

***Korea Internet & Network Strategy  
: Preparing for the Future***

***Korea Communications Commission  
Director, Kim, Jung Ryul***

# Past, Present & Future of Internet

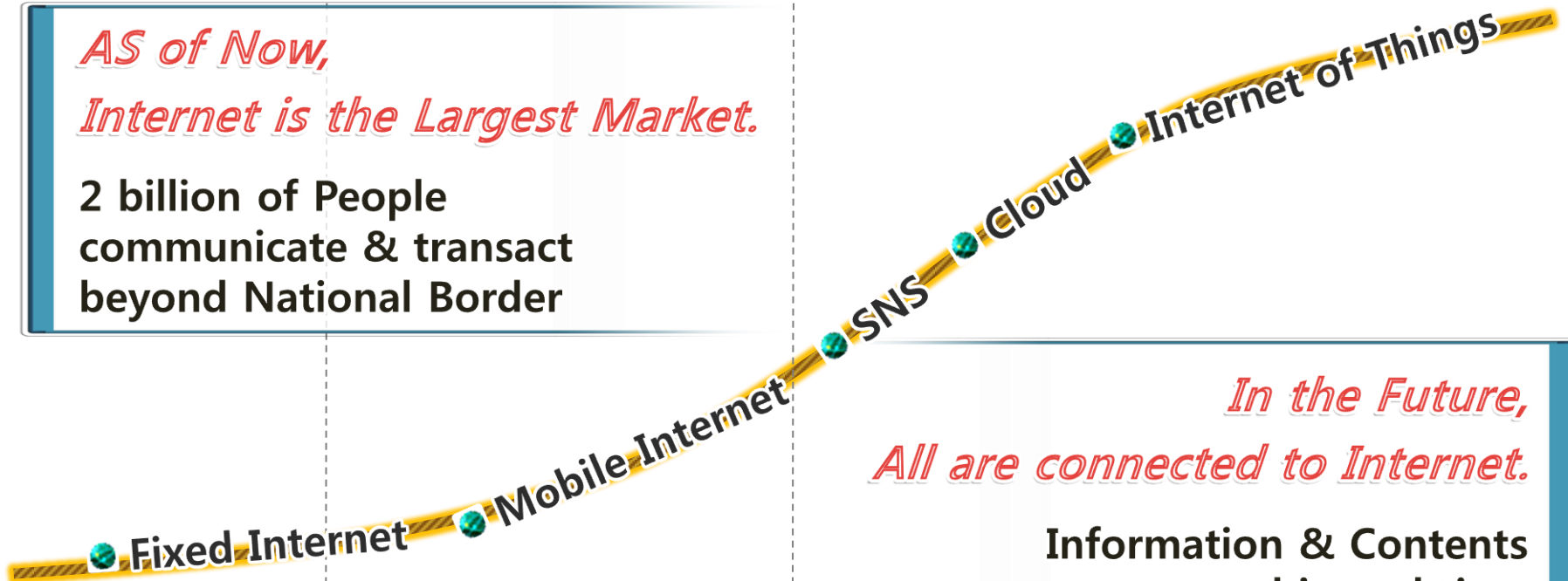
1990's

2000's

Present ~ 2020

*AS of Now,  
Internet is the Largest Market.*

2 billion of People  
communicate & transact  
beyond National Border



*In the Future,  
All are connected to Internet.*

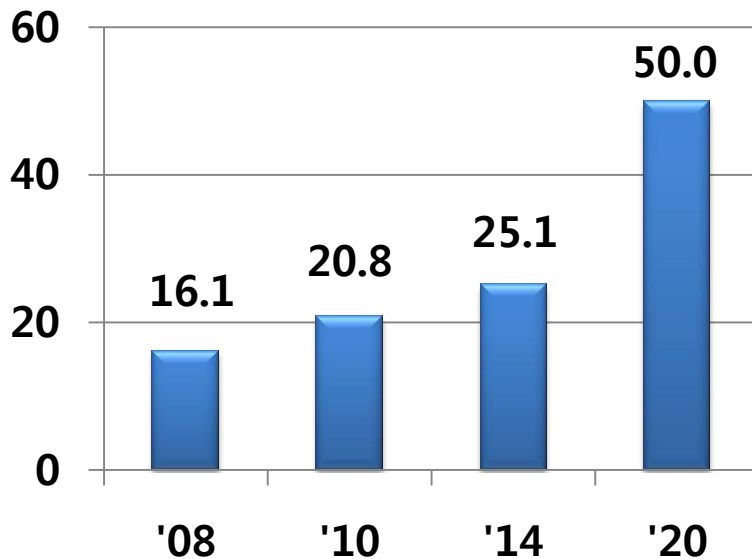
Information & Contents  
spread in real time  
to 5 billion of People & Things

# Growth of Internet Economy

## Global Internet Users

**5 billion Users (2020)**

Unit : 100 mil. People



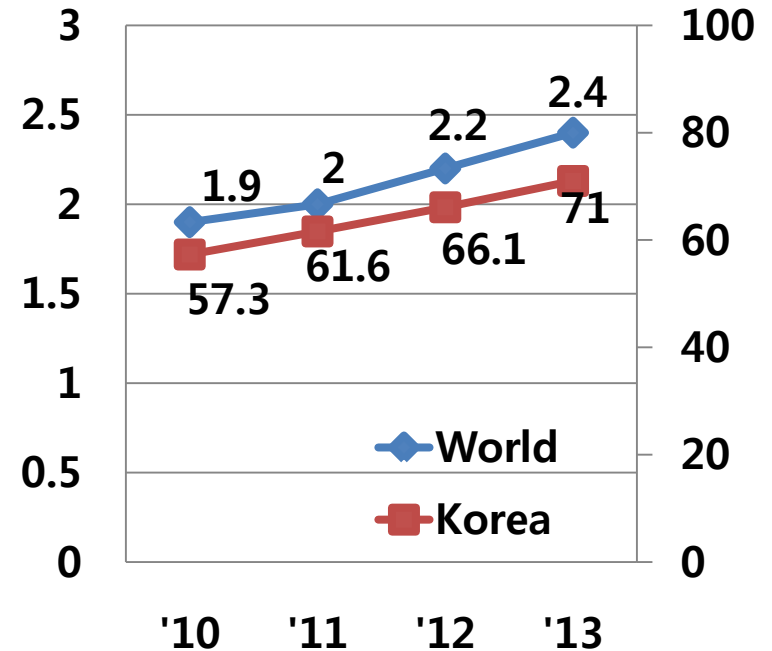
\* Source : NSF (2010) & eTForecasts (2010)

