

Broadband Network Penetration

Challenges for Future: Lessons from Experiences of Japan

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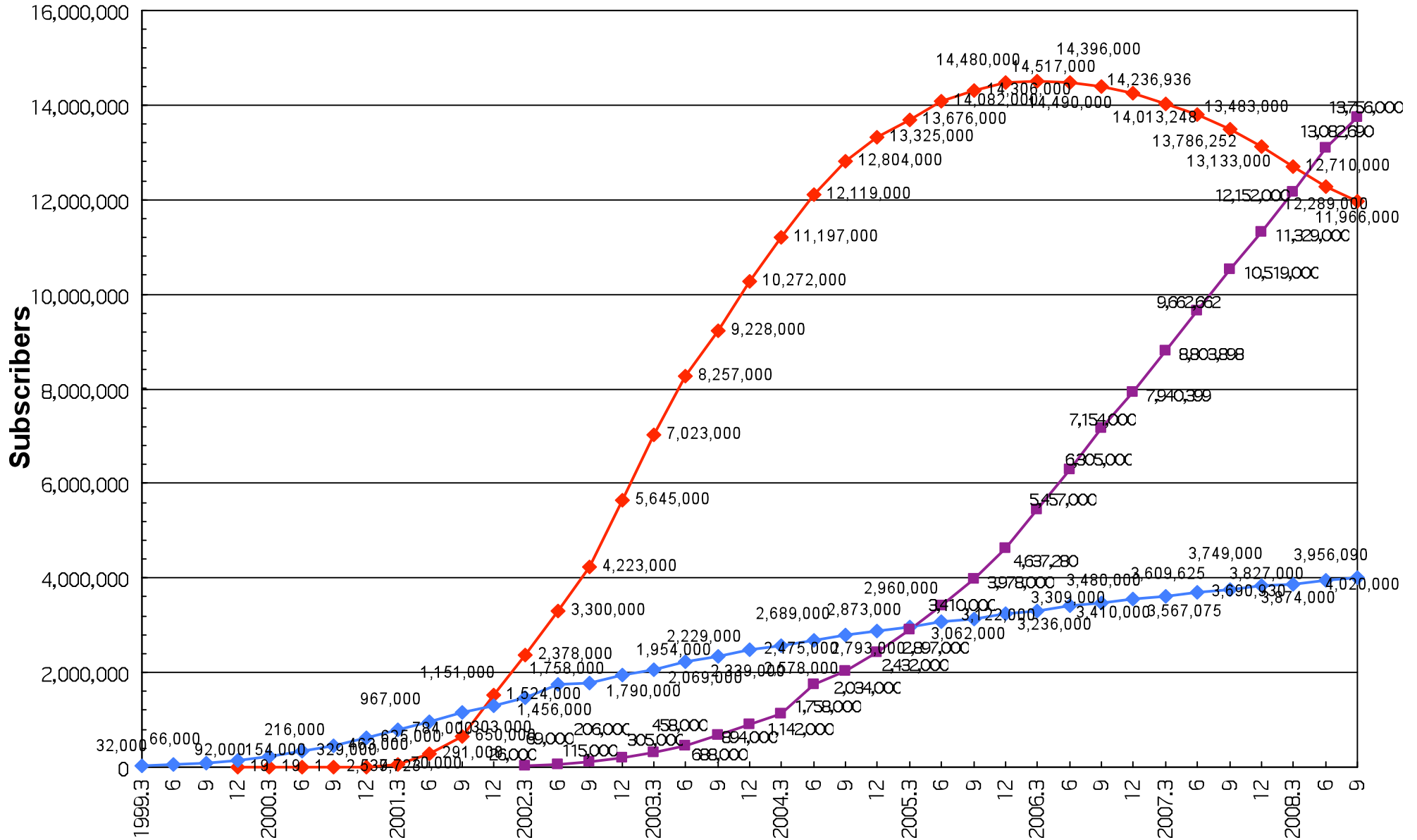
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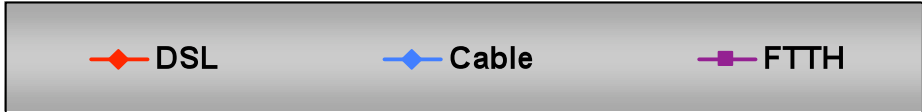
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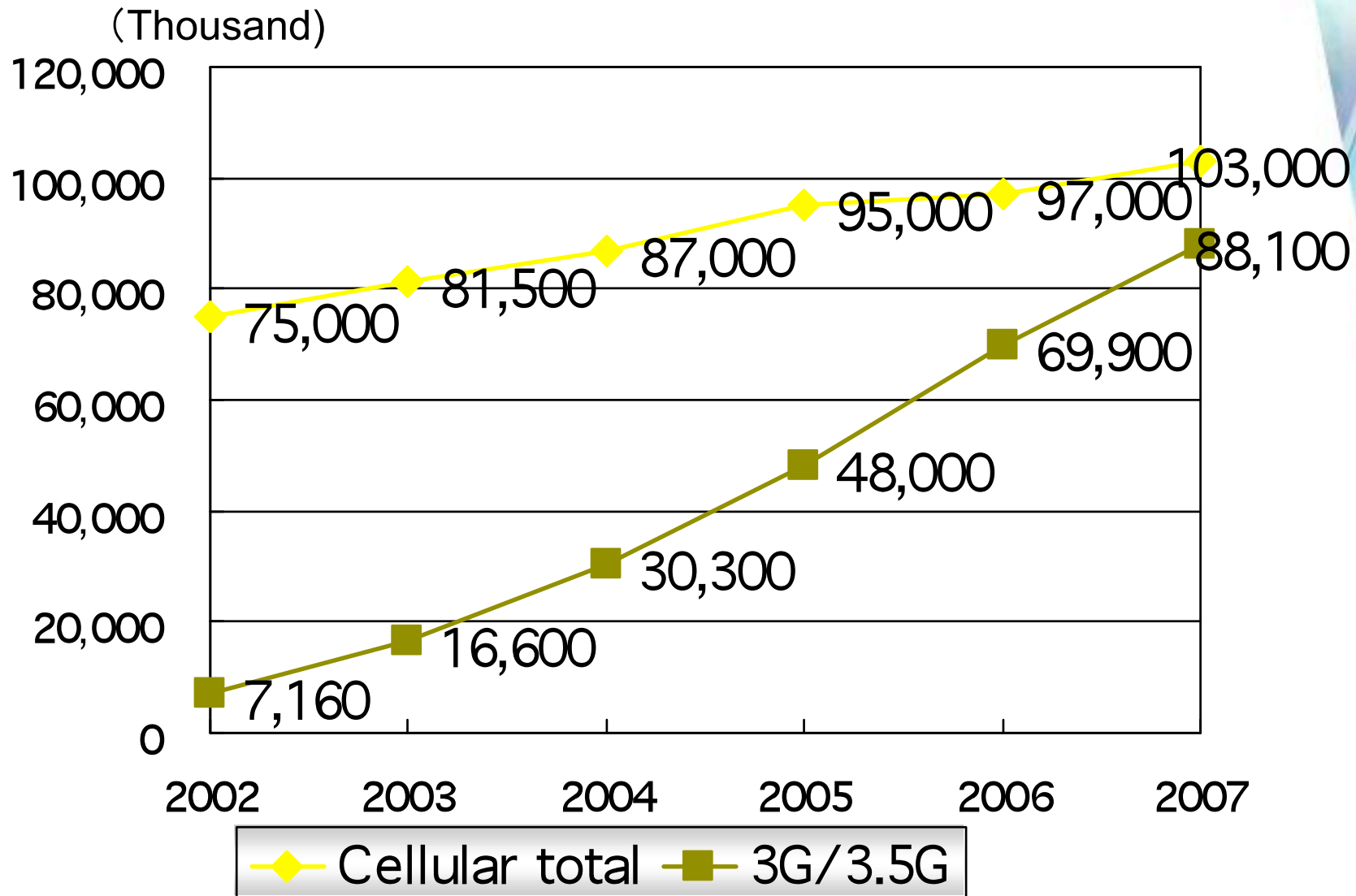
Broadband User in Japan



