

Vision for a new optical generation and Resonant communication network architecture (RENA)

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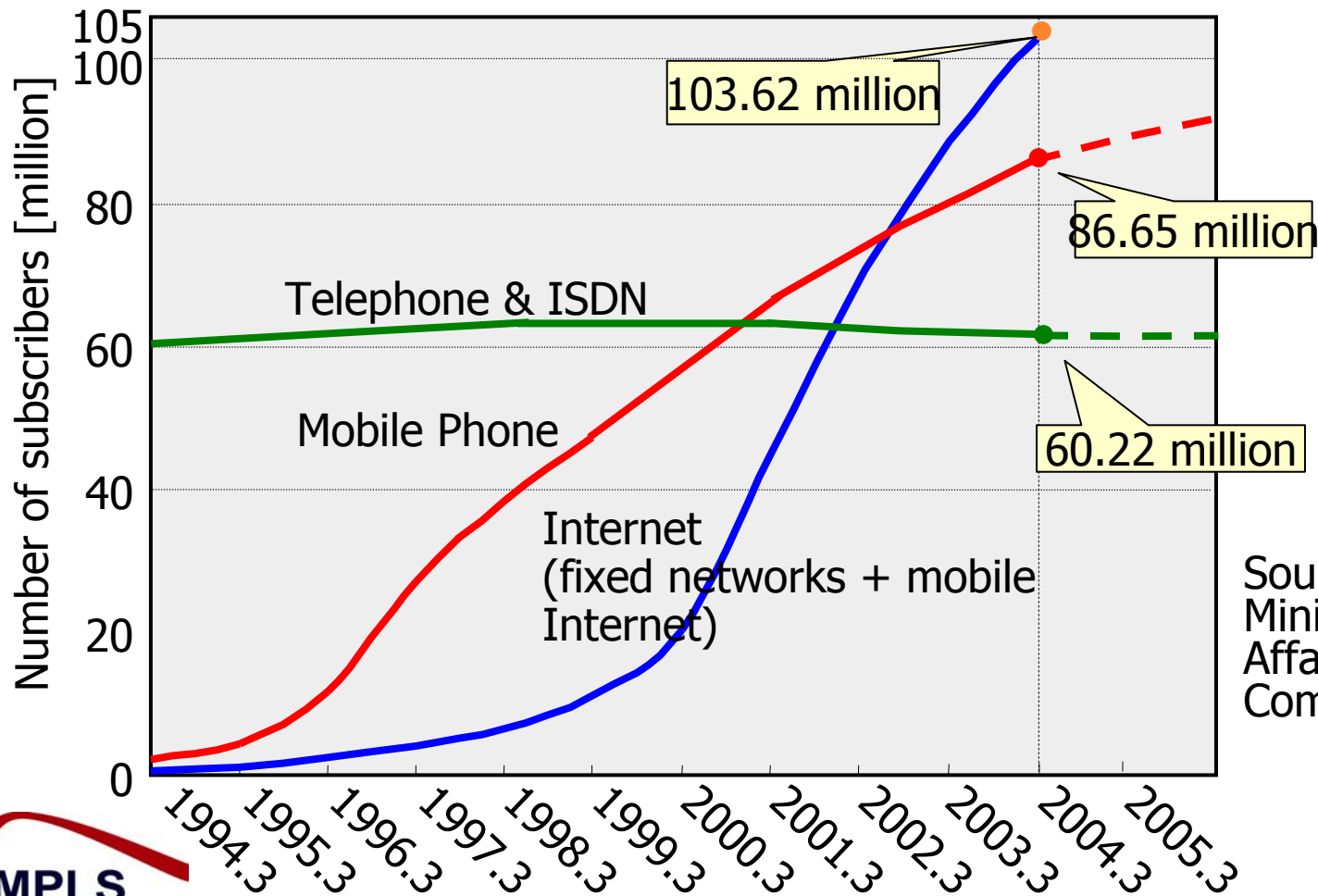


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- Broadband Services in Japan: Proliferation and Usage Trends
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- IP Optical Technologies for Resonant Communications

1. Broadband Services in Japan: Proliferation and Usage Trends

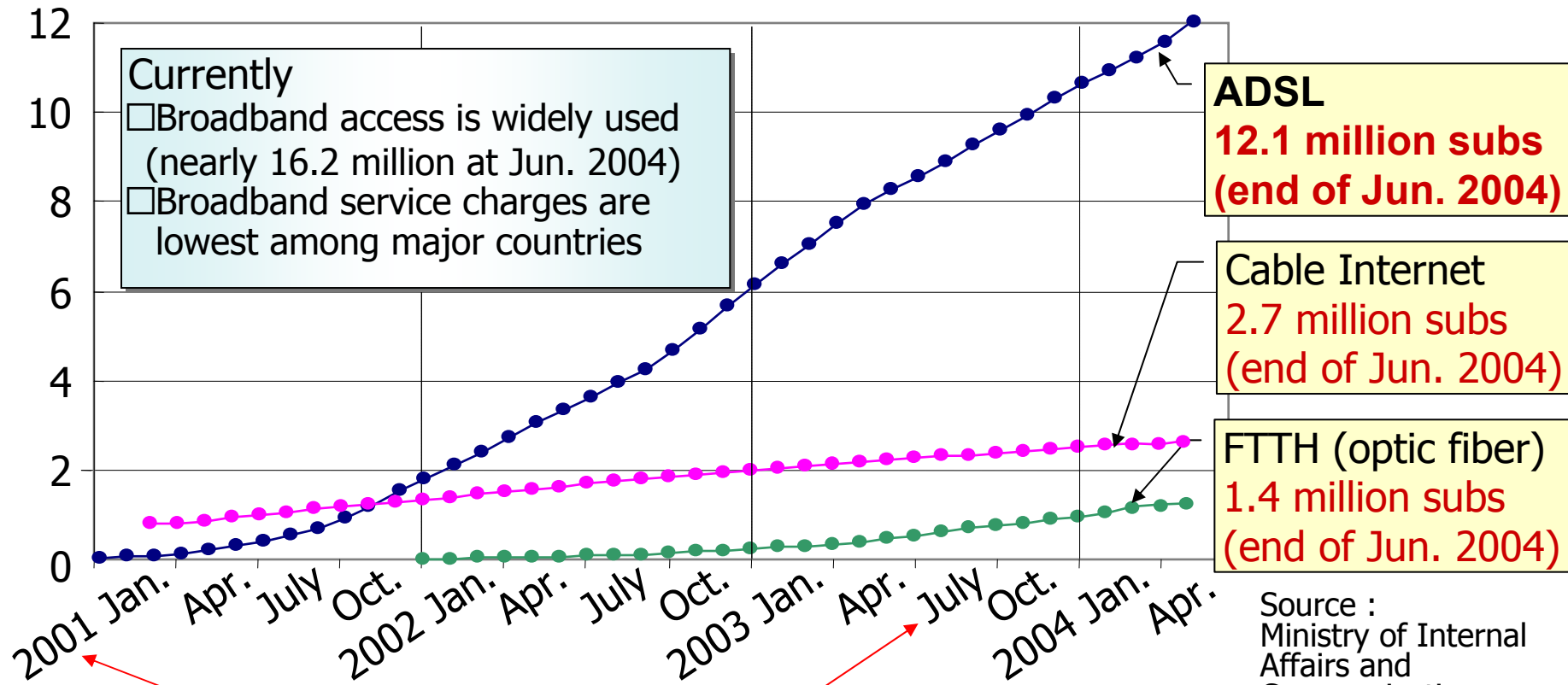
Explosive development of mobile phone & Internet in Japan



Source :
Ministry of Internal
Affairs and
Communications

Growth in Broadband Access

Subscribers (million)



