

Vision for Next Generation Network considering IPTV Services

ITU/APT WS

March 17, 2007

Masashi Hiraiwa

Hitachi, Ltd.

Contents

- 1. Innovation in the Digital Convergence**
- 2. Needs of NGN and its technologies as viewed from Broadcast/ Communication converged services**
- 3. Core Network Infrastructure Trends and Approaches**
- 4. Access Network Infrastructure Trends and Approaches**
- 5. IPTV Fixed Mobile Convergence Trends and Approaches**

Innovation in the Digital Convergence Era-1

- **When a telephone is not a telephone:
From mono-functionality to convergence**

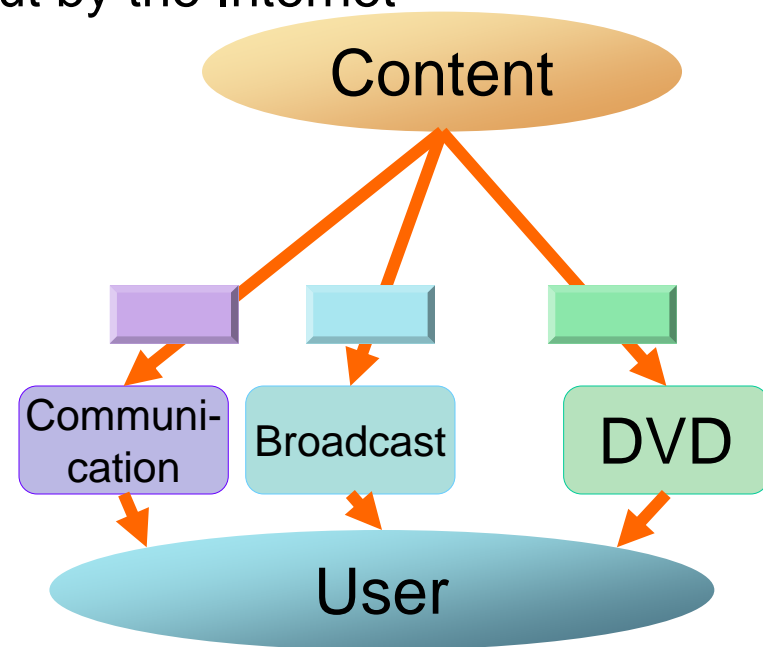
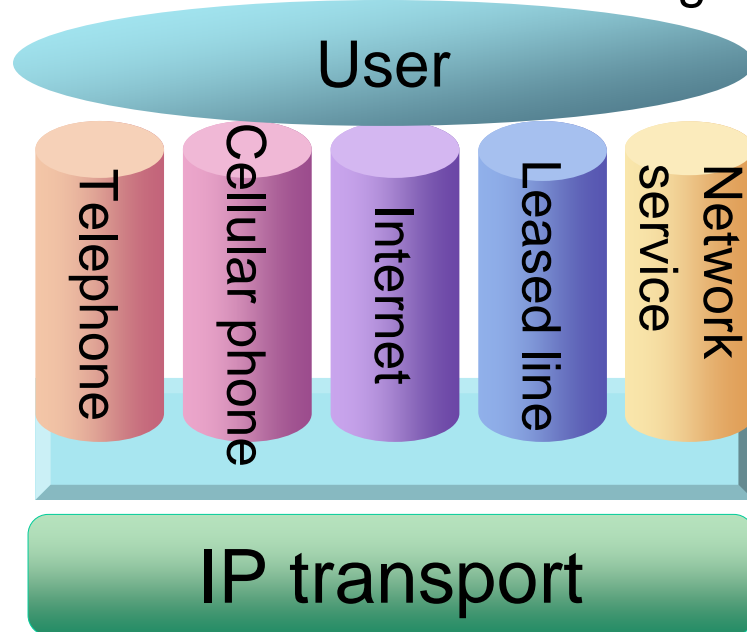


● Progress of convergence

- Barriers between communication services will be removed by integration of IP transport.
- Barriers between distribution channels will be removed by digitization and broadband communication.

● All IP (Internet Protocol)

- Value and issues brought about by the Internet



Value and Issues Brought by the Internet

● Value brought about by the Internet

- Creating diversified value to end users through the open and modular architecture

● Issues for the social infrastructure

- Reviewing the network control mechanism
- Reorganizing the roles of the network and end systems

How Can the Next Generation Network Be Viewed?

Requirements for the network

● Enhancement of network functionality

- Multimedia information transfer : IP-based high-speed broadband communication
- Service quality assurance : IP-based bandwidth control
- End-to-end security : Providing network authentication, etc.
- Seamless fixed/mobile services : Providing versatile mobility functionality

