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

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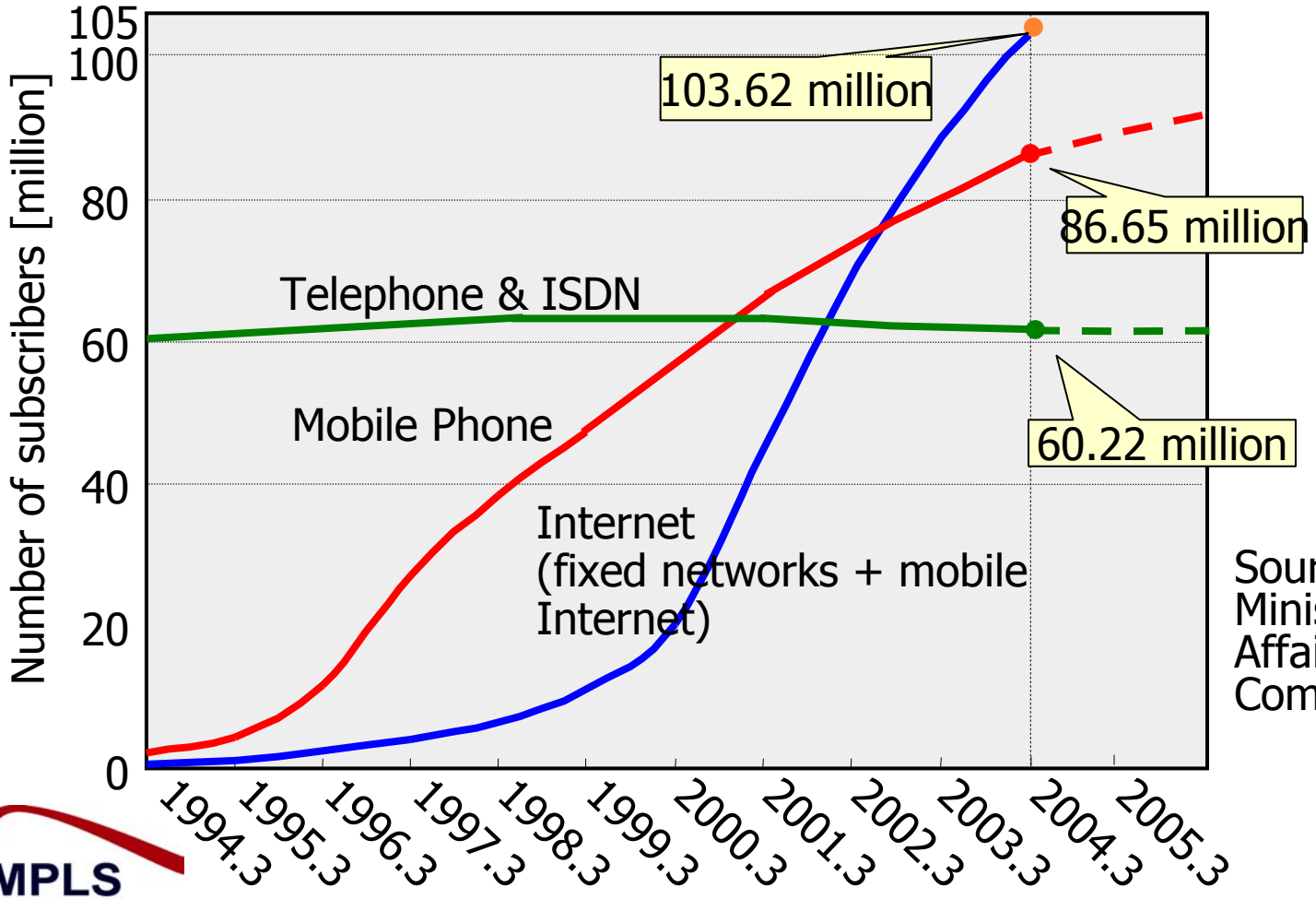
Contents

- Broadband services in Japan: proliferation and usage trends
- Creation of carrier-grade IP networks: RENA (Resonant communication network architecture)
- IP optical technologies for Resonant communications

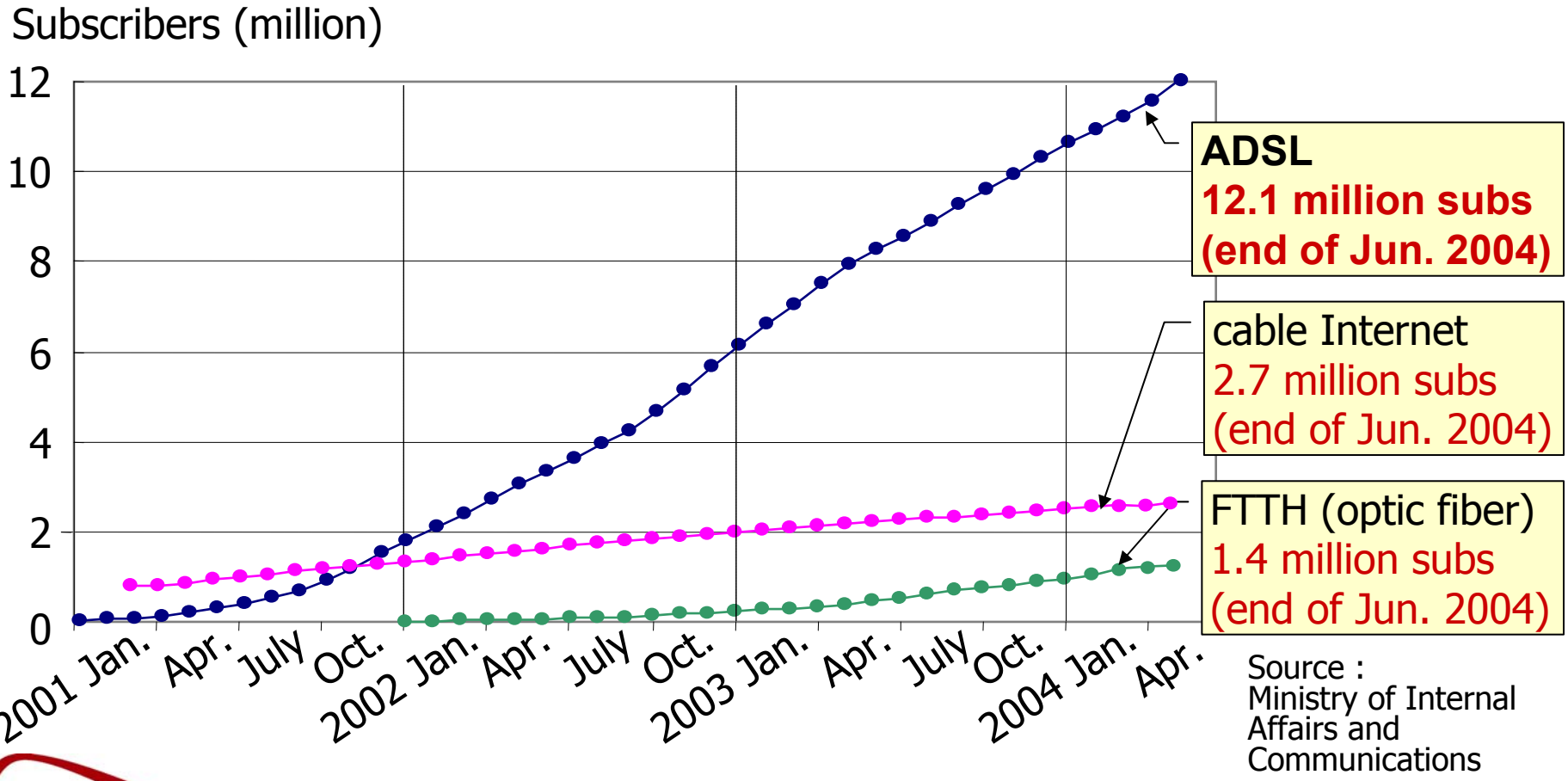
1. Broadband services in Japan: proliferation and usage trends