Source :
Ministry of Internal
Affairs and
Communications

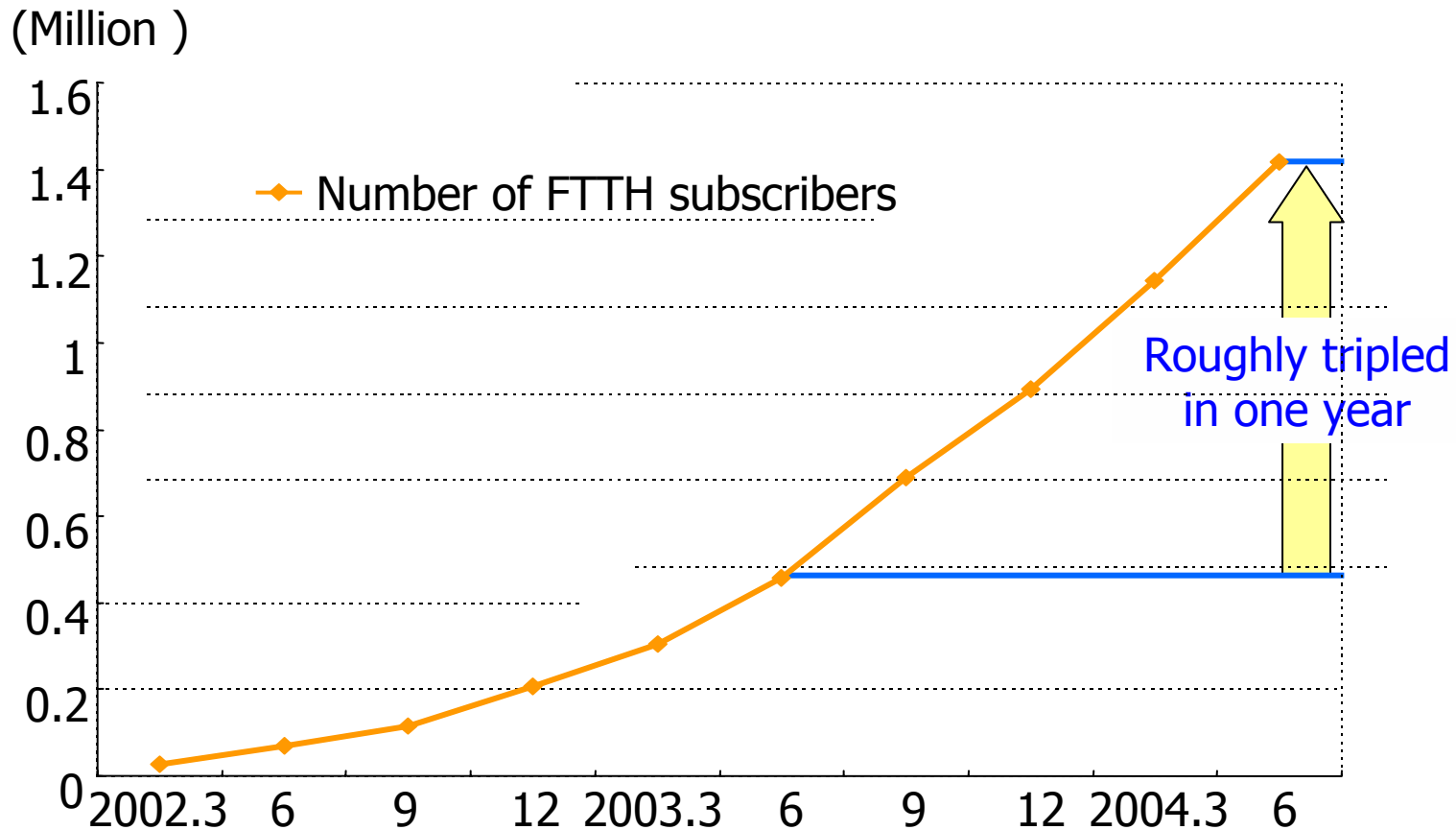
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e-Japan Strategy