## Global Internet Industry

**\$ 2.4 trillion Mkt (2013)**

Unit: trillion \$

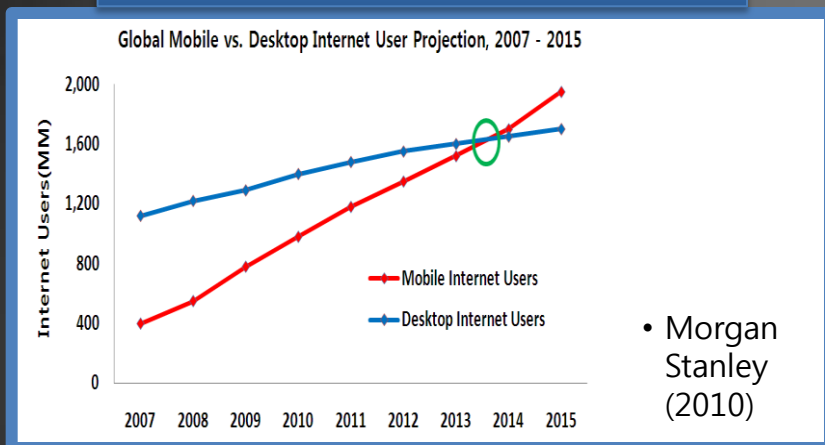
Unit: trillion Won



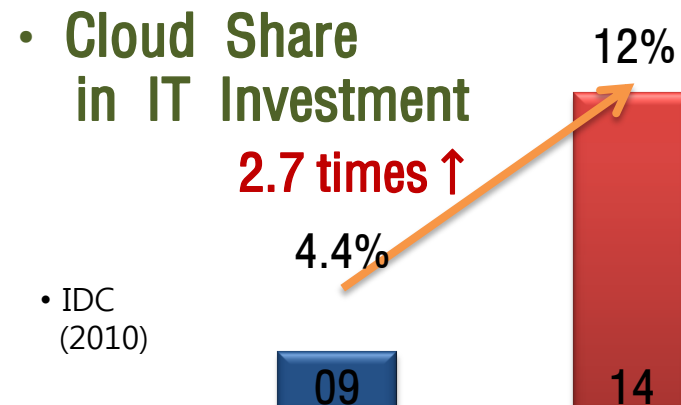
# Advent of New Services

\* IDC (2010)

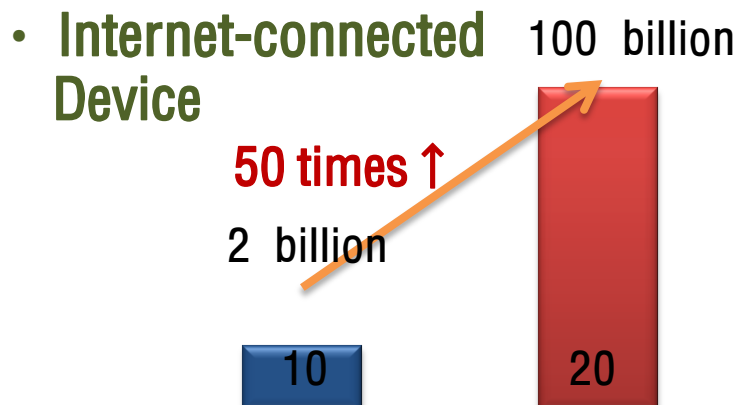
## Mobile Internet



## Cloud Service



## Internet of Things



## Smart Work

- **US** : 62% Fed. Gov't Officials
- **UK** : 87% BT Employees
- **Netherlands** : 49% Businesses