Explosive development of mobile phone & Internet in Japan



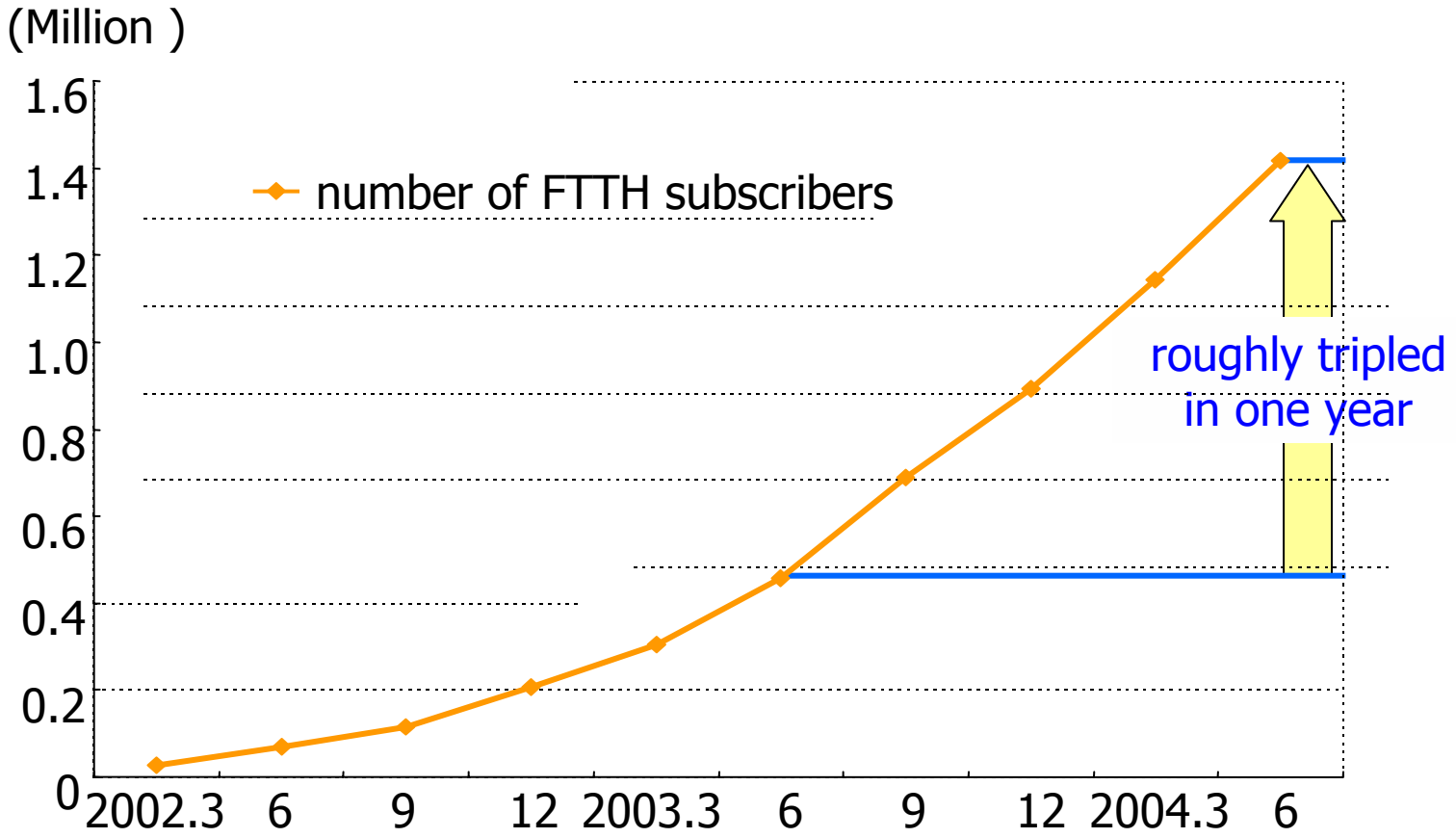
Source :
Ministry of Internal Affairs and Communications

Growth in broadband access



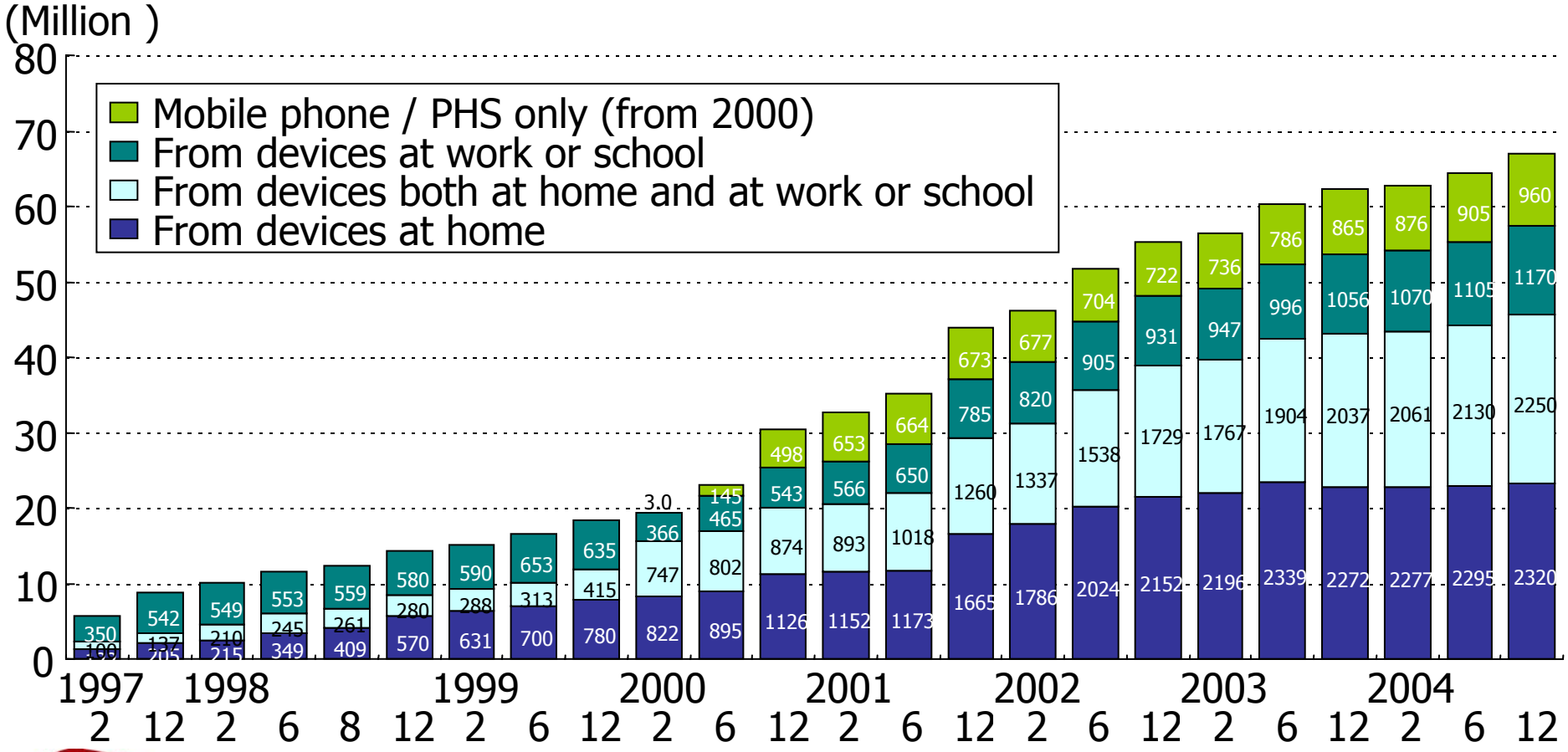
Source :
Ministry of Internal Affairs and Communications