e-Japan Strategy II

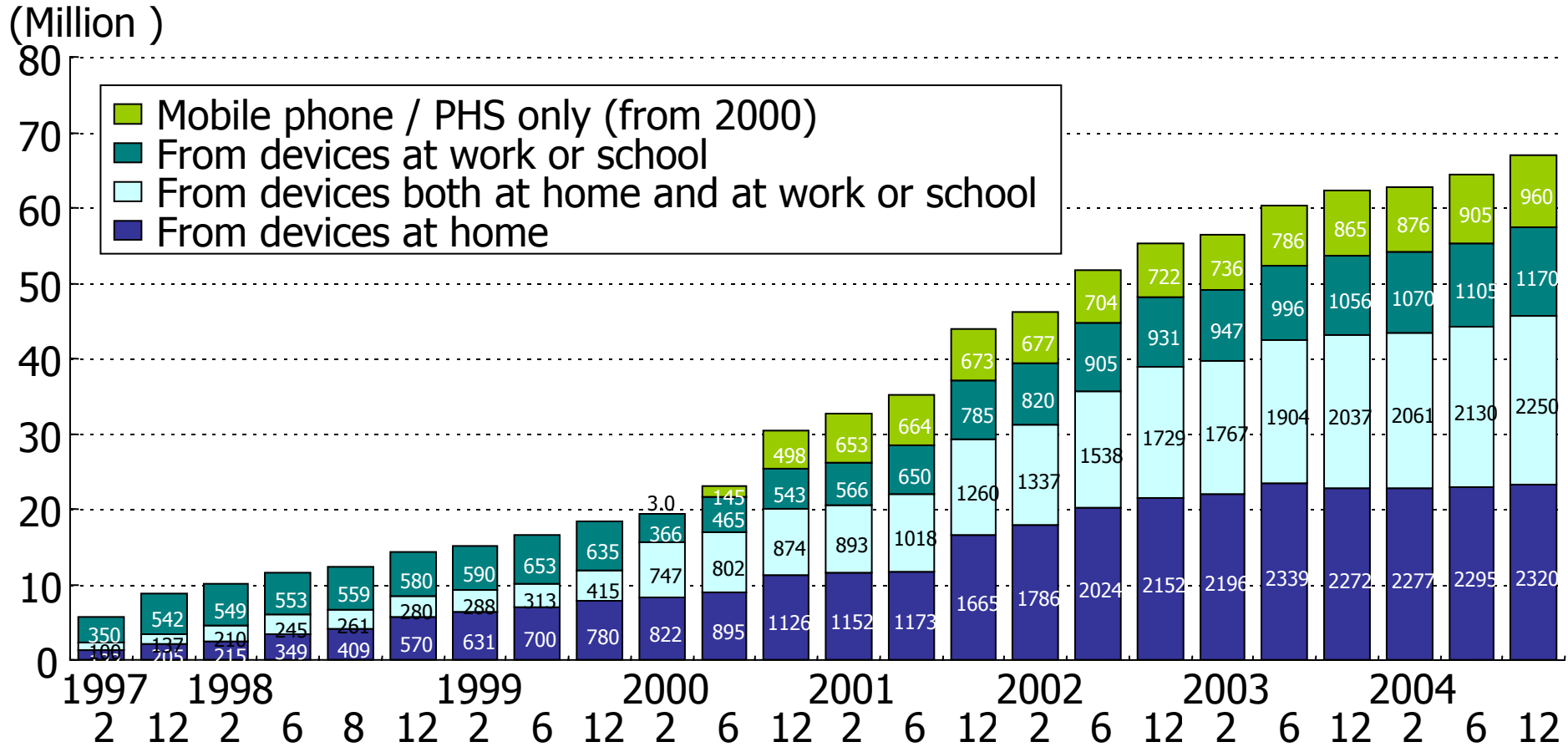


Rapid growth of FTTH subscribers in Japan



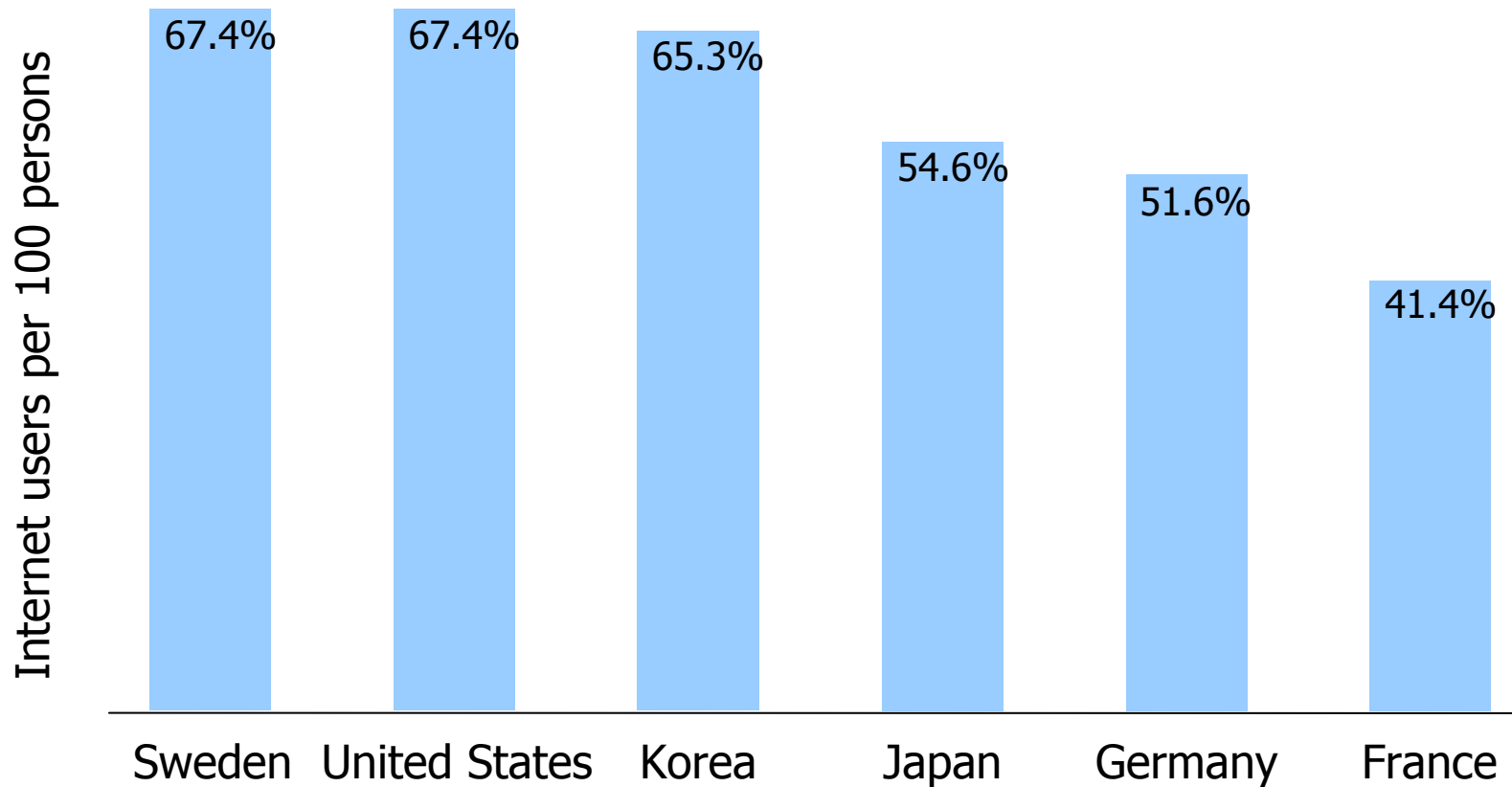
Source: Materials published by Ministry of Internal Affairs and Communications (July 3, 2004)

Number of Internet users



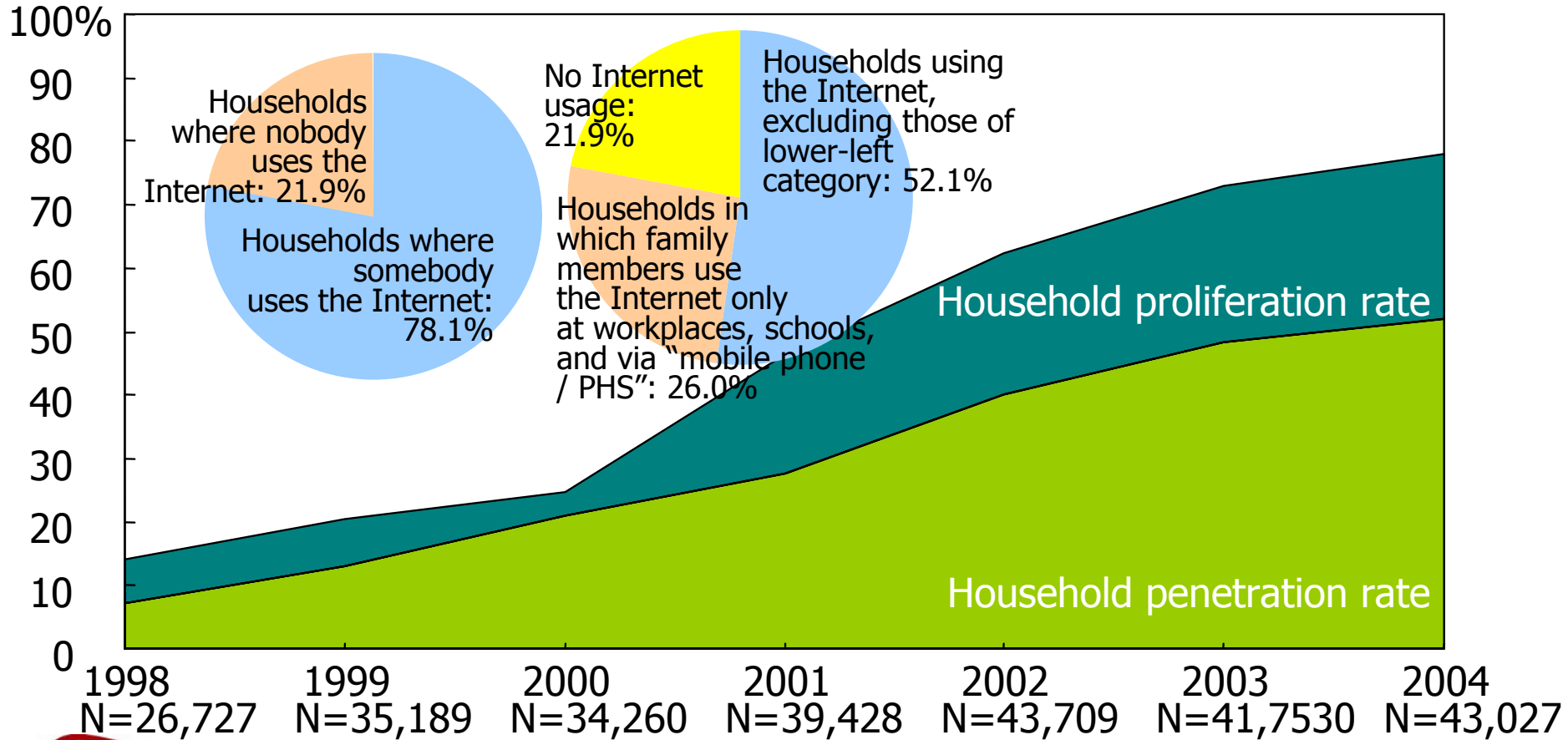
Source: "Internet White Paper 2004"

Internet penetration rate at the end of 2003



(Source: IDATE)