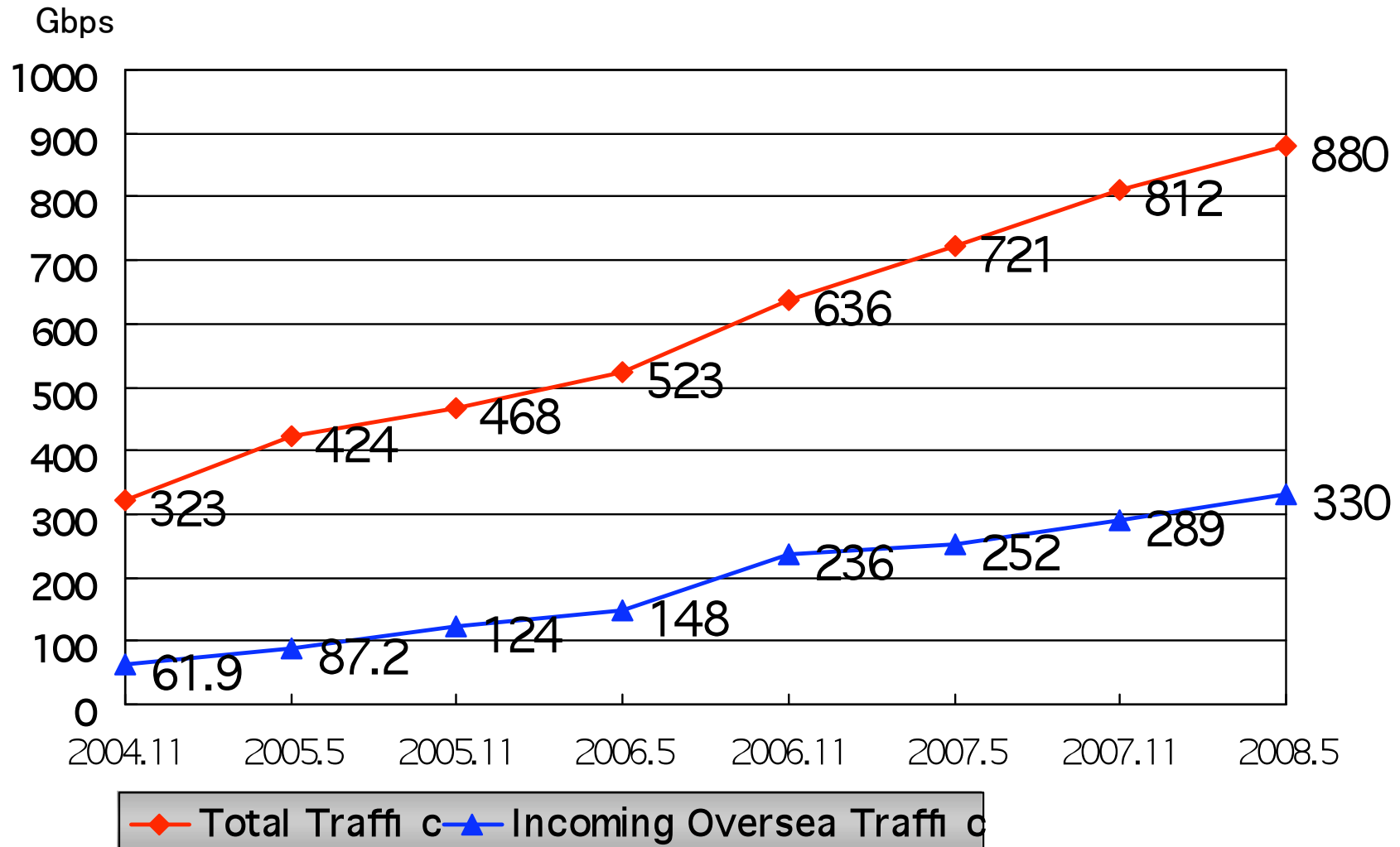
<http://www.soumu.go.jp/s-news/2005/051129.3.html>



