the Internet industry

Main category	Intermediate category	Subcategory
Infrastructure industry	Internet terminal	Smartphone, DTV, computer (desktop, notebook, medium-sized to large computer, other small computer, etc.), and set top box
	Transfer system	VoIP, videophone, pair and coaxial cable transfer system, optical transfer system, signal converter, multiplexer, etc.
	Network equipment	Wired NIC, router, network switch, hub, access point, wireless NIC, general subscriber modem, cable modem, xDSL modem, optical modem, network security system, home network system, etc.
Support industry	System software	Communications software, system management software, information security software, etc.
	System management/maintenance	Information system outsourcing, ASP service, SW maintenance, education/training, etc.

Main category	Intermediate category	Subcategory
Application industry	Wired/Wireless access service	ISDN, Internet telephony, Internet backbone service, leased line service, broadband network service, wireless Internet service (WAP/ME), portable Internet (WiBro), wireless LAN, and wireless fixed communication service (B-WLL)
	Network access service	Network service, Internet access-based service, Internet management service, Internet support service, etc.
	Application service	Enhanced fax, credit card search (CCIS), online reservation, e-document interchange, remote communication, electronic payment, online data processing, e-commerce (commission), etc.
	Contents delivery service	Internet media, Internet broadcasting, online game, online education, information delivery, digital publication, digital sound, Internet advertising, etc.

※ Internet terminals such as smartphone, DTV, and computer are included in the infrastructure industry beginning 2014.

KISA

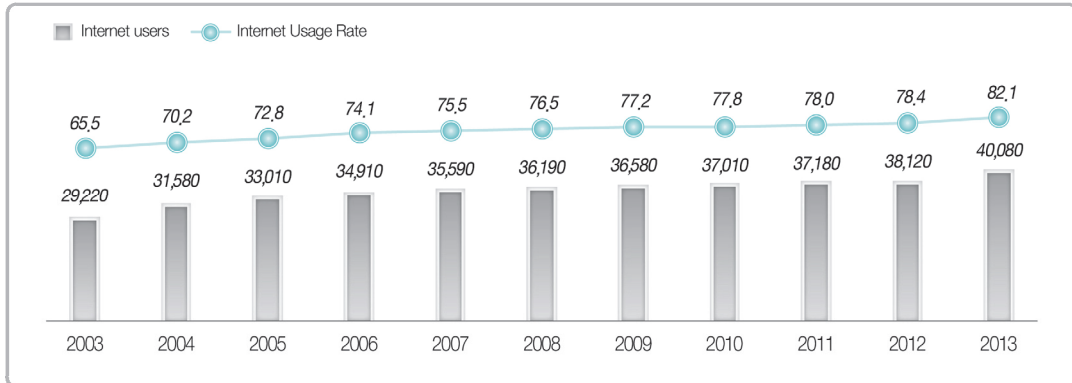
## B. Internet Usage

### 1) Individuals and Households

According to a survey on Internet usage conducted by MSIP and KISA in 2013, the Internet usage rate (rate of Internet use of at least once within the past one month) of population 3 years or older was 82.1%, a 3.7%p increase compared to the previous year; Internet users numbered 40.08 million (1.96 million increase compared to the previous year). Although the Internet usage rate in 2003 was 65.5% (29.22 million people), it increased by 16.6%p, with the number of users increasing by 11 million persons (1.4 times) as the broadband Internet infrastructure rapidly increased in the past 10 years. On the other hand, the Internet usage rate among senior citizens 60 years or older was 26.8%, with Internet users numbering 2.3 million (increase of 2.4% and 280,000 persons, respectively, compared to the previous year); thus indicating steady growth.

Figure 3-1-1 Internet users and usage rate

(unit : %, 1,000 persons)



※ 2003~2005 : Population 6 years or older

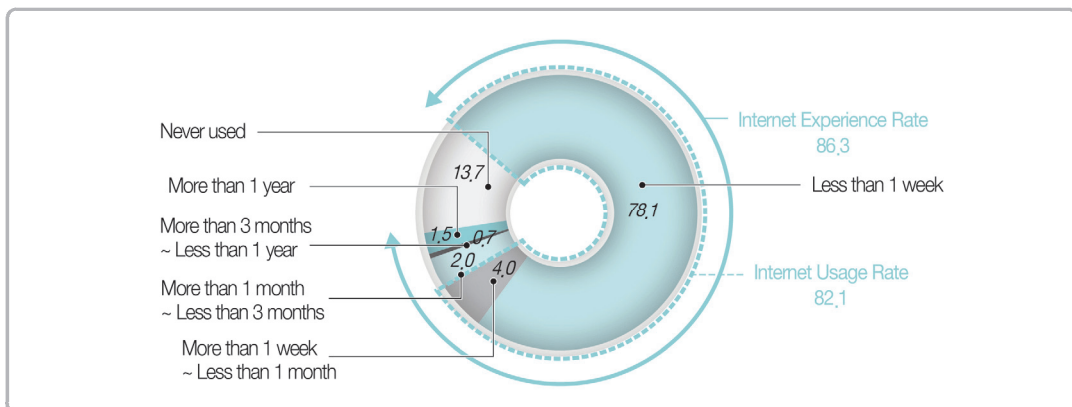
MSIP·KISA, 2013 Survey of Internet Usage, 2013

※ After 2006 : Population 3 years or older

Among the population 3 years or older, 86.3% were 'Internet users' defined as those who have experience of using the Internet. In terms of the last time the Internet was used, 82.1% used the Internet 'within the past month'; 84.1% and 84.8% used the Internet 'within the past three months' and 'within the past year', respectively.

Figure 3-1-2 Time of the most recent Internet usage

(unit : %)



MSIP·KISA, 2013 Survey of Internet Usage, 2013

## 2) Business

The result of the '2013 Informatization Statistical Survey' - conducted by MSIP and KISA in December 2012 among domestic business entities with at least one employee - was analyzed to check the Internet access environment and application. Here, a business entity is an individual profit-oriented or nonprofit business unit that conducts business activities at a specific location under single ownership or control. If an enterprise does business in multiple sites, each site is considered a business entity.

According to the survey, the Internet infrastructure and use of Internet - such as e-commerce and e-government service - by all business entities as of the end of 2012 generally increased compared to 2011. The rate of business entities with access to the Internet increased by around 11.3%p, and the Internet access rate has risen considerably among entities with fewer than 10 employees; hence the narrowed Internet access gap according to business size.

## 2. Internet and Society

### A. Politics

Our society has been changing day by day since the Internet was introduced. Although the changes may be in different forms, the biggest change is probably the change of communication method. Just as we are more familiar with the phrase ‘mobile era’ than the ‘Internet era’, web-based communication quickly evolved into mobile-based communication.

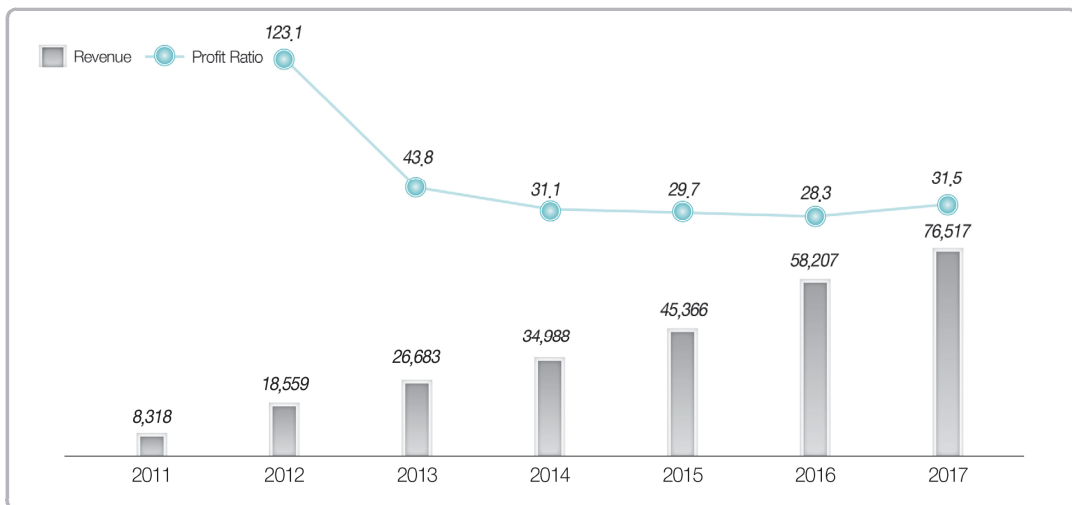
The impact of such changes on the political sector is also immense. For one, politicians as well as the government strived to change the way they communicated with citizens. The Park Geun-hye administration announced the ‘Government 3.0’ policy. The core value of ‘Government 3.0’ is the opening of public information and quantitative/qualitative expansion of citizen participation channels and paradigm shift from supplier-centered to individual citizen-centered government operation. Public agencies are introducing various communication methods in keeping with the ‘Government 3.0’ paradigm. Second, online voting is firmly established as an important means of election campaign, and its impact on the election culture and voting behavior is increasing every day. The online election campaign such as online encouragement of voting and voting evidence shot during the local elections on June 4, 2014 had a positive impact on increasing voter turnout.