Proliferation rate for Internet in Japanese households

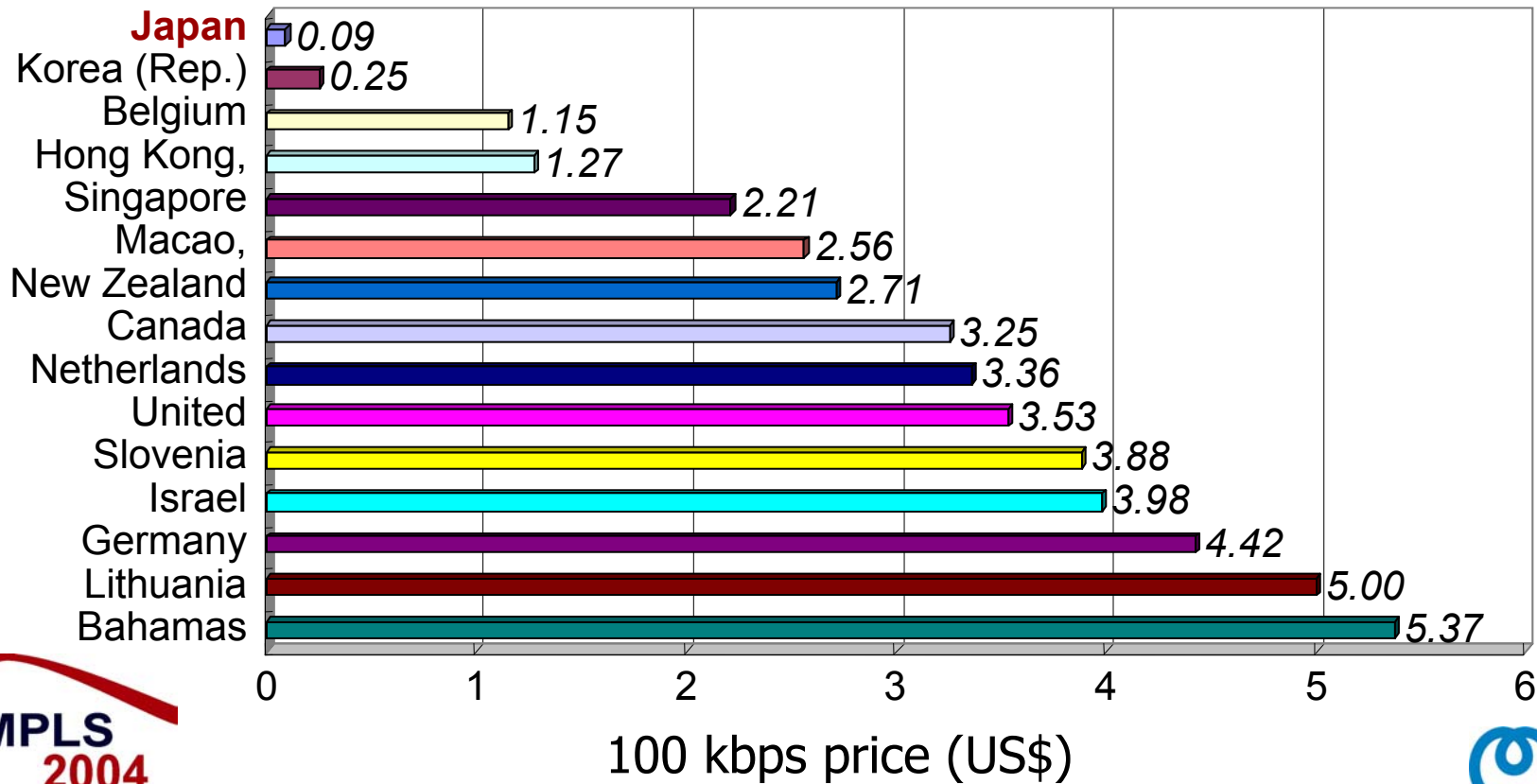


Source: "Internet White Paper 2004"

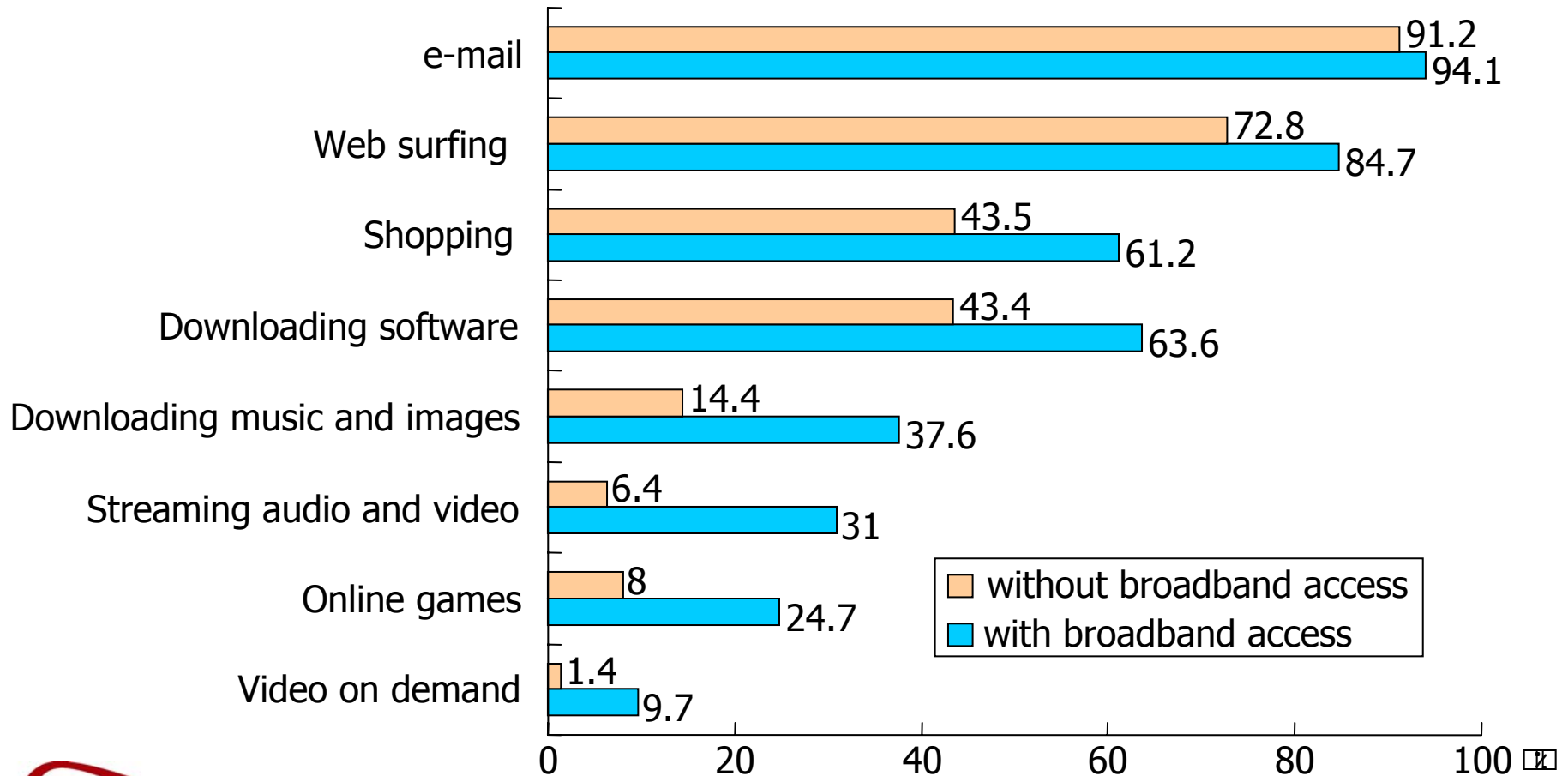
Creation of Carrier-grade IP Networks

"Deadly" business model

- The one of cheapest countries in the world thanks to fierce competition
- However, no ISPs can profit enough money to invest new tech.