● Creation of new services and business models

- Advanced use of network services : Providing APIs

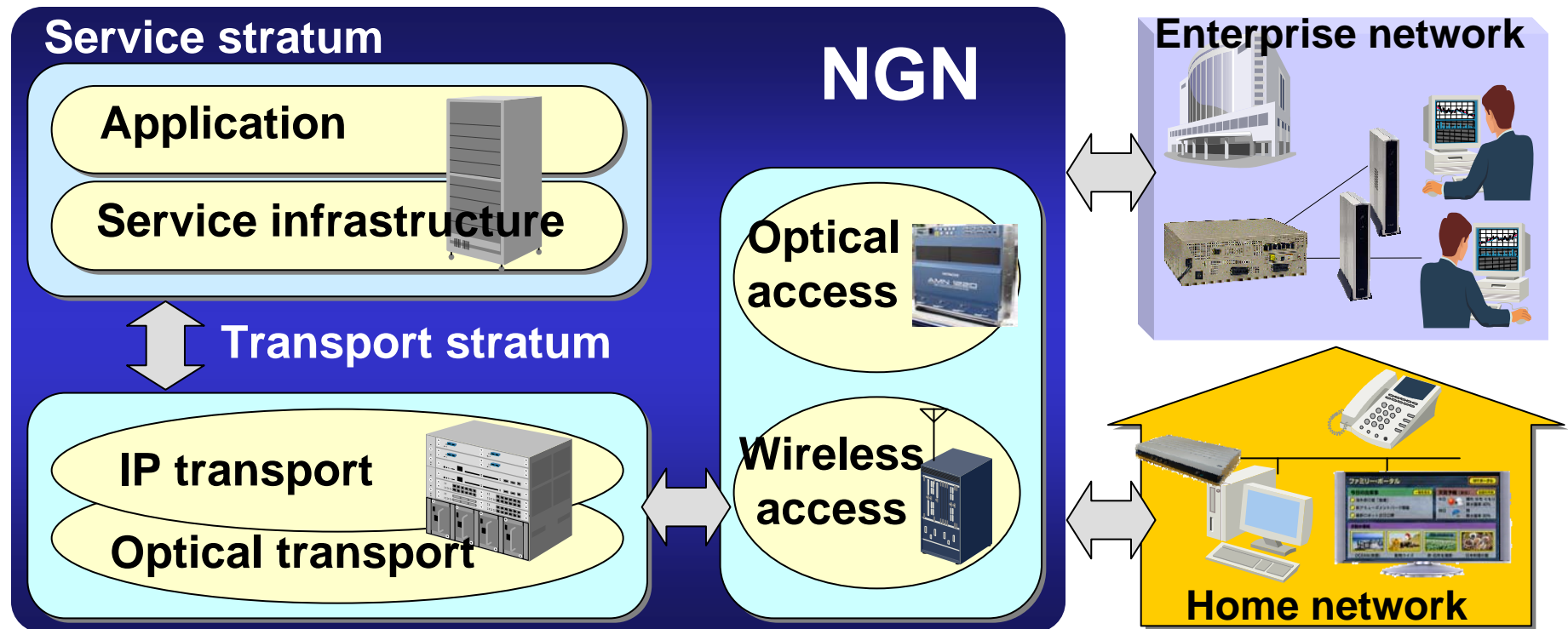


Next Generation Network (NGN)

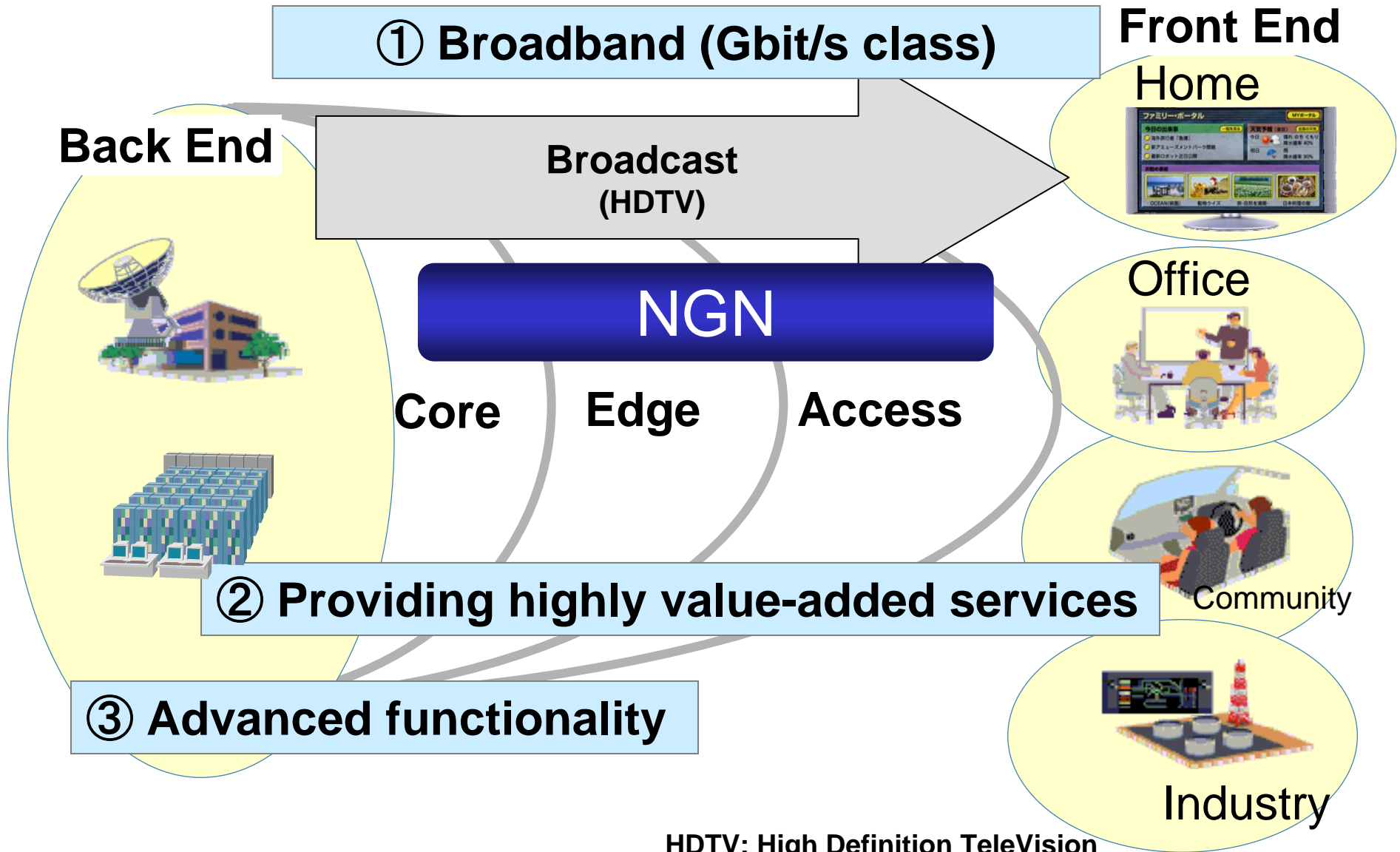
NGN will grow as a social infrastructure, by resolving issues, while taking advantage of the openness of the Internet (IP network).

NGN (Next Generation Network) Architecture

- Standardization in progress at ITU-T
- Broadband and QoS-controllable IP network
- Separation of the service stratum (service providing capabilities) from the transport stratum (information transfer capabilities) to provide diversified services