Rapid growth of FTTH subscribers in Japan



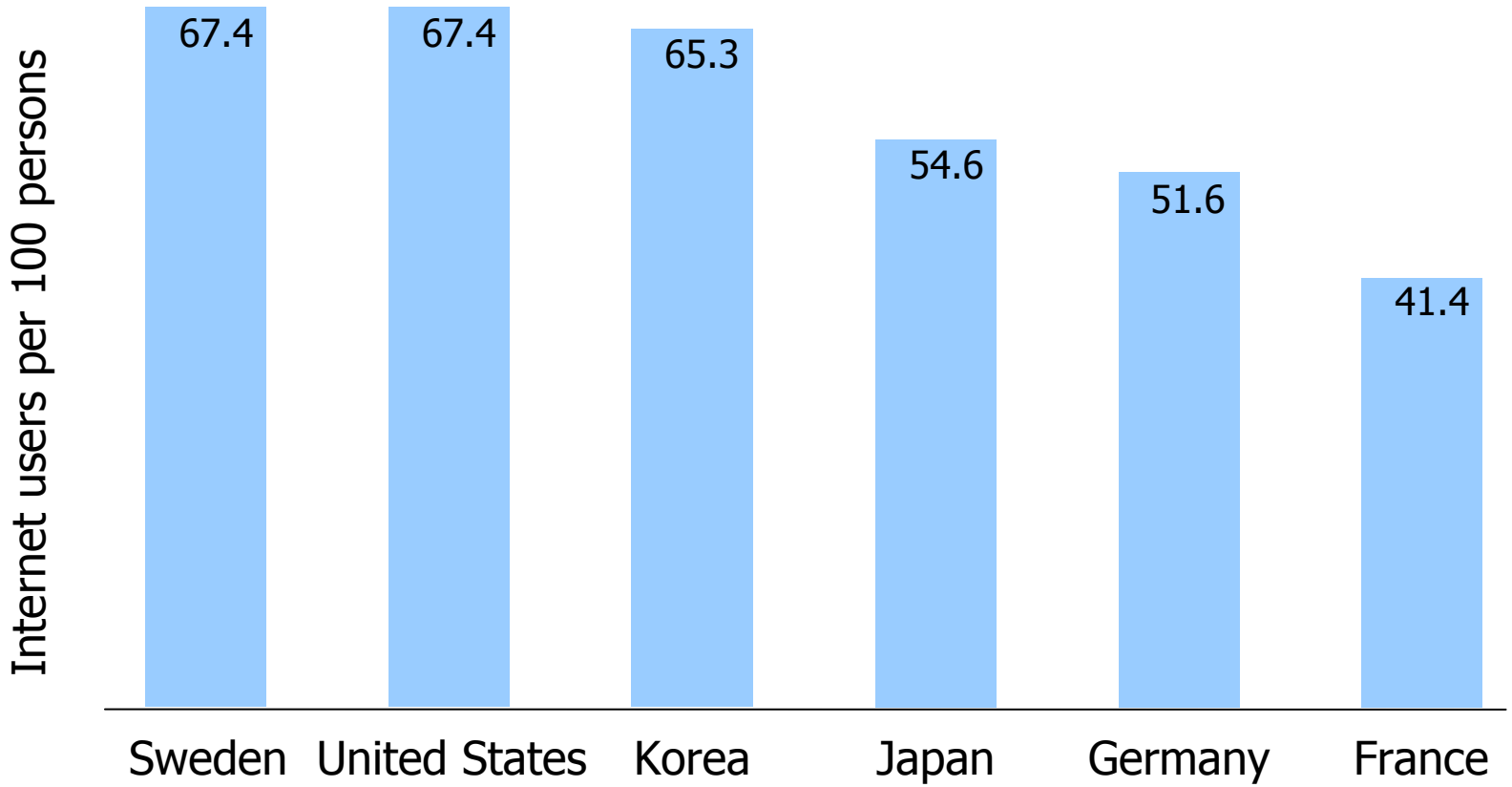
Source: Materials published by Ministry of Internal Affairs and Communications (July 3, 2004)

Number of Internet users



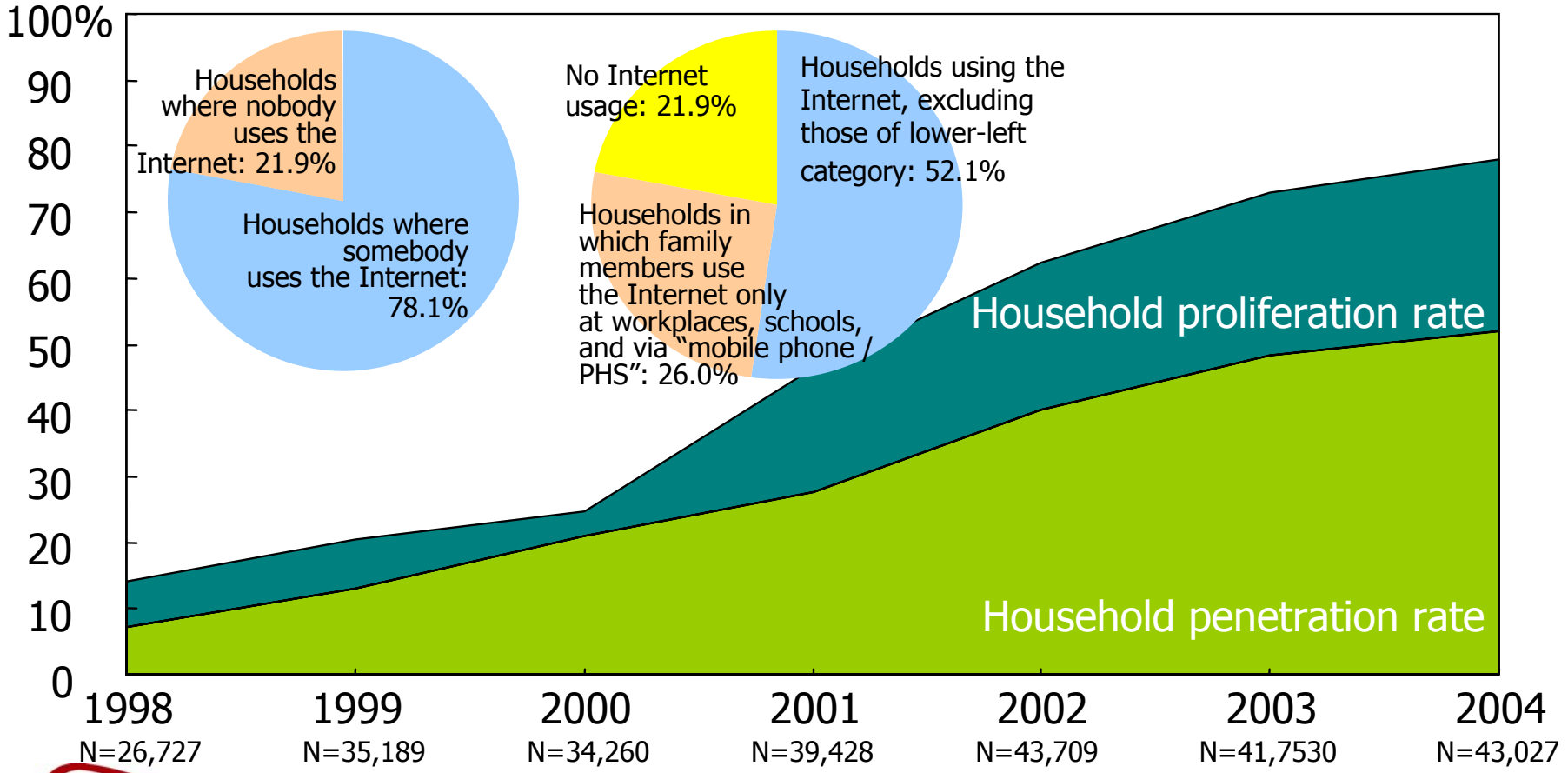
Source: "Internet White Paper 2004"