### B. Economy

As the impact and size of the Internet economy greatly increased, R&D and investment in new

industries or areas to lead the future growth of the Internet economy are also growing in each country. In the US, the term app economy is also used to encompass the jobs and added values created through the development of mobile applications by companies like Apple. The mobile app market revenue - called app economy - worldwide is expected to grow rapidly from USD 26,683 billion in 2013 to USD 76,517 billion in 2017.

Figure 3-2-1 Status and forecast of profitability of mobile apps worldwide (unit : %, USD million)



Gartner, Forecast : Mobile App Stores, Worldwide 2013 Update (recited), 2013

Following the development of mobile Internet, IoT or IoE (Internet of Everything) will emerge as the new growth engine of the Internet economy. According to the report titled 'Worldwide IoT Policies, Market Trend, and Leading Services' issued by ETRI in 2013, IoT encompasses technologies creating future services such as smart grid, smart home, healthcare, and intelligent automobile service through the convergence of IT and various industries. Such veers away from the existing wired-oriented Internet or wireless-oriented mobile Internet and means that the human-centered communication paradigm is shifting to IoT wherein things have become the subject of communication. Such paradigm shift is expected to result in the growth of the global

IoT market from USD 201.3 billion in 2013 to USD 12.195 trillion by 2022. In the application and service sector in particular, the automobile telematics market is expected to record the biggest growth.

## C. Society and Culture

Whenever social controversies arose such as leak of personal information by 3 credit card companies, 6<sup>th</sup> nationwide local elections in 2014, and Palestine incident, there were heated debates and creation of information online, with the result reflected on public opinion and society to form a circulation structure.

The sinking of the Sewol ferry on April 16, 2014 in particular left tremendous shock and impact on the online society and culture as much as it left a huge scar on the entire Korean society. Many problems arose such as the amplified distrust in the government and press, conflict between classes, and flooding of unconfirmed rumors. Distribution and consumption of information related to the Sewol incident were quite different from the past. In the 20<sup>th</sup> century when there was only the mass media, there was only the central press such as newspaper, radio, and TV; thus, the government could easily control it. In 2014, however, SNS played the role of a new press medium as real-time news by the people at the site are transmitted to the public over the Internet. As the direct communication with people at the site was enabled by SNS in particular, distrust in and resistance to the press - which carried a false report of all passengers being rescued - and the government, which was criticized for its handling of the incident, were formed mostly online. Such resistance highlighted the SNS and some media as the alternative press and pitted them against conventional press. Meanwhile, the movement to wear yellow ribbon that began in SNS became the icon symbolizing the Sewol incident, again showing the characteristics of online culture representing voluntary participation.

As the communication means moved to MIM (Mobile Instant Messenger) such as Kakao Talk,

Line, and Band, the influence of MIM amplified, and MIM used such influence to expand its presence not only to shopping but also to finance; thus furthering the breakdown of boundaries of industries. Other changes in the Internet society in 2014 included the increased number of Korean users of foreign services and expansion of their influence, dramatic emergence of closed SNS such as Naver Band and Kakao Group, and increased use of SNS by middle-aged users, increased influence of Internet communities, proliferation of direct purchase of foreign products and social shopping culture, participation of foreign services and expanded influence, and change of contents industries such as popularity of webtoons and decline of games.

The Korean wave also affected the Internet society significantly. The problem of authentication certificate, whose abolishment has been called for - for a long time now - but has yet to be accepted, has become an issue again because of the popularity of direct purchase from foreign sites and payment of foreigners at Korean shopping malls. On the other hand, as YouTube became the popular medium to transmit the Korean wave, the reverse-discrimination of foreign Internet companies and Korean companies has become a problem.

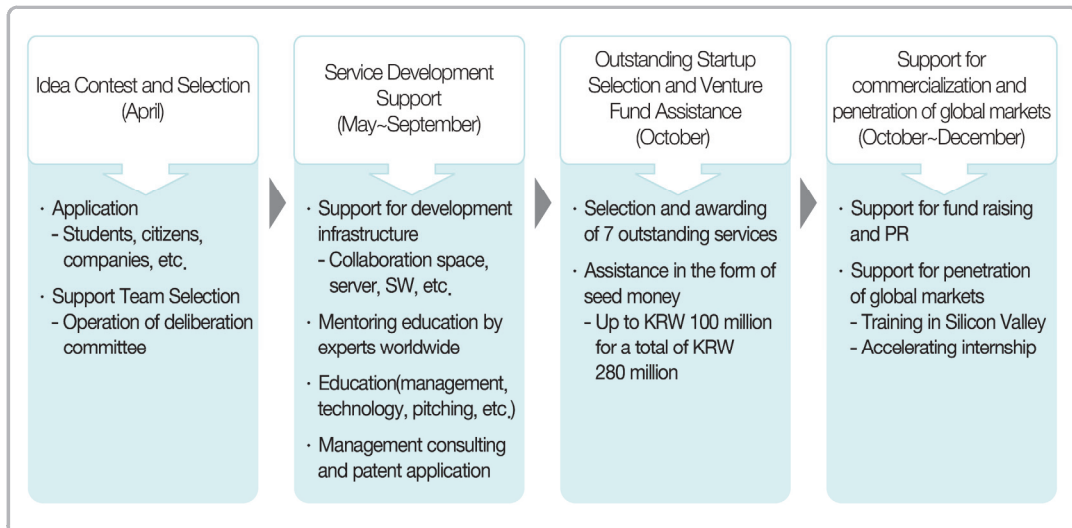
## 3. Promotion of the Internet

### A. Promotion of Internet Services

#### 1) Creating Win-Win Internet Infrastructure

MSIP launched the 'Global K-Startup Program 2013' in 2013 to pursue collaboration with portal operators and mobile communication operators in identifying innovative Internet startups and systematically incubating them to support them in international IR and global market entry by linking with Google, etc.

Figure 3-3-1 Global K-Startup incubation process



MSIP, Press release - MSP Implements global K-Startup program, 2014. 3

The Global K-Startup Program began as WBSP (Web Business Startup Program) in 2010, with

the 4<sup>th</sup> phase operated in 2013. For the operation of the 2013 program, MSIP signed an MOU with Google in May, and the program was jointly carried out with the joint private and public Internet Collaborative Cooperation Council participated in by portal operators, mobile communication operators, and industry associations.

## 2) Improvement of the Internet Usage Environment

MSIP announced the 'Plan to Improve the Global Standard-Based Internet Use Environment' in May 2014. The plan consists of 4 implementation programs and 11 detailed plans, with the vision of 'Development of the World's Top-tier Web Ecosystem in 2017'. For the compatibility of web services, the ministry is establishing the environment for supporting various browsers and basis for ActiveX free authentication certification. It is also implementing various policies to induce the voluntary proliferation of web compatibility. In addition, it is supporting web standard technologies and educating web standard specialists to distribute the global web standard. To encourage the openness of websites, it plans to issue the 'Guidelines for Web Openness' to support related technologies and establish detailed programs such as promotion of web openness by open API. Its goal is to increase the multi-browser support rate of the top 100 sites in the private sector from 22% in 2013 to 90% in 2017 and the website search openness rate of main academic/research institutes from 57.5% in 2013 to 90% in 2017.

## 3) Web Accessibility

The advancement of information and communications technology has brought about drastic changes that are obviously different from those in existing societies in all areas of life such as politics, economy, society, culture, education, administration, and employment. The web is playing the biggest key role in the change, and it has become a significant part of daily lives through IoT, etc.

Although some are concerned that the change of lives caused by the web can intensify the digital divide of the disabled, it can open the doors to new opportunities and present unlimited possibilities even in the part that was physically isolated if there are proper measures for even the disabled to access the web. Therefore, the issue of web accessibility to allow the disabled to use the web like users without disabilities is very important to the lives of the disabled.

## **B. Internet Usage Culture**

### **1) Reducing Internet Dysfunctions**

Launched in 2002, the 'Internet Addiction Response Center' has been implementing projects related to preventive education and counseling, development and distribution of contents, and cultivation of specialized manpower to cope effectively with the issue of Internet addiction. Preventing and alleviating Internet addiction require comprehensive assistance such as prevention, counseling, treatment, and follow-up throughout the life cycle from childhood to adulthood. Based on the 'Second Comprehensive Plan to Prevent and Alleviate Internet Addiction' issued in June 2013, 8 agencies - MSIP, MOE, MOJ, MND, MCST, MW, MOGEF, and KCC - jointly establish and execute the annual action plan after the policy council meetings each year to implement the policies efficiently and systematically for the prevention and alleviation of Internet addiction.

Policies to improve the informatization level of neglected groups such as the disabled, senior citizens, and low-income groups are continuously implemented as well. The education of digitally neglected groups on informatization is continuously strengthened through group education, visiting education, and specialized education of the disabled, senior citizens, and foreign spouses and by developing and supporting various customized educational contents based on the establishment and implementation of the 'Plan to Educate 10 Million People on Informatization' in 2000, 'Plan for the Two-Step Education of Citizens on Informatization' in 2002, and 'Plan to

Educate 5 Million Neglected People' in 2004. Training of mobile-specializing lectures and education on smart mobile were conducted in 2012, with the guidelines for the group informatization education of the disabled, senior citizens, and foreign spouses revised to expand the mobile informatization curriculum from 10% to 20% of the total in 2014. Efforts to reduce the digital divide in the smart society will continue.