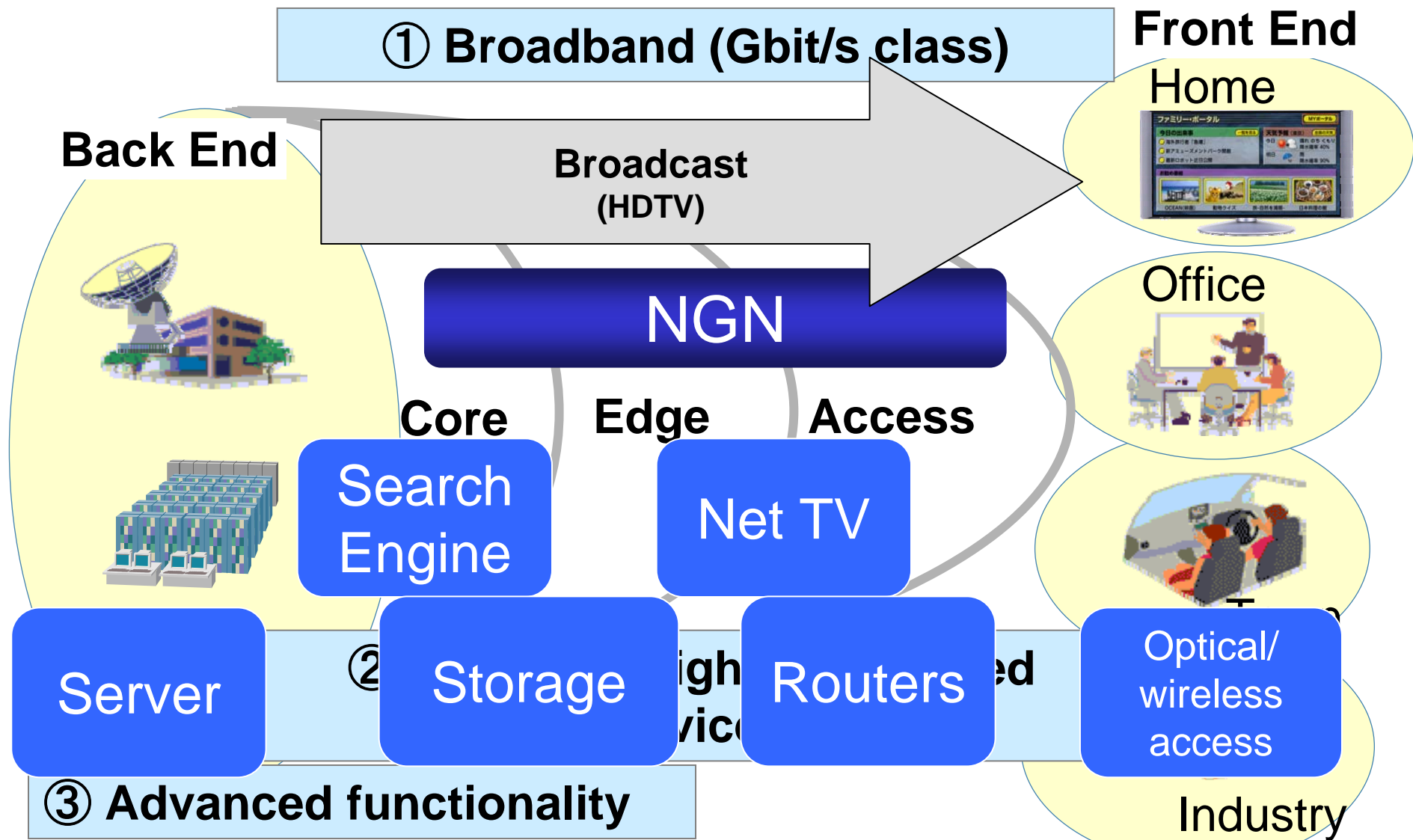
Requirements for the Broadcast/Communication Convergence Services



HDTV: High Definition TeleVision

2. Needs of the NGN and technologies

2-2 Key Technologies for Broadcast/Communication Convergence Services



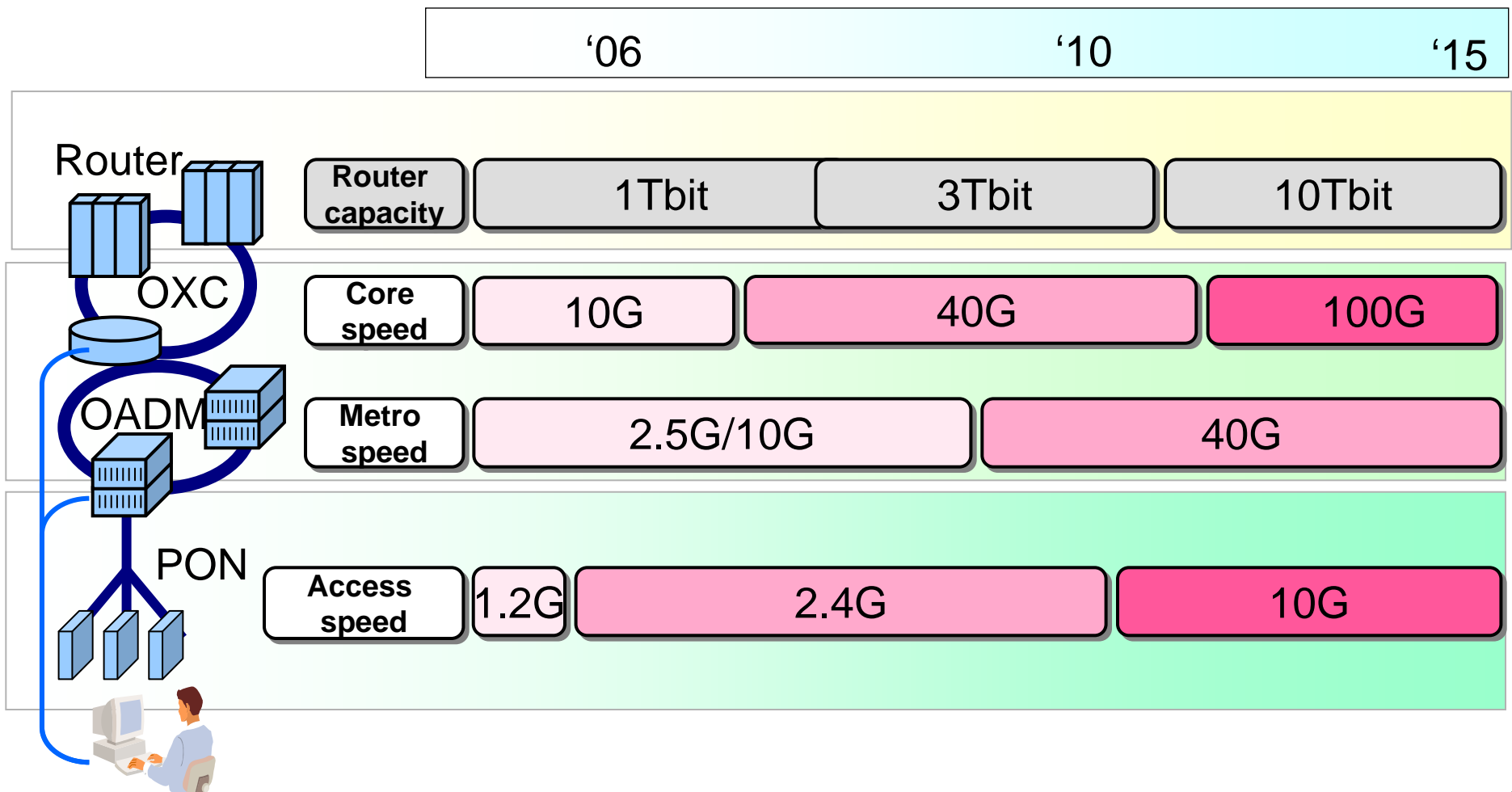
HDTV: High Definition TeleVision

3-1

3. Core Network Infrastructure Trends and Approaches

Trends of Broadband Core Network

- Gigabit accesses will be commonplace and network capacity will continue to increase as Digital Broadcasting services spread.

