IPTV Standard and Applications for Next Generation Broadband
-- Toward Mobile E-health --

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Agenda

- Importance of UI
- TV as Universal UI
- What and Why IPTV
- Standards of IPTV
  - Example of ITU IPTV Standards
- NTT’s Hikari-TV: Standard Based IPTV Service
- Mobile and related IPTV services
Topics

- Importance of Application/Service for Infrastructure
- Application/Service required by both client and provider
  - Infotainement, e-government, e-health,
- Interface: key for accepted application/service
- Importance of Standards for Infrastructure
IPTV as a bridge for Digital Divide

- Human Interface is the Key for solving Digital Divide
- Human Interface Persists
  - E.g: Keyboard
- TV as a Universal Human Interface
Human Interface Persists

- Typewriter Keyboard is the ancestor of the present-day Windows PC and Blackberry
- For a new technology to be accepted, Human Interface should be modeled after accepted models
TV Set as a Universal UI

- TV set is not just for broadcasting
- It is the universal user interface for various services
- Game, DVD, VHS,
- Familiar to both Young and Old
- Accessible to a wide range of population, without special training
- Model of similar Interfaces
**TV set as Universal Interface**

- Since its introduction, familiar to both Young and Old
- Accessible to a wide range of population, without special training
- It is the universal user interface for various services
TV as Universal Interface Model

- TV set is not just for broadcasting
- Model of similar Interfaces
What is and Why IPTV?
Why IPTV?

- IPTV is not just “TV”
- It is the multimedia center for broadband age
- Ideal medium for bridging the gap over “Digital Divide”
- Easy interface
- Popular and User Friendly
TV sets in Brazil

- **Household (HH): 53 MM**
  - Stove 97.5%
  - TV set 91.4%
  - Radio 88.0%
  - Refrigerator 87.4%
  - Phone 69.0%
  - PC 18.6%
  - Internet Access 13.7%
  - Pay TV 7.3%

  Source: Anatel / IBGE PNAD (2005/2006)

- **Broadcasting (FTA)**
  - Covers 100% of the country territory;
  - Reaches 97% of the population;
  - 5 big TV Networks with national coverage;
  - 478 TV stations;
  - More than 20,000 TV translators;
  - Main or the only option of entertainment, information and culture;
  - Main producer and distributor of national content;
  - Integration of the Federation, preservation of the idiom and national culture.


<table>
<thead>
<tr>
<th>Services penetration (%)</th>
<th>TV</th>
<th>Phone</th>
<th>PCs</th>
<th>Internet</th>
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</thead>
<tbody>
<tr>
<td>Total</td>
<td>92.0</td>
<td>66.1</td>
<td>16.0</td>
<td>12.1</td>
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</table>

  From SBTVD Forum Presentation (2007)
Big screen LCD TV in Japan

Units [thousand]

<table>
<thead>
<tr>
<th>Year</th>
<th>Liquid crystal device (LCD) TVs</th>
<th>Plasma display panel (PDP) TVs and monitors</th>
<th>CRT TVs and monitors</th>
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<tbody>
<tr>
<td>2004</td>
<td>1,500</td>
<td>1,000</td>
<td>500</td>
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<tr>
<td>2005</td>
<td>2,000</td>
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</tr>
<tr>
<td>2006</td>
<td>3,500</td>
<td>3,000</td>
<td>3,500</td>
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</table>

International Telecommunication Union
Price-drop of LCD TV in Japan

Price change of 32 inches LC TV sets in Japan shows it is sold now at around JPY 90,000 yen (about BRL 1800)
DTV Revenue Projection

Annual DTV Shipment Revenues
Billions of Dollars

<table>
<thead>
<tr>
<th>Year</th>
<th>Revenue (Billions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>$0.0</td>
</tr>
<tr>
<td>1999</td>
<td>$0.3</td>
</tr>
<tr>
<td>2000</td>
<td>$1.4</td>
</tr>
<tr>
<td>2001</td>
<td>$2.6</td>
</tr>
<tr>
<td>2002</td>
<td>$4.3</td>
</tr>
<tr>
<td>2003</td>
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<tr>
<td>2005</td>
<td>$17.4</td>
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<tr>
<td>2006</td>
<td>$23.3</td>
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<tr>
<td>2007</td>
<td>$26.3</td>
</tr>
<tr>
<td>2008</td>
<td>$30.9</td>
</tr>
<tr>
<td>2009</td>
<td>$33.2</td>
</tr>
</tbody>
</table>
Projection of IPTV Market Growth
IPTV would be a perfect setting for next generation broadband network
Service and Standards of IPTV for Next Generation Broadband
Why standardize IPTV?

