

NTT's Initiatives for NGN

June 19, 2007

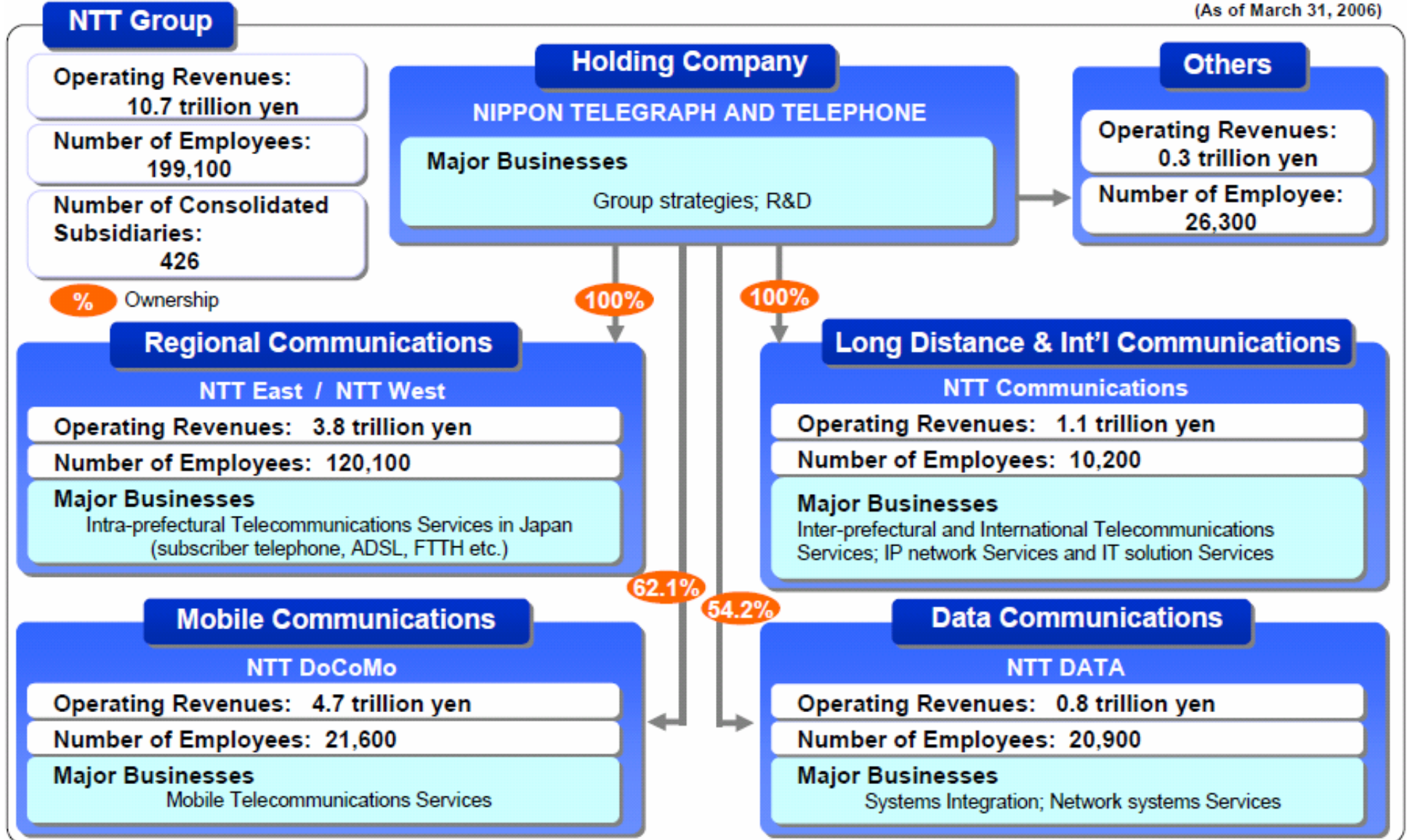
Atsushi Hiramatsu

Nippon Telegraph and Telephone Corporation

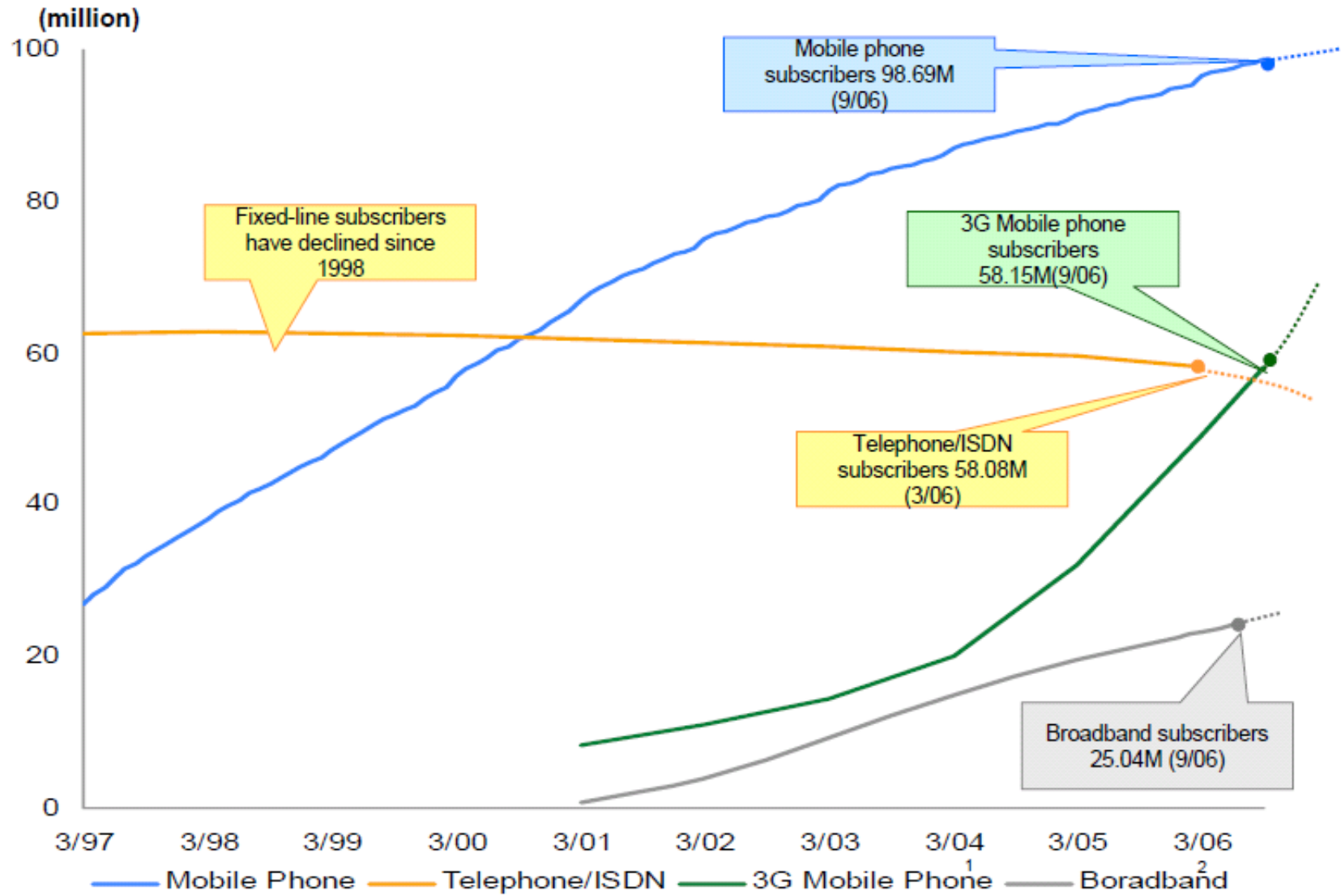
N T T G r o u p S t r u c t u r e

▶ **NTT Group offers a full range of telecom services**

(As of March 31, 2006)



Changes in Subscribers to Telecom Services in Japan



Source: Materials and other from Ministry of Internal Affairs and Communications and Telecom Carriers Association