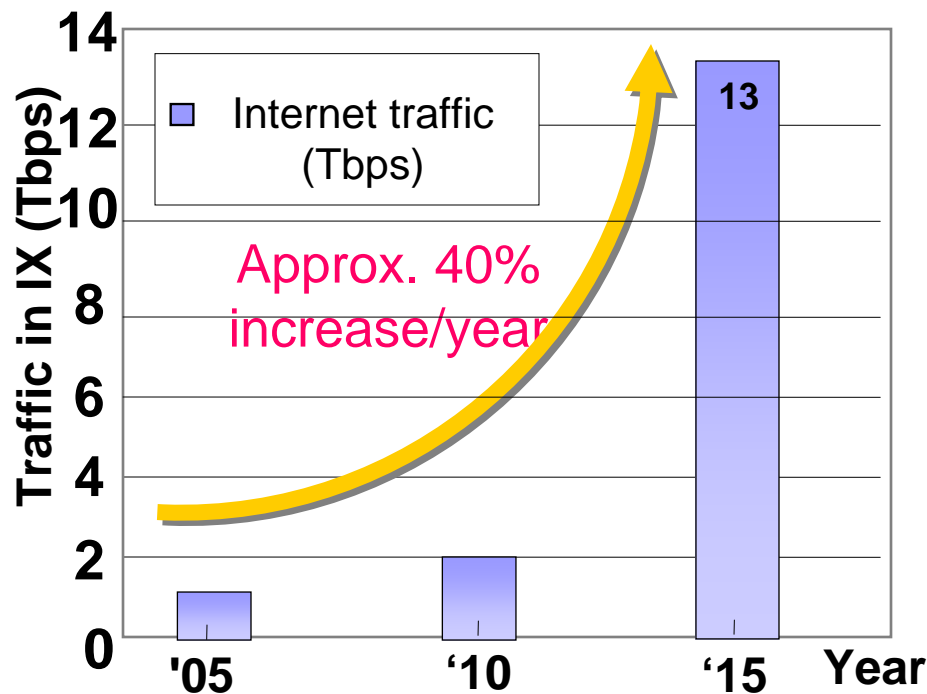


3-2

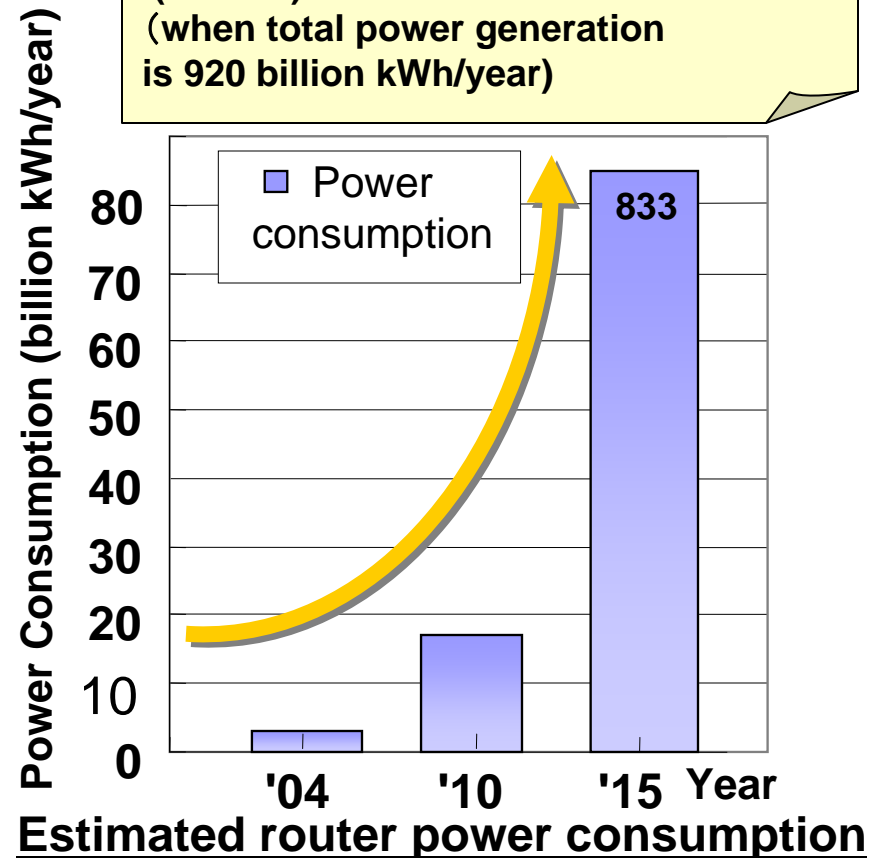
3. Core Network Infrastructure Trends and Approaches Trends for Increasing Traffic and Power Consumption

- Internet traffic: 40% increase per year
- Power savings is a national issue.

9% of total power generated in Japan is estimated to consume by network. (in 2015)
(when total power generation is 920 billion kWh/year)



Estimated Internet traffic



Estimated router power consumption

Source: Science and Technology Trend Research Center

Broadband transport & low power consumption are indispensable.