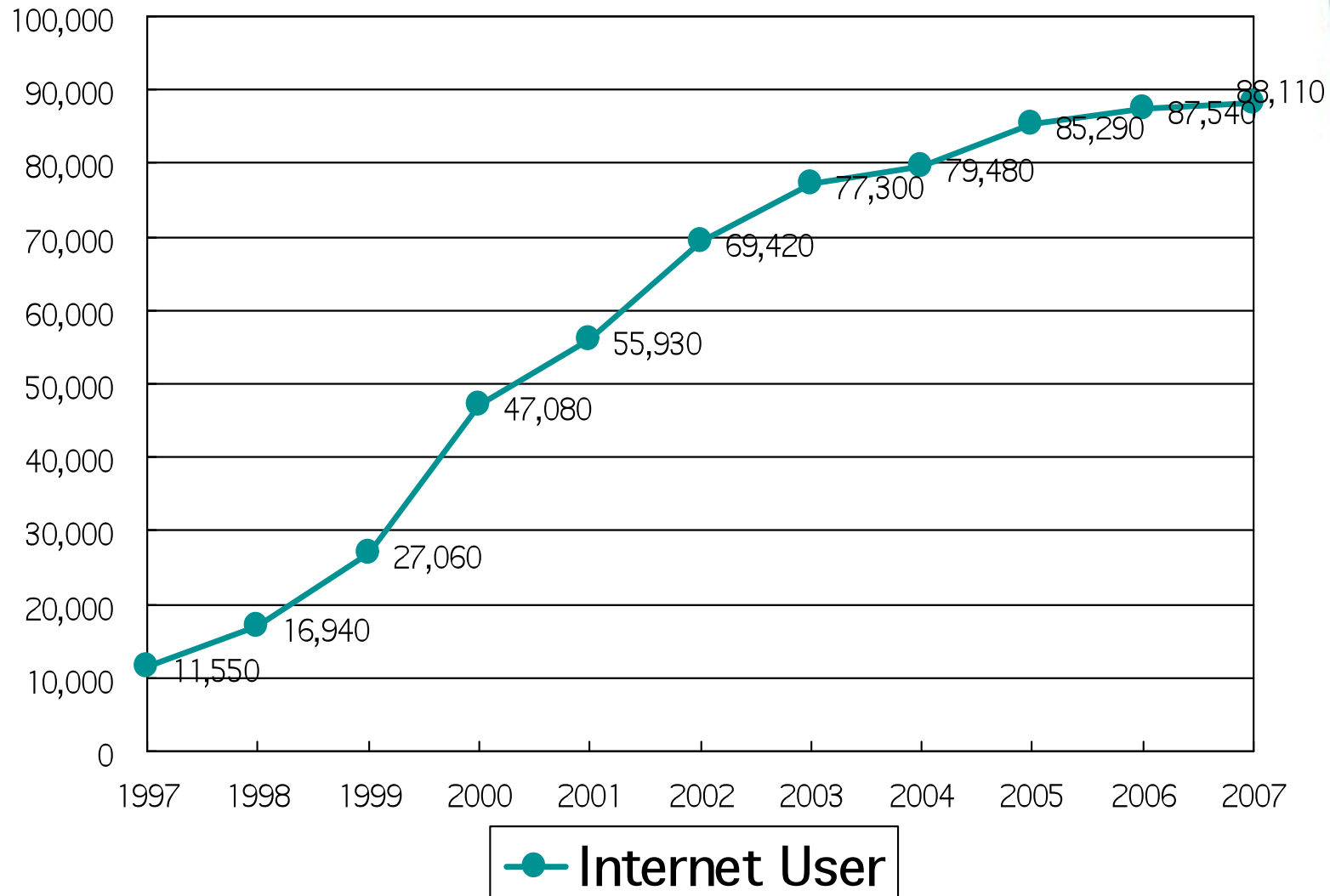
Mobile Broadband Users



Total Internet Traffic in Japan



Internet Users in Japan



Use Mode of Internet (2007)

Thousand users

PC	78,130	(88.7%)
Cell phone	72,870	(82.7%)
Game machine	3,580	(4.1%)
Use All	59,930	(68%)
PC only	14,690	(16.7%)
Cell phone only	9,920	(11.3%)