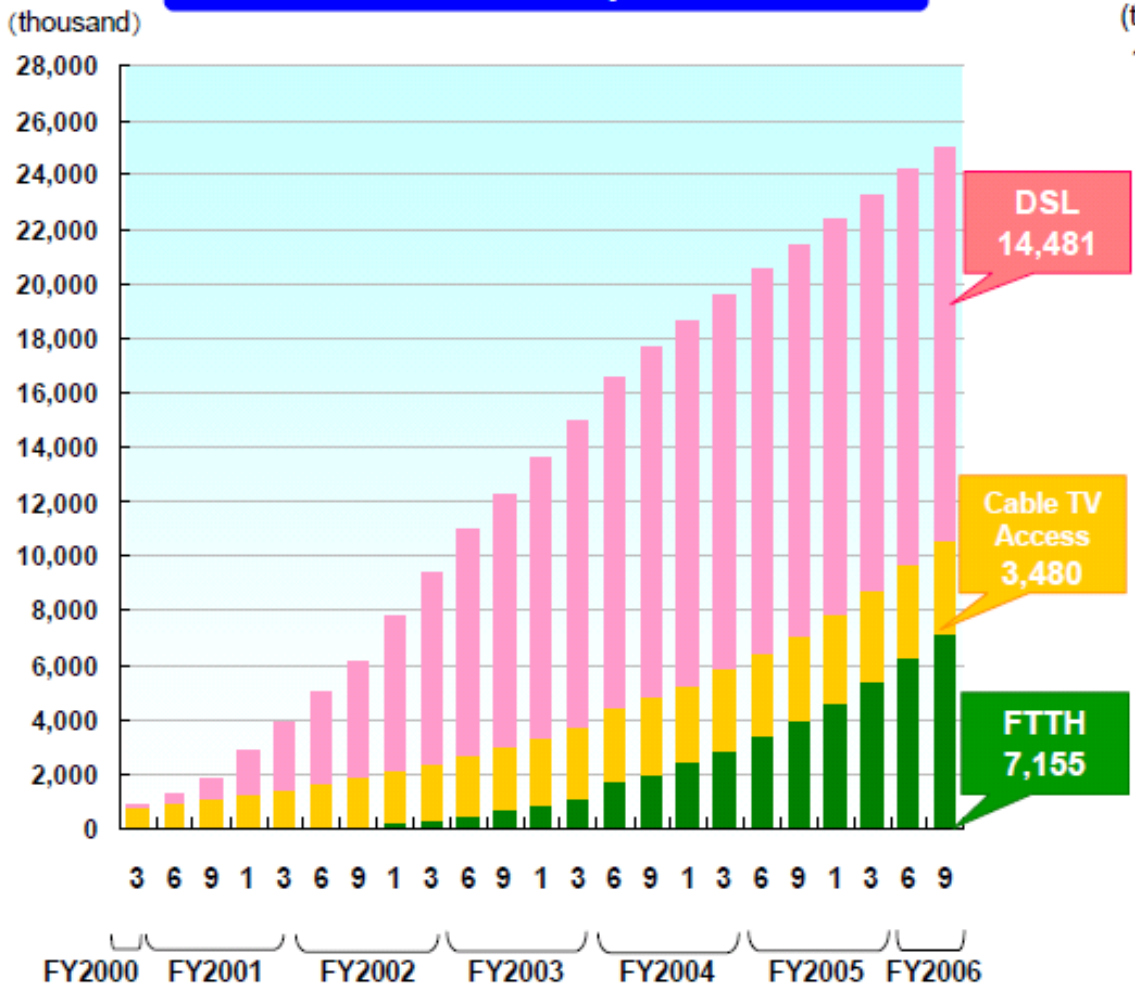
1 3G mobile phones include W-CDMA, CDMA2000, and odmaOne types.