Internet penetration rate at the end of 2003



(Source: IDATE)

Proliferation of Internet in Japanese households

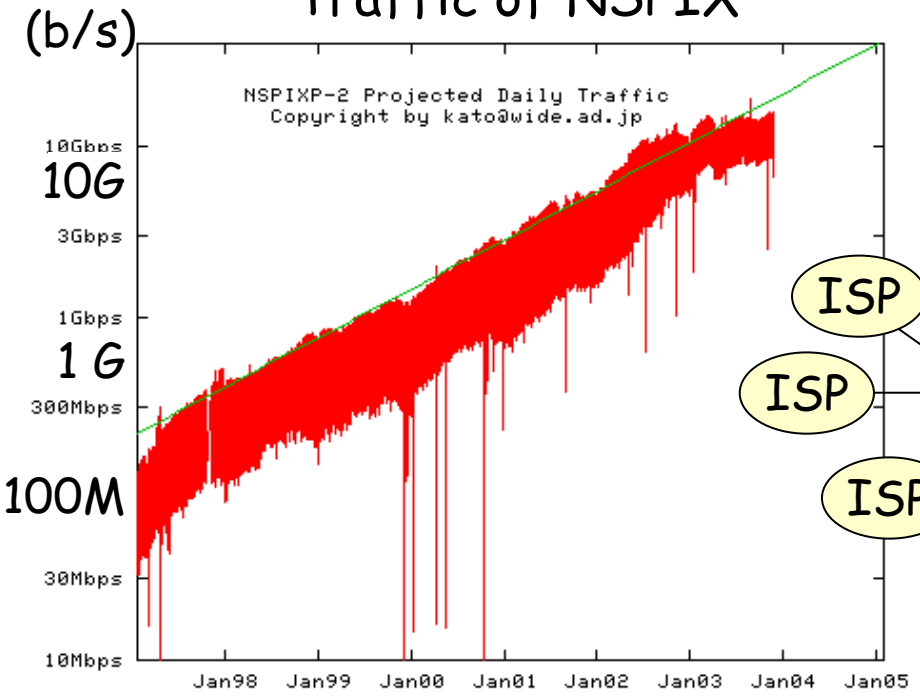


Source: "Internet White Paper 2004"

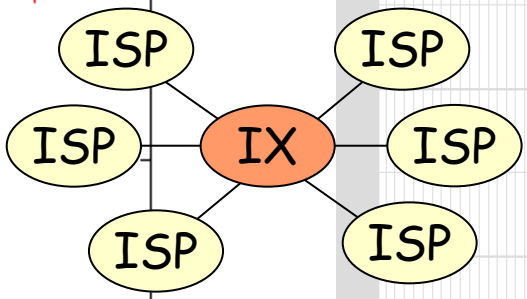
Explosion of broadband traffic

doubling every year ...