Approaches to Network Infrastructure

- **Network Infrastructure needs to be enhanced in terms of**
 - its Capacity
 - Power savings
 - Advanced Value-added Functionality**in all layers of Core, Edge and Access.**

Core

- Large capacity: High-speed optical transport technology (40G, 100G)
- Power savings: Photonic network (route switching at the wavelength level)

Edge

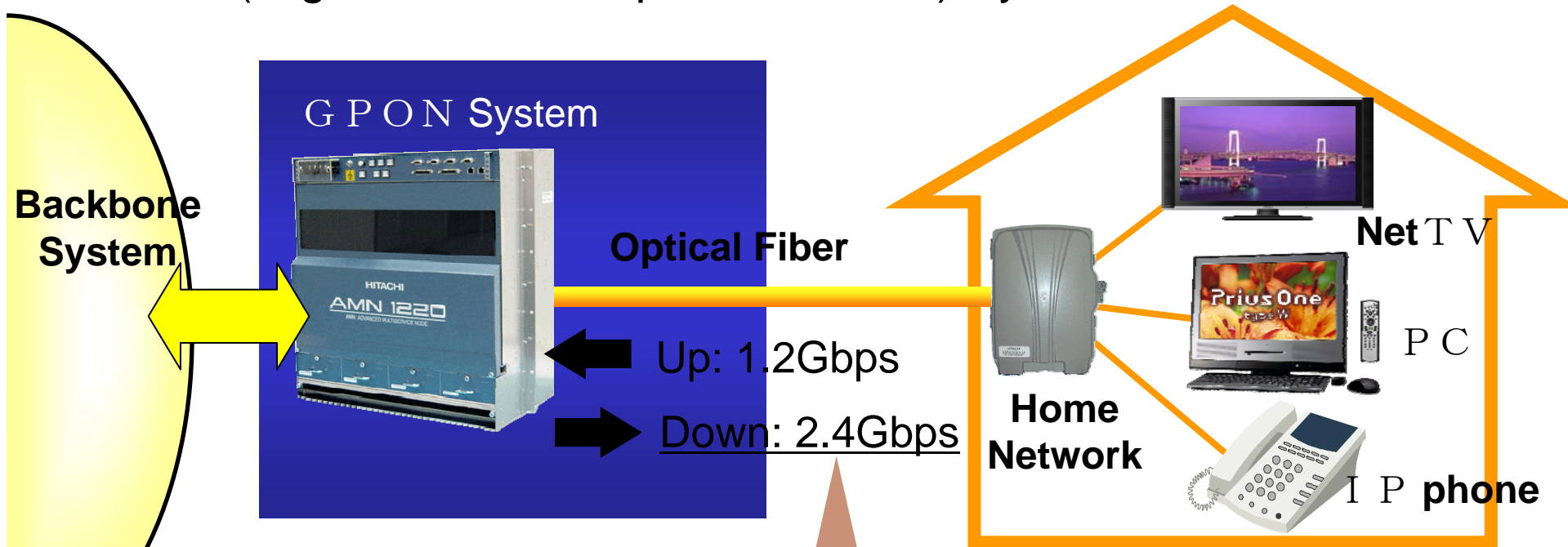
- Large capacity: High-speed search technology
- Power savings: Improvements in architectures, circuits, and devices
- Advanced functionality: Service stratum linkage (QoS control/ security/ APIs)

Access

- Large capacity: GPON (2.4Gbps-FTTH)
- Power savings: Specialized LSI with low-power SerDes
- Advanced functionality: QoS control supporting triple services (data, voice and video)

Progress of FTTH Technology

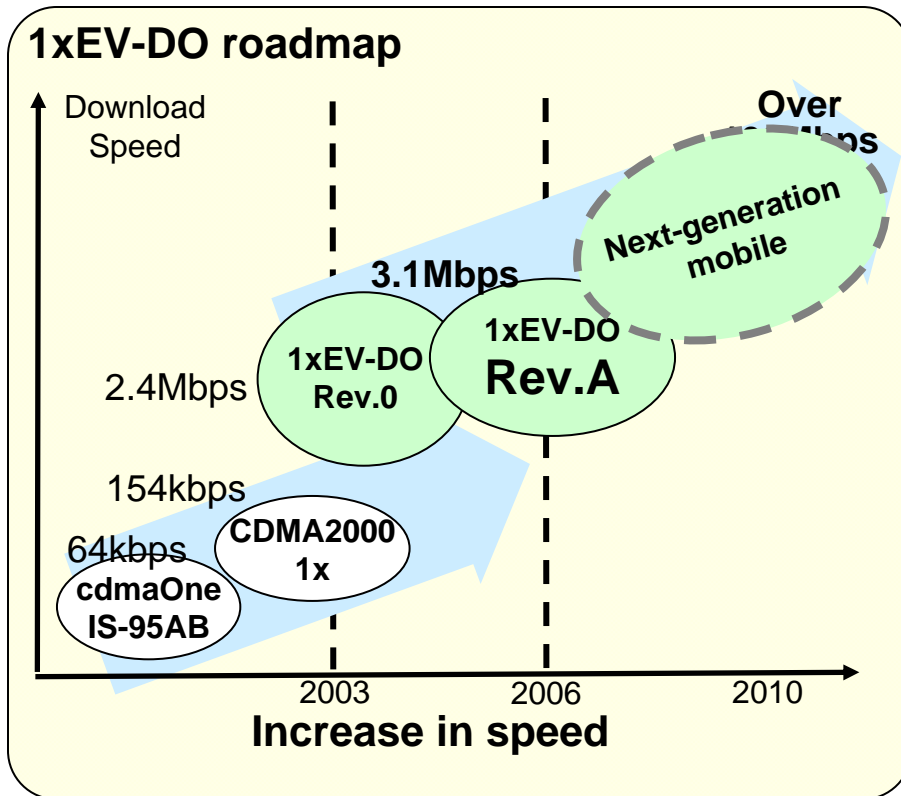
GPON (Gigabit Passive Optical Network) System



Time to transfer one movie	
Optical Broadband Service (100Mbps)	6 minutes
GPON system	16 seconds (in 2006)

One movie downloaded **in a few seconds any place**

Trends of Mobile Access Speed – cdma2000 1xEV-DO

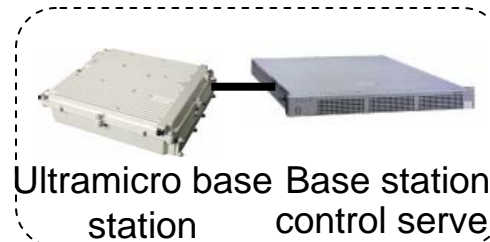


	Rev.0	Rev.A	Next-generation mobile
Down	2.4Mbps	3.1Mbps	- 100Mbps -
Up	144Kbps	1.8Mbps	- 10Mbps -

Significant increase in uplink speed

Features of wireless access products

- Quality demonstrated by operational results, supporting capacity, and scalable product menu
- Conforming to the new “Revision A” 1xEV-DO specifications
- Providing a compact EV-DO system that meets indoor coverage needs
- Securing the advantages of handover technology (WiFi, WiMAX, etc.)



Ultramicro base station Base station control server

Compact EV-DO system



1xEV-DO base station: ER2000

Mobile Access – Case of 1xEV-DO Applications

Example of 1xEV-DO high-speed mobile Internet
 Nationwide deployment of BSs conforming to the new service by “Revision A” specs is in service.