Short History of Telecommunication Policy

1985 Privatization of NTT incumbent carrier

1986 ISDN

1990' s Started B-ISDN and installation of optical fiber subscriber line

Mid 1990' s Subscriber carrier system using optical fiber

2000' s ADSL unbundling of copper wire world lowest collocation fee
\$1.5/month

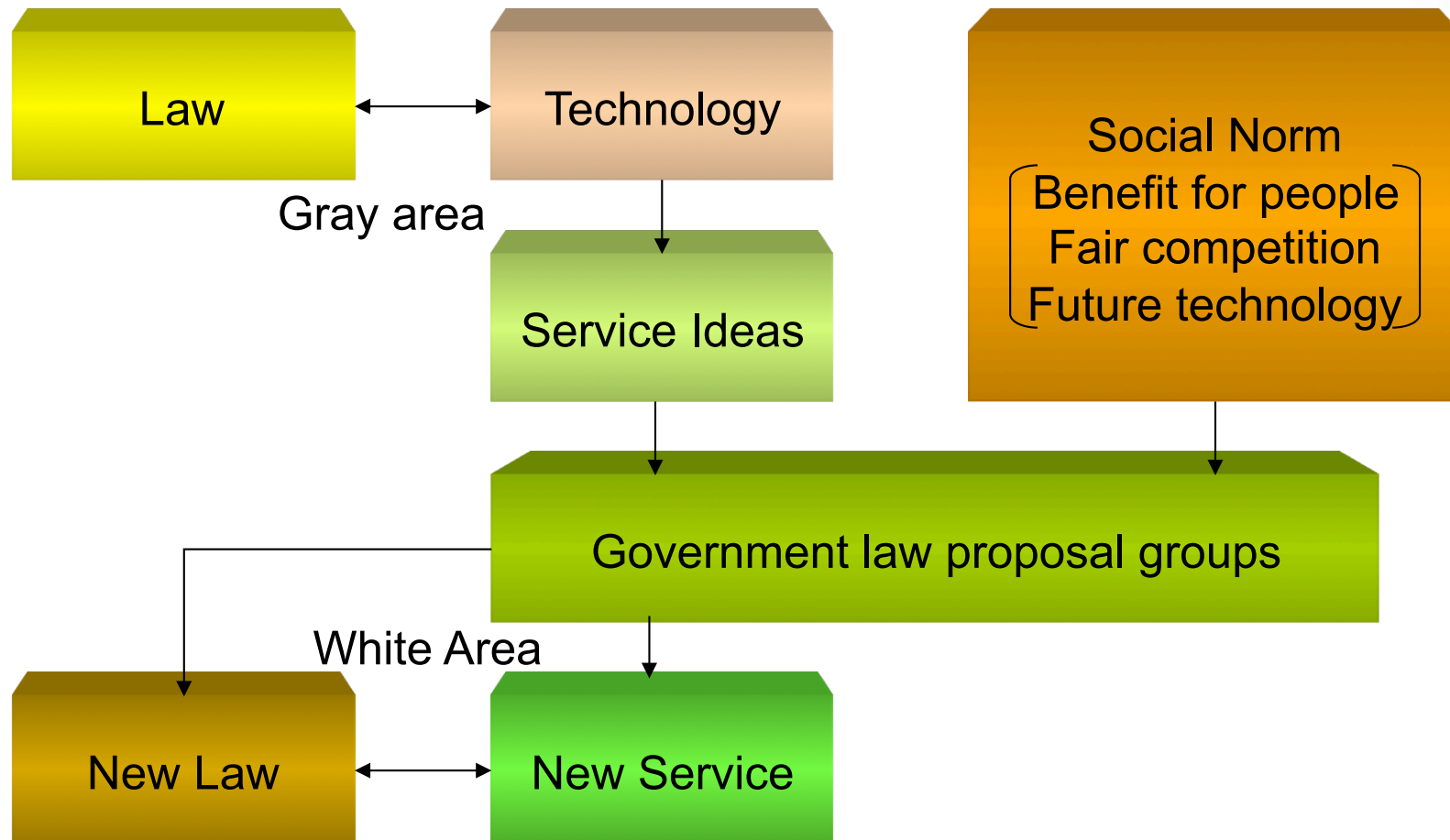
2004 Competitive optical fiber price

Position of the Author on Broadband Penetration Policy of Japan

- 1985–2004: member of telecommunication council of MIC, Japan
- 1985–2002: Chairman of telecommunication business committee of the council.

Formulated major policy on competition and broadband penetration.

New Technology Requires New Law



Creation of service ideas beneficial for people taking advantage of new technology is the key to enhance welfare of people.