2 Broadband includes DSL, FTTH, and CATV.

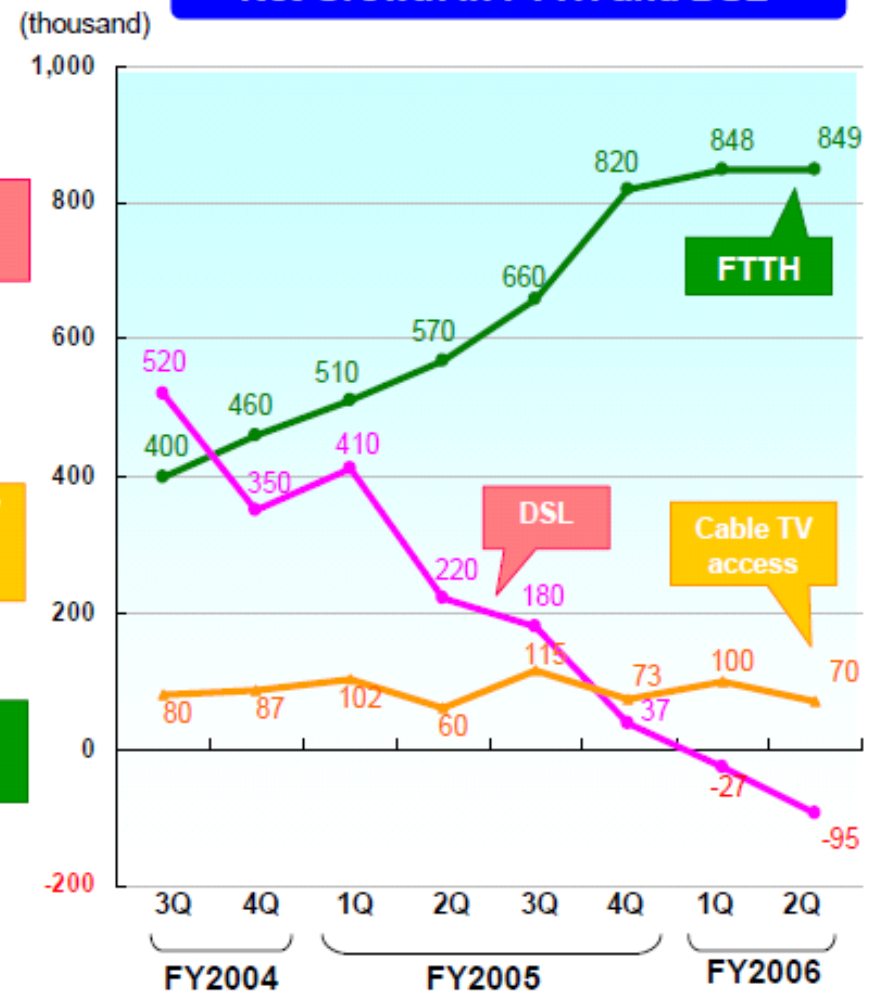
Growth of Broadband Market in Japan

▶ **Broadband market in Japan has been growing rapidly**

Broadband Subscription Trends



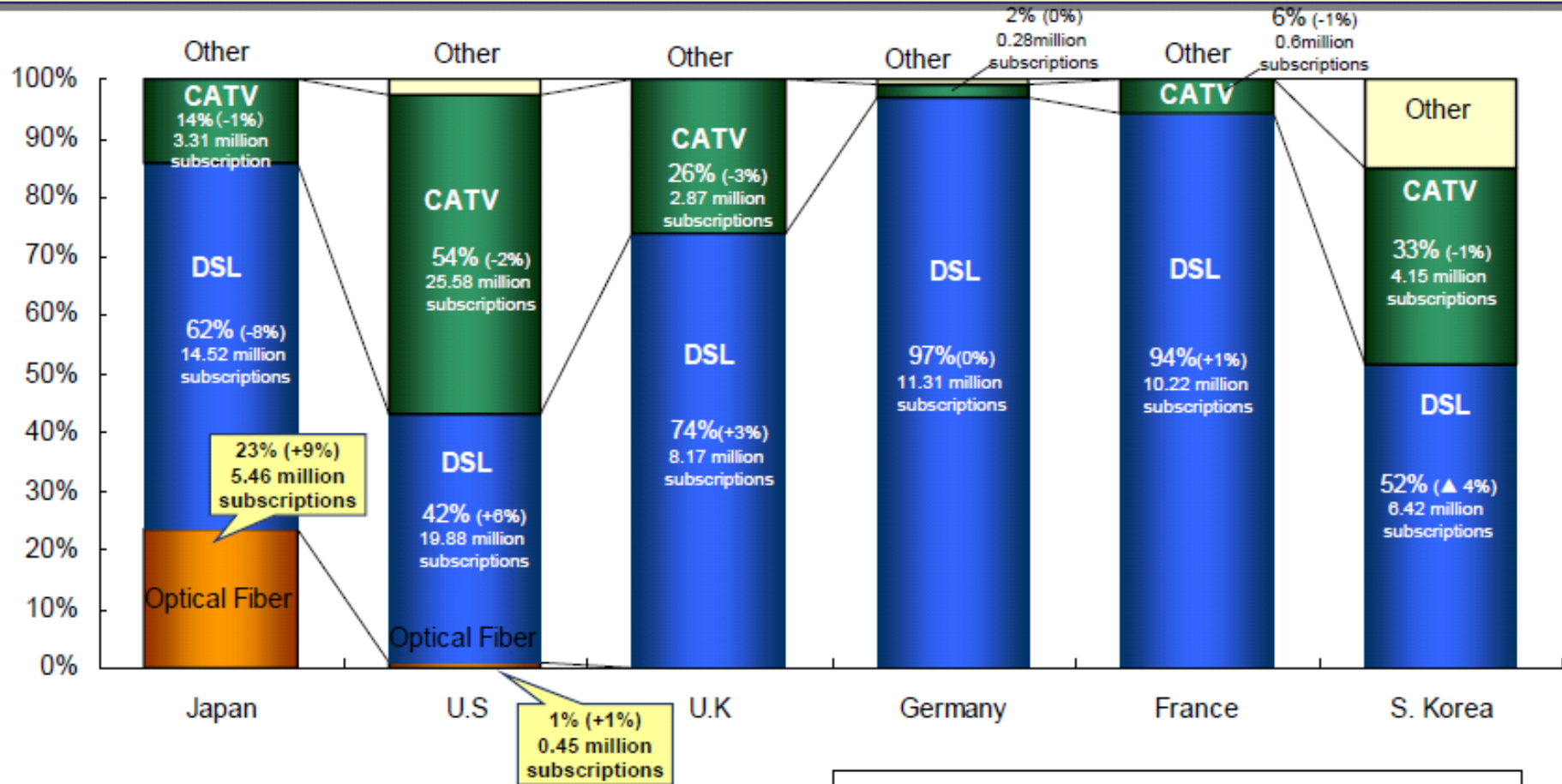
Net Growth in FTTH and DSL



Source: Ministry of Internal Affairs and Communications (MIC)

Broadband Share by Service Type, by Country

■ In the US, Verizon and AT&T have just launched fiber-optic broadband services, and in Europe, service providers are still at the planning stage. In Japan, however, fiber-optic services are growing rapidly



Sources: Regulatory agencies in countries

Figures: upper left: composition ratio (%),
 Upper right: (composition ratio year-on-year changes (%))
 Bottom line: number of subscriptions (as of end of 2005 for U.S., and as of end of March 2006 for other countries)

Medium-Term Management Strategy

(Released in November 2004)

Our Goals

- **Achieve a ubiquitous broadband services society**
 - ▶ **Creating a rich communications environment for individuals and communities**
 - ▶ **Making corporate activities more efficient and generating new business opportunities**
- **Build an open network environment**
 - ▶ **Encouraging application and content providers to utilize Next-Generation Network, and to provide a wide variety of services**
 - ▶ **Proactively forming alliances with the application and content providers**
- **Increase NTT Group's corporate value, benefiting shareholders and investors**

In line with Japan's Information and Communication Technology ("ICT") strategy ("e-Japan" strategy and "u-Japan" policy)

Specific Measures

**Construction of
Next-Generation Network**

**Development of
Ubiquitous Broadband
Services**

NTT Group aims to shift 30 million customers to optical fiber access and Next-Generation Network services by FY2010

Specific Initiatives for Promoting NTT Group's Medium-Term Management Strategy [Released on Nov. 9, 2005]

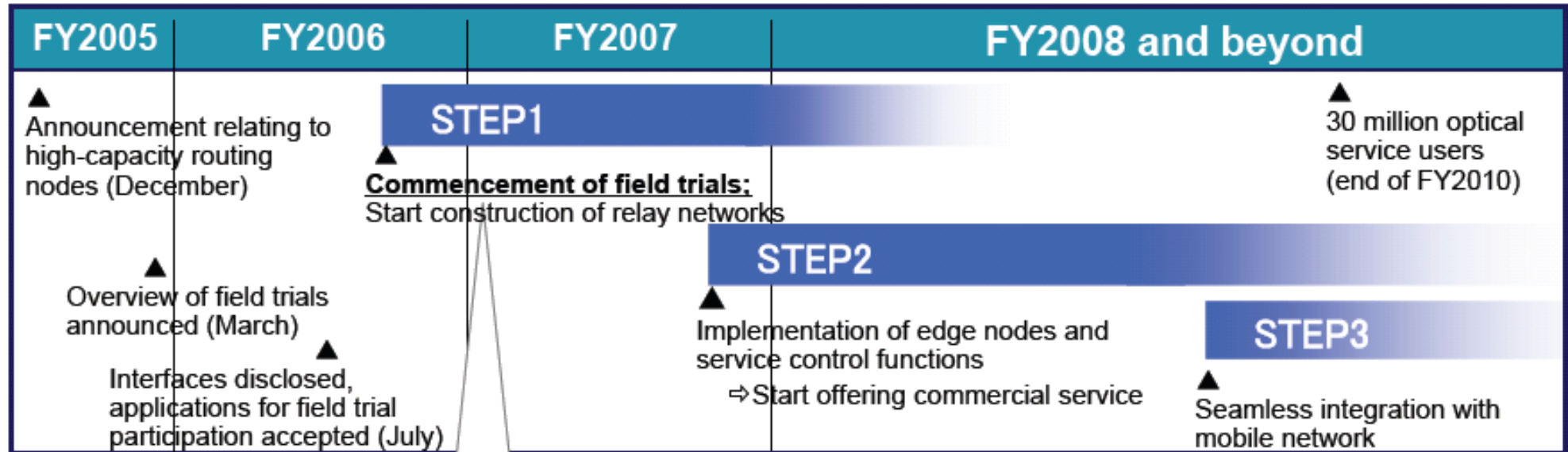
Building Next-Generation Network

- Basic concepts
 - A safe, secure, and convenient network which can handle rapid increase of IP traffic
 - providing services that ensures Quality of Services ("QoS")
 - IP-based network enabling the provision of seamless fixed communications (intra-and inter-prefectural) and mobile communications
 - Adoption of a layered structure model to conform to international standards
 - Disclosure of interface between application layers enabling (service providers) to provide a wide array of application services
 - An open network ensuring security and connectivity (interconnectivity) with other carriers and ISPs
- Designing of roadmap and implementation of field trials (commencing in the 2nd half of FY2006)

Developing Ubiquitous Broadband Services

- Network services
 - Highly-functional, highly-reliable optical fiber services
 - High-speed and advanced functions of mobile services, and multi-functions of wireless handsets
 - Promotion of FMC
- Upper-layer services enhancement such as Internet connection and portal
- Enhancement of corporate customer service
- Promotion of convergence of telecommunications and broadcasting
- Provision of one-stop services
- Expansion of International business and standardization activities
- Efforts directed to realize a "safe and secure" society as envisioned by new innovative IT strategy and u-Japan Policy