## 2) ICT Ethics Education

Although the rapid advancement of information and communications technology such as the wide use of Internet and proliferated mobile services brought many benefits to our lives, it is also causing unexpected side effects and damages. For example, the adverse effects of informatization such as cybercrime, bashing, unhealthy distribution of information, Internet addiction, and leak of personal information incurred heavy social cost and gave rise to increasing concerns over such.

To cope with such adverse effects of informatization, the amendment of legislation and development and distribution of technical preventive measures are important, but not as much as public consensus to establish the culture of proper use and formation of value rule. That is because it is difficult to solve online deviant behaviors with legal enforcement and regulation alone. We should also consider that, as new technologies and media emerge, the criteria for legality under the existing law and regulation keep changing. The purpose of education on information and communications ethics is to cultivate awareness and value rule appropriate for the digital society and promote civic consciousness accordingly as information communications technologies advance.

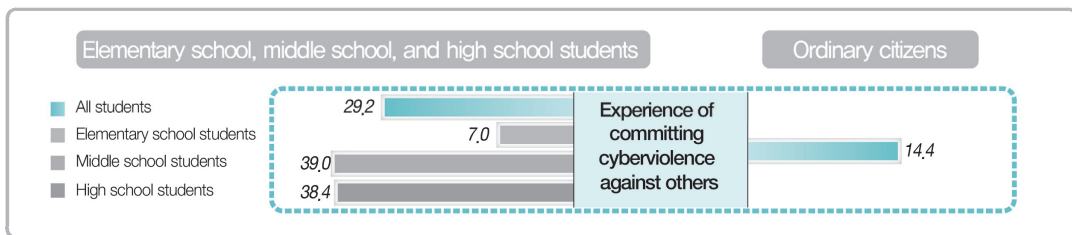
The Korean government has been conducting information and communications ethics education specialized for each group such as children, teenagers, teachers, parents, and local residents. It is also operating programs to increase awareness of information and communication ethics such as education of professional manpower and development of educational contents, private-public joint monitoring of harmful information, and joint campaign of the press to expand the information and communications ethics education infrastructure and establish the proper value rule over the

Internet for the establishment of a healthy information culture.

### 3) Status of Usage Culture

According to a survey conducted in 2013 by KCC and KISA on cyberviolence among 2,500 elementary, middle, and high school students, parents, teachers, and ordinary citizens, 29.2% of the students had committed cyberviolence against others, with 14.4% of ordinary citizens committing cyberviolence.

Figure 3-3-2 Experience of committing cyberviolence (multiple answers allowed) (unit : %)



KCC·KISA, 2013 Survey on Cyber Violence, 2013

The most common form of cyberviolence by both students and ordinary citizens was bashing. Among students in particular, cyberbashing was the most serious with 25.2% having experience doing it, followed by cyberbullying with 5.6%, cyberdefamation with 4.8%, leak of personal information with 3.6%, cyberstalking with 2.2%, and cyber sexual assault with 1.9%. The biggest targets of cyberviolence were 'students in the same school (54.3%)' for elementary school students and 'total strangers (52.3% and 64.6%)' for middle school and high school students, respectively.

In the case of ordinary citizens, the most serious cases of violence were bashing such as cursing or slandering a person they met online or distributing an acquaintance's personal information over the Internet.

At least 30.3% of students and 33.0% of ordinary citizens had experienced cyberviolence. High

school students (40.6%) and middle school students (39.4%) had more experiences of cyberviolence than elementary school students (7.4%).

#### 4) Enhancing Internet Ethics

With the dawning of society wherein the Internet is available through mobile devices such as smartphone and tablet PCs anytime, anywhere, the adverse effect of Internet also became noticeable. In 2013 in particular, cyberviolence and group bullying by teenagers became a serious problem, with bashing of famous people or social issues becoming more extreme and vicious regardless of the target.

There was strong call for self-cleaning by netizens after an Internet community against a 7-year-old child appearing on TV programs was created. Victims of bashing are becoming younger, with a picture of an underage entertainer posted as a sexual object. There was also a case of an elementary school student operating a pornographic site and another synthesizing a friend's picture disgracefully and distributing it. Moreover, as the enforcement of school violence becomes stricter, it is moving to the cyberspace. There were cases of inviting a student to a group chatting room and the student ending up being bashed by the group, sending continuous harassing SMS, and posting malicious comments in the group to the victim's SNS. There are also cases of the smartphone being used as a tool for harassment by teenagers.

To cope with the adverse effects of Internet, KCC has been operating the 'Creating Beautiful Internet Communities' program since 2010. In 2013, it launched various PR campaigns under the theme of 'Creating Schools without Cyberviolence' to convey the seriousness of cyberviolence by students. Moreover, it operated various programs to prevent cyberviolence and provide education on Internet ethics to reinforce Internet ethics. It also opened Internet ethics experiential centers where children and teenagers can learn proper Internet etiquette in an entertaining manner through games and experiential learning and carried out Internet Keeper programs with the Korea Internet Dream Group nationwide. It plans to foster a culture that enables citizens of all ages to

use the Internet properly and safely through continuous education on Internet ethics and experiential Internet culture programs.

## 5) Online Protection of Children

As use of the Internet has become general in all walks of life, people addicted to the Internet account for 7.7% of all Internet users. The addiction rate was highest among high school students and relatively high among the neglected groups (low-income families, multicultural families, single-parent families, etc.) and teenagers.

In accordance with the Internet Addiction Prevention and Alleviation Implementation Status and 2012 Execution Plan issued on March 23, 2012, 8 relevant agencies have formed the inter-departmental 'Internet Addiction Policy Council' to establish and implement policies to cope with Internet addiction.

KCC developed the 'Green I-Net' ([www.greeninet.or.kr](http://www.greeninet.or.kr)) in 2008 to protect children and teenagers from illegal harmful contents; it is providing various programs to cope with harmful Internet data such as support for filtering of data harmful to the youth on the Internet, rating service for contents harmful to the youth, prevention of violation of cyber rights, and Internet data usage time management. Moreover, it is operating an emergency response hotline council of 30 Internet service providers such as portals, P2P, and webhard to monitor obscene contents such as child pornography for the prevention of distribution of illegal and malicious contents over the Internet. As such, Internet service providers such as portals are strengthening the surveillance and strictly checking the legality of third-party created contents in order to stop the uploading of obscene contents by the youth.

In the case of Internet ethics, KCC and KISA are carrying out systematic cultural movements to establish a healthy Internet culture voluntarily participated in by all members of society. To protect the youth, who are the most active yet most vulnerable on the Internet, they are conducting children's literacy education with the theme of Internet ethics and personal information protection and cooperating with the relevant organizations such as portal providers to provide

on and offline education. They are also expanding the 'Internet Ethics Class' for elementary school and middle school students nationwide, launching the 'Korea Internet Dream Group' in June 2010 to provide the stage for experiential education for the youth to learn the proper Internet culture.

## 4. Internet Security

### A. Information Security

Since many services based on the Internet are provided, dependency on the Internet is increasing, and information intrusion incidents not only damage individuals and enterprises but also cause confusion throughout society.

Large-scale cyberattacks occurred on March 20 and June 25, 2013. Since the attacks targeted main facilities such as major broadcasting companies and press, political parties, and financial institutes, and the forms of attacks were compounded such as DDoS attacks, homepage falsification, and system destruction, the damage could have been expanded but was minimized by timely response. Smishing (SMS + phishing) attacks, which attempt to leak personal information and financial information by sending SMS containing a malicious link to smartphone users to induce the installation of malicious apps or connection to a phishing site, are continuously launched.

MSIP and KISA are operating various programs to prevent Internet intrusion incidents and respond in a timely manner when an incident actually occurs. For one, they are operating the Korea Internet Security Center to monitor Internet traffic 24×365 and collect and analyze security threats such as security vulnerabilities and malware to take proper follow-up measures. The center has also established a collaboration system with the relevant agencies here and abroad to share the information and cooperate in responding to incidents to minimize the damage.

To prevent Korean Internet users from being infected by malware by visiting a homepage, the Korean government is detecting hidden malware in 2.3 million domestic domains and deleting the malware. For users of zombie PCs already infected by malware and misused for intrusion, a popup window is displayed when the user uses the Internet, with vaccine provided for treatment.

