Vision for Next Generation Network considering IPTV Services

ITU/APT WS
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1. Introduction

Innovation in the Digital Convergence Era-1

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

Is a mobile phone a telephone?

Schedule management
Wallet
Commuter pass
Web
Shopping
Digital camera
Email
Call
Music player
TV
Watch
1. Introduction

**Innovation in the Digital Convergence Era -2**

**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

[Diagram showing relationships between different communication and distribution channels]
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

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

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

Service stratum

- Application
- Service infrastructure

Transport stratum

- IP transport
- Optical transport

NGN

Optical access

Wireless access

Enterprise network

Home network
2. Needs of the NGN and its technologies

Requirements for the Broadcast/Communication Convergence Services

① Broadband (Gbit/s class)

② Providing highly value-added services

③ Advanced functionality

Front End
Home
Office
Community
Industry

Back End

Broadcast (HDTV)

Core
Edge
Access

NGN

HDTV: High Definition TeleVision
2. Needs of the NGN and technologies

Key Technologies for Broadcast/Communication Convergence Services

① Broadband (Gbit/s class)

Back End

Broadcast (HDTV)

Core

Search Engine

Server

Storage

Edge

Net TV

Routers

Access

Front End

Home

Office

Industry

Optical/wireless access

HDTV: High Definition TeleVision

② Providing high value-added services

③ Advanced functionality

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

<table>
<thead>
<tr>
<th>Year</th>
<th>Router Capacity</th>
<th>Core Speed</th>
<th>Metro Speed</th>
<th>Access Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>'06</td>
<td>1Tbit</td>
<td>10G</td>
<td>2.5G/10G</td>
<td>1.2G</td>
</tr>
<tr>
<td>'10</td>
<td>3Tbit</td>
<td>40G</td>
<td>40G</td>
<td>2.4G</td>
</tr>
<tr>
<td>'15</td>
<td>10Tbit</td>
<td>100G</td>
<td>40G</td>
<td>10G</td>
</tr>
</tbody>
</table>
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.

**Estimated Internet traffic**

- Approx. 40% increase/year

**Estimated router power consumption**

- 9% of total power generated in Japan is estimated to consume by network (in 2015)

**Source:** Science and Technology Trend Research Center

**Broadband transport & low power consumption are indispensable.**
3. Core Network Infrastructure Trends and Approaches

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

Optical Fiber

Up: 1.2Gbps
Down: 2.4Gbps

GPON 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
4. Access Network Infrastructure Trends and Approaches

Trends of Mobile Access Speed – cdma2000 1xEV-DO

**1xEV-DO roadmap**

- **2003**: CDMA2000 1x
  - 64kbps
  - 154kbps
- **2006**: 1xEV-DO Rev.0
  - 1.8Mbps (Up)
  - 2.4Mbps (Down)
- **2010**: 1xEV-DO Rev.A
  - 3.1Mbps (Over)
  - 100Mbps (Over)
  - 10Mbps (Over)

**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.)

**Table of speeds**

<table>
<thead>
<tr>
<th></th>
<th>Rev.0</th>
<th>Rev.A</th>
<th>Next-generation mobile</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Down</strong></td>
<td>2.4Mbps</td>
<td>3.1Mbps</td>
<td>- 100Mbps -</td>
</tr>
<tr>
<td><strong>Up</strong></td>
<td>144Kbps</td>
<td>1.8Mbps</td>
<td>- 10Mbps -</td>
</tr>
</tbody>
</table>

**Significant increase in uplink speed**

- **1xEV-DO base station**: ER2000
  - Ultramicro base
  - Base station control server
  - Compact EV-DO system
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.

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

Mobile terminal applications

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

PC card applications

- High-speed Internet
- Various services

Communication quality control

Large capacity

Multicast

High-speed data transmission

1xEV-DO system
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
iVDR: iInformation Versatile Disk for Removable usage
PDSN: Packet Data Serving Node

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5. IPTV Fixed Mobile Convergence

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

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
Combination of Functional Modules provides Service Delivery Platform (SDP) for IPTV multi-services:
- Application delivery/ Profile/ Network Service control

SDP for ‘easy to provide diversified applications’

Service Delivery Platform
- Application Control
- Profile Control
- Network Service Control
- Search Engine
- Directory
- SIP core control
- Contents Delivery
- Presence
- Authentication
- DRM
- Billing/ User Profile
- Session Border
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

**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.
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