Roadmap for building the NGN



Participating firms

■ Network-related equipment suppliers

▶ Cisco, Juniper, NEC, Hitachi, Fujitsu, Oki Denki, Alaxala and others

■ Application services providers

▶ Cisco, Sony, Matsushita (Panasonic), Hitachi, NEC, NEC Biglobe and others

Application services

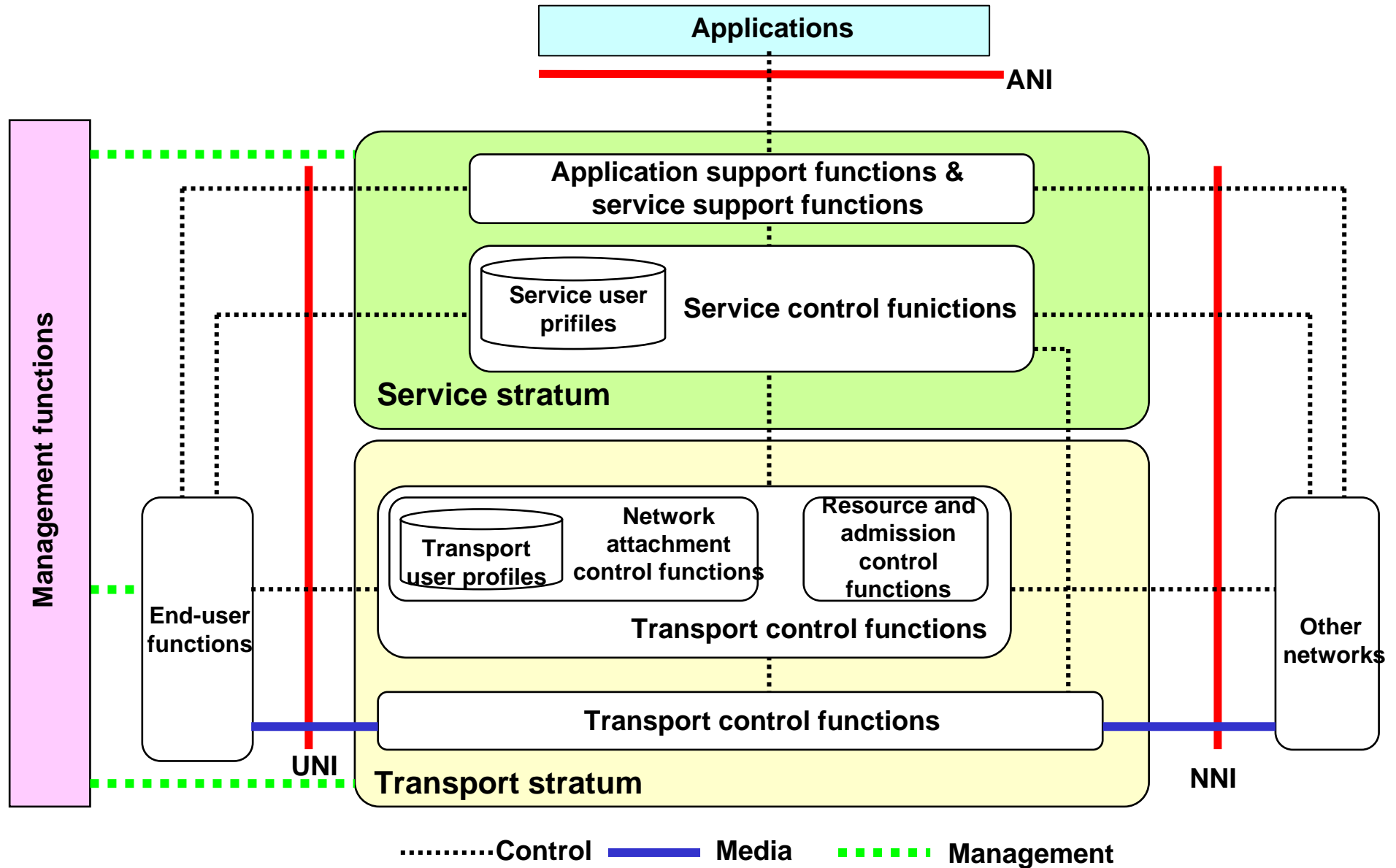
▶ High definition video and distribution services, home security and control, and ubiquitous monitoring

NTT Otemachi Showroom for NGN field trial



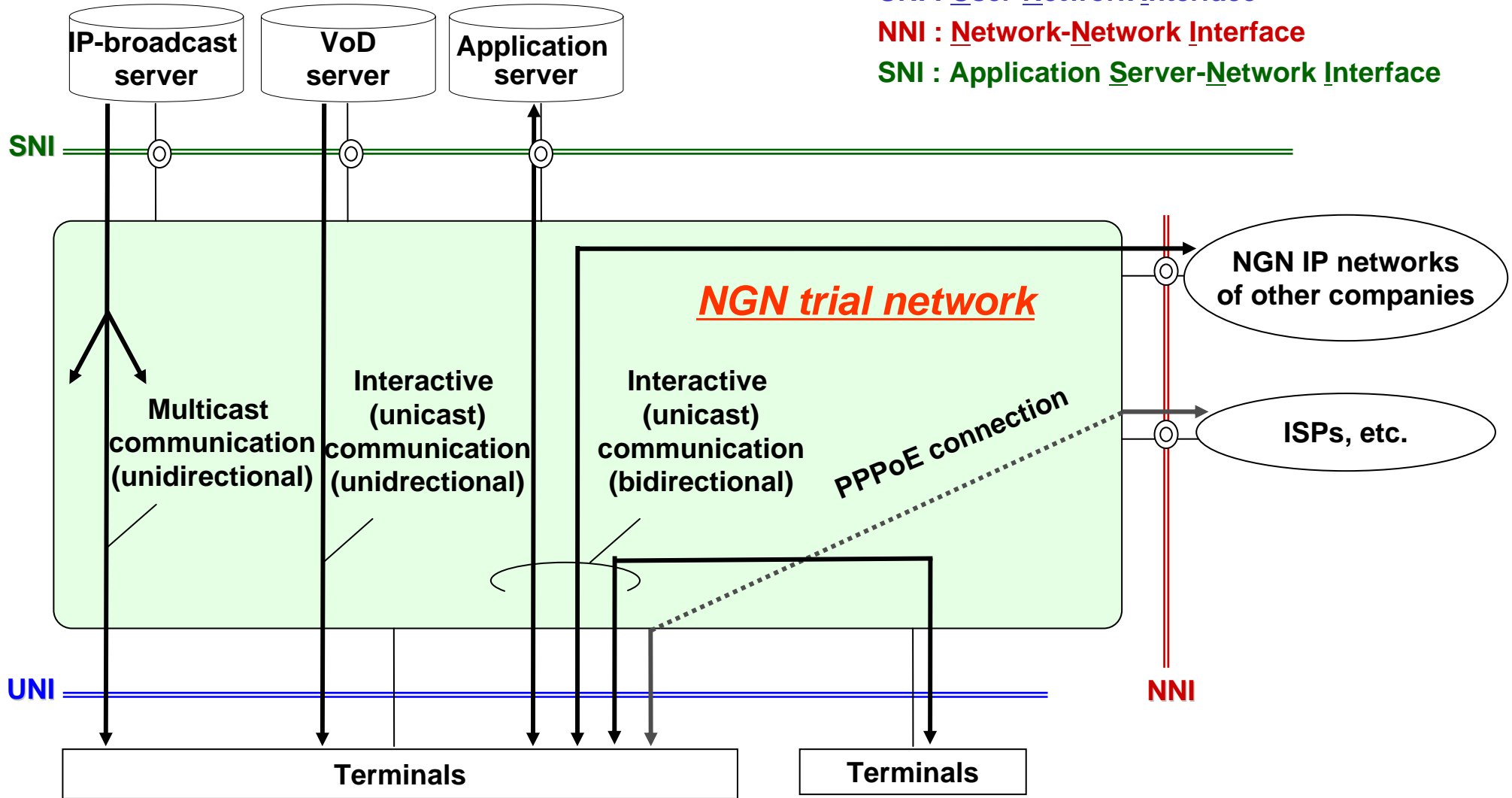
NTT's technologies for NGN

NGN architecture overview at ITU-T



Overview of NGN field trials

UNI : User-Network Interface
NNI : Network-Network Interface
SNI : Application Server-Network Interface