# Vision

*Next 10 years, Internet Global Leader*

*- \$ 470 mil. from Gov't & \$ 33 bil. from Private (~2015) -*

User

*World-Fastest Internet Service (100 times Faster)*

Company

*Enhanced Global Competitiveness of Business*

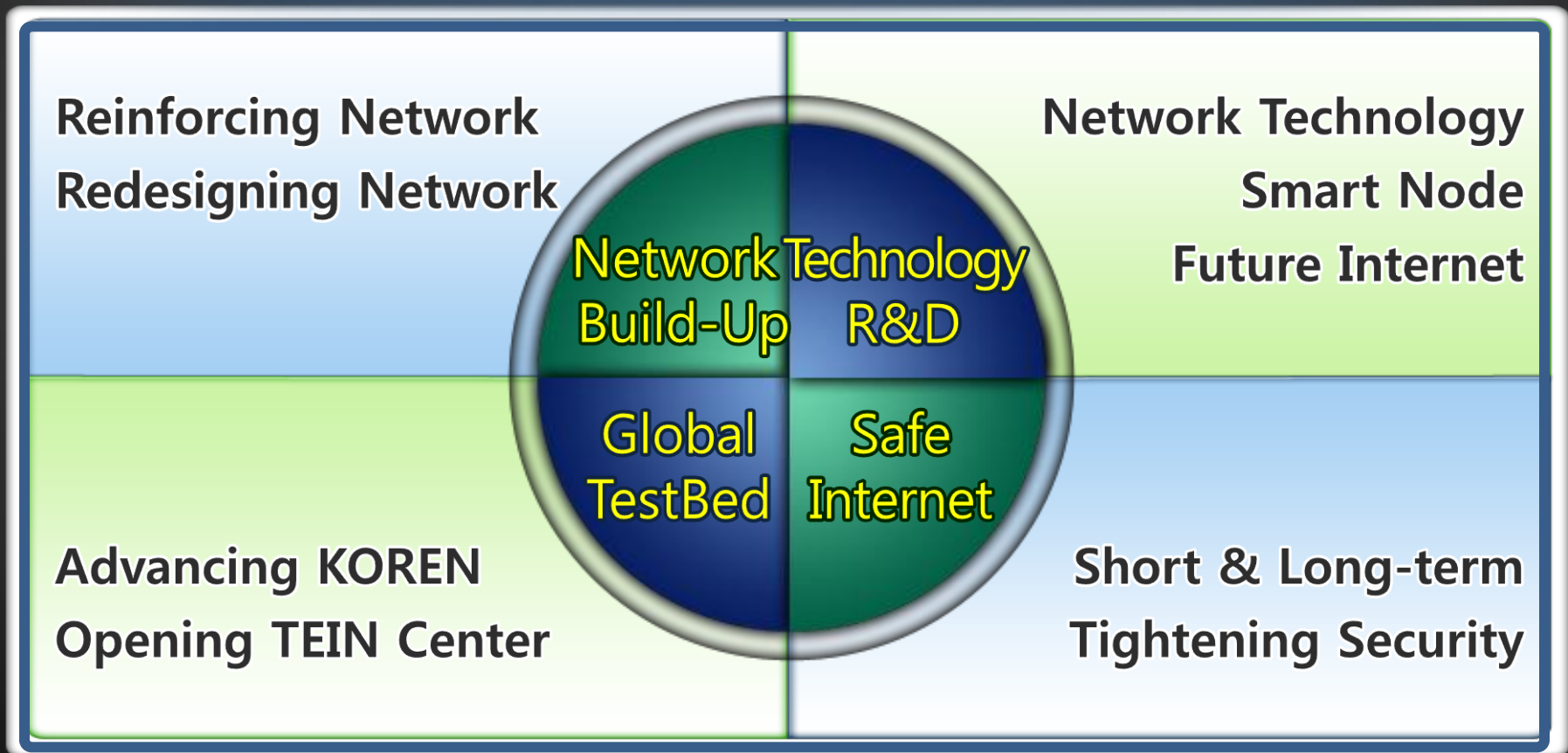
Nation

*More GDP & Jobs (36,000 Jobs More for 5 years)*

# Policy Agenda

## *Virtuous Circle of Policy*

*- Network · Technology · Testbed · Security -*

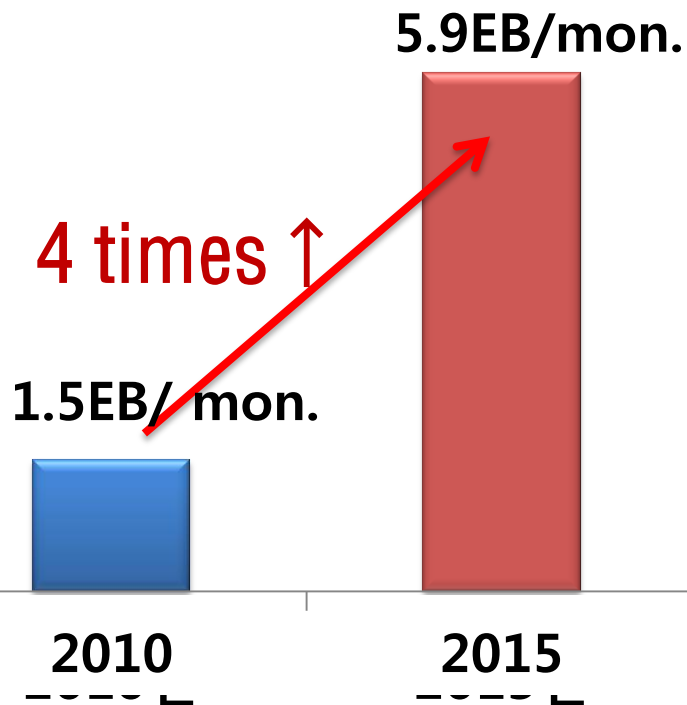


# ***1. Network Build-Up***

# 1.1 Fixed Network : Giga-bps and above

*In 10 years, FTTH to All : 100 times Faster*

## Total Traffic (Fixed)



1Gbps per Household (12)

### ✓ FTTH in Major Cities

\* *HD Movies on TV Screens in Real Time*

- Full-HDTV..

10Gbps per Household (20)

### ✓ FTTH in All Households

• *3-D HD on Large Screens in Real Time, seamlessly*

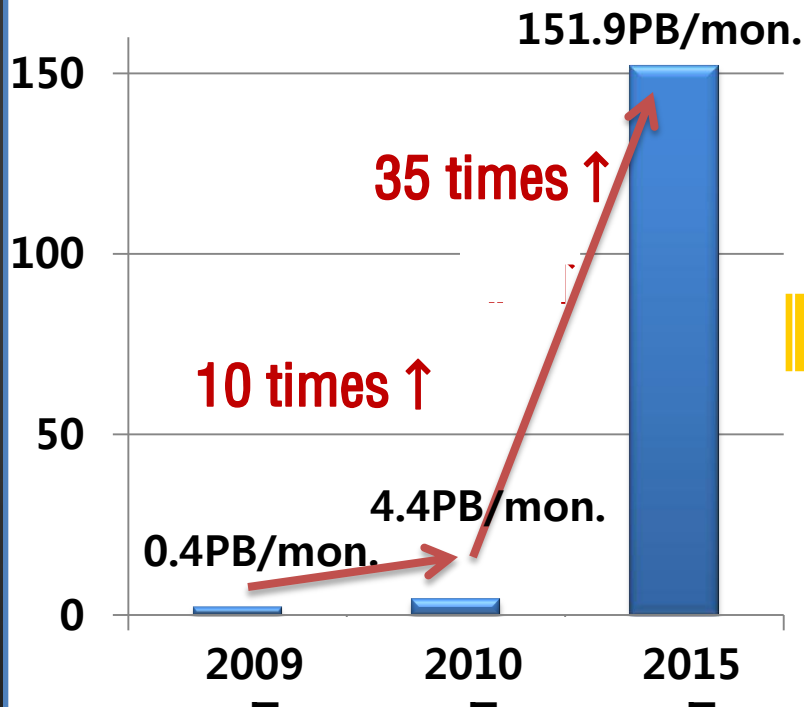
- Hologram, Virtual Reality..