Telecommunication carrier status

Structure of Telecommunication Law in Japan

Carrier License is basically facility based

1985 Law Type1 carrier: transmission facility

Type2 carrier: switching and computer

facility through which signal is transmitted

2003 Law Unification of Type1 and 2

This rule simplify the definition of telecommunication business

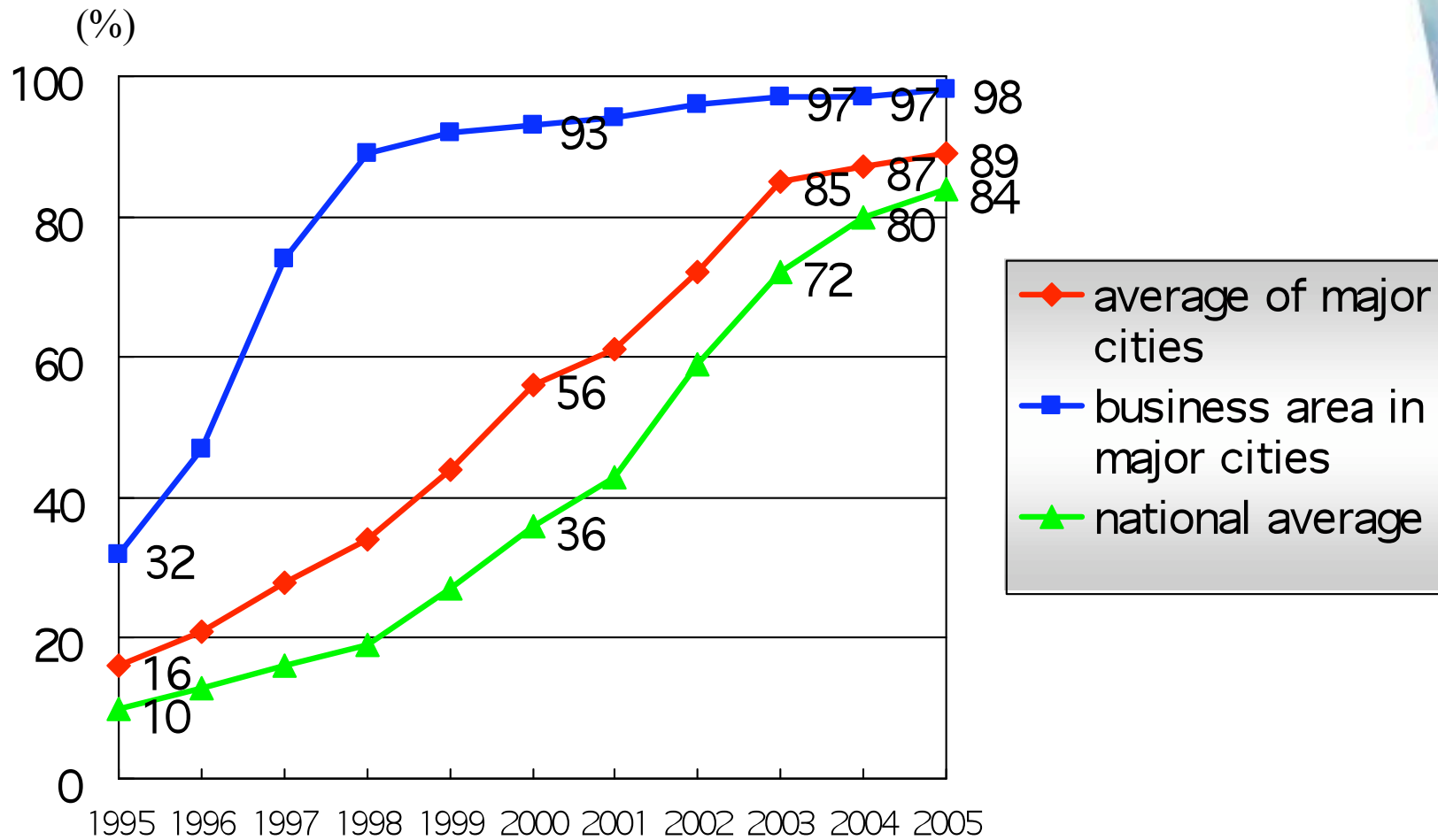
To have carrier status is easy

just registration by sending a form to MIC

If registered as a carrier, no additional obligation.

Universal service fund contribution is on assigned telephone number.

Optical Fiber Penetration in Japan



Competition Accelerated Broadband

Optical fiber was not successful until 2000.

ADSL unbundling started competition in pricing.

2Mbps:¥7000/m → 50Mbps:¥4000/m

In ADSL service incumbent carrier failed to have major share. In 2003–2005 share of NTT was about 35–40%.