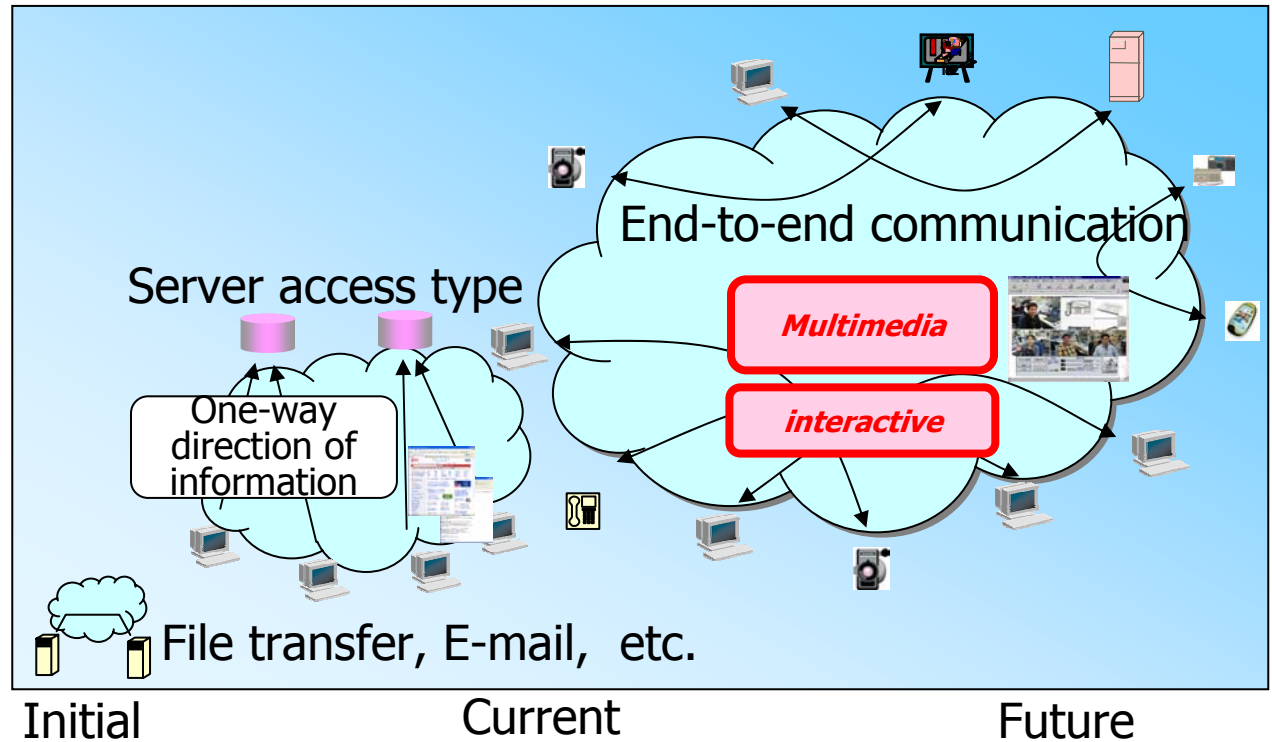
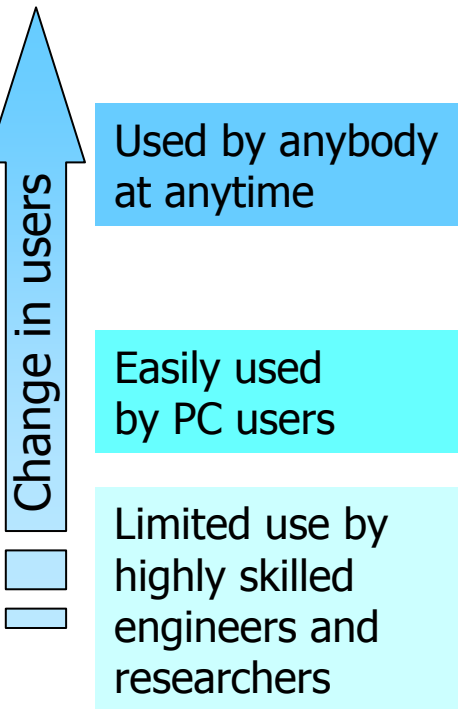
Changes in the use of contents with/ without broadband access



Source: An Outlook for the Spread of the Internet, May 21, 2002, InfoCom Research, Inc.

An expected change in the use of the Internet

- End-to-end, direct communication between arbitrary users will prevail.
- The characteristics of end-to-end communication could be interactive and multimedia.



1. Cost and bandwidth of access line → cheaper, broader
2. Servers and PCs → larger capacity
3. Non-PC, multimedia devices → higher performance, always-on

Concerns of Internet Users

Users want stronger security, protection of personal information, and prevention against network crimes

0 20 40 60 80 100%

Network abuse prevention and countermeasures

88.6

Control and prevention of network-based crime

87.6

Strengthened network security

89.4

Protection of personal information

90.5

Protection of copyrights and other rights for parties providing information

46.6

■ Total (n = 4727)

Barrier-free information usage environments

47.6

Backup systems in case of emergencies

51.1

Other

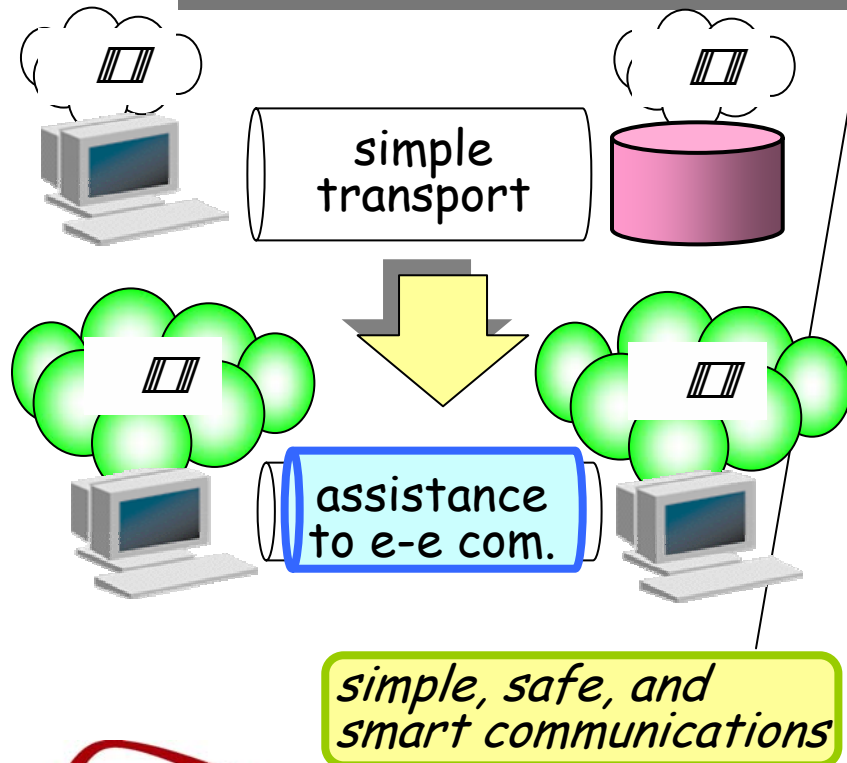
1.1

* Source: InfoCom Research Inc. Questionnaire survey Aug. 2002 4,727 samples

Ages mainly in 30s or early 40s;
Ratio of male to female: 50/50;
Company employees: more than 40%;
Housewives: about 20%.

Network assistance to end-to-end communications

□ "Simple, safe and smart" are keys to the development of end-to-end communications.