# 1.2 Mobile Network : Faster & Broader

## Advancing Mobile Broadband Communication & WiFi

### Total Traffic (Mobile)



2012

Mobile 5Mbps / WiFi 600Mbps

- ✓ 3.9G LTE all over the Country
- ✓ High-speed WiFi (2mil. Nodes~)  
Femto-Cell (10,000 Nodes~)

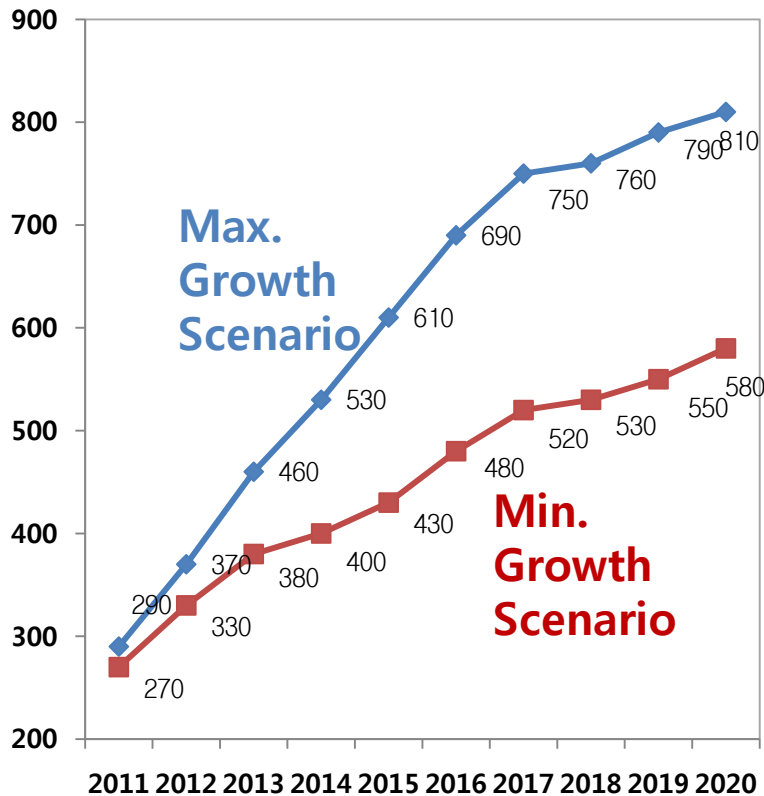
2020

Mobile 60Mbps~ / WiFi 1~10Gbps

- ✓ Next-Generation Mobile N/W
- => *Seamless Service  
despite Increase  
in Users & Movement*

# 1.3 Securing More Frequency

## Demand for Frequency



### ✓ Frequency Bandwidth

: Demand >>> Supply

## Future Direction

### ✓ As of Now

270MHz  
for Mobile Providers

\* 50MHz for 4G

### ✓ In the Future

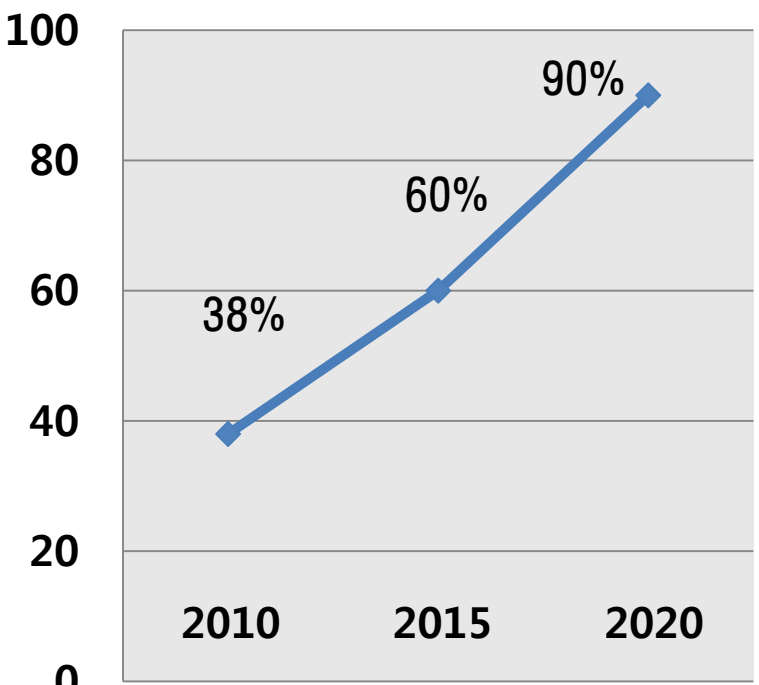
Securing 200~300MHz

- \* *Rearranging Public Band*
- \* *Analog TV Channel 108MHz*
- \* *White Space..*