To compete with ADSL competitor, incumbent started low flat rate price optical fiber for internet access.

In FTTH share of NTT is around 60%.

Current Broadband Access Price

ADSL 50Mb/s ¥2600~4200/M

Optical fiber 100Mb/s ¥3500~6500/M

Cost of Access Line

- Price of Optical fiber by core is lower than copper in recent 10 years.
- Current cost of including construction of optical fiber is in between the cost of 0.4mm copper and 0.65mm copper both for aerial and underground installation.
- Lives in field are also not very much different.

European Possibility

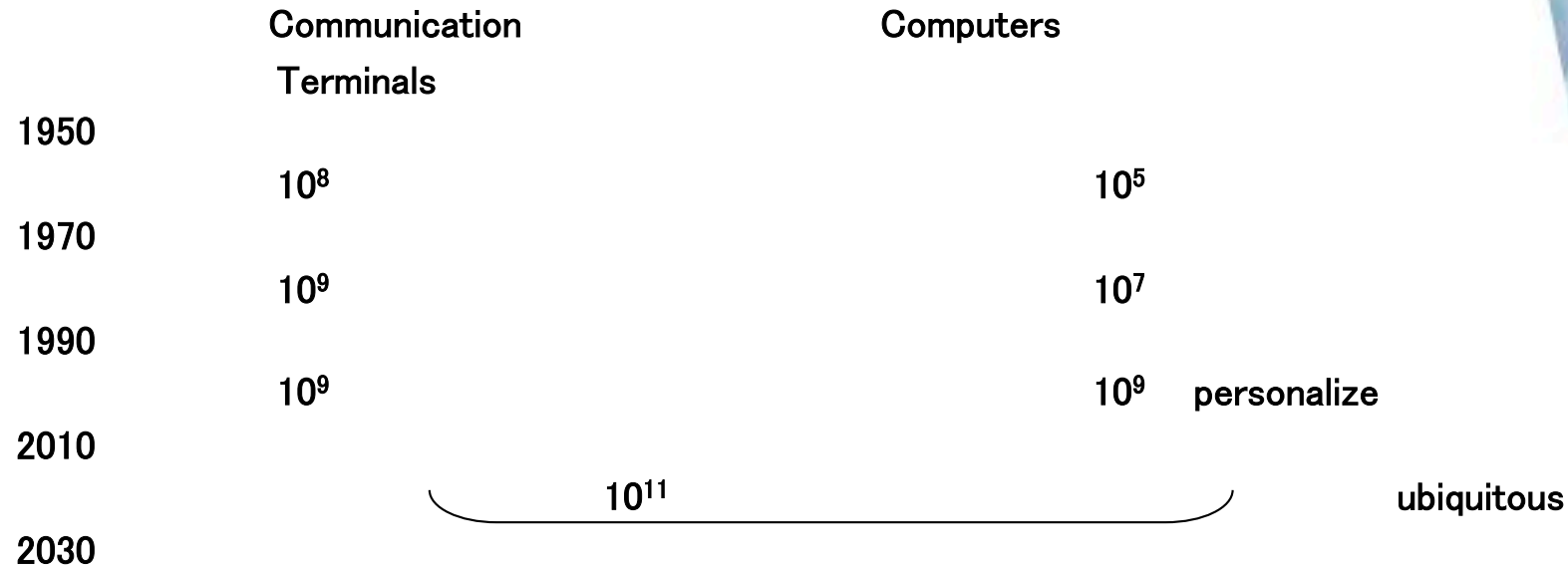
Current optical access line cost is not very much different from copper line.

Underground subscriber line cost is not very high including construction cost if underground tunnel is available.

Permission of aerial line shorted construction delay for competitors.

Appropriate competition policy among access carrier is important to realize affordable broadband.