simple

1. *Well-managed communication*

safe

2. *Authentication / security support*

smart

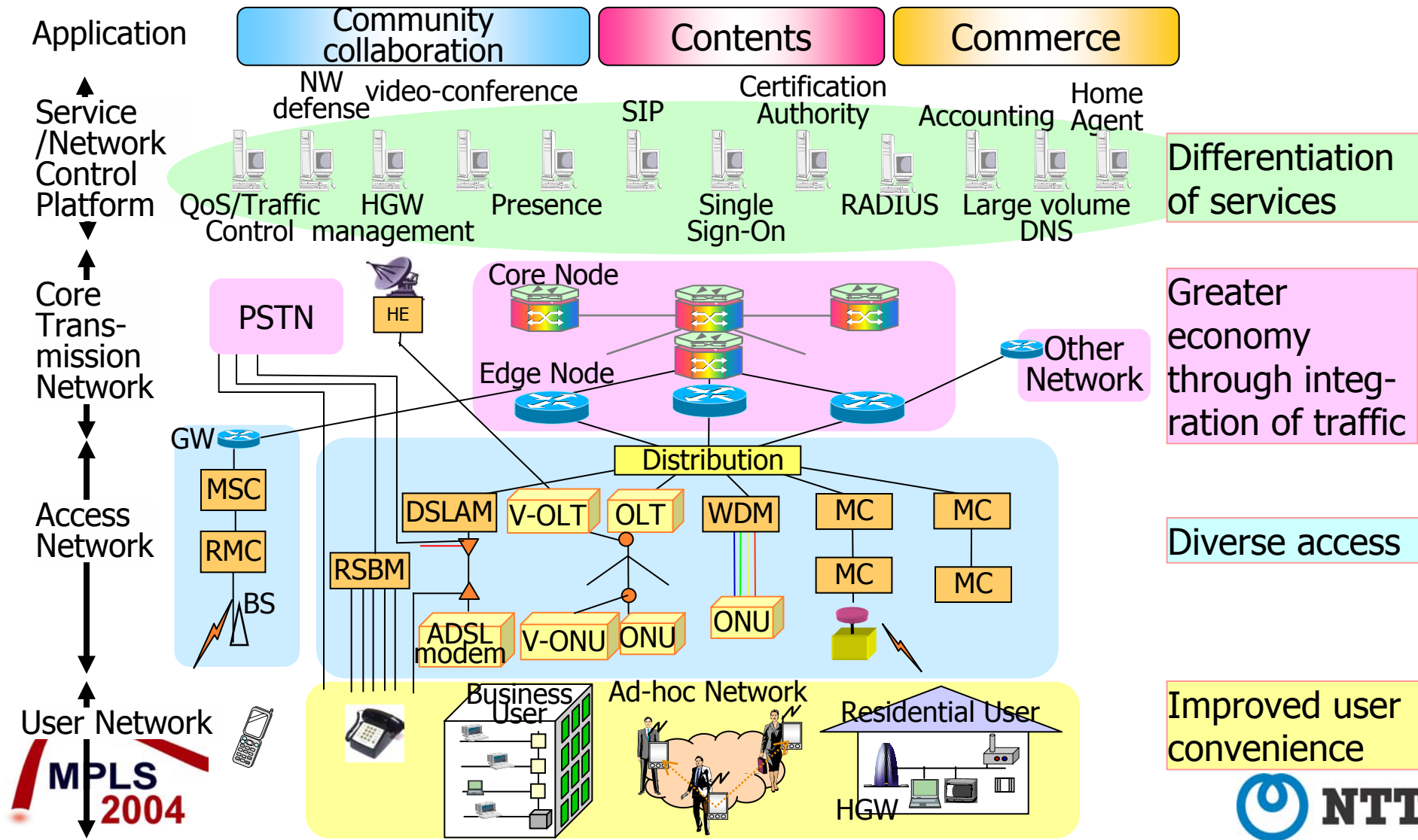
3. *Communications with any user*

4. *Sophisticated use of diverse premises*

simple

5. *Stable communication quality*

Four-stage model for a carrier-grade IP network

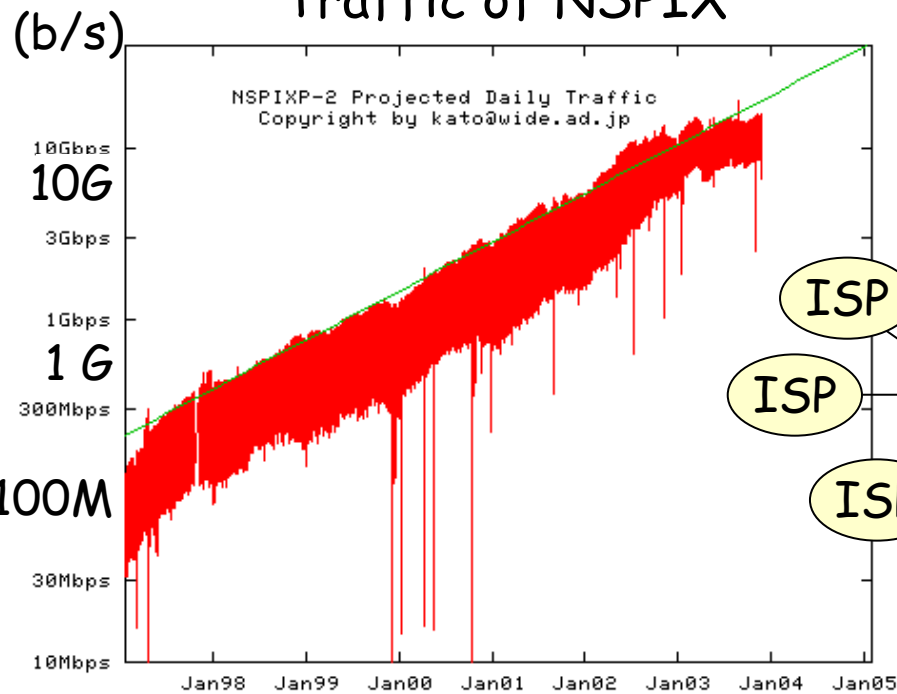


3 IP Optical Technologies for Resonant Communications

Explosion of broadband traffic

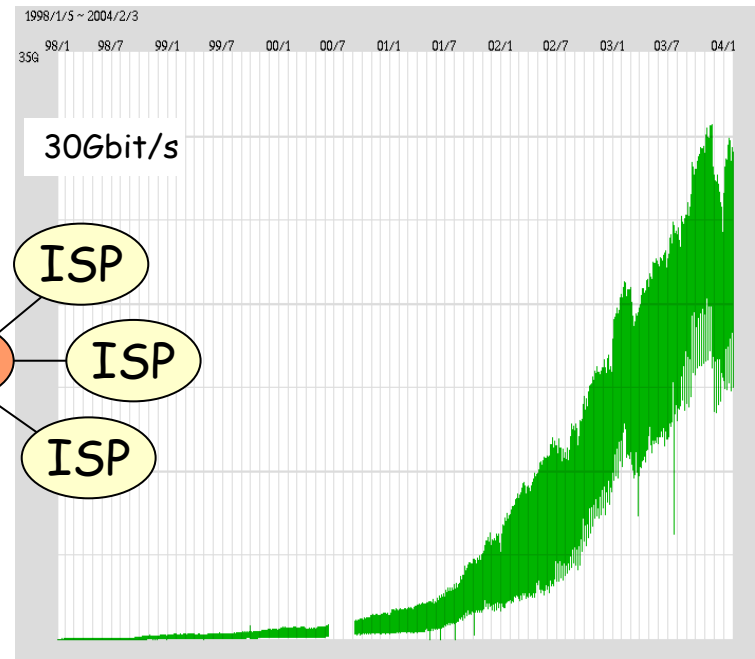
doubling every year ...