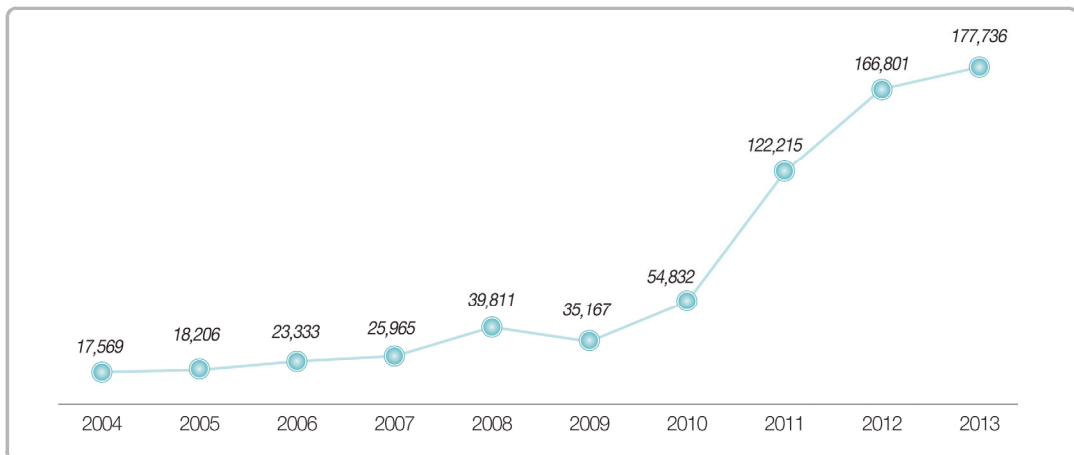
To minimize the damage from DDoS attacks, the government also provides DDoS cybershelter service for small enterprises that have difficulty responding to DDoS attacks and operates the DDoS response system in traffic interface zones between ISPs since it can be a security blind spot.

In addition, to prevent the rapidly increasing e-banking fraud, it operates the 'Alimi' service to notify users of pharming sites and the 'Phone Keeper' service, a self-inspection app to check whether a malicious app is installed. It also analyzes smishing SMS to strengthen the follow-up measures by blocking malicious app-distributing sites and information-leaking server.

## B. Personal Information Protection

In 2013, the Privacy Violation Report Center and Privacy Grievance Mediation Committee of KISA received 177,736 cases of personal information violation reports and counseling and requests for damage relief. This represents a 7% increase compared to the 166,810 cases in 2012.

Figure 3-4-1 Annual report on privacy violation & request for counseling and remedy (unit : cases)



KISA

KCC waged the '2013 Internet Safety Keeper' campaign from October 21, 2013 to November

20 to raise public awareness and encourage the practice of personal information protection. Under the slogan 'One Minute for Your Personal Information Protection', it promoted 10 principles of protecting the personal information of smartphone users and new regulation (restriction on the collection and use of resident registration number, etc.) as per the provisions of the 'Act on the Promotion of Information and Communications Network Utilization and Information Protection, etc.'.

It appointed public ambassadors to run TV advertising, radio advertising, subway screen door advertising, and bus advertising and cooperated with information and communications service providers to post campaign banner advertisements on 32 pages of 18 sites including portals, shopping malls, and game sites.

## 5. Internet Related Laws

Internet related laws can be mainly categorized into laws related to the establishment of Internet infrastructure and usage environment (distribution and access to Internet, manufacturing and distribution of information systems such as terminals and storage units, Internet address resource management, e-payment measures, communication charge, e-signature, information protection, etc.) and laws related to the use and application of Internet (e-commerce, e-banking, e-learning, online game, online contents, IPTV, Internet press, location based service, u-health, e-government, u-city, etc.). Specifically, they can be categorized into laws related to the design and building of Internet infrastructure, laws related to Internet information security, laws related to Internet industry promotion, and laws related to Internet user protection.

Table 3-3-1 Internet related laws (as of June 2014)

Classification	Key related laws
Design and building of Internet infrastructure	Telecommunications Business Act, Framework Act on Telecommunication, Internet Address Resources Act, Framework Act on National Informatization, Act on the Promotion of Information and Communications Network Utilization and Information Protection, etc., Digital Signature Act, etc.
Internet information security	Act on the Protection of Information and Communications Infrastructure, Act on the Promotion of the Information and Communications Network Utilization and Information Protection, etc., Electronic Government Act, Act on the Prevention of Divulgence and Protection of Industrial Technology, etc.
Internet industry promotion	Information and Communications Technology Industry Promotion Act, Framework Act on Electronic Transactions, Electronic Financial Transactions Act, Electronic Trade Facilitation Act, Contents Industry Promotion Act, e-Learning Industry Development Act, Game Industry Promotion Act, Act on the Promotion of Newspapers, etc., Internet Multimedia Broadcast Services Act, Act on the Protection, Use, etc., of Location Information, Act on the Construction, etc., of Ubiquitous Cities, etc.
Internet user protection	Act on the Promotion of Information and Communications Network Utilization and Information Protection, etc., Framework Act on National Informatization, Protection of Communications Secrets Act, Personal Information Protection Act, Use and Protection of Credit Information Act, Copyright Act, Act on the Protection, Use, etc., of Location Information, Act on Consumer Protection for Electronic Commerce Transactions, etc., Electronic Government Act, Act on Reporting and Using Specified Financial Transaction Information, Special Act on the Refund of Damages from Telecommunication Financial Scams, etc.

Legal Knowledge Information System (compiled), [likms.assembly.go.kr/law](http://likms.assembly.go.kr/law)

The most significant change of legislation related to Internet in Korea from the second half of 2013 to the first half of 2014 was caused by the personal information leak by credit card companies. Laws were amended and enacted to introduce the compensation system for statutory damages so as to complement the remedy for the violation of rights of information and communications service users and strengthen the punishment for information communications service providers that violate their legal obligations.

There were also movements to establish comprehensive government-level mediation, active promotion, and rule since the current laws do not reflect the changes brought about by the new technologies developed to deploy new services converging information and communications. In response to the criticism that the existing regulations obstruct the growth of related industries as mobile communications become part of everyday life and become generalized, the government amended the existing law to enforce the promotion of information and communications convergence.

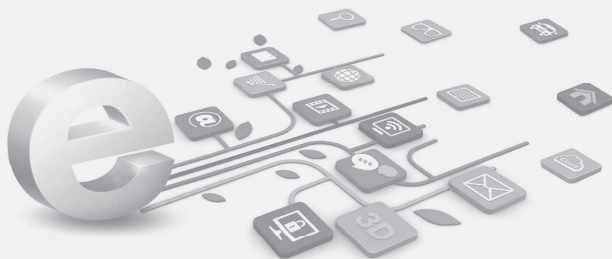
Such amendments of Internet related laws accept most of the measures for regulatory improvements discussed in the ICT sector. Although the abolishment of mandatory use of authentication certificate enabled the application of other security technologies and authentication technologies in Internet banking and e-commerce, the regulations have not yet been effective since alternative authentication measures are not developed. The forced shutdown regulation was eased although it was judged to be constitutional by the Constitutional Court, and cloud computing - considered to be the new computing paradigm - is being legislated owing to the need for laws to cultivate related industries and protect user information. Legislation related to big data analysis is also key agenda for Internet related laws since data are increasing explosively.

With incidents of leaks of large volumes of personal information often occurring nowadays, there are concerns of secondary damage from personal information leak; hence the demand for legislation and regulatory measures to prevent such. As such, various amendments to the information and communication network act containing clauses related to technical and managerial protective measures and method of damage compensation are outlined. The proposed amendments mostly

emphasize the rights of users and contain new clauses on personal information protection and information security as well as prevention of user damage due to the abused small payment system. There are also some proposals to guarantee the freedom of expression as a basic attribute of information and communications.

The improvement of the Internet regulatory system is the new administration's national policy agenda for the promotion of creative economy. Its intention is to establish firmly the grounds for the virtual cycle of Internet ecosystem and use it as the driving force for new economic development.

Based on such policy agenda, MSIP (jointly with other relevant agencies) announced on December 19, 2013 the plan to amend 13 Internet regulations in 3 areas (e-commerce, contents rating, and personal/location data) that restrict the Internet industry or reverse-discriminate the domestic enterprises. The regulatory amendment focuses on the improvement of regulation of the Internet industry and service providers. The amendment of 13 regulations in 3 areas reflected the difficulties and proposal by the industry (businesses).



# 2014 Korea Internet White Paper



## Part 4. International Trends

- 1. Worldwide Internet
- 2. Internet Governance
- 3. International Cooperation

# 1. Worldwide Internet

## A. Global Internet

Sweden was ranked second - like the previous year - in the ICT Development Index for 2013. Among the Asian countries, Hong Kong was ranked tenth, Japan, twelfth, Macao, fourteenth, Singapore, fifteenth, and China, seventy-eight. Korea was ranked first and second in ICT application capability and usage, respectively, indicating the use of ICT and proving its status as an Internet powerhouse.

Table 4-1-1 ICT development index country ranking (2012)

Rank	Country (Index)	Rank	Country (Index)
1	Korea (8.57)	8	UK (7.98)
2	Sweden (8.45)	9	Luxembourg (7.93)
3	Iceland (8.36)	10	Hong Kong (7.92)
4	Denmark (8.35)	11	Australia (7.90)
5	Finland (8.24)	12	Japan (7.82)
6	Norway (8.13)	17	US (7.53)
7	Netherlands (8.00)	78	China (4.18)

ITU, Measuring the Information Society 2013, 2013

## B. Asia-Pacific Region

According to ITU, Internet users in the Asia-Pacific region in 2013 numbered 1.205 billion - an increase of 92 million compared to the previous year - and accounted for 44.9% of all Internet

users worldwide. Mobile Internet users are also steadily increasing; the number of actual mobile Internet users stood at 753 million in 2013.