- Provides various services by high-quality, high-speed and multicast technologies.

Mobile terminal applications

- ◆ Push-To-Talk
- ◆ Electronic money
- ◆ Video phone



High quality

High speed

Communication quality control

Large capacity

PC card applications

- ◆ High-speed Internet
- ◆ Thin-clients, high-speed access lines, etc.

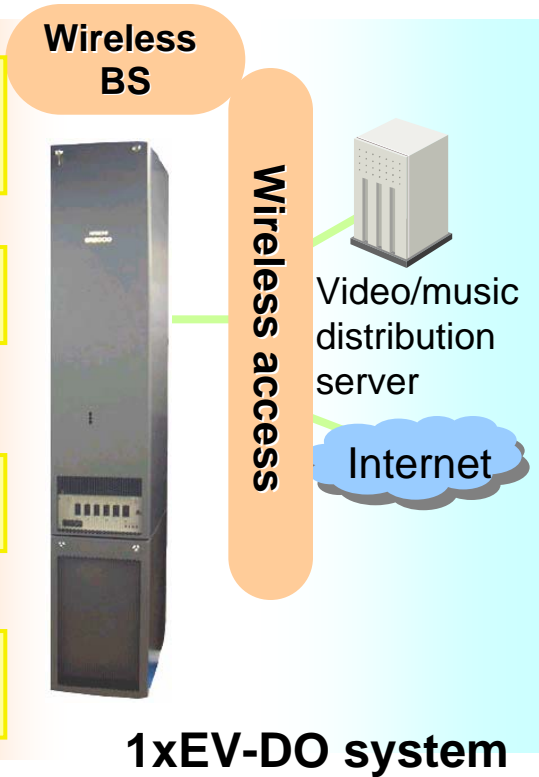


Multicast services

Various services

Multicast

High-speed data transmission



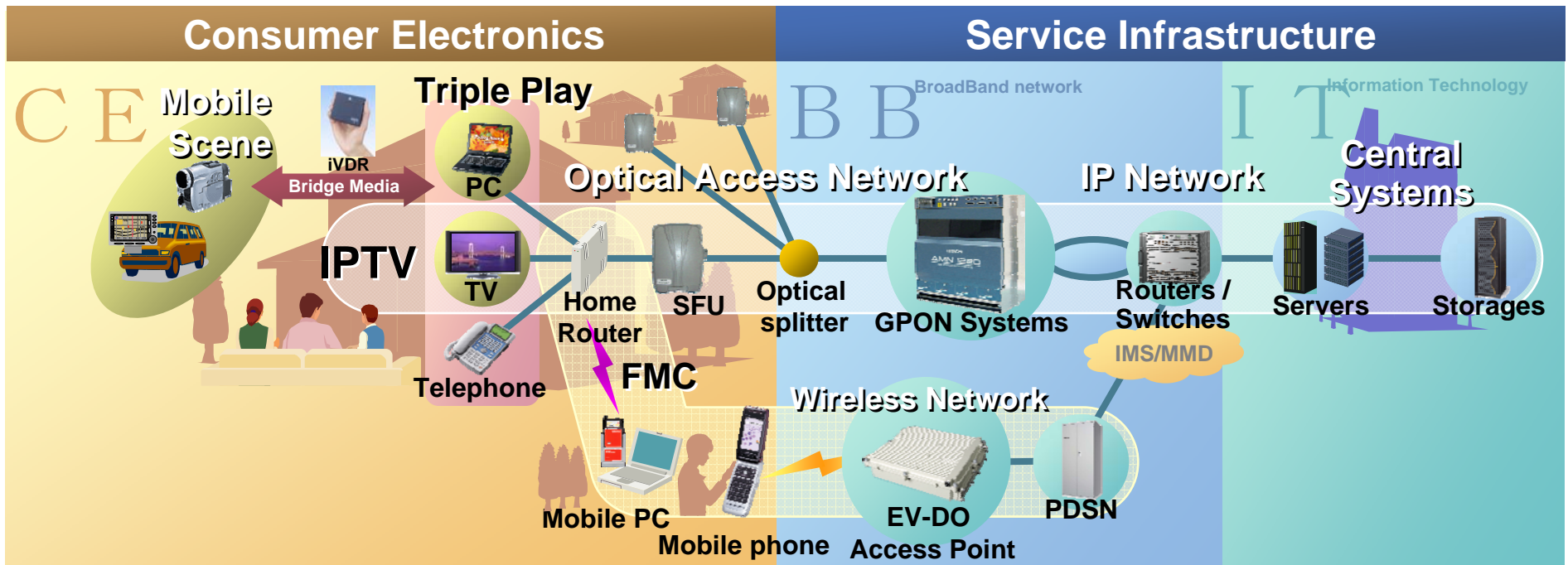
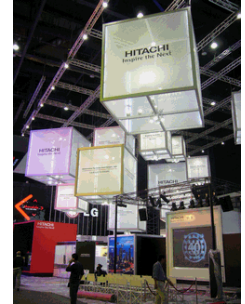
5-1

5. IPTV Fixed Mobile Convergence

IPTV Solution for Triple Play Services

- End-to-end solutions for IPTV fixed mobile convergence for the realization of triple play services

Dec. 4 - 8, 2006
Hong Kong



Hitachi's approach to Triple Play with IPTV and Fixed Mobile Convergence
Hitachi offers service linking carriers to consumers by the "CE x BB x IT" system, creating newer and better services for consumers.