Saturation of Current IT Market



To Overcome saturation of market, cultivation of new applications is important.
 Vehicle Market is the first market to be attacked by new telecommunication network.

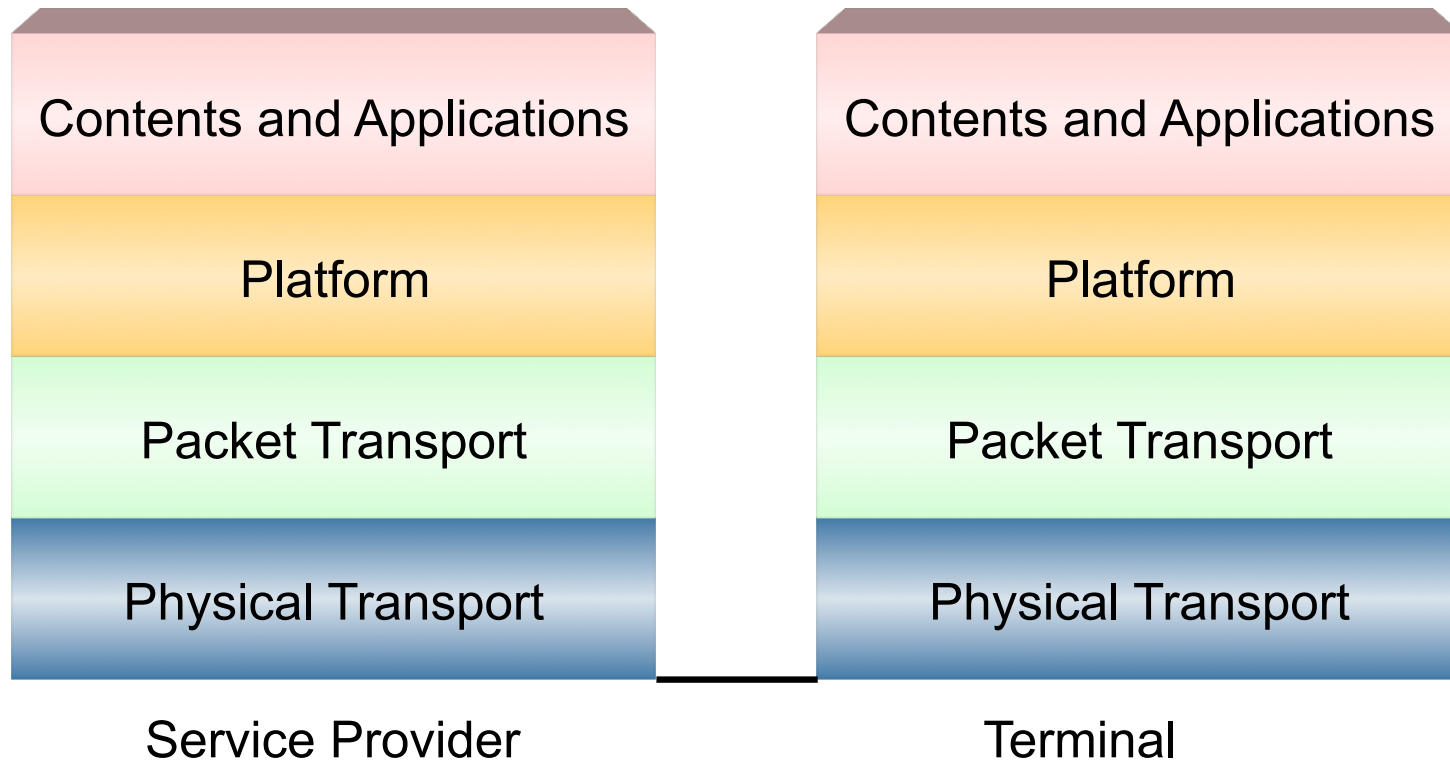
Improvement of processors

1971年11月	4004	2,300 Transistors
1974年4月	8080	6,000 Transistors
1978年6月	8080	29,000 Transistors(5~10MHz)
1985年10月	386	275k Transistors(16~33MHz)
1993年3月	Pentium	5M Transistors(60~300MHz)
2000年11月	Pentium4	80M Transistors(1.4~3.8GHz)
2007年11月	Itanium dual core for servers	2B Transistors

(10^6 in 36 years)

(source Intel Dec.2007)