**Table 4-1-2 Internet users and broadband Internet subscribers in the Asia-Pacific** (unit : million people, %)

Classification	2009	2010	2011	2012	2013	2014 <sup>e</sup>
Internet users	726(18.9)	872(22.5)	988(25.2)	1,113(28.1)	1,205(30.1)	1,310(32.4)
Actual mobile Internet users	N/A	286(7.4)	432(11.0)	605(15.3)	753(18.8)	920(22.8)
Broadband Internet subscribers	183(4.7)	214(5.5)	251(6.4)	276(7.0)	295(7.4)	313(7.7)

※ Figures in ( ) represent the rate of Internet users, mobile Internet users, and broadband Internet subscribers per 100 people. ITU, ITU Statistics, 2014

※ e : estimated

## C. Americas

According to ITU, Internet users in South and North American regions in 2013 numbered 597.2 million, representing an Internet usage rate of 61.8% and constituting 22.2% of all Internet users worldwide. In 2014, 2 out of 3 people are expected to use the Internet, with the Internet usage rate in the Americas becoming second highest after Europe.

**Table 4-1-3 Internet users and broadband Internet subscribers in the Americas** (unit : million people, %)

Classification	2009	2010	2011	2012	2013	2014 <sup>e</sup>
Internet users	428(46.1)	473(50.5)	519(54.8)	556(58.1)	597(61.8)	639(65.5)
Actual mobile Internet users	N/A	230(24.6)	323(34.1)	401(41.9)	494(51.1)	577(59.1)
Broadband Internet subscribers	120(13.0)	131(14.0)	142(15.0)	151(15.8)	157(16.3)	163(16.7)

※ Figures in ( ) represent the rate of Internet users, mobile Internet users, and broadband Internet subscribers per 100 people. ITU, ITU Statistics, 2014

※ e : estimated

## D. Europe

According to ITU, Internet users in the European region in 2013 numbered 455.6 million, representing an Internet usage rate of 73.1% and making up 16.9% of all Internet users worldwide. In 2014, 3 out of 4 people are expected to use the Internet, with the Internet usage rate in the European region becoming the highest in the world. The number of actual mobile Internet users in 2013 was 356 million, which is smaller than that in the Asia-Pacific region but is steadily increasing.

Table 4-1-4 Internet users and broadband Internet subscribers in the Europe (unit : million people, %)

Classification	2009	2010	2011	2012	2013	2014 <sup>e</sup>
Internet users	338(63.2)	410(66.6)	428(69.2)	443(71.4)	456(73.1)	467(74.8)
Actual Mobile Internet users	N/A	188(30.5)	244(39.4)	305(49.1)	356(57.1)	399(63.8)
Broadband Internet subscribers	136(22.1)	145(23.6)	154(24.8)	159(25.7)	166(26.6)	173(27.7)

※ Figures in ( ) represent the rate of Internet users, mobile Internet users, and broadband Internet subscribers per 100 people.

ITU, ITU Statistics, 2014

※ e : estimated

## E. Middle East·Africa

According to ITU, Internet users in the Middle East region in 2013 numbered 137 million people, representing an Internet usage rate of 37.4% and accounting for 3.7% of all Internet users worldwide. Internet users in the Middle East region are increasing each year, with the region gaining attention as an emerging Internet market. Gartner forecasts that the IT market in the Middle East region in 2014 will be valued at 211 billion USD, representing an 8% growth compared to the previous year.

Table 4-1-5 Internet users and broadband Internet subscribers in the Middle East-Africa (unit : million people, %)

Year		2009	2010	2011	2012	2013	2014 <sup>e</sup>
Internet users	Middle East	66(19.1)	81(23.0)	94(26.6)	121(33.8)	137(37.4)	152(40.6)
	Africa	58(7.3)	79(9.8)	105(12.6)	125(14.6)	148(16.8)	172(19.0)
Actual mobile Internet users	Middle East	N/A	18(5.1)	46(13.1)	58(16.1)	75(20.6)	92(24.6)
	Africa	N/A	14(1.8)	38(4.6)	74(8.5)	117(13.3)	172(19.0)

※ Figures in ( ) represent the rate of Internet users and mobile Internet users per 100 people.

ITU, ITU Statistics, 2014

※ e : estimated

## 2. Internet Governance

### A. Definition of Internet Governance

Internet governance is the development and application by governments, private sector, and civil society - in their respective roles - of shared principles, norms, rules, decision-making procedures, and programs that shape the evolution and use of the Internet. It is the only official definition of Internet governance adopted by WSIS (World Summit on the Information Society) held in Switzerland in 2003.

At the WTPF (World Telecommunication/ICT Policy Forum) held in May 2013, the panels focused their discussions on Internet governance-related agenda such as multi-stakeholder model and strengthened cooperation as well as the new agenda on the 'expansion of role of governments in Internet governance' outlined by Brazil among 6 key agendas.

Such full-fledged discussion of Internet governance is based on the relation with ICANN, which has the policymaking authority on Internet address resources (IP address and domain name) and US Government. With China, Russia, India, and some African countries recently raising the need for international discussion on strengthening the role of governments in the Internet governance system, however, discussion on Internet governance became the political issue that triggered the so-called digital cold war.

As the demand for change of the Internet governance system grew stronger particularly after the leak by Edward Snowden, ICANN formed a high-level panel to discover an Internet governance model based on multilateral discussion; the report on the principles and roadmap of future Internet governance cooperation was issued in June 2014 after three meetings. In October 2013, the ICANN CEO proposed to the President of Brazil the holding of an international meeting to review the current model and discuss the future development. As a result, the Global Multi-stakeholder

Meeting on the Future of Internet Governance - also called NetMundial - was held in Sao Paulo, Brazil in April 2014 to deduce the principles of Internet governance and provide the roadmap for the development of the future Internet governance ecosystem, and the Netmundial statement was drawn up. In March 2014, or one month earlier, NTIA (National Telecommunications and Information Administration) under the US Department of Commerce announced its intention to transition IANA (Internet Assigned Numbers Authority); the discussion on forming the global multi-stakeholder community to take over the functions of IANA is ongoing as of 2014.

## B. Trend in Leading Countries and International Organization

Korea submitted its Internet governance principles to the Global Multi-stakeholder Meeting on the Future of Internet Governance (Netmundial) held in Sao Paulo in April 2014. It presented 6 principles - Internet accessibility, multi-stakeholderism, flexibility, engagement based on global cooperation, Internet security, and balance of Internet use capacity - as important values for the future discussion of Internet governance. It supported open, safe global Internet based on the principle of participation of multi-stakeholders. While expressing its support for the multi-stakeholder-based Internet governance system, it also cited the need to seek various solutions optimized for each sector and issue.

The 50<sup>th</sup> ICANN meeting held in London, UK in June 2014 presented 4 criteria for ensuring a successful Internet governance system: comprehensive participation of neglected countries; transfer based on sufficient discussion; improvement of the role of GAC, and; establishment of procedure to assure the responsibility of ICANN.

The discussion on Internet governance is progressing in various forms, and it is expected to expand gradually both here and abroad. That is because the new stages of discussion - such as ITU Plenipotentiary Conference in October 2014 and WSIS+10 Meeting in 2015 as well as

Netmundial and Global Committee on Internet Governance (GCIIG) - are continuously established. With the US Government announcing its intention to transfer the authority to manage Internet addresses, its discussion will also continue in different stages. The movement to establish the Internet governance system is also seen to accelerate in each country. Internet governance issue-related information will be shared, and opinions will be collected through the establishment of Internet governance system in each country; international cooperation and active discussion are expected at the international level.

## 3. International Cooperation

### A. Cooperation with International Organizations

Twenty years since the Internet became popular worldwide, major international organizations such as ITU and OECD have paid attention to the ripple effect and effective use of the Internet. ITU defined its business scope in communications.

Nonetheless, the need to reinterpret the meaning of communications as specified in the Charter of ITU Constitution has emerged as the scope of communication was expanded due to the emergence of new ICT services, convergence of service, and change of ICT environment. As such, ITU is breaking away from its traditional way of discussing Internet issues that recently proliferated multi-dimensionally and discussing it to reflect the positions of its member countries at a broader level.

OECD expanded the meaning of Internet economy as the ICT environment changed and presented the term digital economy as the paradigm appropriate for the new ICT environment. It established the global agenda for Internet measurement and information protection and held discussions on joint response measures for each agenda.

The digital-based economy has drawn immense interest from not only the international organizations such as OECD and ITU but also the developing countries. They particularly consider the use of Internet and ICT as the basis of economic development and the key driving force for the creation of knowledge-based economy. As the potential of Internet and ripple effect of ICT grow, countries all over the world are establishing the direction for Internet policy and discussing the development of ICT through the international organizations.

## B. Supporting Overseas Exports

### 1) Global Marketing Support

To respond proactively to the changes in the global information, communication, and broadcasting market environment, MSIP and KISA are working hard to lay the foundation for making inroads into overseas markets and cooperate with countries around the world based on the global ICT market forecast and opinions of the industry. They support overseas consulting and hold overseas road shows and broadcasting contents showcases.