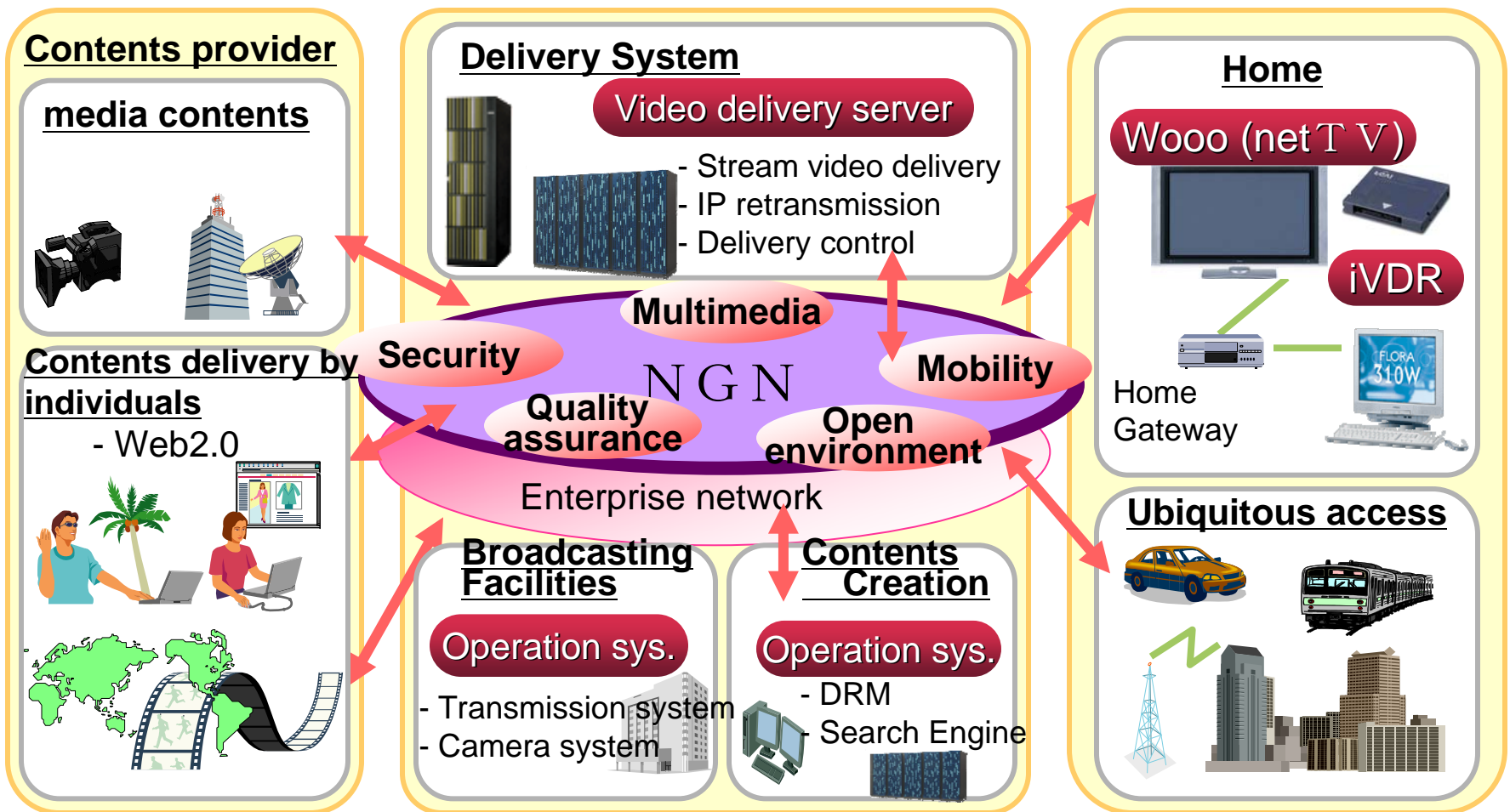
SFU: Single Family Unit (Optical Network Unit for the GPON system)

MMD: Multimedia Domain EV-DO: Evolution Data Only

PDSN: Packet Data Serving Node
IVDR: information Versatile Disk for Removable usage

Contents Delivery Service Platform for IPTV

- Provides end users with safe, secure multi-channel high-definition IPTV.
- Proposes ways to utilize TV in broadcast/communication convergence.
(B-B, B-C)

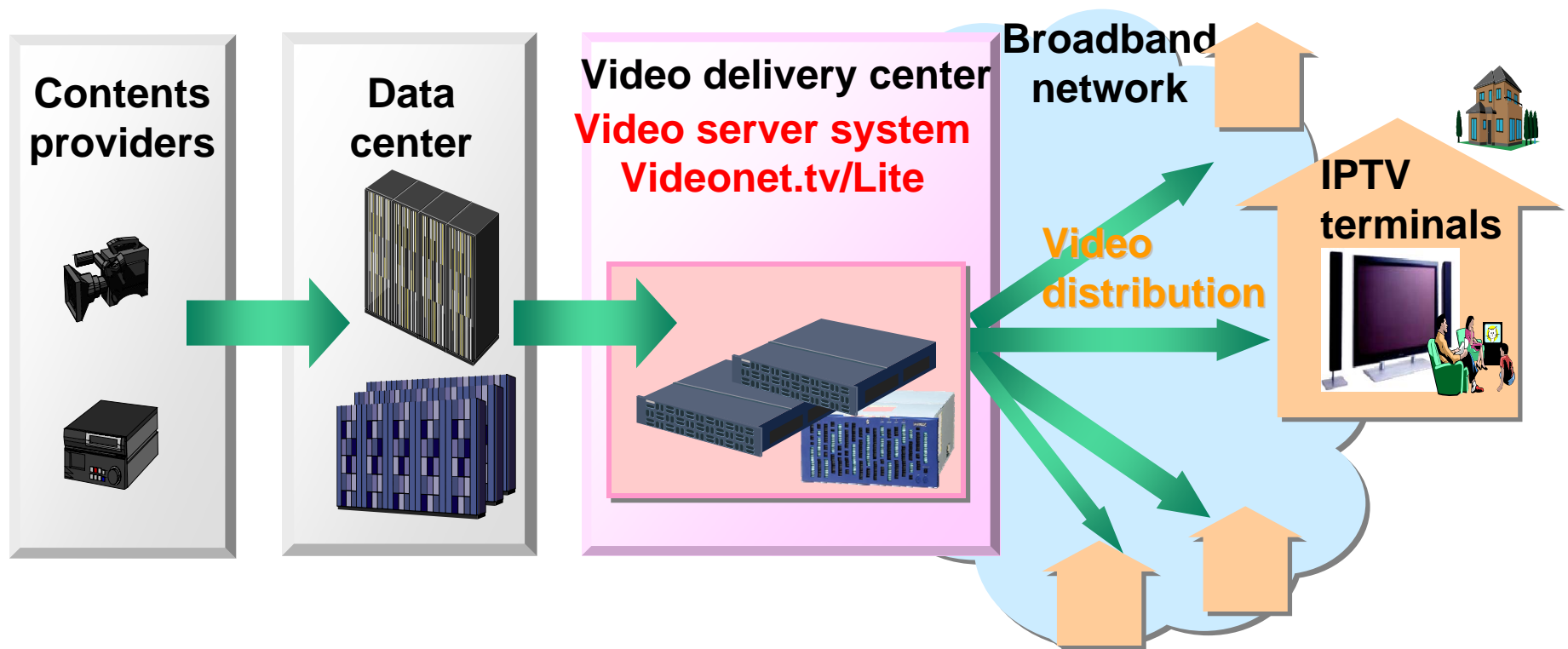


Advanced Video Server System

● Advanced Video Server System

Allows simultaneous delivery of 250 HD video images (6 Mbps)