Communication functions and service examples in field trails

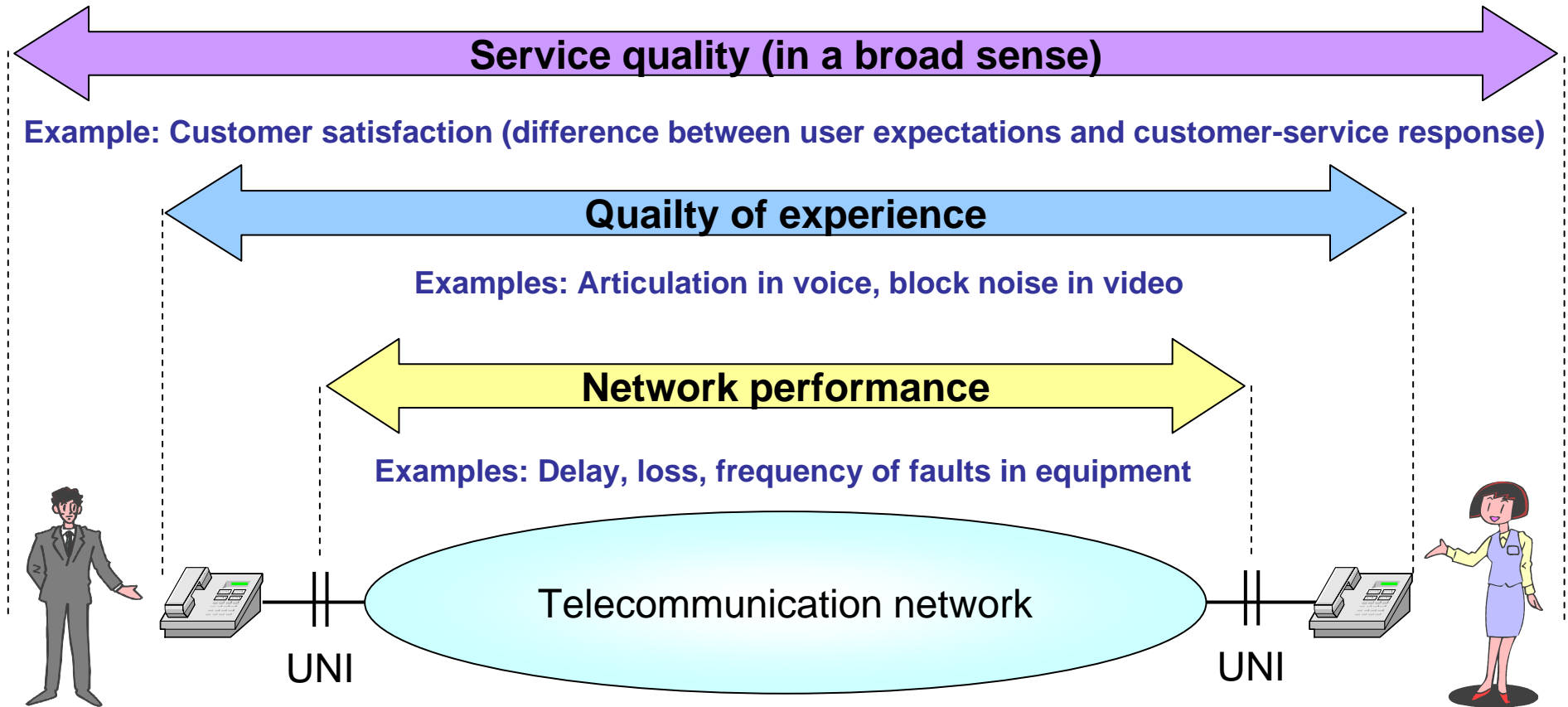
Communication functions	Service category	QoS class	Bandwidth (codec)
Interactive (unicast) communication (bidirectional)	IP telephony (with 0AB-J phone number)	Highest priority	<ul style="list-style-type: none"> •Wideband speech: 7kHz (G.722, etc) •Narrowband speech: 3.4kHz (G.711)
	Video telephony (with 0AB-J phone number)	Highest priority	<ul style="list-style-type: none"> •SDTV class (MPEG4): 2 Mb/s •HDTV class (MPEG2): 30 Mb/s
Interactive (unicast) communication (unidirectional) Multicast communication (unidirectional)	Video delivery (VoD / IP broadcast)	High priority	<ul style="list-style-type: none"> •SDTV class (MPEG2): 6 Mb/s •HDTV class (H.264): 10 Mb/s
		Best effort	
PPPoE connection	ISP connection	Best effort	

QoS objectives in NGN field trials

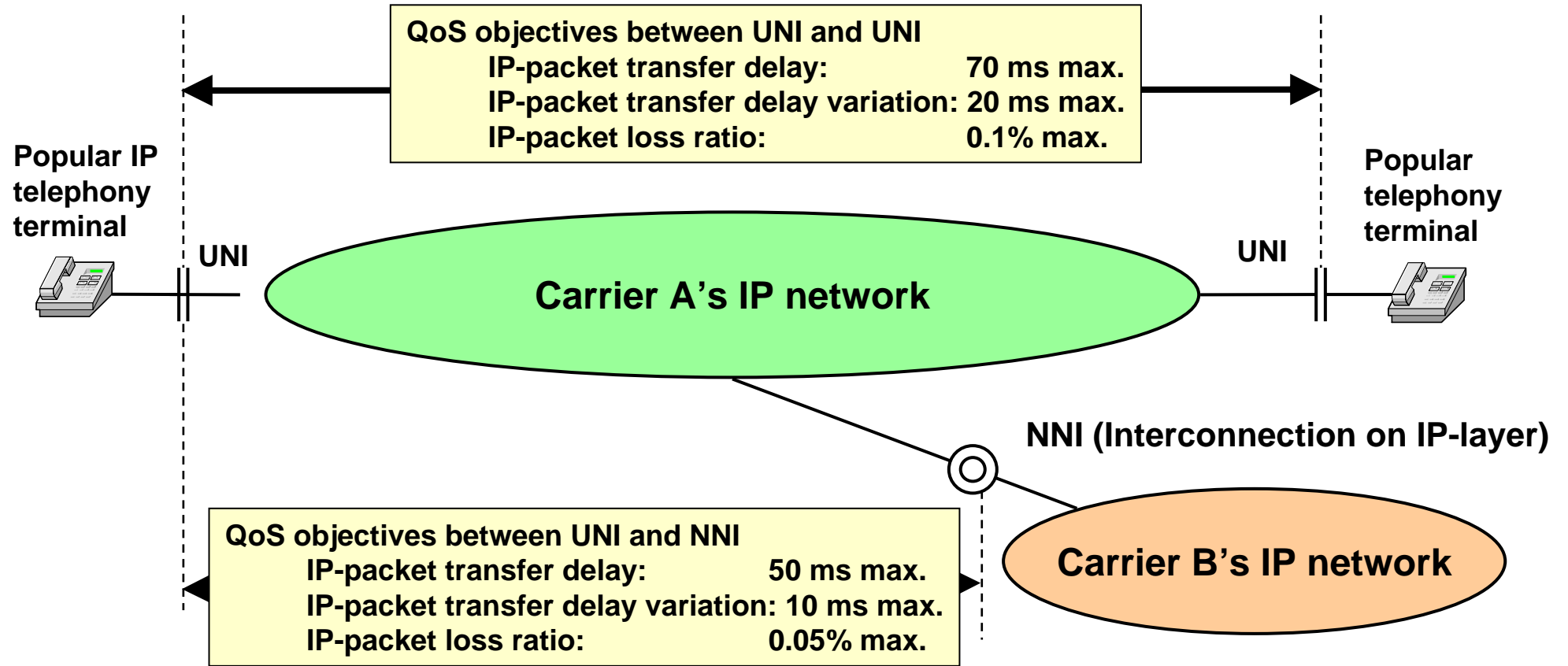
Class		Highest-priority	High-priority	Priority
Diffserv mapping		EF	AF(high)	AF(low)
Interactive (unicast)	IP-packet transfer delay	70ms (UNI-UNI)	200ms (UNI-UNI)	NOT specified
	IP-packet transfer delay variation	20ms (UNI-UNI)	200ms (UNI-UNI)	
	IP-packet loss ratio	0.1% (UNI-UNI)	0.1% (UNI-UNI)	NOT specified*
Multicast	IP-packet transfer delay	/	400ms (UNI-SNI)	/
	IP-packet transfer delay variation		200ms (UNI-SNI)	
	IP-packet loss ratio		0.1% (UNI-SNI)	

*Priority-class traffic is given priority over best-effort class by packet transfer processing in the network