# 1.4 Background : Redesigning N/W Structure

## Video Contents Explosion

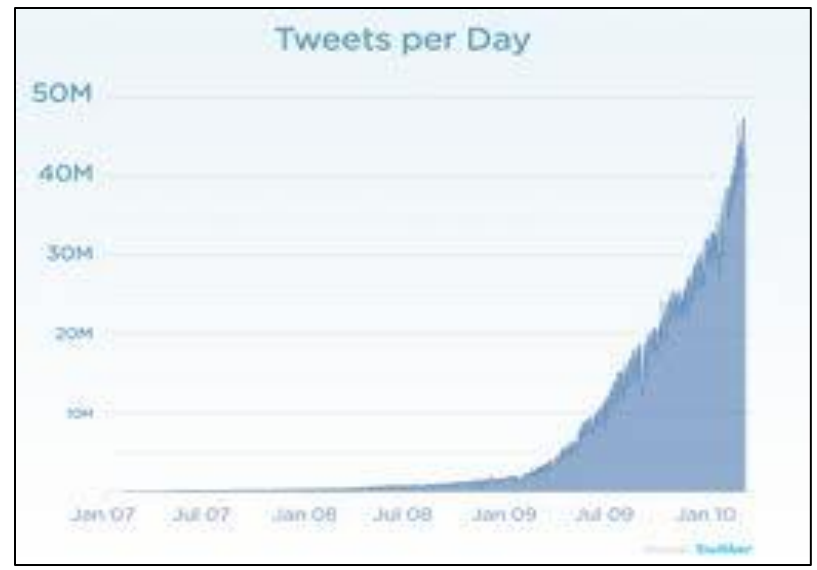
### Share of Video Traffic



✓ 90% of Total Traffic in 2020

## Rise of Big Data

### Amount of Tweet per Day



✓ 110 mil. Tweets daily in 2010

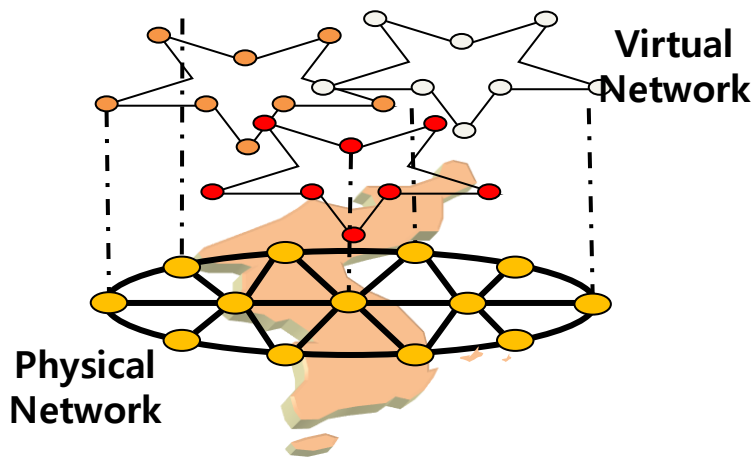
# 1.5 Redesigning Network Structure

## Network Virtualization

- ✓ Physical Base  
-> Virtual Base

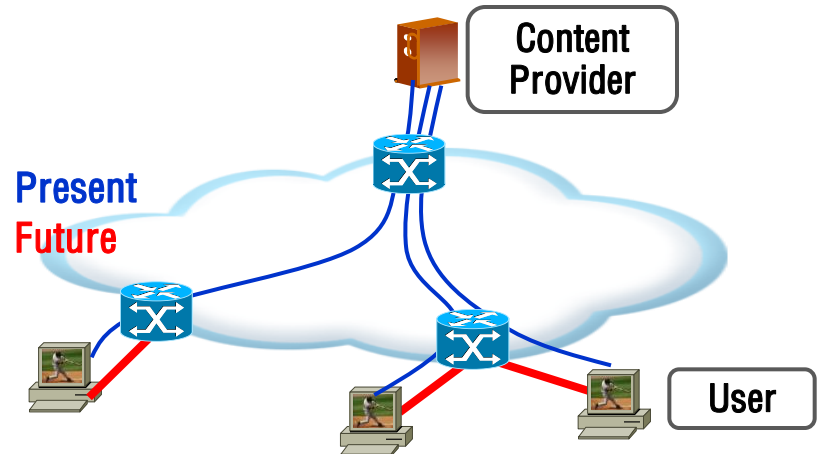
### \* Telemedicine

*100 Mbps Normally ->  
1~10Gbps during Surgery*



## Network Decentralization

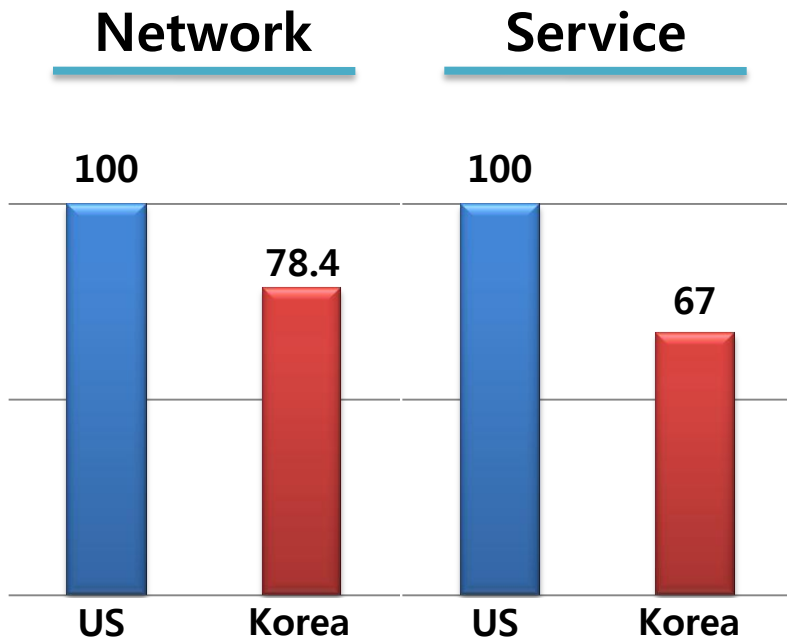
- ✓ Centralized Contents  
-> Locally Distributed
- \* *Downloading Video Contents  
from the Node  
closest to Home*