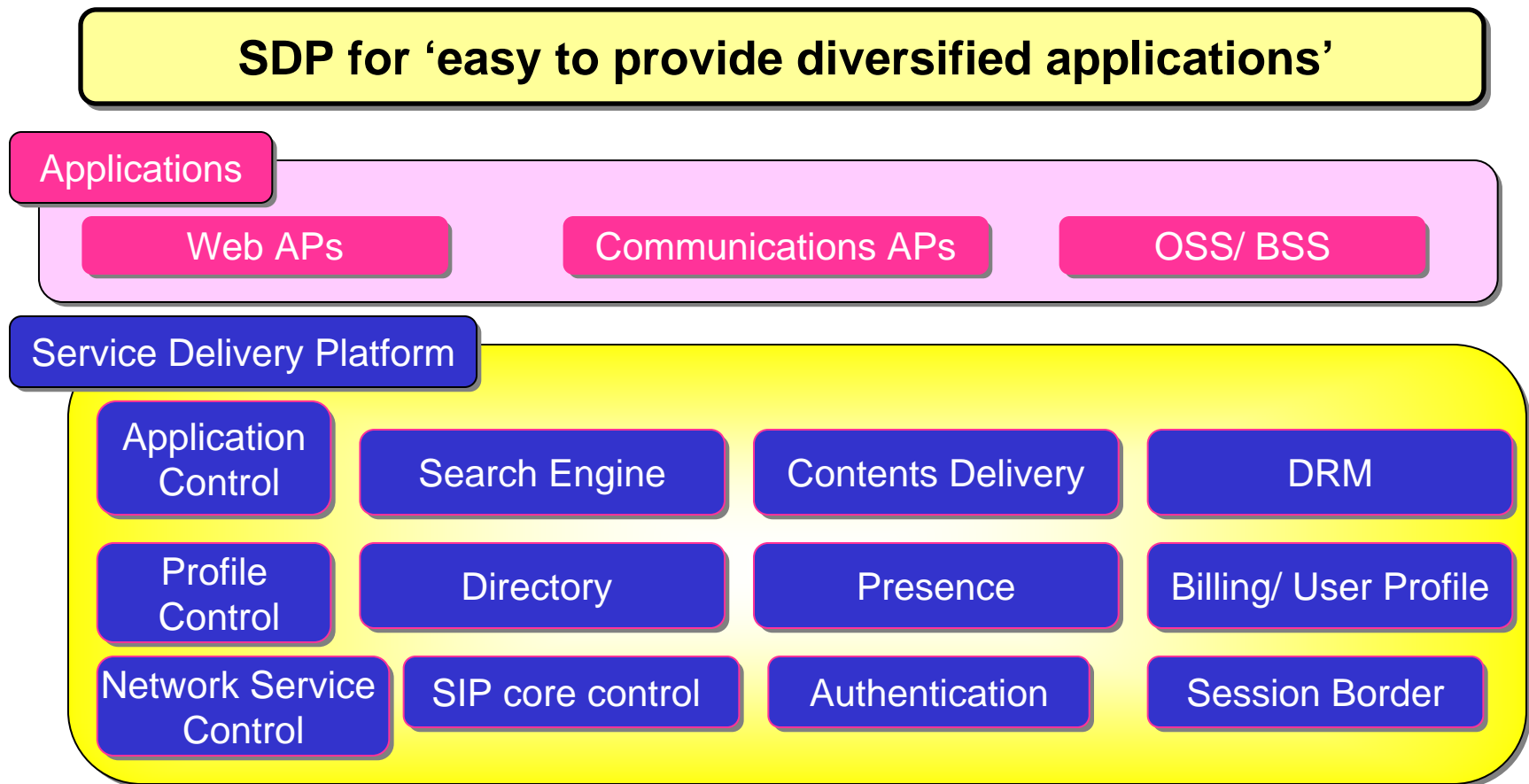
- Delivers video data in response to requests from TVs/ STBs conforming to specifications by domestic Study Group.
- Services: VOD, IP multicast



Service Delivery Platform for IPTV multi-services

- Combination of Functional Modules provides Service Delivery Platform (SDP) for IPTV multi-services:

- Application delivery/ Profile/ Network Service control



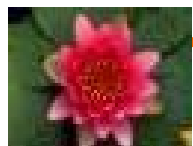
Service Platform: Search Technology

- What do they need as the service platform for IPTV services?
- Research on the new search engine for diversified media is proceeding.
 - Search technology focusing on Image Similarity/ Associative Document

Applied to broadcast/communication convergence solutions

Image Similarity search

- Quick search for similar images using color/shape information
- No search keyword necessary



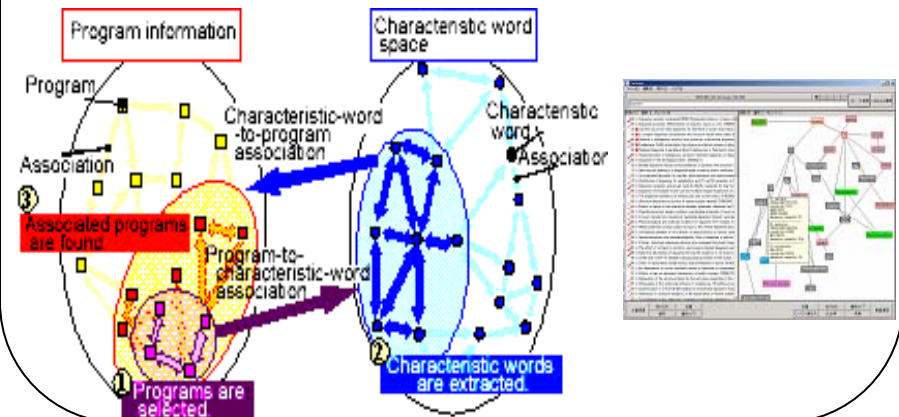
Key image

Search for an image similar to the key image



Associative Document search

- Performs associative search of texts such as EPG information and closed captions to detect related programs.



NGN is a social infrastructure, encompassing the domain of carriers, businesses and lives/communities.

- **Implementation strategy to network infrastructure**
To enhance in terms of its capacity, power savings and advanced value-added functionality
- **Implementation strategy to service/ solutions**
To provide end-to-end solutions for IPTV in the environment of Fixed/Mobile convergence.
- **Seeks business models to promote IPTV market.**
- **Provides total solutions, creating safe and innovative value.**

HITACHI
Inspire the Next