Traffic of NSPIX

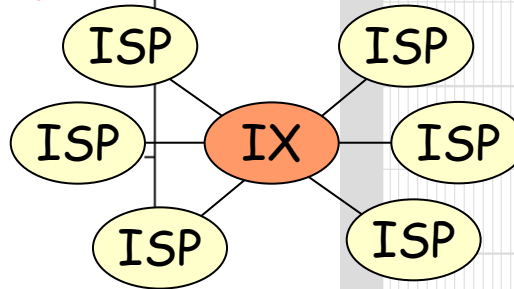


<http://nspixp.sfc.wide.ad.jp/Traffic/>

Traffic of JPIX

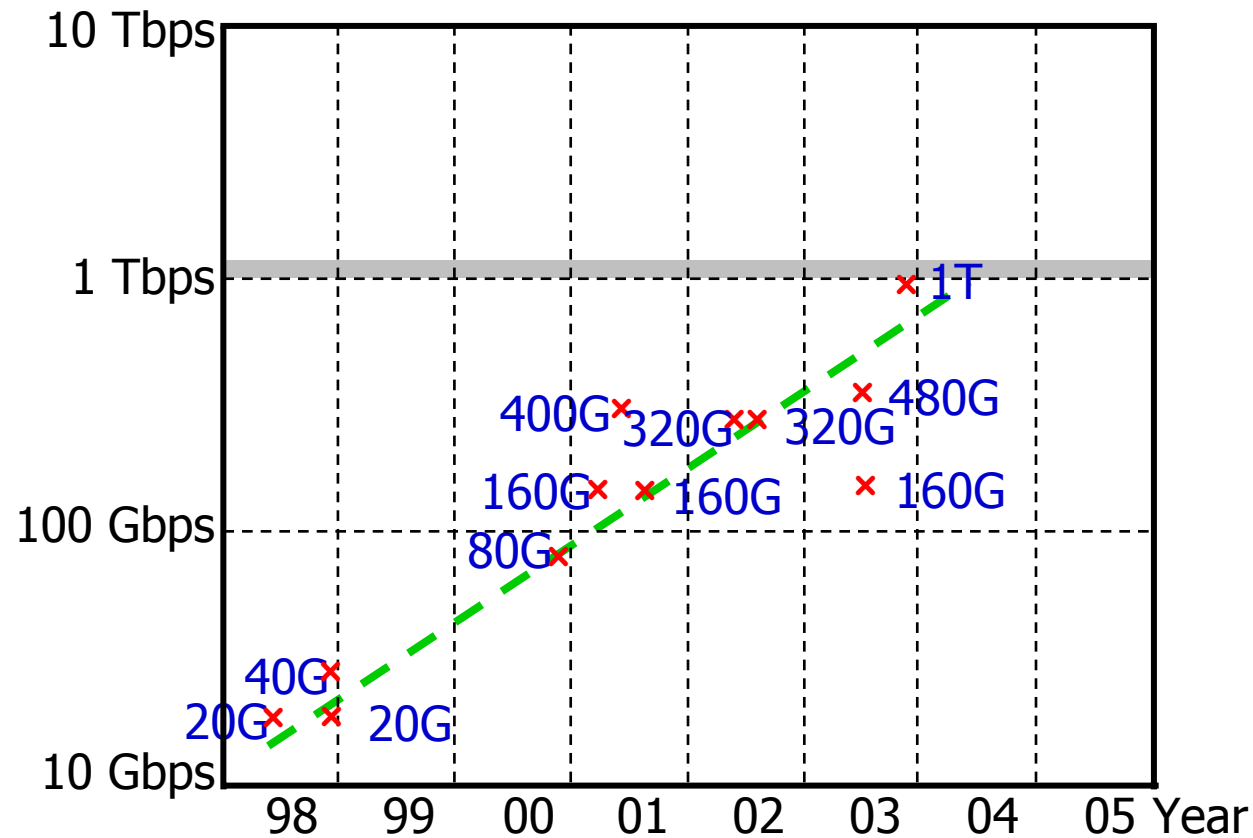


<http://www.jpix.co.jp/jp/technical/traffic.html>



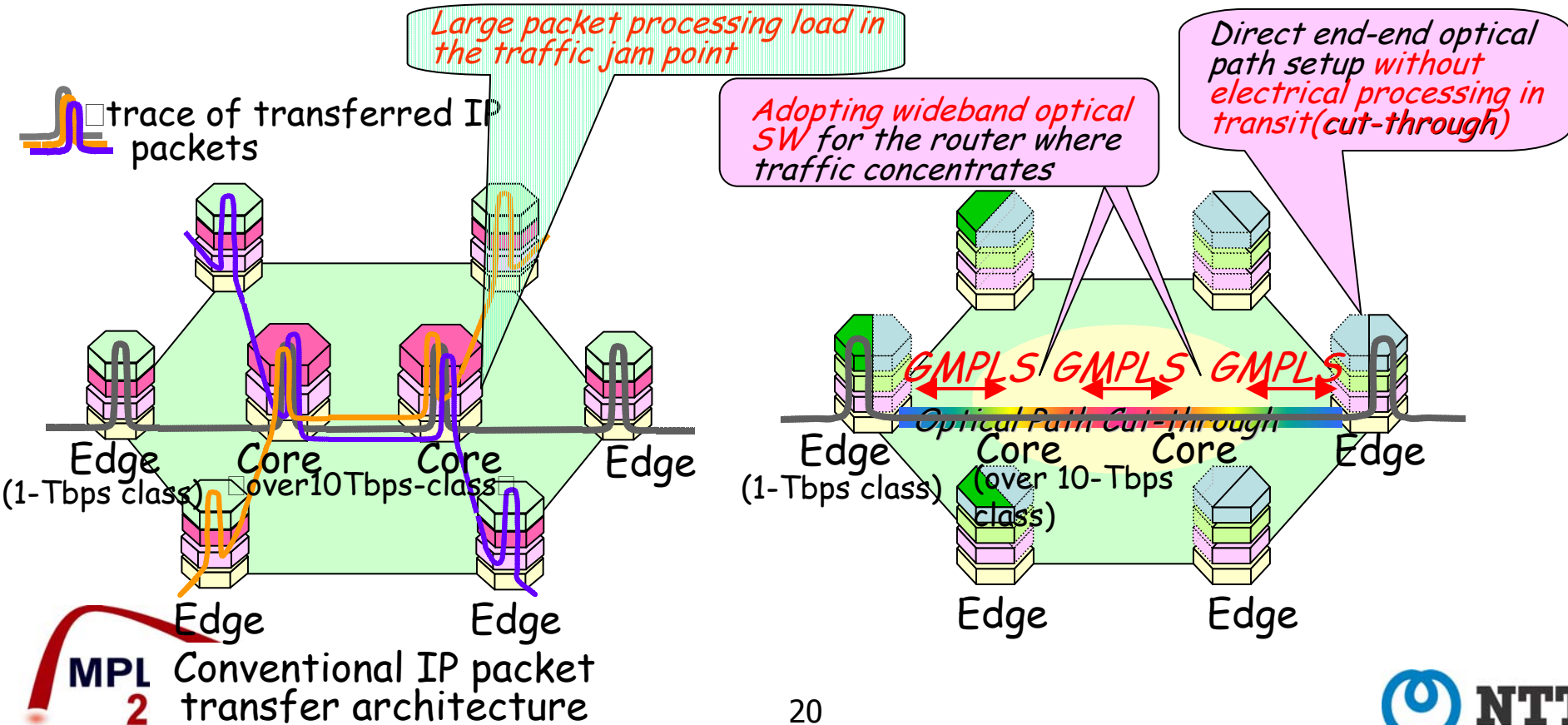
System capacity of Commercial IP Router

System capacity of
Single Chassis IP Router



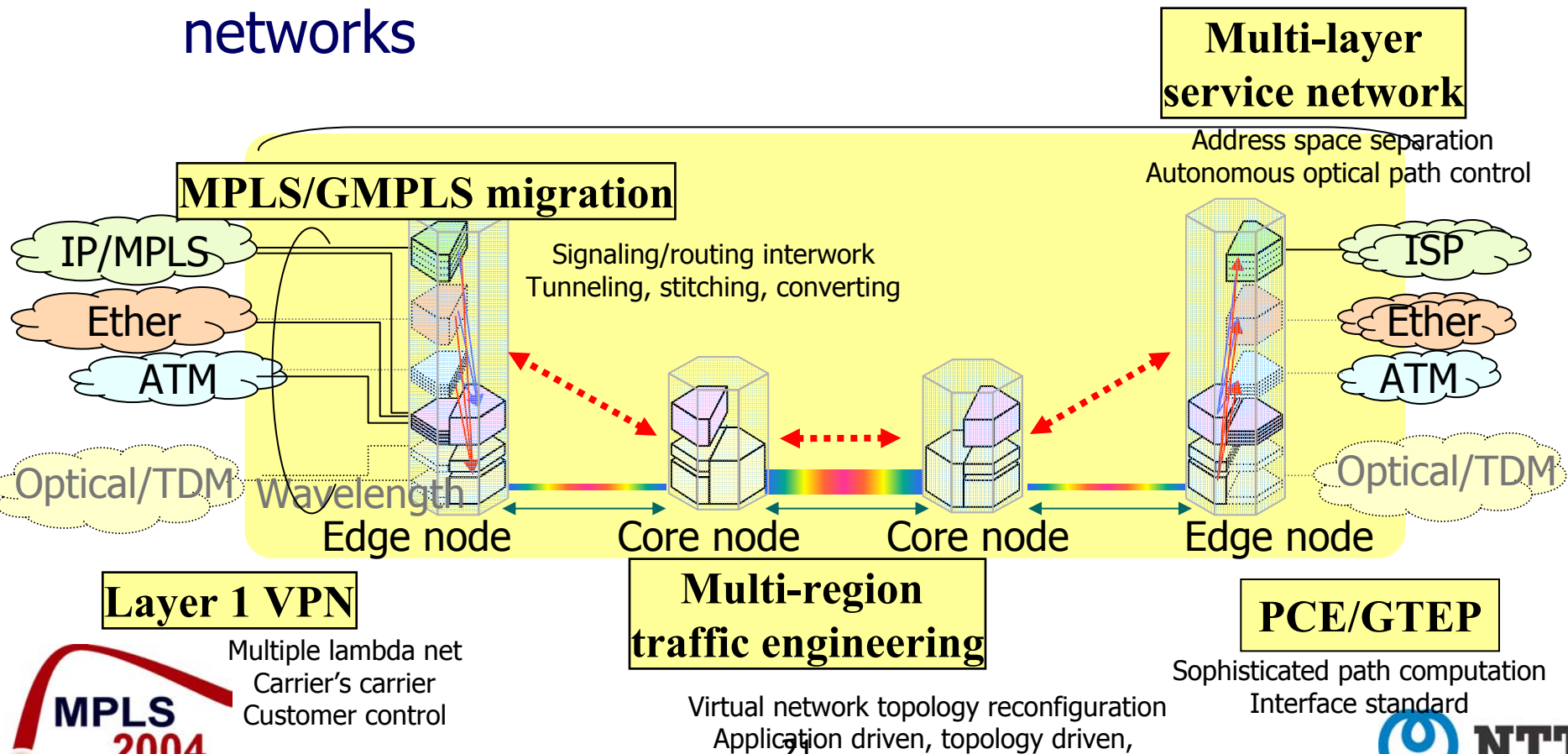
Incorporation of Optical and IP Technologies