## *2. Technology R&D*

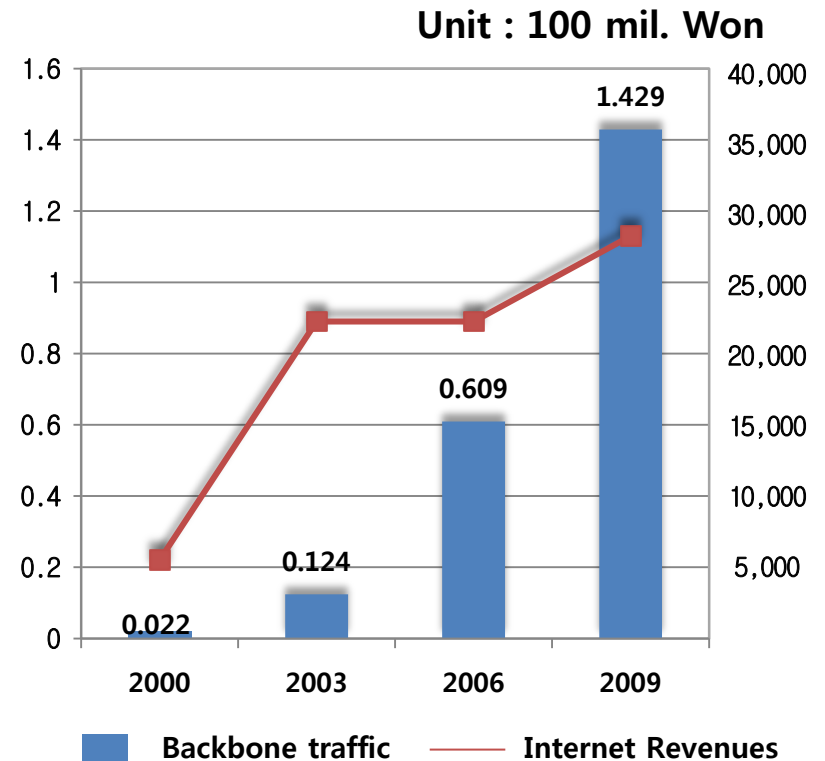
# 2.1 Current Status

## Technology Level



=> 3~4 Years Technology Gap between US & Korea

## Limit in N/W-based Model



=> Growth Rate : Traffic >>> Revenue

## 2.2 Developing Network Technology

### *Preparing for Network Traffic Explosion High-Performance Network Equipment*

#### Fixed Network Technology

✓ WDM-PON Technology

2.5Gbps (2012)

=> 10Gbps (2015)

✓ Packet-Optical  
Integrated Switch

Dozens of Tbps (2012)

=> Hundreds of Tbps (2015)

#### Mobile Network Technology

✓ High-Speed WiFi Technology

2Gbps (2012)

=> 1~10Gbps (2015)

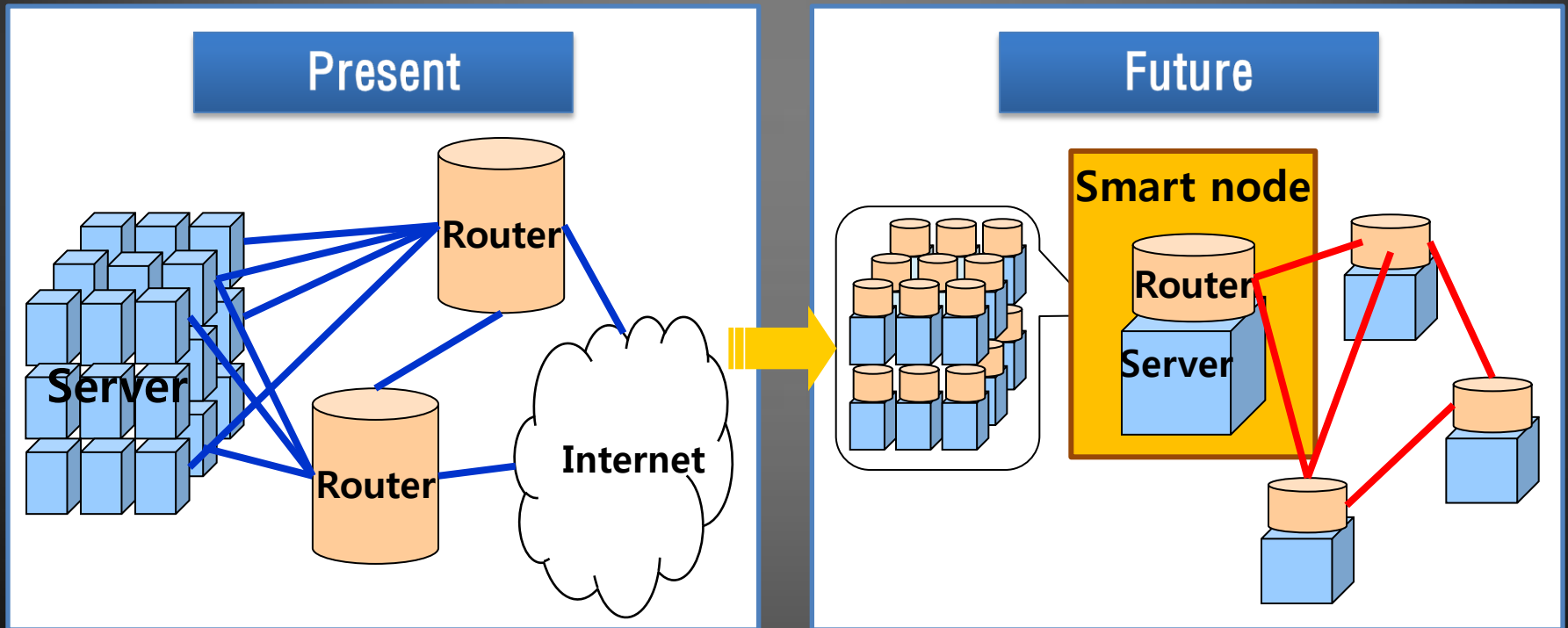
✓ Next-Generation  
Mobile Communication

60Mbps~ per Subscribers

10~100Gbps per Node  
(2015~2020)

## 2.3 Smart Node

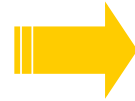
- *Integrating Router & Server (Storage)*
- *Open Software Platform*
- *Joint R&D : Vendor, Telco, ETRI, University*