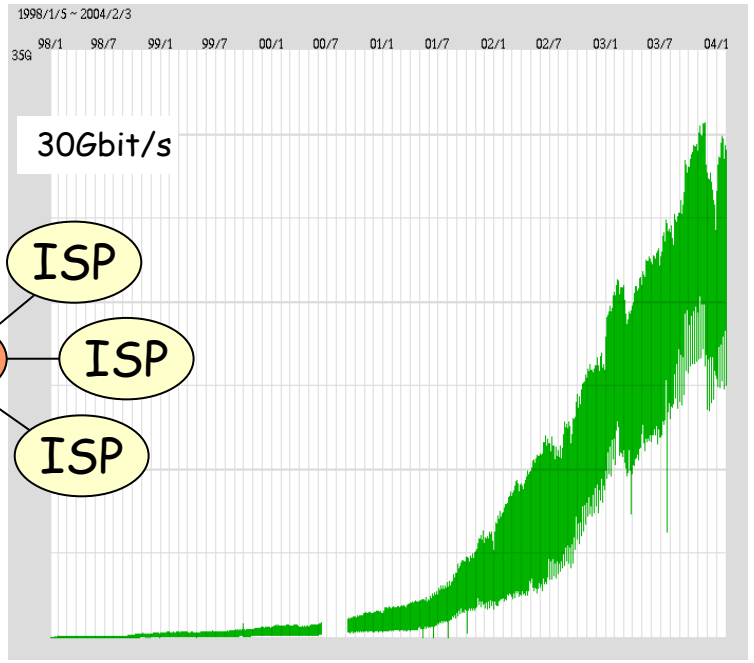
Traffic of NSPIX



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



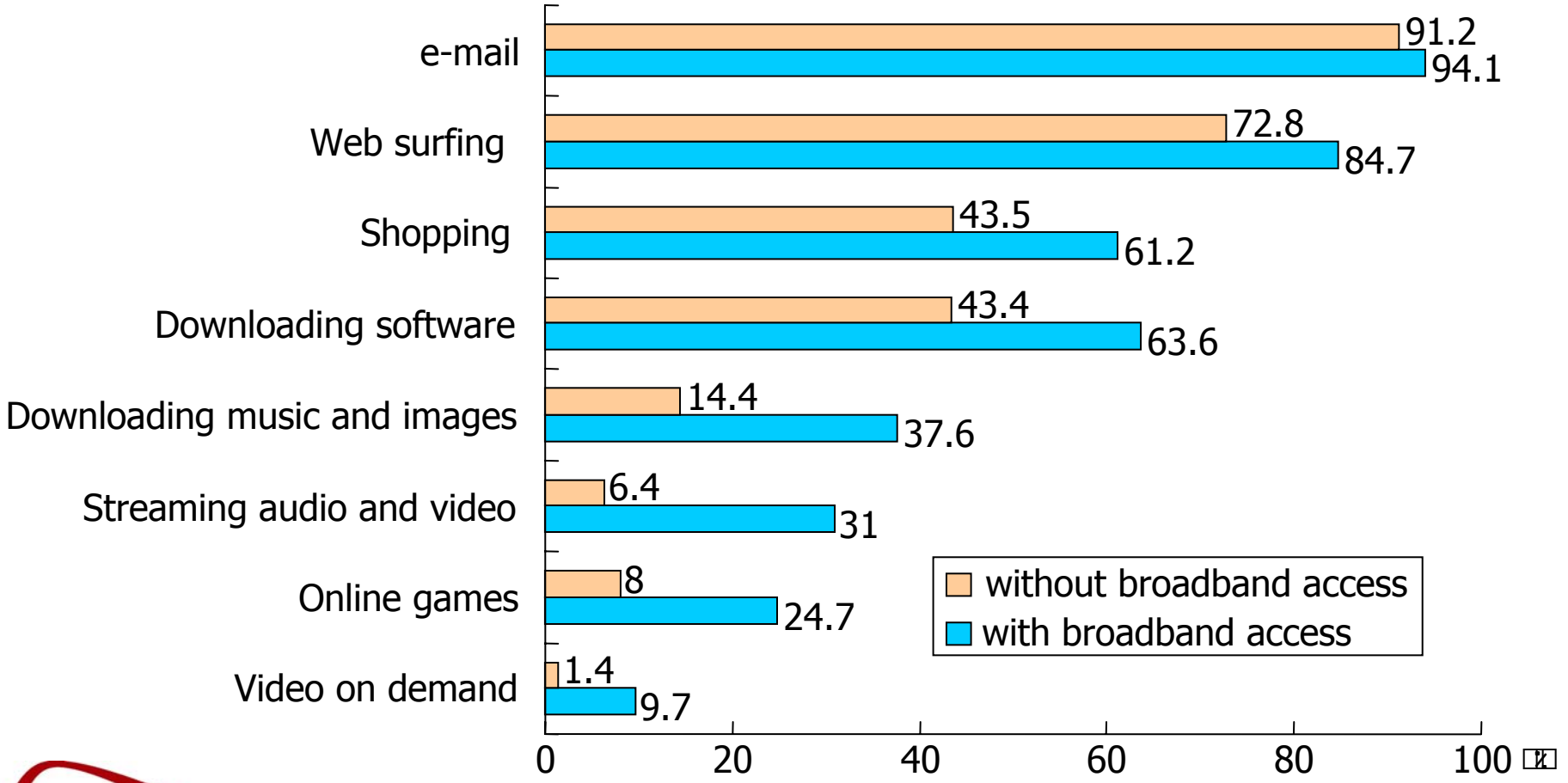
Traffic of JPIX



http://www.jpix.co.jp/jp/techncal/traffic.html

2. Creation of carrier-grade IP networks

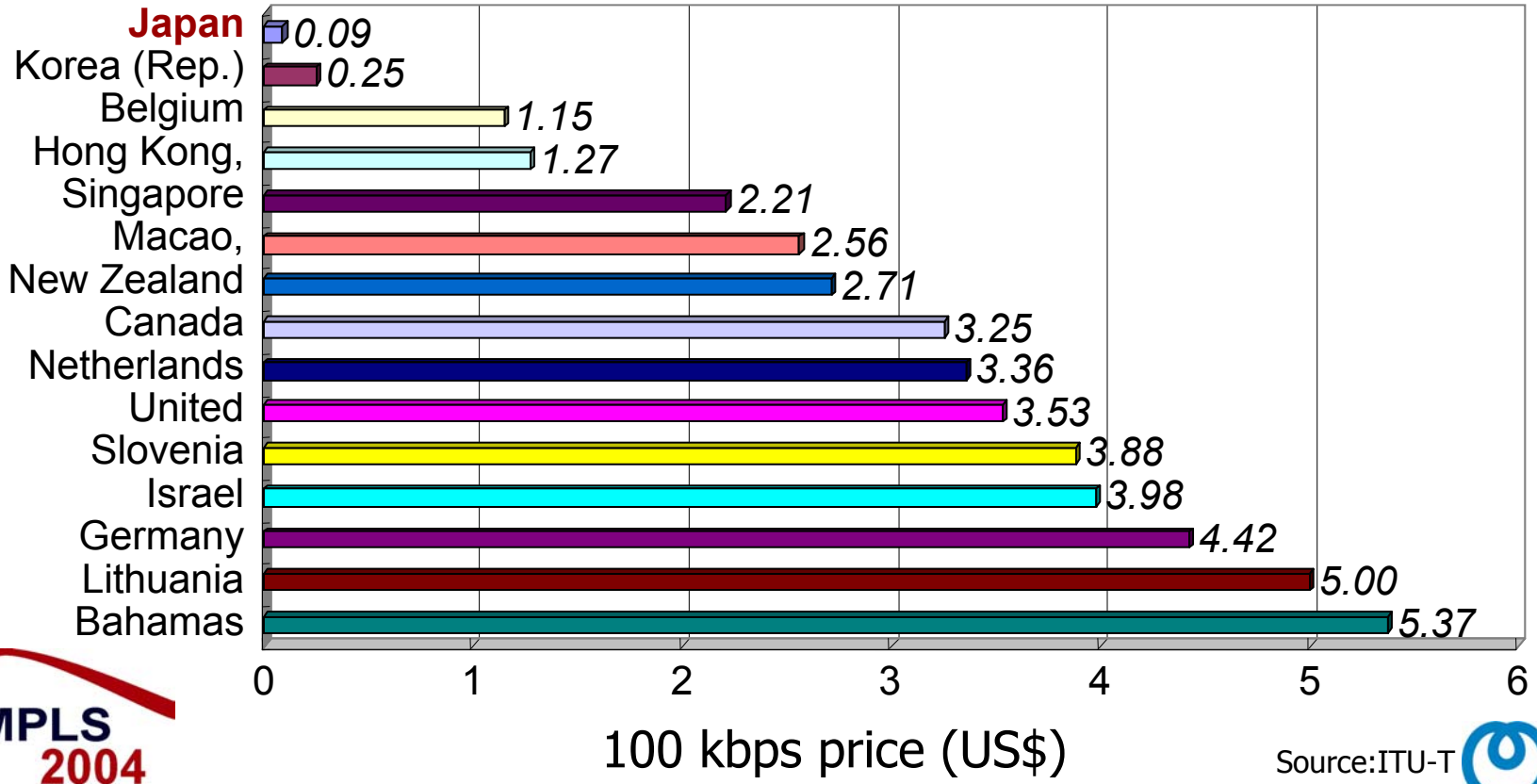
Changes in the use of contents with/ without broadband access



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

“Deadly” business model

- The one of cheapest countries in the world owing to fierce competition
- As a result, no ISP can profit enough money to invest new technology.



Source:ITU-T

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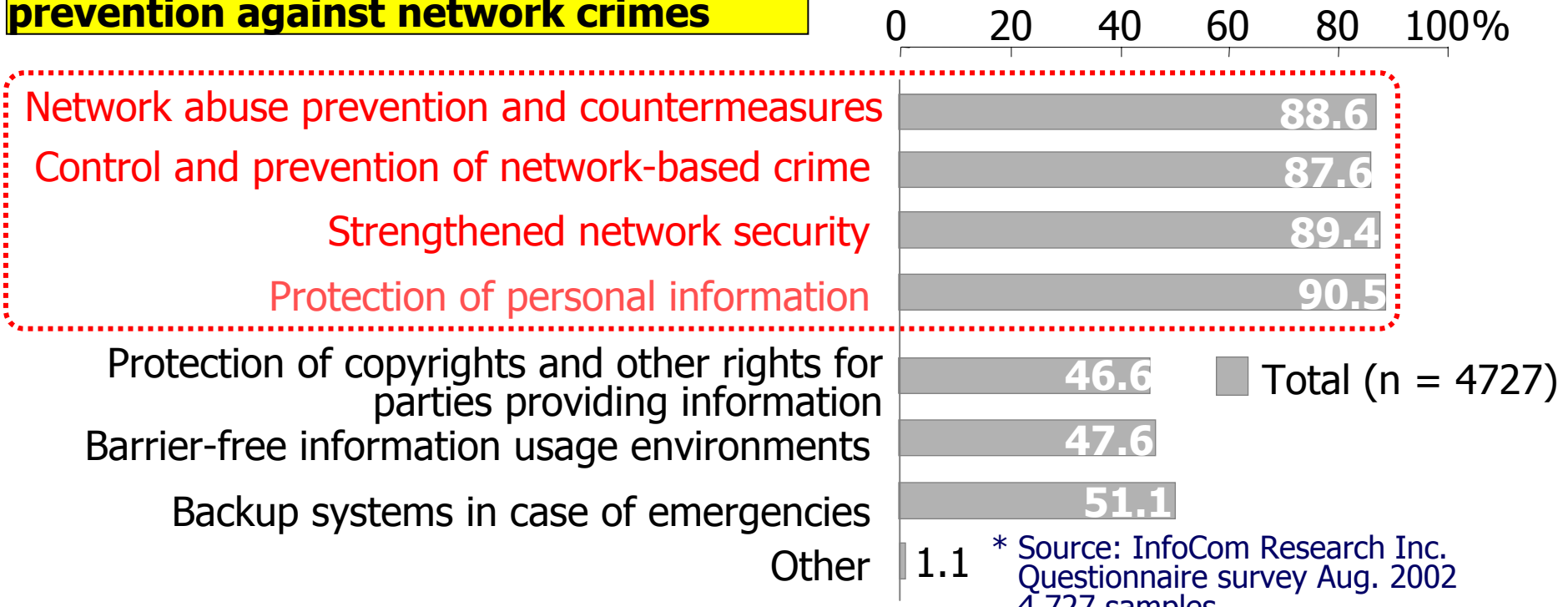
Concerns of Internet Users

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



* 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%.