Advanced countries such as the US, Japan, China, and Europe are quickly identifying government-led overseas project opportunities to develop the rapidly changing ICT and markets. Such is part of the strategy to revive the depressed national economy and seize the leadership in the global communication market. Under such environment, the preemptive identification and timely support of project opportunities are needed for domestic ICT companies to enter the global markets.

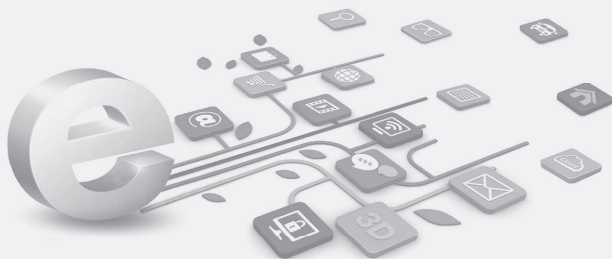
KISA has held international road shows and overseas consulting in keeping with the environment changes; it is focusing on supporting Korean ICT companies in laying the groundwork for entering the global markets. The agency is committed to identifying and developing projects in emerging and strategic countries to help Korean ICT companies penetrating the global markets and actively assist in the partnership of large and small companies to make it easy for them to establish their presence in the global markets.

### 2) Support for SMEs' Marketing Efforts

KISA has provided comprehensive support to help SMEs solve the problems they face in relation to information, communication, and broadcasting as well as Internet companies with all their export needs from overseas expansion planning and execution to follow-up management.

KISA is steadily expanding and reviewing the consultants and manpower pool of consulting

companies with expertise in the local markets and products to sell in order to provide specialized information and advice to the businesses. It plans to strengthen expertise in ICT-based products and services in particular to improve the quality of consulting continuously. Moreover, it is playing the role of the driving force for small and intermediate-sized companies in ICT and broadcasting sectors by establishing a full-time support system for small companies to penetrate the global markets and linking with various systems providing information related to overseas business.



# 2014 Korea Internet White Paper



# Appendix

- List of ISPs
- Abbreviations
- Organization Abbreviations

## List of ISPs

(as of June 2014)

No.	Name	Service Name	Address	Tel.	URL
1	Gangwon Broadcasting	GANGWONNET	1F, 76, Soygangang-ro, Dong-myeon, Chuncheon-si, Gangwon-do	033-241-4435	www.igbn.co.kr
2	Gyeonggi Techno Park	GTP	705, Haean-ro, Sangnok-gu, Ansan-si, Gyeonggi-do	031-500-3004	www.gtp.or.kr
3	KCN TV	KCNNET	569, Iksan-daero, Iksan-si, Jeollabuk-do	063-850-8575	www.kcn.tv
4	Nam Incheon Broadcasting (NIB)	NIBDIGITAL	14, Juanse-ro, Nam-gu, Incheon	032-882-9660	www.nibtv.co.kr
5	Naver Business Planet	NHN-NET	13F, Green Factory, 6, Buljeong-ro, Bundang-gu, Seongnam-si, Gyeonggi-do	031-1588-3820	www.nhncorp.com
6	Netropy	Netropy	#602, Halla Sigma Valley, 545, Dunchon-daero, Jungwon-gu, Seongnam-si, Gyeonggi-do	070-7432-2345	www.netropy.co.kr
7	Networks ING	ONAIRIC	2710, 293, Mokdongdong-ro, Yangcheon-gu, Seoul	070-7897-7171	-
8	Nexinno	NEXINNO	233-5, Mokdongdong-ro, Yangcheon-gu, Seoul	02-2061-2001	www.nexinno.co.kr
9	Nuri Link System	KOREAONLINE	7F, Jisan IT Venture Center, 15, Beotkkot-ro 12-gil, Geumcheon-gu, Seoul	02-2039-7749	www.kol.net
10	Daou IDC	DAOU	81, Digital Vally-ro, Suji-gu, Yongin-si, Gyeonggi-do	070-8795-0790	www.daouidc.com
11	Dotname Korea	DOTNAME	234, Teheran-ro, Gangnam-gu, Seoul	070-7090-0852	www.dotname.co.kr
12	Duzon IT	DUZON	130, Beodeul 1-gil, Namsan-myeon, Chuncheon-si, Gangwon-do	02-6233-5393	www.duzon.com
13	Duruan	DURUAN	#202, 55, Digital-ro 33-gil, Guro-gu, Seoul	02-6330-8044	www.duruan.co.kr
14	Dream Line	DREAMX	9F, IT Venture Tower East Bldg., 135, Jungdae-ro, Songpa-gu, Seoul	02-6007-6009	www.dreamline.co.kr
15	Lotte Data Communication	LDCC-SAFEGUARD	179, Gasan Digital 2-ro, Geumcheon-gu, Seoul	02-2626-3919	www.ldcc.co.kr
16	Vtopia	VTOPIA	#505, Apec Center, 18, Ahasan-ro 7na-gil, Seongdong-gu, Seoul	02-563-2245	www.vtopia.co.kr
17	Samsung SDS	SAMSUNGSDS	318, Teheran-ro, Gangnam-gu, Seoul	070-7015-6504	www.sds.samsung.co.kr

No.	Name	Service Name	Address	Tel.	URL
18	Samjung Data Service	DIRECT-HOSTING	#1202, Acehighend Tower 5-cha, 226, Gasan Digital 1-ro, Geumcheon-gu, Seoul	02-2029-0342	www.sds.co.kr
19	Seogyong Broadcasting	SCSNET	532, Jinyangho-ro, Jinju-si, Gyeongsangnam-do	055-740-3121	www.iscs.co.kr
20	Sejong Telecom	SEJONGNET	36, Sangil-ro 10-gil, Gangdong-gu, Seoul	02-1688-7380	www.sejongtelecom.net
21	Smile Serv	SMILESERV	2F, Daeryung Techno Town 2-cha, 33-33, Gasan Digital 1-ro, Geumcheon-gu, Seoul	070-7549-7062	www.1000dedi.net
22	Shinsegae I&C	SSEN	61, Digital-ro, 31-gil, Guro-gu, Seoul	02-3397-1665	-
23	Shinsegae I&C	SINC	Shinsegae Digital Valley Center, 61, Digital-ro, 31-gil, Guro-gu, Seoul	02-3397-1207	www.sinc.co.kr
24	Simplex Internet	SIMPLEXINTERNET	15, Boramae-ro 5-gil, Dongjak-gu, Seoul	02-6276-1572	www.simplexi.com
25	Cyber One	CYBERONEIDC	3F, 191, Yangjaecheon-ro, Gangnam-gu, Seoul	02-829-3066	http://idc.cyberone.kr
26	CD Networks	CDNETWORKS	7F, 37, Teheran-ro, 8-gil, Gangnam-gu, Seoul	02-3441-0491	www.cdnetworks.co.kr
27	CNM	CNM	4F,6F,7F, 9, Teheran-ro 103-gil, Gangnam-gu, Seoul	070-7410-4703	www.cnm.co.kr
28	CMB Donggu Broadcasting	CMBDONGBU	15, Hwarang-ro, Dong-gu, Daegu	053-744-5700	http://cmbtg.tv
29	CMB Susung Broadcasting	CMBSUSUNG	15, Hwarang-ro, Dong-gu, Daegu	053-744-5700	http://cmbtg.tv
30	CS Technology	CST21	15F, Woolim Blue 9, A dong, 583, Yangcheon-ro, Gangseo-gu, Seoul	02-6031-0067	tel.cst21.com
31	CMB Kwangju Broadcasting	CMBKWANGJUNET	13, I, Sangmujungang-ro 104beon-gil, Seo-gu, Gwangju	070-8110-7734	www.cmbkj.tv
32	CMB Daejeon Broadcasting	CMBI-NETDJ	CMB B/D, 20, Daejong-ro 584beon-gil, Jung-gu, Daejeon	070-8110-7401	www.icmb.tv
33	CMB Dongseo Broadcasting	CMBPLUSONE	3F, 91, Wangsan-ro, Dongdaemun-gu, Seoul	070-8125-0119	http://cmbds.tv
34	CMB Chungcheong Broadcasting	CMBMUTINET	125, Bonghwang-ro, Gongju-si, Chungcheongnam-do	070-8110-7917	www.cmbtv.com
35	CMB Hangang Cable TV	CMBI-NETHK	22, Yangpyeong-ro, 17-gil, Yeongdeungpo-gu, Seoul	070-8110-7144	-