Quality in telecommunication services

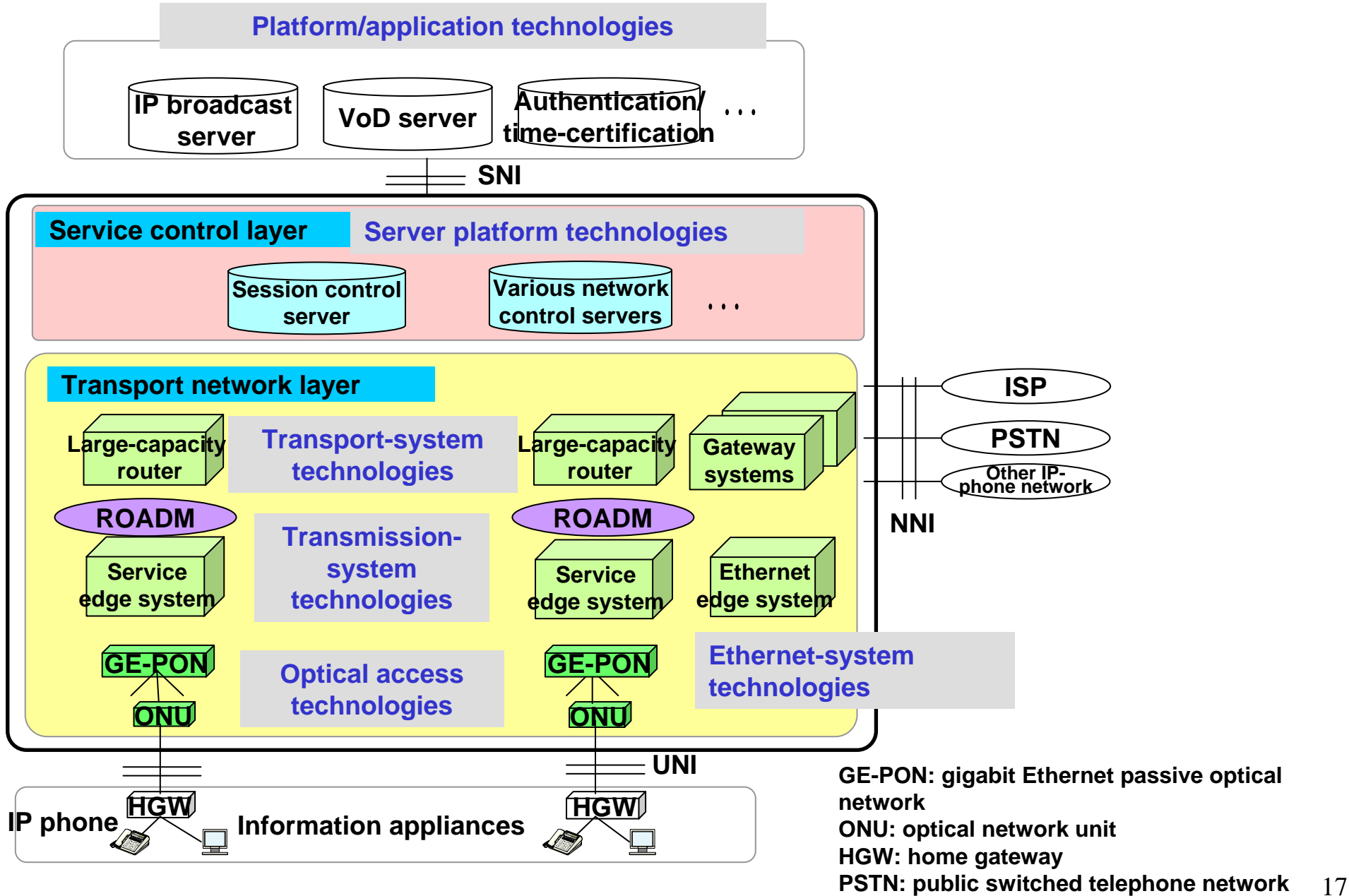


QoS regulations for IP telephony using 0AB-J phone numbers

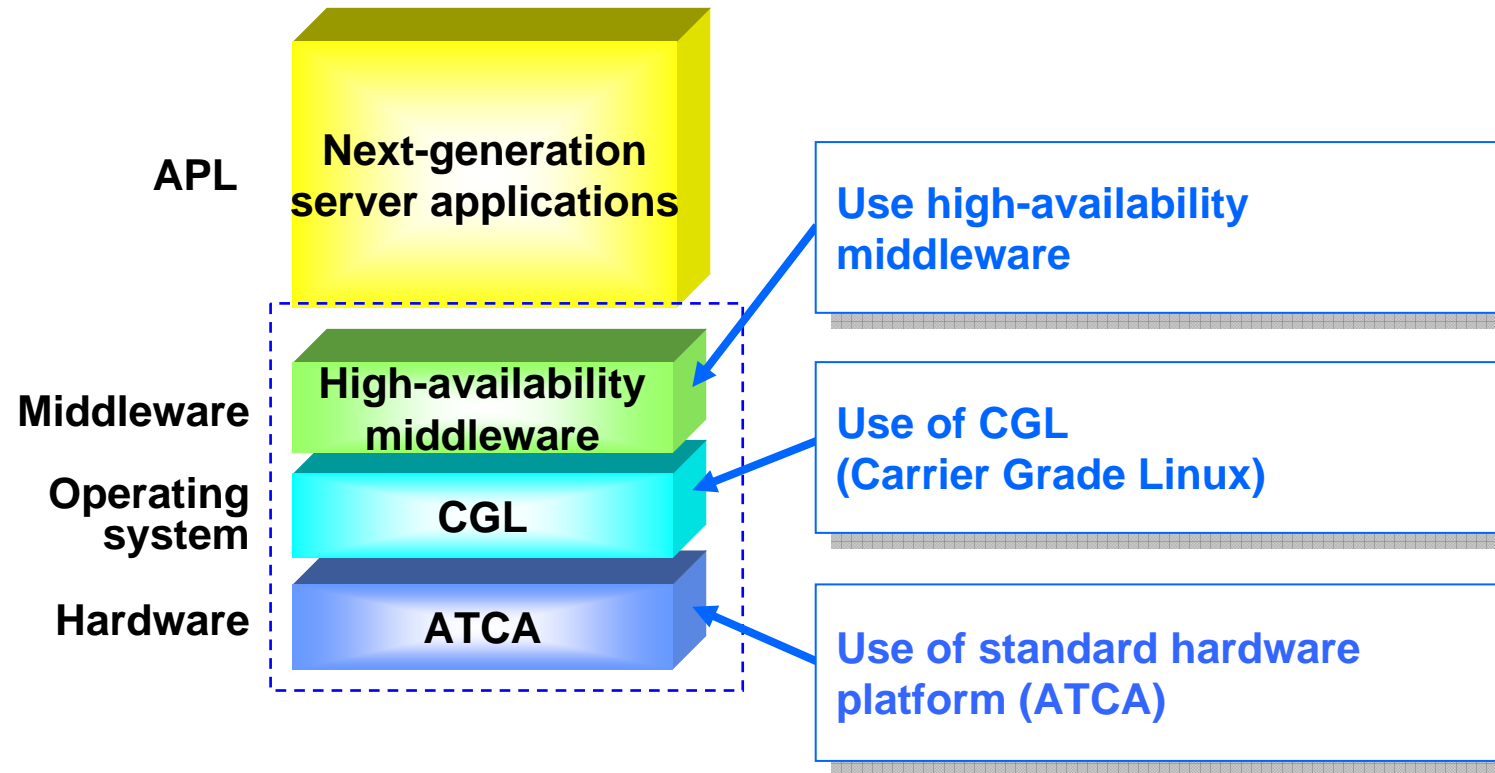