An expected change in the use of the Internet

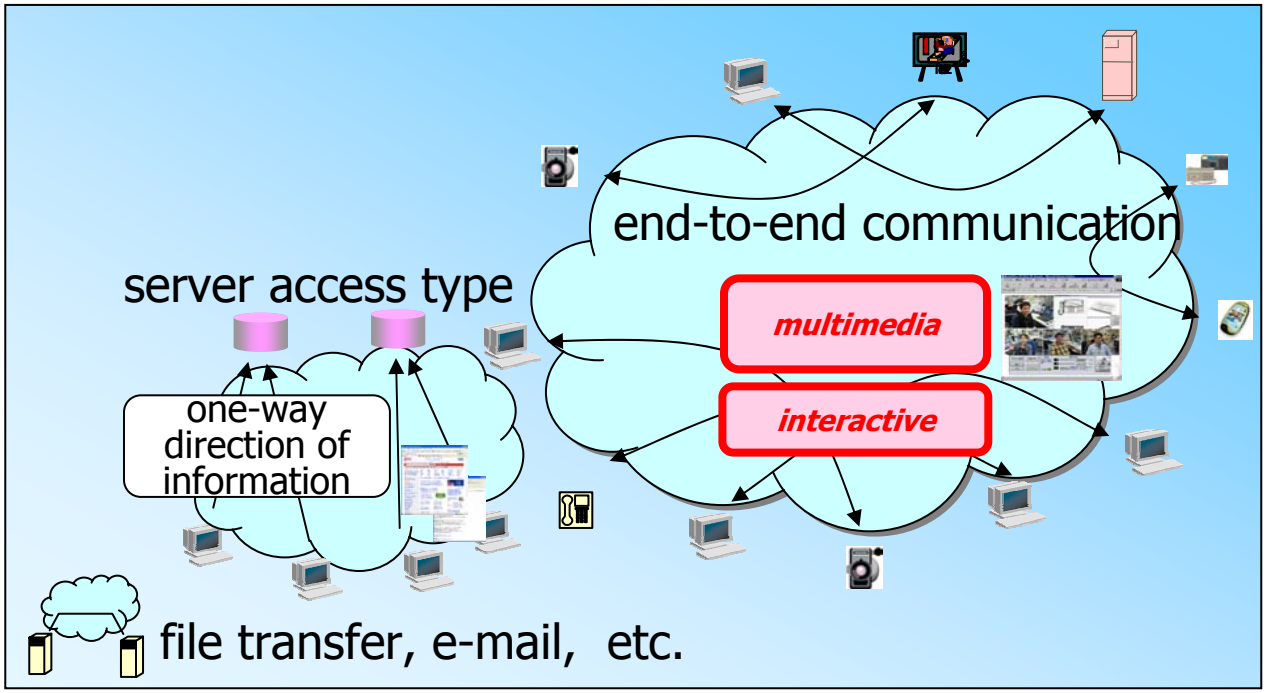
- End-to-end, direct communication between arbitrary users will prevail.
- The characteristics of end-to-end communication could be interactive and multimedia.

change in users

used by anybody at anytime

easily used by PC users

limited use by highly skilled engineers and researchers



initial current future

1. cost and bandwidth of access line ⇒ cheaper, broader
2. servers and PCs ⇒ larger capacity
3. non-PC, multimedia devices ⇒ higher performance, always-on

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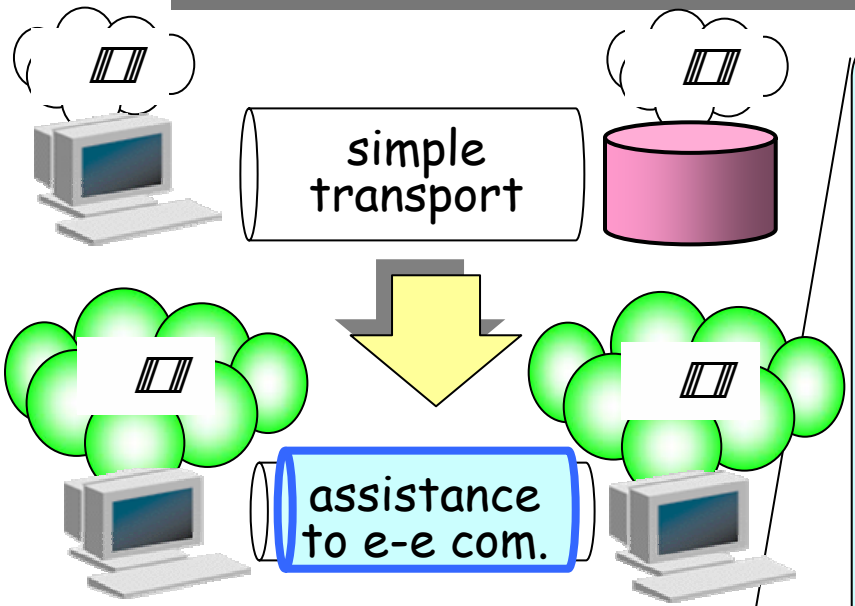
Network assistance to end-to-end communications