Technically terminal needs identical layer set as service providers

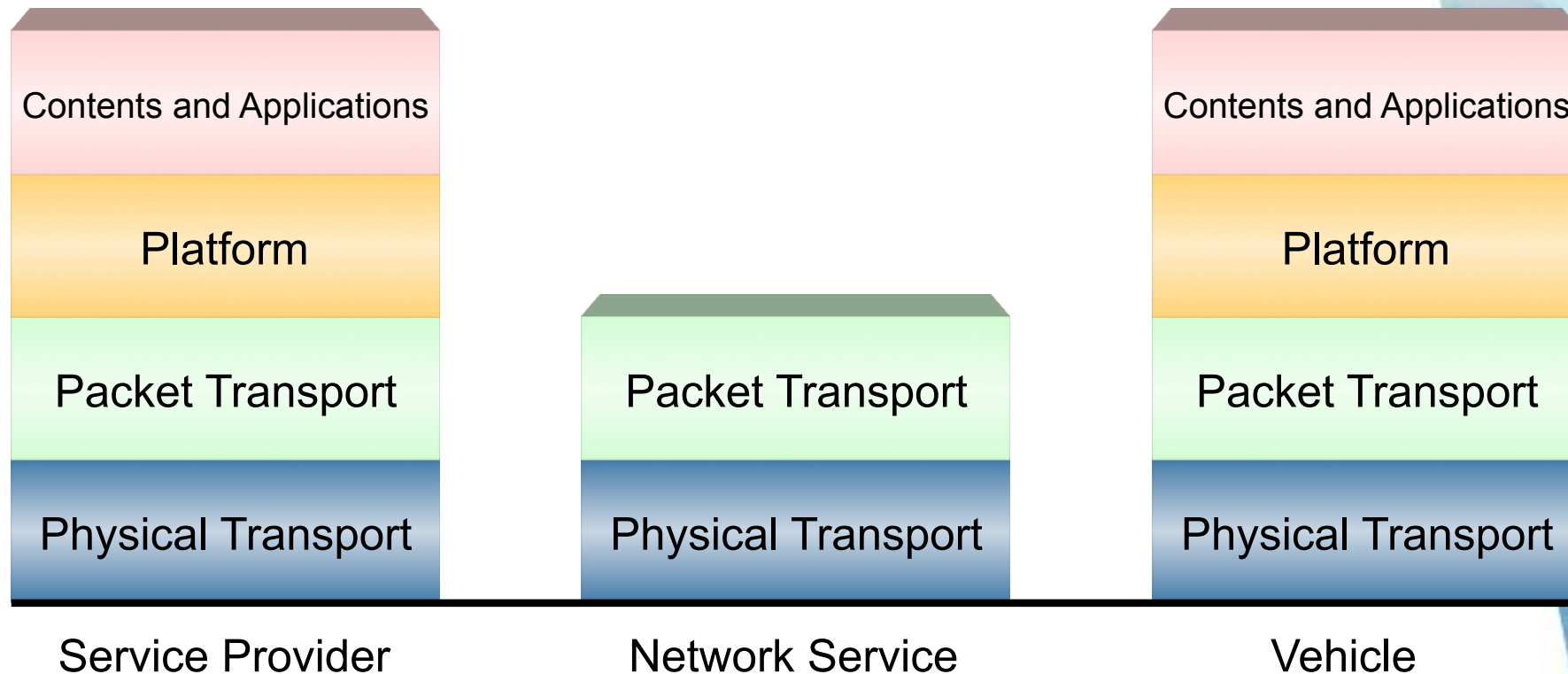


Network Neutrality

Network is free from restrictions on

- equipment
- mode of communication
- content
- site
- platform

Neutral Network Service



Surrounding a neutral network, many contents and application service providers can develop services

To expand market Standardization of platform and application is important.

Cost Performance Improvement Gap

Processing Capability	18months/double
Data Storage	15months/double
Bandwidth	28months/double

Performance bottleneck

- Core network transmission bandwidth
- Congestion in server system

800Gb/s 30M subscribers

25kb/s/subscriber

Higher utility is needed for future developments.

Network use having less traffic in core network is requested.



New ideas by openness of network

voice video data, new commerce

Creation of rich services and contents by lowering entry barrier.

Skype and JOOST are typical examples successful in neutral network.

Resilience, Economy of Scale, Decentralized Control

new P2P

Traffic localization

hybrid P2P, P4P

Effective use of broadband access system

Cost Effectiveness of P2P

- Use of high speed access without core network overload
- reduction of proxy servers
- long line capacity of core network
- better quality of information

End-User Generated Information Distribution

- everybody can be information source

Locality in Internet

- local information can be handled locally

Network neutrality is essential to enrich usage of broadband by user initiative.

Social issues caused by internet

1. **Overflow of spam mail**
2. **Phishing and fraud using mail and VoIP**
3. **Effects on young people**
 - Improper relationship caused by internet mail**
 - Loss of social reality**
 - Fraud targeting young people**
4. **Menacing by block.**

Variety means needed to overcome issues

1. **Technical measure**
Authentication of user ID and content
Confirmation of information source
2. **Low enforcement**
Prevention of spam mail and fraud mail
3. **Education to cope with crime**

Broadband to enrich society

We still have many technical, business and social issues for future internet society.

Shortage of IP address should be solved by rapid penetration of IPv6.

Applications using elaborate techniques of v4 should be identified and improved.

Society need effective means to overcome issues.

Total effort to overcome the issues and to create rich society is the key for the future.

Effort to create rich future society will depend on technology and wisdom of society.