From: Next Generation IP Network Promotion Forum, Japan

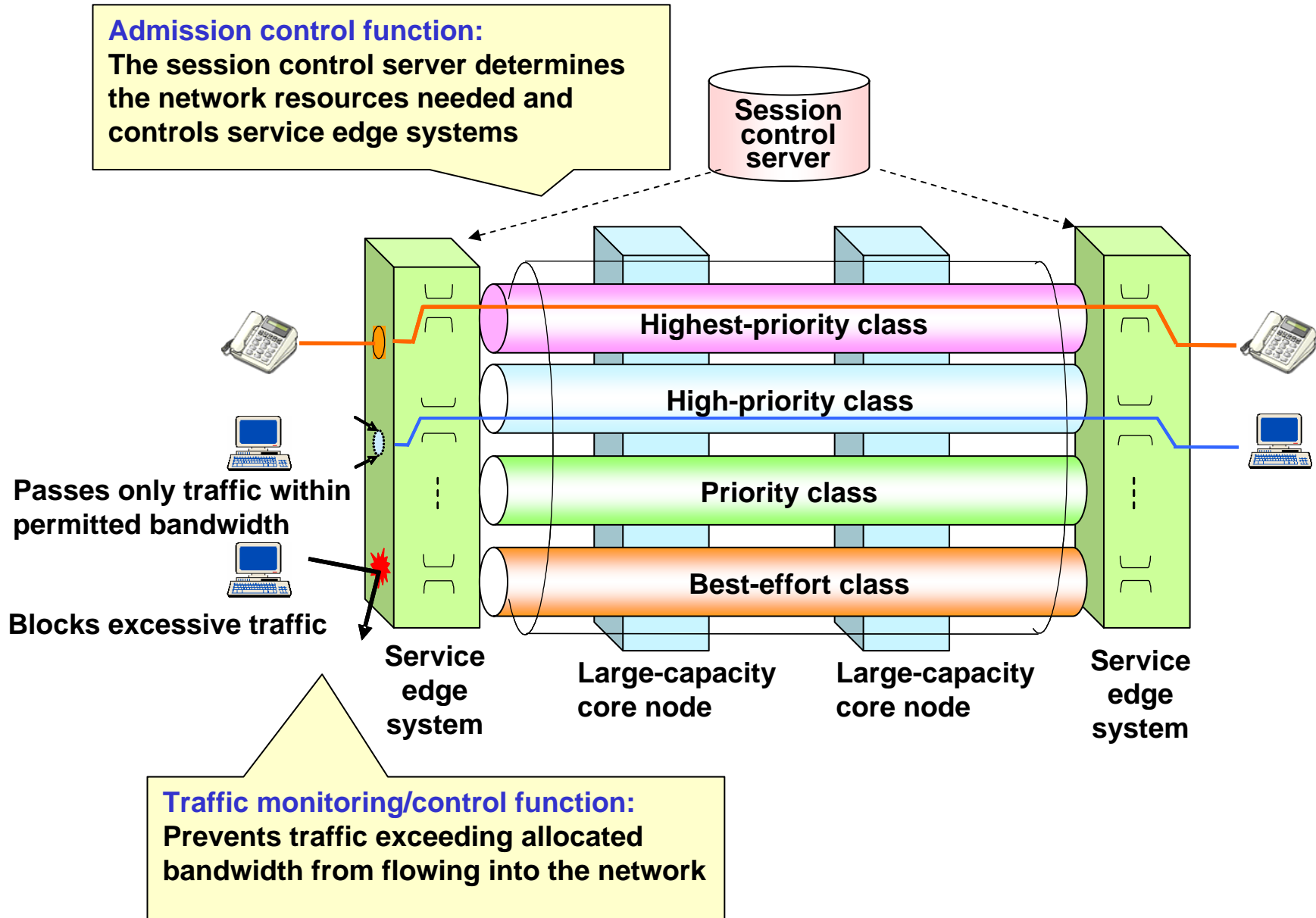
NTT Research and Development for NGN



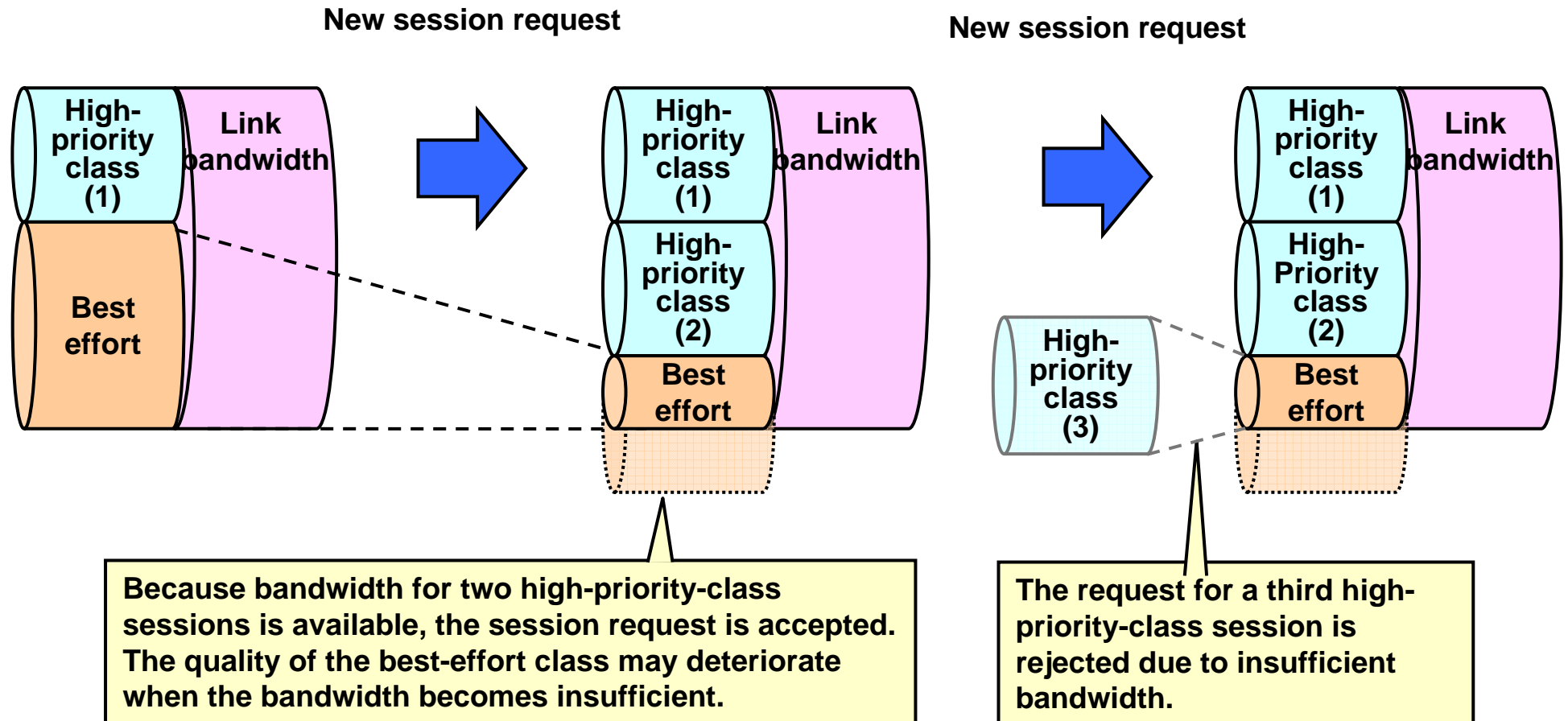
Architecture for NGN service control server