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



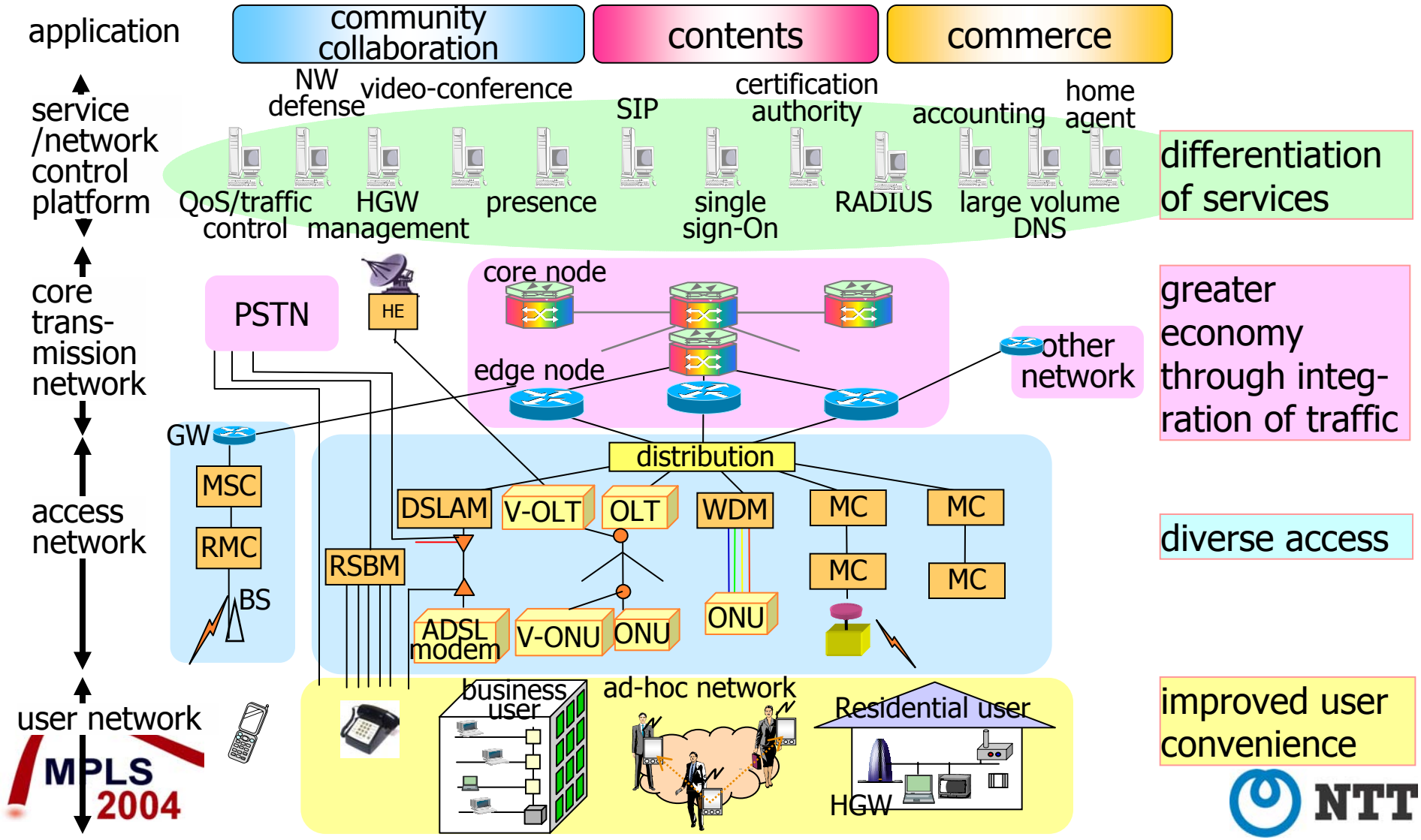
simple
1. Well-managed communication

safe
2. Authentication / security support

smart
3. Communications with any user
4. Sophisticated use of diverse premises

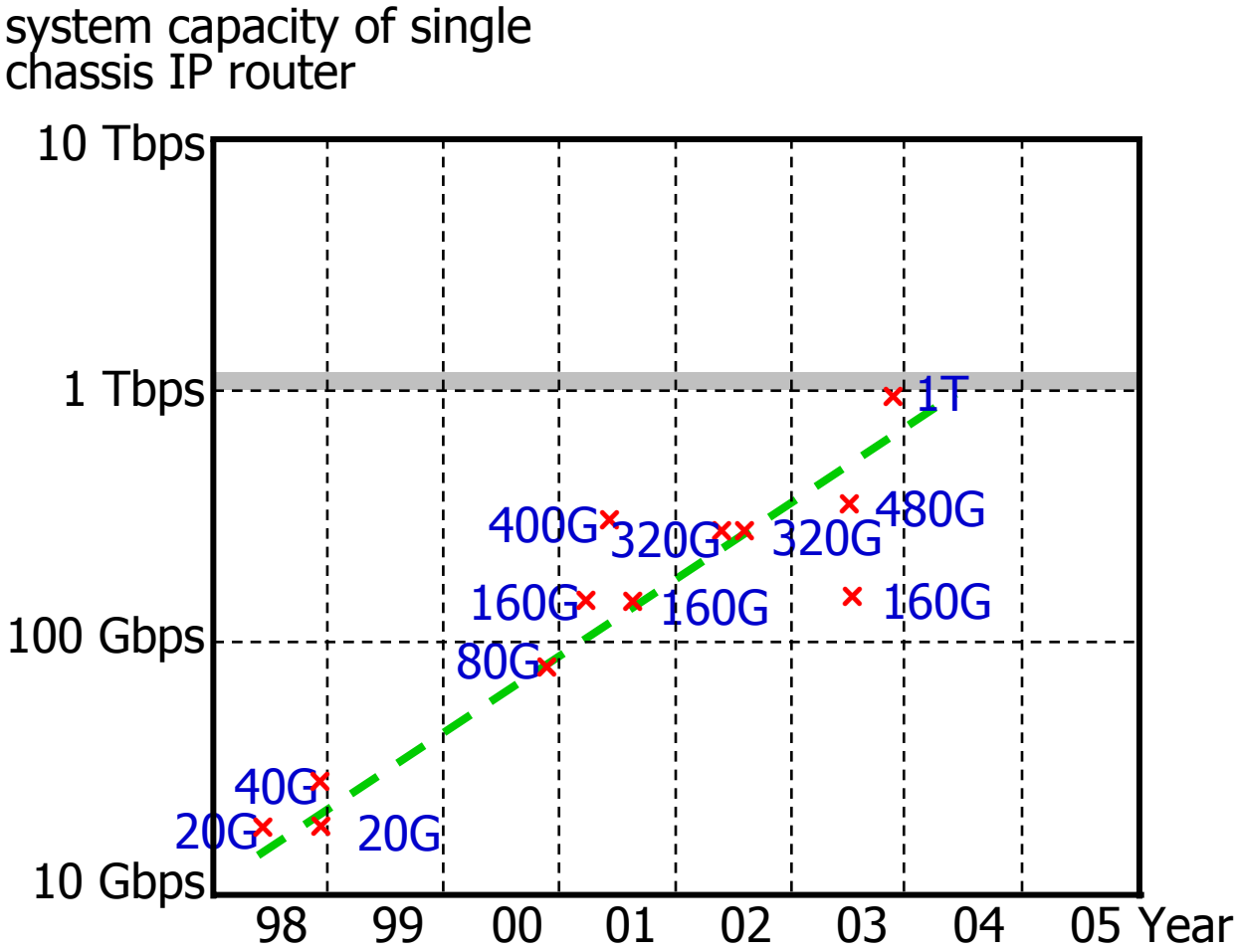
simple
5. Stable communication quality

Four-stage model for a carrier-grade IP network



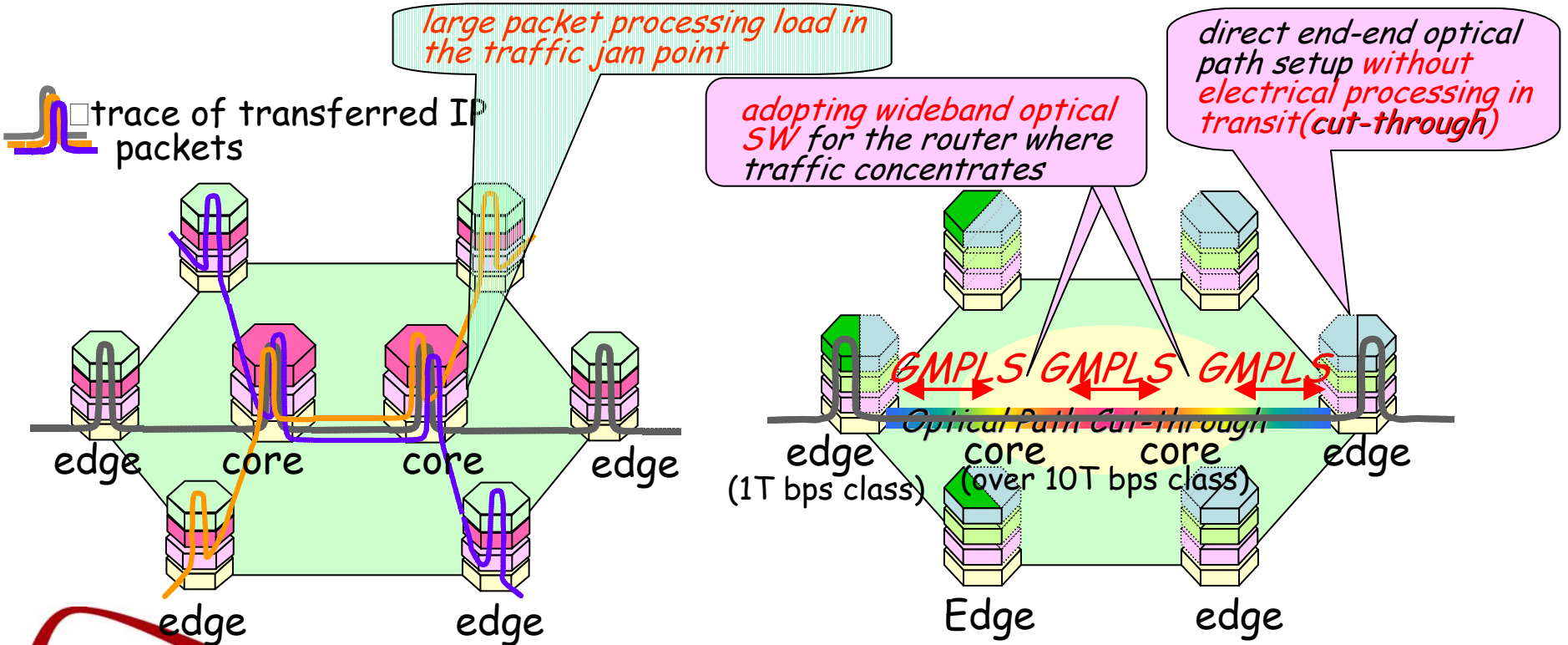
3 IP optical technologies for Resonant communications