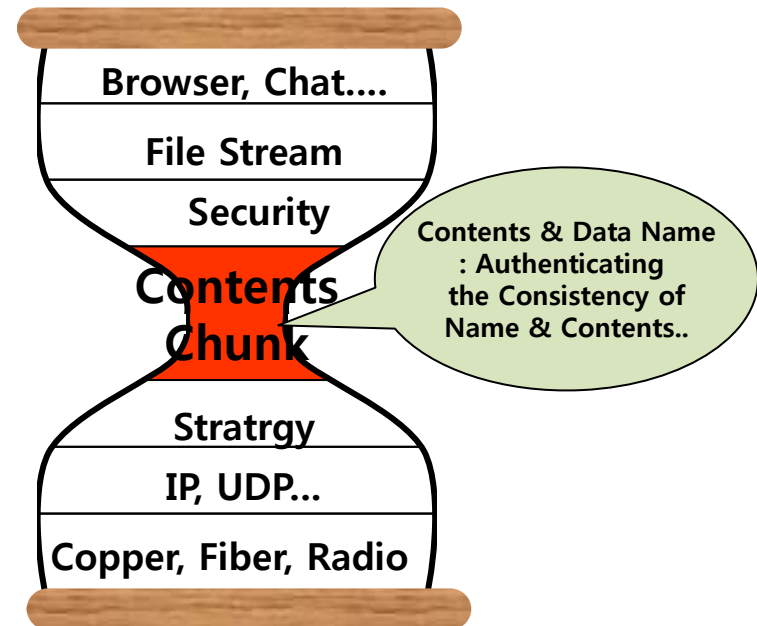
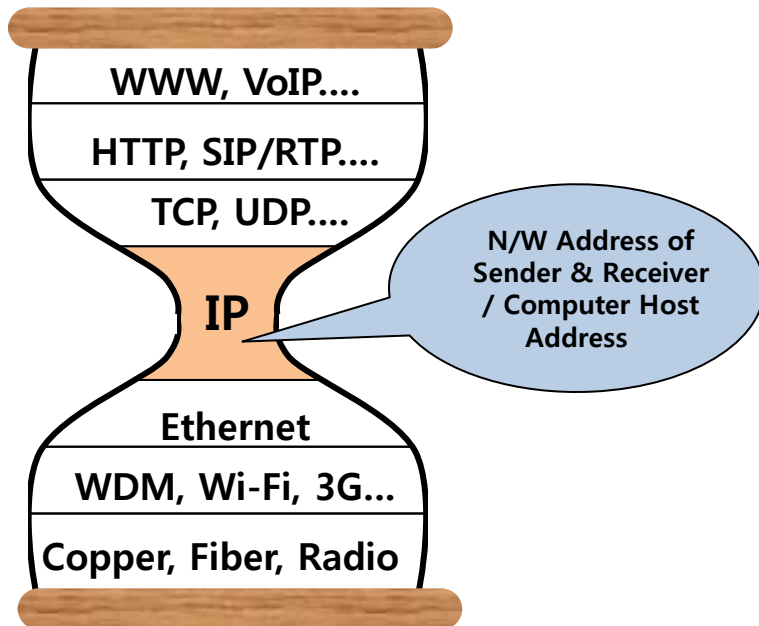
# 2.4 Future Internet Technology : NDN

IP & Where-Based



Name & What-Based

- Seoul National University \$ 1.6 mil. (2011~2013)

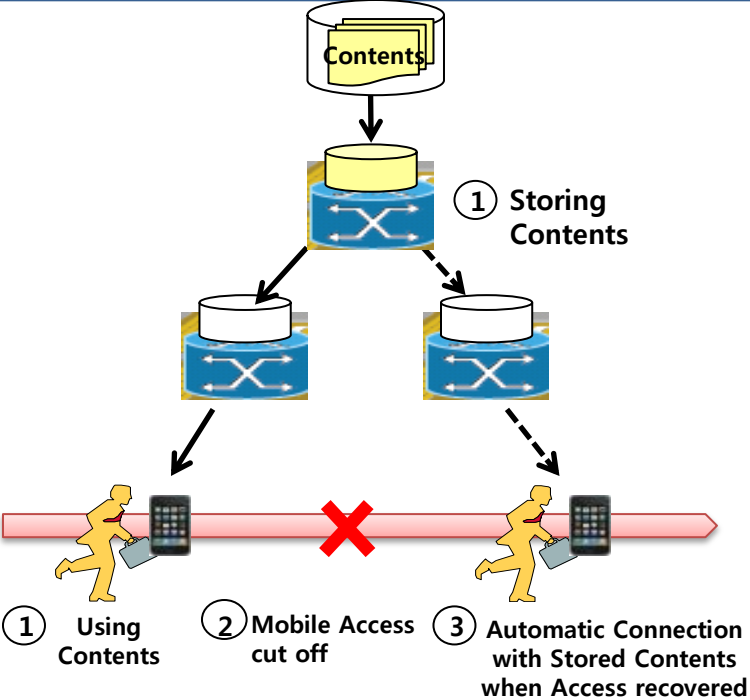


# 2.5 Future Internet Technology : DTN & Network Virtualization

## DTN

Incomplete → Complete Mobility

- KAIST \$ 1.3 mil. (2011~2013)



## N/W Virtualization

Physical N/W → Virtual N/W

- ETRI \$ 1.3 mil. (2011~2013)