No.	Name	Service Name	Address	Tel.	URL
36	CJ Hello Vision	CJ-HELLOVISION	267, Sinjeong-ro, Yangcheon-gu, Seoul	070-8130-1751	<a href="http://cjyc.net/">http://cjyc.net/</a>
37	CJ Hello Vision Nara Cable TV	NARA-CABLE-TV	340, Pyeonghwa-ro, Uijeongbu-si, Gyeonggi-do	02-1855-1002	<a href="http://www.naraspeed.net">www.naraspeed.net</a>
38	CJ Hello Vision YBN	YBN	154-25, Dongbusunhwan-ro, Wonju-si, Gangwon-do	070-7373-4222	<a href="http://www.ybn.co.kr">www.ybn.co.kr</a>
39	CJ Hello Vision JBC	URINET	5-10, Suseong 6-ro, Jeongeup-si, Jeollabuk-do	070-8145-6300	<a href="http://jbclife.com">jbclife.com</a>
40	CJ Hello Vision HBC	UPASS	115-1, Hadang-ro, Mokpo-si, Jeollanam-do	061-270-1542	<a href="http://www.hbc24.co.kr">www.hbc24.co.kr</a>
41	ABN	DITIZONE	14, Seongnam-daero 343beon-gil, Bundang-gu, Seongnam-si, Gyeonggi-do	070-8145-1031	<a href="http://www.abn.co.kr">www.abn.co.kr</a>
42	I-net	KPIN	238, Eulji-ro, Jung-gu, Seoul	02-2273-9744	<a href="http://www.kpin.net">www.kpin.net</a>
43	I-net Hosting	INET	40, Nambusunhwan-ro 337ga-gil, Seocho-gu, Seoul	070-8220-7748	<a href="http://www.inet.co.kr">www.inet.co.kr</a>
44	Link Korea	INDICLUB	#613, LG Palace, 156, Yanghwa-ro, Mapo-gu, Seoul	02-1566-5670	<a href="http://www.ilinkkorea.co.kr">www.ilinkkorea.co.kr</a>
45	IP4 Networks	IP4NET	#302, 13, Eonju-ro 81-gil, Gangnam-gu, Seoul	02-6925-0042	<a href="http://www.ip4.co.kr">www.ip4.co.kr</a>
46	Afreeca TV	AFREECATV	#901, 2-dong, 15, Pangyo-ro 228beon-gil, Bundang-gu, Seongnam-si, Gyeonggi-do	031-622-8000	<a href="http://corp.afreecatv.com">http://corp.afreecatv.com</a>
47	SK Broadband	broadNnet	SK Namsan Green Bldg., 24, Toegye-ro, Jung-gu, Seoul	02-6266-6764	<a href="http://www.skbroadband.com">www.skbroadband.com</a>
48	SK C&C	SK-NET	SK u-Tower, 8, Seongnam-daero 331beon-gil, Bundang-gu, Seongnam-si, Gyeonggi-do	02-6400-4297	<a href="http://www.sk-net.com">www.sk-net.com</a>
49	SK Telecom	SK-TELECOM-NET	65, Eulji-ro, Jung-gu, Seoul	02-6100-4573	<a href="http://sktelecom.com">sktelecom.com</a>
50	SK Telink	SKTelink	16F, SK Namsan Green Bldg., 24, Toegye-ro, Jung-gu, Seoul	070-7400-1716	<a href="http://www.sktelink.net">www.sktelink.net</a>
51	NTT Korea	GIN	7F, CALT Bldg., 22, Teheran-ro 87-gil, Gangnam-gu, Seoul	02-2156-9000	<a href="http://www.kr.ntt.com">www.kr.ntt.com</a>
52	Elim Net	ELIMNET	Elim Net Bldg., 15, Gyeonggi-daero, Seodaemun-gu, Seoul	02-3149-4831	<a href="http://www.elim.net">www.elim.net</a>
53	LX Networks	LXN	JNK Digital Tower, Digital-ro, 26-gil, Guro-gu, Seoul	02-851-0111	<a href="http://www.lxn.co.kr">www.lxn.co.kr</a>

No.	Name	Service Name	Address	Tel.	URL
54	LG CNS	LG-NET	10-1, Hoehyeon-dong 2-ga, Jung-gu, Seoul	02-2099-5891	www.lgcns.com
55	LG U+	KIDC	616, Eonju-ro, Gangnam-gu, Seoul	02-2086-2924	www.kidc.net
56	LG U+	LGTELECOM	416, World Cup buk-ro, Mapo-gu, Seoul	02-6290-1680	www.lguplus.com
57	LG U+	Xpeed	416, World Cup buk-ro, Mapo-gu, Seoul	02-6928-3087	www.uplus.co.kr
58	LG U+	PUBNETPLUS	30, Sowol-ro 2-gil, Jung-gu, Seoul	02-2089-7755	www.pubnetplus.ne.kr
59	LG U+	BORANET	30, Sowol-ro 2-gil, Jung-gu, Seoul	02-6928-3087	www.dacom.net
60	Onse Telecom	SHINBIRO	85, Yonggu-daero 2771beon-gil, Suji-gu, Yongin-si, Gyeonggi-do	02-1666-0120	www.shinbiro.com
61	UL Networks	ULNETWORKS	4F, 24-6, Ganho-daero 3-gil, Seodaemun-gu, Seoul	02-396-0100	www.ul-net.co.kr
62	Esocom	ESONET	E&C Venture Dream Tower 2-cha, 55, Digital-ro, 33-gil, Guro-gu, Seoul	02-3281-1007	www.esocom.com
63	eGIOS	eGIOSNET	6F, 158, Eulji-ro, Jung-gu, Seoul	02-2116-8035	www.egios.com
64	Ehost Internet Data Center	EHOSTIDC	#1509, STXV Tower, Gasan Digital 1-ro, Geumcheon-gu, Seoul	070-7600-5528	www.ehostidc.co.kr
65	Incheon Airport	IIAC	Incheon Airport, 47, Gonghang-ro, 424beon-gil, Jung-gu, Incheon	032-741-5964	www.airport.kr
66	JND Info	JNDINFO	5F, Gyeongsu-daero 338beon-gil, Gwonseon-gu, Suwon-si, Gyeonggi-do	031-226-9399	www.jndinfo.com
67	GDSYS	GDSYS	2F, B dong, 63, Venture-ro, Yeonsu-gu, Incheon	070-7337-7355	www.gdsys.co.kr
68	Ray Net	RayNet	#106, E-dong, 60, Haan-ro, Gwangmyeong-si, Gyeonggi-do	02-6112-2000	www.raynet.co.kr
69	KDDI Korea	TELEHOUSE SEOUL	136, Sejong-daero, Jung-gu, Seoul	02-310-0461	www.kddi.co.kr
70	KINX	KINXINC	5F, 13, Eonju-ro 30-gil, Gangnam-gu, Seoul	02-2187-6380	www.kinx.net
71	KT	KORNET	90, Buljeong-ro, Bundang-gu, Seongnam-si, Gyeonggi-do	02-500-6630	www.kornet.net

No.	Name	Service Name	Address	Tel.	URL
72	KT	PUBNET	90, Buljeong-ro, Bundang-gu, Seongnam-si, Gyeonggi-do	02-3674-5890	www.pubnet.ne.kr
73	KT	KTFWING	90, Buljeong-ro, Bundang-gu, Seongnam-si, Gyeonggi-do	031-727-1093	www.ktf.com
74	Korea Center.Com	KOREACENTER	#1401, A dong, 168, Gasan Digital 1-ro, Ceumcheon-gu, Seoul	02-2627-6634	www.koreacenter.com
75	Koscom	KOINS	KRX, 76, Yeouinaru-ro, Yeongdeungpo-gu, Seoul	02-767-7148	www.kosocm.co.kr
76	Cross On Net	CROSSONNET	#2305, Daecheong Tower, 623, Gaepo-ro, Gangnam-gu, Seoul	02-6207-6208	www.crson.net
77	Clunet	WIZCDN	#1303, 27, Digital-ro 34-gil, Guro-gu, Seoul	02-2015-3419	www.clunet.co.kr
78	T-broad Ginam	GINAMHANVITNET	139-20, Ihwa-ro, Pyeongtaek-si, Gyeonggi-do	070-8188-1903	www.tbroad.com
79	T-broad Gangseo	GSD	112, Kkachisan-ro, Gangseo-gu, Seoul	070-8188-5083	www.gstv.co.kr
80	T-broad Nakdong	TBROADNAKDONG	8F, 131, Saebyeok-ro, Sasang-gu, Busan	070-8188-9089	www.digitalbusan.net
81	T-broad Namdong	NAMDONGNET	174, Yesul-ro, Namdong-gu, Incheon	070-8188-6092	www.tbroad.com
82	T-broad Daegu	QRIXINTERNET	87-2, Hyeonchung-ro, Nam-gu, Daegu	070-8188-9743	www.tbroad.com
83	T-broad Dongnam	digitalbusanet	10F, 297, Suyeong-ro, Nam-gu, Busan	070-8188-9089	www.digitalbusan.net
84	T-broad Dongdaemun	DONGDAEMUNCA BLEINTERNET	Sejong Bldg., 42, Jegi-ro 38-gil, Dongdaemun-gu, Seoul	070-8188-5770	www.dcnatv.co.kr
85	T-broad Saerom	SAEROMNET	174, Yesul-ro, Namdong-gu, Incheon	070-8188-6092	www.tbroad.com
86	T-broad Seodaemun	QRIXNET	2F, 218, Yeonhui-ro, Seodaemun-gu, Seoul	070-8188-5711	www.tbroad.com
87	T-broad Suwon	TBROAD	336, World cup-ro, Paldal-gu, Suwon-si, Gyeonggi-do	070-8188-1086	www.tbroad.com
88	T-broad ABC	VITSEN	8F Hungkuk Life Insurance Co. Bldg., 194, Simin-daero, Dongan-gu, Anyang-si, Gyeonggi-do	070-8188-3082	www.tbroad.com
89	T-broad Jeonju	JEONJU-HANVITNET	295, Paldal-ro, Wansan-gu, Jeonju-si, Jeollabuk-do	070-8188-8085	www.tbroad.com