System capacity of commercial IP router

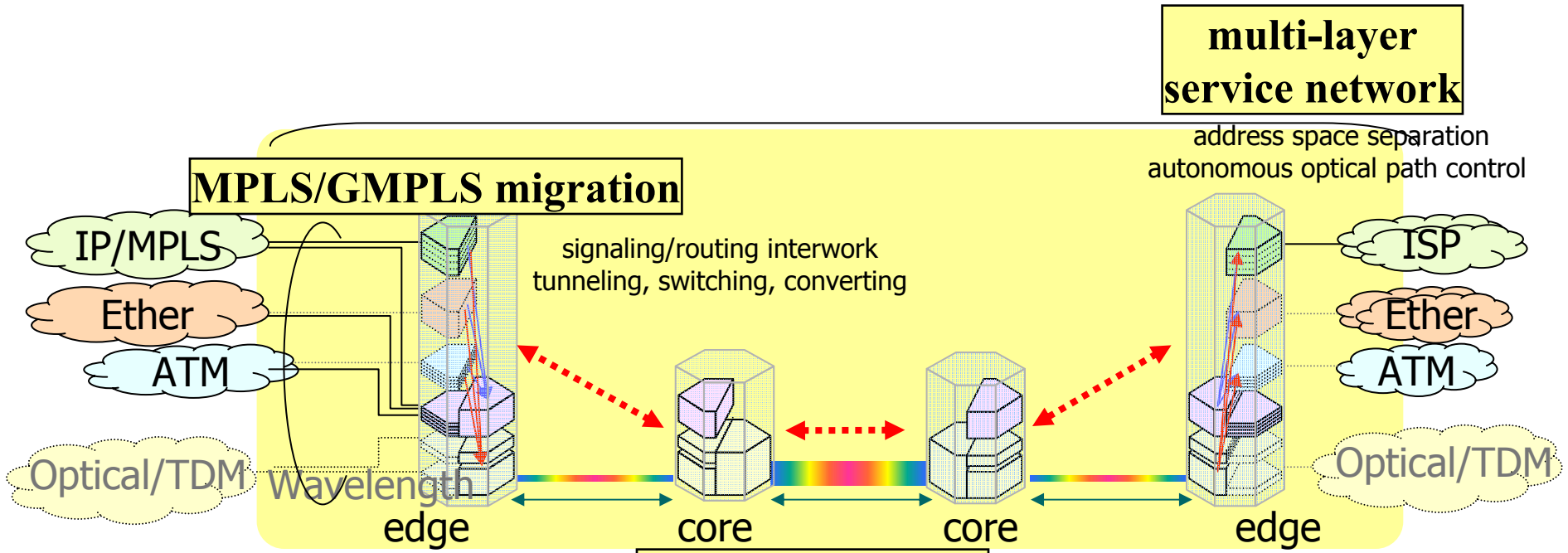


Incorporation of optical and IP technologies

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

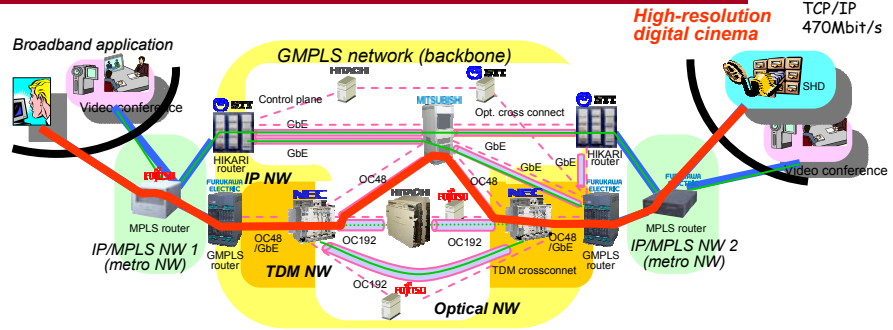


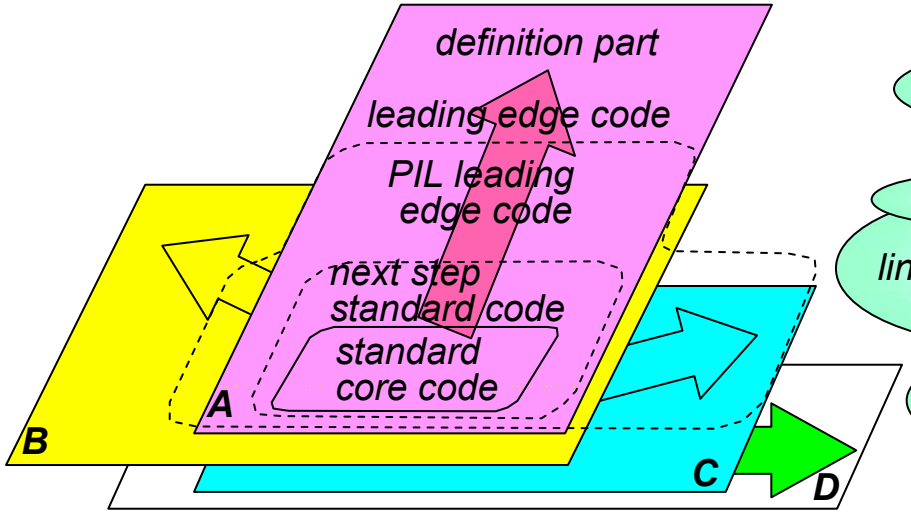
IP optical backbone network



Photonic Internet Lab. (PIL)
http://www.pilab.org/

- Founded in 2002. Supported by the Ministry of Internal Affairs and Communications of Japan.
- Promoting 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)

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PIL Members

NTT NEC FURUKAWA ELECTRIC ipinfusion OKI HITACHI Inspire the Next MITSUBISHI ELECTRIC FUJITSU KEIO UNIVERSITY

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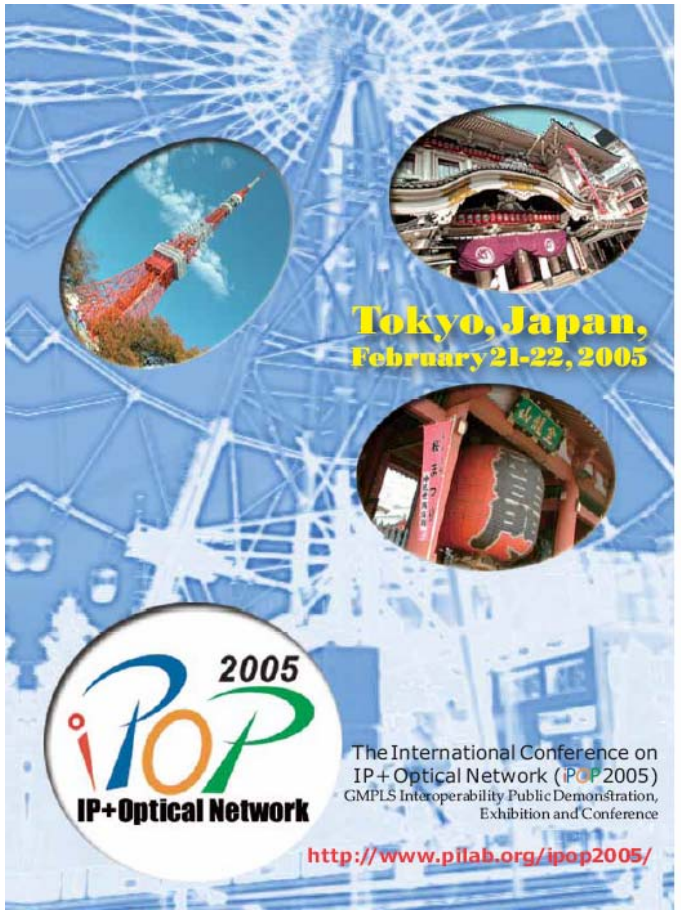
iPOP2005

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 EXHIBITION 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!

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