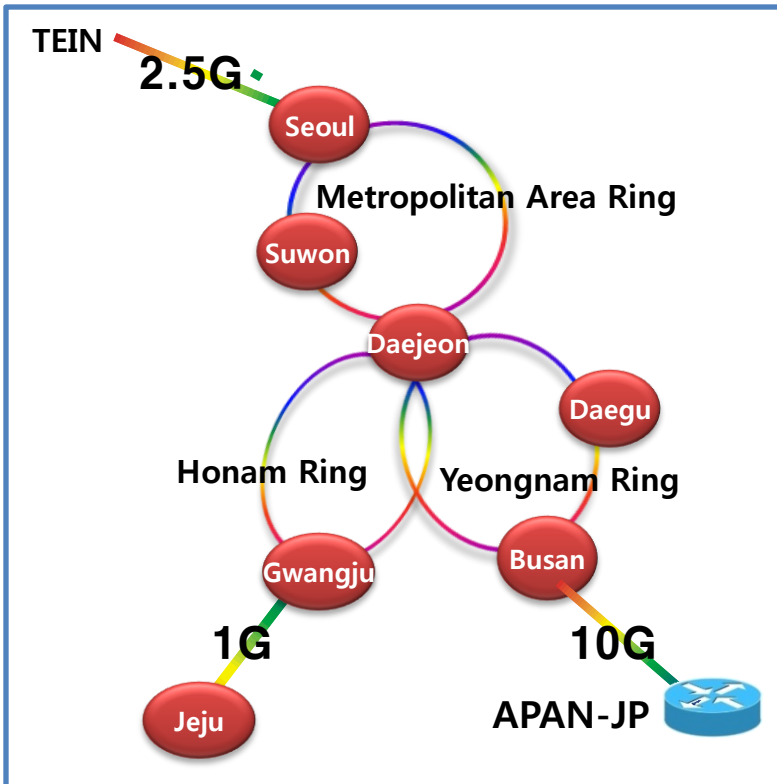
- Virtualization of N/W Resource (Router, Switch, Bandwidth..)  
: *Creating, Removing, Combining & Subdividing N/W depending on specific Service*
- Example  
: *Virtual Cloud Networking*

### ***3. Global Testbed***

# 3.1 Advancing KOREN

## Current KOREN

*Testbed for N/W Tech. & Application  
: Open in 1995*



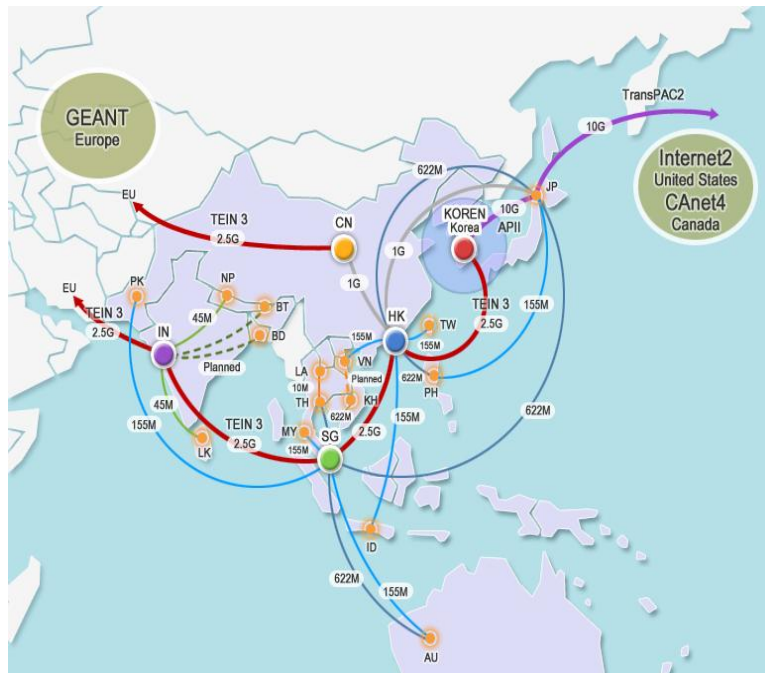
## Future Direction

- ✓ *Seoul-Daejeon 20Gbps (2011)  
=> Nationwide 100Gbps (2015)*
- ✓ *Star-type Topology  
=> Ring-type Topology*
- ✓ *60 Subscriber Lines (2011)  
=> 300 Subscriber Lines (2015)*
- ✓ *Testing Internet R&D Results  
\* Open Flow Switch..*

# 3.2 Opening TEIN Cooperation Center

## TEIN

*Trans-Eurasia Information Network*  
*- Super High-Speed R&D Network -*  
*: Asia 19 countries, EU 34 countries*



## TEIN Cooperation Center

- ✓ *Open in March 2012*
- ✓ *ASEM-affiliated Organization*
- ✓ *Located in Seoul, Korea*
- ✓ *10Mbps~100Gbps Lines*
- ✓ *Attracting New Members*  
*\* Myanmar, Mongolia..*

*Welcome to TEIN & Korea*

## 3.3 Global Cooperation

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### Testbed Cooperation Program

- *Advancing the Connection with Global Networks*
  - ✓ APII (Asia Pacific Information Infrastructure) : 10Gbps => 20Gbps
- *International Joint R&D on KOREN & TEIN with...*
  - ✓ US - GENI, Internet 2
  - ✓ EU - FP 7, Korea-EU S&T Joint Committee
  - ✓ Japan - NwGN, AKARI
- *Cooperating with Asian Developing Countries*
  - ✓ e-TEIN Project (\$680,000) : Video Conference, Distance Education..

## ***4. Safe Internet***

# 4.1 Safe Internet : Short-term Policy

## Frequent Cyber Attacks

### DDos & N/W Down

36 Sites Attack (09. 7)  
40 Sites Attack (11. 3)  
Nonghyup Bank (11. 4)

### Personal Information Leak

Hyundai Capital (11. 4)  
SK Communications (11. 7)  
Nexon (11. 11)

## Reinforcing Security

- ✓ Holding Cyber Attack Drill
  - \* 4 times per Year
- ✓ Daily Check on Malware
  - \* 1.8 mil. High-Risk Sites
- ✓ Safe Haven for DNS Attacks
  - \* 50 Companies=>100 Companies
- ✓ Distributing Vaccines to People
  - \* At the time of DDoS Attack..



## 4.2 Safe Internet : Long-term Policy

### ✓ *Network with embedded Security*

Vulnerable to DDos Attack



*Diverting Attacking Traffic  
in Real Time*

Difficult to Trace Attackers



*Auto-Tracing System  
for Cyber Attackers*

Burdensome Authentication  
for Various Services



*One-time Authentication  
for Various Services*

Low in Adopting Encryption  
\* Slowing down System



*Developing & Spreading  
High-Performance Encryption*

*Thank you !*