No.	Name	Service Name	Address	Tel.	URL
90	T-broad Chungbu	CHUNGBU VITSSSEN	19, Suseonjeong-gil, Dongnam-gu, Cheonan-si, Chungcheongnam-do	070-8188-7086	www.tbroad.com
91	T-broad Hanvit	TBROAD-HANVIT	120, Jeokgeum-ro, Danwon-gu, Ansan-si, Gyeonggi-do	031-480-9449	www.tbroad.com
92	TCN	TCNINTERNET	95-10, Waryong-ro 9-gil, Dalseo-gu, daegu	053-254-2940	www.tcnctv.com
93	Purple Stones	HCLC	5F Lotte Data Communication Company, 179, Gasan digital 2-ro, Geumcheon-gu, Seoul	02-831-0510	www.purplestones.co. kr
94	Piranha Systems	PIRANHA	Smart Valley Knowledge Industry Center, 30, Songdomirae-ro, Yeonsu-gu, Incheon	02-1644-7568	www.piranha.co.kr
95	Hi Line.net	HINETWORKS	3F Sehwa Bldg., 48, Teheran-ro 25-gil, Gangnam-gu, Seoul	02-1544-4450	www.hilineisp.net
96	Haion Net	HAIONNET	EnC Venture Dream Tower 3 Cha, 38-21, Digital-ro 31-gil, Guro-gu, Seoul	02-3281-3456	www.haion.net
97	Korea Institute of Science and Technology Information	KREONet	Yuseong POB #122, 51, Oncheon-ro, Yeseong-gu, Daejeon	042-869-0707	www.kreonet.re.kr
98	Korea Education Network	KREN	Seoul University Computer Center, 1, Gwanak-ro, Gwanak-gu, Seoul	02-880-5364	www.kren.ne.kr
99	Korea Education and Research Information Service	EDUNET	64, Dongnae-ro, Dong-gu, Daegu	053-714-0266	www.keris.or.kr
100	Korea Data	KDATA	325, Hyundai Hyel, 438, Gyeongsu- daero, Paldal-gu, Suwon-si, Gyeonggi-do	031-234-0445	-
101	KDTIDC	KDTIDC	8F, Sindorim Techno Mart, 97, Saemal-ro, Guro-gu, Seoul	02-2062-7671	www.kdtidc.com
102	KTNET	KTNET	511, Yeongdong-daero, Gangnam-gu, Seoul	02-6000-2705	www.ktnet.co.kr
103	KICA	SINGGATE	Nurikkum Square Business Tower, 396, World Cup buk-ro, Mapo-gu, Seoul	02-360-3118	www.signgate.com
104	KISA	KOREN	NIA Bldg., 14, Cheonggyecheon-ro, Jung-gu, Seoul	02-2131-0466	www.ngix.ne.kr
105	KCTV Gwangju	KCTVNET	Namhwa Bldg., 146, Geumnam-ro, Buk-gu, Gwangju	062-417-6070	www.kctv.co.kr
106	Green Cable Television Station	GCS	1611, Dalgubeol-daero, Dalseo-gu, Daegu	070-8145-6143	www.gcs.co.kr
107	KCTV Seodaegu	SEODAEGU CLEANNET	3F, 23, Waryong-ro 84-gil, Seo-gu, Daegu	053-567-6000	www.scs5.co.kr

No.	Name	Service Name	Address	Tel.	URL
108	Hansol NexG	VAAN	16F Nurikkum Square Business Tower, Sangam-dong, Mapo-gu, Seoul	02-2016-0834	www.hansolnexg.com
109	Hanil Networks	TTNet	13F Kolon Digital Tower Villant Bldg., 30, Digital-ro 32-gil, Guro-gu, Seoul	02-2101-0150	www.tt.co.kr
110	HCN	HCN	HCN Bldg., 19, Banpo-daero, Seocho-gu, Seoul	070-8109-1656	www.hcn.co.kr
111	Host Way IDC	HOSTWAY	2F, 36, Jangmi-ro, Budndang-gu, Seongnam-si, Gyeonggi-do	070-8630-1534	www.hostway.co.kr
112	Hyosung ITX	HYOSUNGCDN	16F, Ire Bldg., 57, Seonyudong 2-ro, Yeongdeungpo-gu, Seoul	02-6288-6507	www.hyosungitx.com
113	JCN	JCN	76, Sinjeong-ro, Nam-gu, Ulsan	070-8121-9547	www.jcntv.co.kr
114	KCTV Jeju	CABLENET	2, Ayeon-ro, Jeju-si, Jeju-do	070-8145-7747	www.kctvjeju.com

## Abbreviations

6NGIX	IPv6 Next Generation Internet Exchange	HTML	HyperText Markup Language
<b>A</b>		<b>I</b>	
APII	Asia-Pacific Information Infrastructure	IaaS	Infrastructure as a Service
AS	Autonomous System	IAR	Internet Address Resource
ASP	Application Service Provider	ICT	Information & Communication Technology
<b>B</b>		IoE	Internet of Everything
BcN	Broadband converged Network	IoT	Internet of Things
<b>C</b>		IP	Internet Protocol
ccTLD	country code Top Level Domain	IRNC	International Research Network Connection
<b>D</b>		ISDN	Integrated Service Digital Network
DDoS	Distributed Denial of Service	ISP	Internet Service Provider
DNS	Domain Name System	ITR	International Telecommunication Regulations
<b>F</b>		<b>K</b>	
FTTH	Fiber To The Home	KOREN	KOrea advanced REsearch Network
<b>G</b>		KREONET	Korea Research Environment Open NETwork
GENI	Global Environment for Network Innovations	<b>L</b>	
GLORIAD	GLObal Ring network for Advanced application Development	LAN	Local Area Network
GPS	Global Positioning System	LTE	Long Term Evolution
gTLD	generic Top Level Domain	<b>M</b>	
<b>H</b>		M2M	Machine to Machine
HFC	Hybrid Fiber Coax	MIM	Mobile Instant Messenger
		MIMO	Multiple Input Multiple Output
		MOOC	Massive Open Online Course

## N

NFC	Near Field Communication
NFV	Network Function Virtualization
NOC	Network Operations Center

## O

OSMU	One Source Multi Use
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## P

PPS	Page Profit Share
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## Q

QC	Query Count
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## R

RFID	Radio Frequency Identification
RFP	Request For Proposal
RSS	Really Simple Syndication

## S

SaaS	Software as a Service
SDN	Software Defined Network
SMS	Short Message Service

## T

TEIN	Trans Eurasia Information Network
TPS	Triple Play Service

## U

USN	Ubiquitous Sensor Network
-----	---------------------------

## V

VLBI	Very Long Baseline Interferometry
VSAT	Very Small Aperture Terminal

## W

WCIT	World Conference on International Telecommunications
Wi-Fi	Wireless-Fidelity
WLAN	Wireless Local Area Network
WPAN	Wireless Personal Area Network
WWAN	Wireless Wide Area Network

## X

xDSL	xDigital Subscriber Line
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## Organization Abbreviations

### A

APEC Asia Pacific Economy Cooperation

### C

CGI.br Comite Gstor da Internet no Brasil

CIA Central Intelligence Agency

### E

ETRI Electronics and Telecommunications  
Research Institute

EU European Union

### I

IANA Internet Assigned Numbers Authority

ICANN Internet Corporation for Assigned Names  
and Numbers

ICASA Independent Communication Authority of  
South Africa

IETF Internet Engineering Task Force

ISO International Organization for  
Standardization

ITU International Telecommunication Union

ITU-D International Telecommunication  
Union-Development Standardization  
Sector

ITU-T International Telecommunication  
Union-Telecommunication Standardization  
Sector

### K

KAIST Korea Advanced Institute of Science and  
Technology

KATS Korean Agency for Technology and  
Standards

KCC Korea Communications Commission

KISA Korea Internet & Security Agency

KISTI Korea Institute of Science and  
Technology Information

KISTI Korea Institute of Science and  
Technology Information

KOCCA Korea Creative Content Agency

KRNIC Korea National Information Center

### M

MCST Ministry of Culture, Sports and Tourism

MND Ministry of National Defense

MOE Ministry Of Education

MOGEF Ministry Of Gender Equality & Family

MOJ Ministry Of Justice

MSIP Ministry of Science, ICT and Future  
Planning

MW Ministry of Health & Welfare

### N

NASA National Aeronautics and Space  
Administration

NIA National Information society Agency

NIC National Intelligence Council

NSA National Security Agency

NSF National Science Foundation

NTIA National Telecommunications and  
Information Administration

## O

OECD Organization for Economic Cooperation  
and Development

## S

STC Special Technical Committee

## T

TTA Telecommunications Technology  
Association

## U

UN United Nations

## W

WCIT World Conference on International  
Telecommunications

WEF World Economic Forum

WSIS World Summit on the Information Society

WTPF World Telecommunication/ICT Policy  
Forum

## 2014 Korea Internet White Paper

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