- Direct optical path setup among edge nodes without electrical IP processing in transit nodes. (cut-through by optical path)
- Considering that the whole backbone network is a virtual huge router



Optical core network

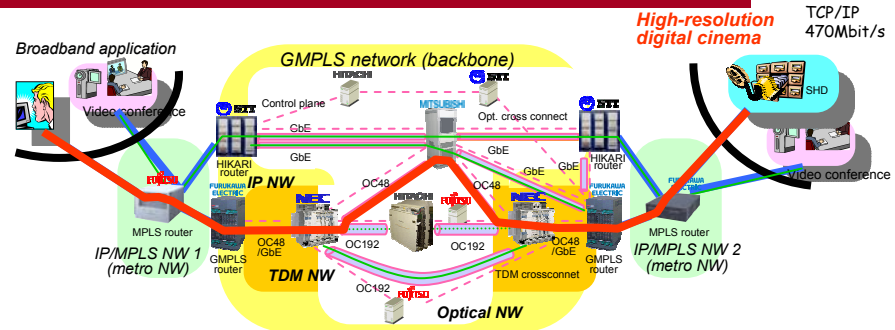
- Carrier's optical backbone for multiple service networks



Photonic Internet Lab. (PIL)

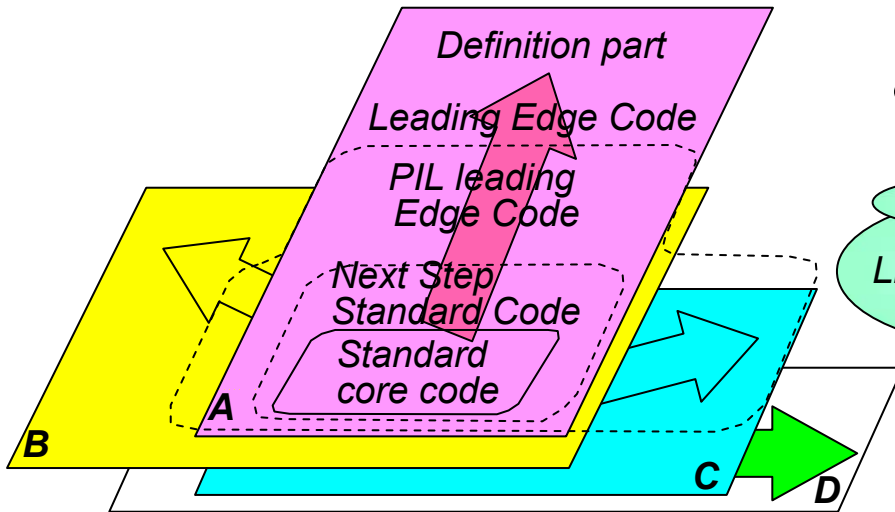
<http://www.pilab.org/>

- The Photonic Internet Lab. (PIL) was founded in 2002. PIL is supported by the MIC (Ministry of Internal Affairs and Communications) in Japan.
- PIL is promoting R&D standardization on next-generation photonic network control protocols based on photonic technologies for managed networks.



PIL targets for NGN architecture/protocol

- All optical network control (RWA, Impairment)
- Multi-region
- Reliability
- Control network
- Link management (LMP)
- Routing (OSPF extension)
- Signaling (RSVP-TE extension)

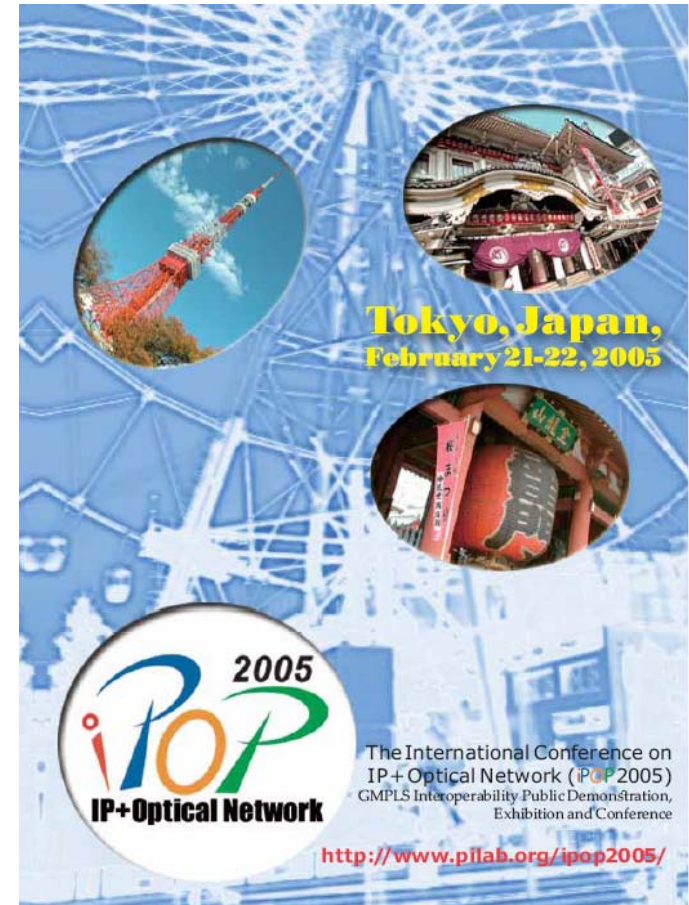


iPOP2005

International Conference on IP + Optical Network

<http://www.pilab.org/ipop2005/>

- Time: **February 21-22, 2005**
- Venue: Tokyo Fashion Town (TFT) Hall, **Tokyo, Japan**
- Sponsors: PIL(Photonic Internet Lab), ISOCORE, and PIF (Photonic Internet Forum)
- **CALL FOR PAPERS**
 - Technical area: Field trial report, operators requirements, international standards, inter-operability experiment, new services, multi-region/multi-layer, P&R, Protocol design, experiment, theory, implementation, and operational experiences are solicited.
 - **Submission Deadline is November 1**
- **CALL FOR SHOWCASE EXHIBITOR PROPOSALS**
 - Showcase inter operability demonstration for the leading-edge technologies
 - Technical area (TBD): multi-region/multi-layer network, P&R, Layer-one VPN, etc.
 - **Early Bird Deadline is November 1**
- Audience: over 200 attendees, made up of network operators, service providers, and equipment vendors are anticipated



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Thank you!