- Lower cost
- Wider Market
- Better Quality of Service and Experience
- More consorted security (content protection, etc.)
- Open infrastructure
- Innovation and new services
  - Standardized HTML gave us Web;
  - Standardized IPTV will give a new Internet
Standard IPTV as Market Driver

- Standardized IPTV will be as ubiquitous as present-day telephones and FAX machines
- Standardized IPTV will allow a wide range of selection and variety of terminals in retail market
- Standardized IPTV will allow low-priced terminals
- Consumers can choose as they want; Service Differentiation is promoted
- Standardized IPTV will create a big market not only for conventional content business but also for various related services: e.g. e-health and e-learning
- stimulate the need for infrastructure and service

It will be the infrastructure that gives a secure, accessible window for Next Gen ICT world
ITU’s Work on IPTV

- Responding to market demands for standard, ITU (International Telecommunication Union) is actively working on IPTV standards.
- IPTV considered one of the most important service applications on Next Generation Network (NGN).
- It is the most salient show case of NGN.
- IPTV is defined as: Multimedia services, such as Television; Video; Audio; Text; Graphics; Data, delivered over IP based networks.
- Managed to provide the required level of QoS/QoE, security, interactivity and reliability.
- IPTV is not Internet Video (best effort model) but is like Cable TV and much more.
- Many advanced services and applications expected.
IPTV Services discussed in ITU-T

- Linear (Channel Service) Broadcast TV
- Audio services
- Video On Demand (VOD)
- Karaoke
- Gaming
- E-publishing (e-Books, Newspaper)
- E-commerce (banking, etc.)
- E-learning (distance learning)
- E-Health (telemedicine)
- Private and Community Broadcasting (sharing videos)
- Photo albums (sharing photos with your friends)
- TV yellow pages
- Public Services (billboards, signage, disaster Alert, traffic news, etc)
- ... and much more
Examples of ITU IPTV Standards

- H.761: Ginga NCL for IPTV
- H.762: LIME (Lightweight Interactive Multimedia Framework)
- H.721: Basic IPTV Terminal
H.761 Ginga-NCL for IPTV

ITU-T H.761 (Ginga-NCL) is an adaptation of Ginga-NCL, the middleware standard for Brazilian digital TV broadcasting.

- Syntactically based on XML and LUA (the script language), which is used in games and widgets (e.g. Verizon).
- Similar implementation to W3C SMIL.
- Often used as “wrapper” for other multimedia frameworks, such as HTML and BML.
- Good integration with Video streaming.
- Strong promotional body in Brazil.
H.762: LIME

- ITU-T H.762 – LIME (Lightweight Interactive Multimedia Framework) has evolved from BML (Broadcasting Markup Language), the interactive application platform for Digital TV
- Syntactically based on simple HTML and Javascript – Just like very Simple Web designing
- Good integration with Video streaming
- Gives sufficient functionality for Interactivity and GUI
- Suitable for any type of terminals, esp. poor ones like TV
- Rigorous Test procedure for Integrity – Very robust and mature
- Extended for IPTV to include:
  - full-fledged Interaction over IP
  - VOD service
  - E-commerce
  - Metadata
  - Parental Control
  - Portal
Standard Suite for Interactivity

- ITU-T H.760 (Multimedia Application Framework) Series defines a standard suite of Multimedia Application Platform that gives multimedia interactivity to IPTV content.
H.721: IPTV Basic Terminal

- Defines a Terminal supporting VoD and Linear TV, and interactive services.
- Targeted at resource limited, embedded terminal, like TV set, as well as STB, so that accessible to anybody
- Managed network model (agnostic as to IMS) – SIP-aware Home Gateway friendly
- Implementation already done
- Several countries considering its adoption
- Interoperability Event expected 2009/2010
- Many companies are welcome to implement
- Will be a TV set of future
Terminals for ITU-T H.721

- Terminals based on ITU-T H.721 are available in the retail market in Japan.
- Currently 6 brands (TV Sets, PC, and STB) from several manufacturers are available in the retail market.
- Customer can buy a TV or PC at a shop, connect to NW, and receive an IPTV service.