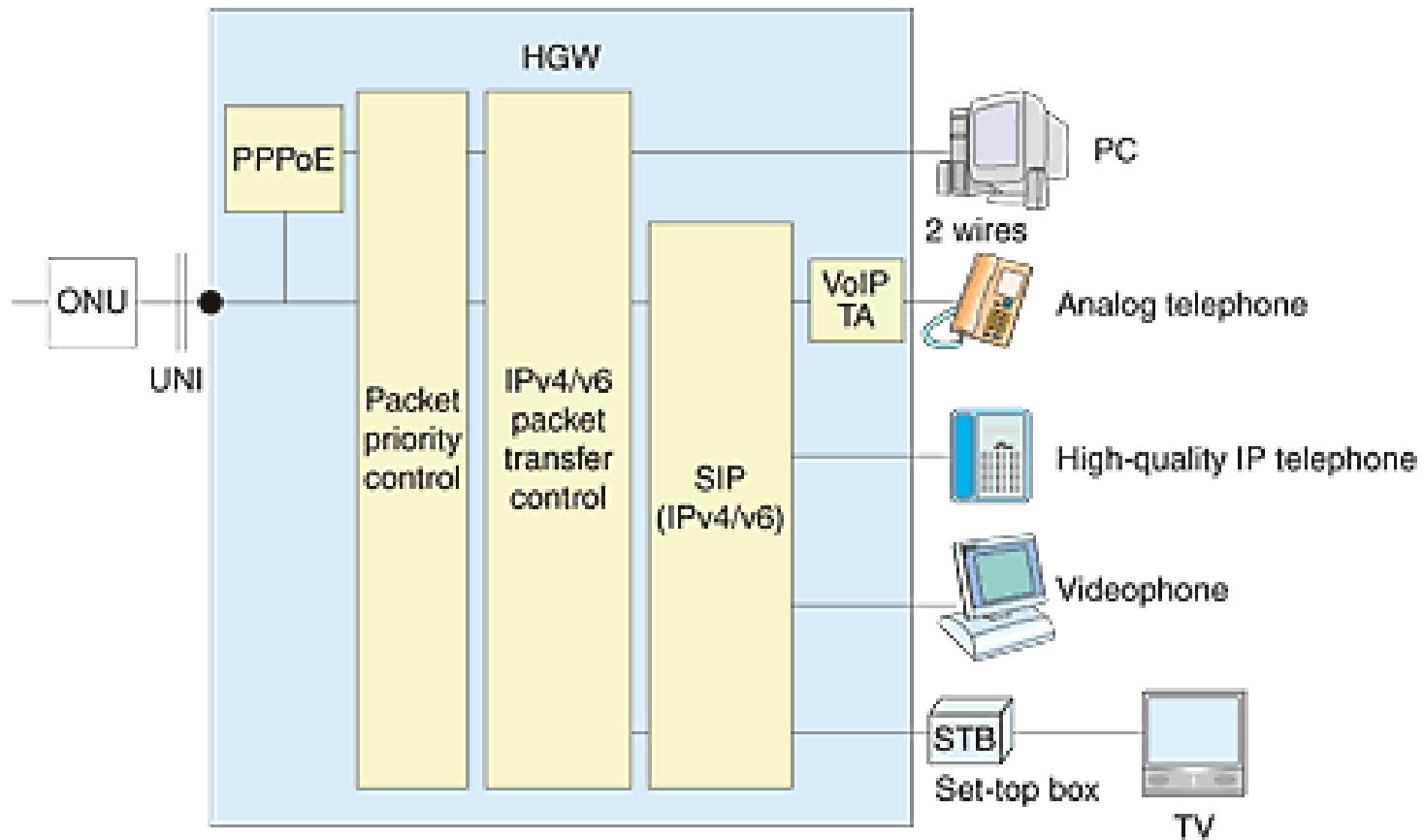
Basic architecture for QoS control



Admission control in the NGN

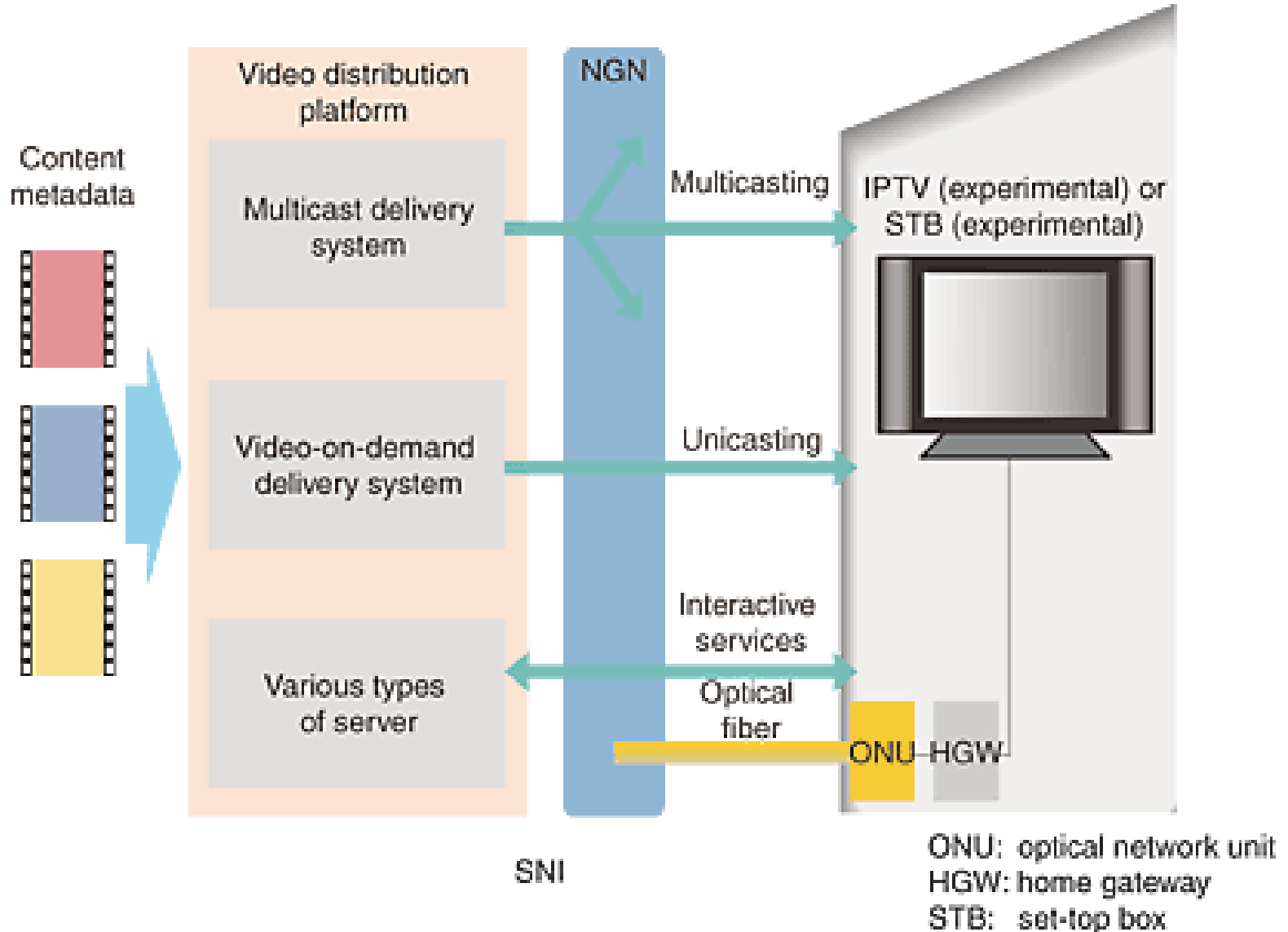


Home network configuration for field trail monitor users

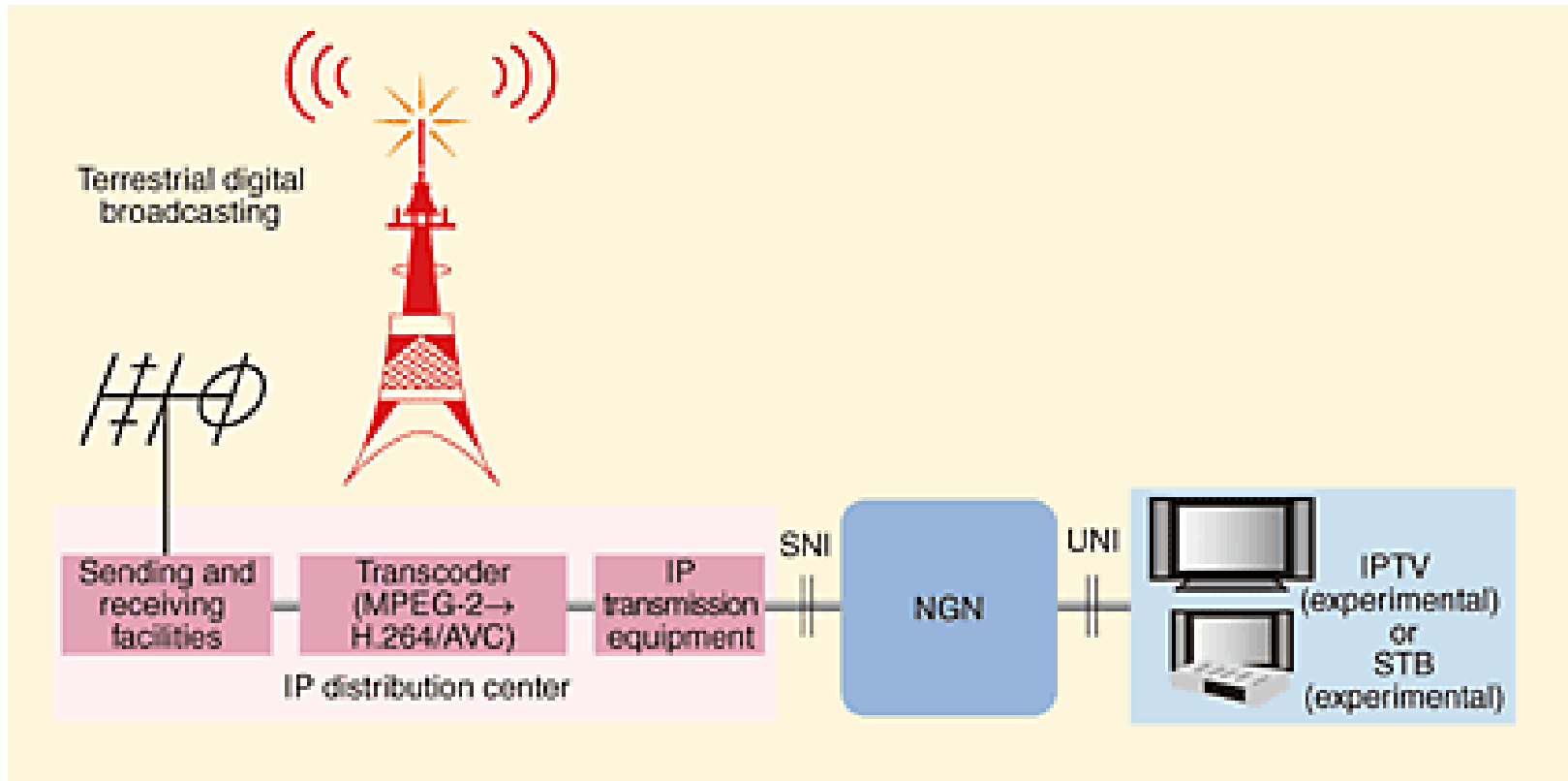


PPPoE: point-to-point protocol over Ethernet
 VoIP: voice over Internet protocol

High-definition video distribution services



IP retransmission service for terrestrial digital broadcasting



Thank you!

I hope you will enjoy the visit to our Otemachi showroom on Thursday.



Reference:

NTT Financial report on November 2006 (www.ntt.co.jp)

NTT Technical Review on June 2007 (www.ntt-review.jp)