PM-700 (Hikari-TV STB)

PM-1000 (Hikari-TV PVR)
Standard-based IPTV service
Hikari TV in Japan: a Case Study

- NTT IPTV Service for FTTH in Japan
  - Test Service on NTT NGN Trial (2006-2007)
  - Market deployment Started in 2008 on NTT NGN
   - Linear TV and VoD - including DTV retransmission
   - Delivered to standard-based (ITU-T H.721) TV and other terminals as well as STB
   - High Definition Video with ITU-T H.264
   - Interactive Portal Service based on ITU-T H.762
   - QoS guaranteed platform for other service providers like NHK
Characteristic of NTT NGN

- QoS-guaranteed (e.g. about 14Mbps for each channel TV)
- Security
- Reliability
- Open Interface
Broadband Subscribers in Japan

- Broadband subscribers are about 30 million
- FTTH subscribers are more than 13 million and exceeded ADSL subscribers
- NTT East and West (local carrier) have over 10 millions of FTTH subscribers.

Source: Ministry of Internal Affairs and Communications
VOD Platform Overview

- Tokyo Super HE (NTT East) and Osaka HE (NTT West) are constructed for VOD Platform and are functioned for traffic load balancing.
- Osaka HE is mainly configured for cache servers.
- The total of Network capacity between HE and CDN is approximately 160Gbps. (It is based on 10Gigabit Ether connection.)
End Users System

- NTT East & West NGN Network (CDN)
- IP Phone
- PC for Internet
- FTTH
- ONU
- Home Gateway
- Ethernet
- PLC
- Power line
- c.LiNK
- Coaxial cable
- Wireless network
- IEEE 802.11n

1. Set Top Box
   - HDMI or NTSC
2. Digital TV with Hikari-TV receiver
3. AV-PC with Hikari-TV receiver
**Service Pack**

**VOD Subscription Pack** (2,625 Yen/month)
- VOD over 10,000 titles, including about 5,000 titles (Subscription)
- Retransmission of DTT (NGN only)
- Default 8 channel

**Channel & VOD Pack** (3,675 Yen/month)
- Default & Basic 54 channel
- VOD over 10,000 titles, including about 5,000 titles (Subscription)
- Retransmission of DTT (NGN only)

**Channel Pack** (2,625 Yen/month)
- Default & Basic 54 channel
- Retransmission of DTT (NGN only)
- VOD over 10,000 titles (pay per view)

Others
Mobile and IPTV-Related Services

- NTT’s Wireless Photo frame
- 1-seg (ISDB-T) based Hybrid IPTV
- NTT Docomo Wellness Mobile as Mobile e-health
NTT’s Wireless Photo frame

What’s New

2009.11.12～【メディア掲載情報】

本トライアルに関する各メディアの記事はこちらをご覧ください。
Wireless Photo frame

- Wireless Digital Photoframe used as part of Home Network Device, at the end of FTTH access network.
- Photoframe is based on Android and can show widgets
- NTT-Group is providing the hardware, network, as well as the Widget Platform (Android)
- Android-based Widgets, provided by service providers
- Test service started in November 2009.
- Currently about 10 companies are providing various services
Current Widget services

- News
- Weather Info
- Traffic Navigation
- Stock Information
- Recipes
- Restaurant
- Community Info
- E-Catalogue
- Flyer
- SNS Site Viewing
- High-Quality Calendar
Offers health- and sport-oriented features, such as pedometer, timer, calorie counter, etc

- Warns you of bad breath and obesity
1-seg (ISDB-T) based Hybrid IPTV

- ISDB-Tmm (multimedia): Mobile terminal becomes an IPTV PVR

- 1-seg is used; fixed spectrum

- 1-segment is 429 kHz (common)

- Steam型 service (multiple segments)
  - Multiple segments can be used (bandwidth is variable)

- Downloading service (multiple segments)
  - Multiple segments are merged for use (bandwidth is variable)
NTT Docomo Wellness Mobile

- Offers health- and sport-oriented features, such as pedometer, timer, calorie counter, etc. as well as warning bad breath and obesity
- Service started this year
Conclusion

- Importance of Interface: key for accepted application/service
- IPTV as Example of FTTH service
- Application/Service for Infrastructure
- Importance of International Standards (e.g. ITU) for Infrastructure, especially for Universal Service like IPTV