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ITU IPTV IPv6 Global Testbed and APT/ITU C&I event

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Introduction to ITU IPTV Standards
ITU global standard

ITU is United Nations agency for telecommunication and ICTs

Members:
- 193 Governments and regulatory bodies
- 700 Private Sector
- 20 Academia

IPTV Testbed content for “Sappro snow festival 2013” (Malcom Johnson, ITU-T Director)
IPTV introduction (1)

- An IPTV service is provided by IPTV service providers.
- End-users buy contents and consume them provided by IPTV service providers.
IPTV introduction (2) IPTV market view

- IPTV market is growing in the world.
- Number of interesting contents made by emerging countries will continue to increase.

Because ...

- Korean TV programs and movies are currently very popular in the world.
- In Festival de Cannes May 2008, a Singapore movie, “My Magic” directed by Eric Khoo, was selected in Competition group.
- In Festival de Cannes 12-13 May 2010, Thai movie, “Lung Boonmee Raluek Chat” directed by Apichatpong Weerasethakul, won Palme d'Or award for the first time.
Stake holders for IPTV services and vendor rolls

- In order to provide IPTV service, not only IPTV service providers but also lots of other stake holders are concerning with IPTV services.
- Vendors are parties to provide IPTV service platforms and IPTV terminals.
IPTV defined in ITU IPTV standards

- IPTV ≠ Internet Video
- 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”.

**Phase 1: Basic Model**
- 2008: Basic service standardization
  - 1st IPTV-GSI: In Jan., 2008
  - H.721 basic model standard

**Phase 2: Advanced Services**
- 2009-2012: Interop / Showcasing
- 2013-: Advanced service standardization

**Study periods**
- 2005-2008
- 2009-2012
- 2013-
IPTV Services overall

- IPTV is a killer service of broadband infrastructure.
- By using of IP, IPTV provides interactive TV services.
- IPTV can be used as a platform of lots of TV base services.

Basic entertainment services
- Linear (Channel Service) Broadcast TV
- Video On Demand (VoD)
- Accessibility: captioning, descriptive audio
- Audio services
- Karaoke, gaming

Public Services
- Billboards, disaster alerts, traffic news, etc.

E-*
- E-government
- E-publishing (e-Books, Newspaper)
- E-commerce (banking, etc.)
- E-learning (distance learning)
- E-health (telemedicine, tele-healthcare)

Private and Community Broadcasting (sharing videos)
- Photo albums (sharing photos with your friends)
- TV yellow pages
- ... and much more

Entertainment

E-learning

Managed IP NW

[ITU-T Y..Sup.5]

Server
Overview of ITU-T Recommendations for IPTV

- There are lots of draft Recommendations and Technical papers under discussion.
- End-user functions and Application functions are hot topics now.

**Home networking**
- H.622.1: Req & Arch for IPTV Home networks

**Applications and end-systems**
- H.750: Metadata for IPTV Services
- H.770: IPTV Service discovery
- H.741.x: Audience Measurement
- H.763.1: Cascading style sheets for IPTV services
- H.721: IPTV Terminal (Basic)
- H.761: Ginga-NCL
- H.762: LIME
- H.264: video

**Architecture, requirements, network**
- Y.2007: NGN Capability Set 2
- Y.Sup 5: IPTV Service use cases
- Y.Sup 7: NGN Release 2 Scope
- Y.1910: IPTV Functional Architecture
- Y.1901: IPTV Service Requirements
- Q.3010: Authentication protocol

**Quality of Experience**
- H.701: Content Error-Recovery
- G.1080: IPTV QoE
- G.1081: Performance Monitoring
- G.1082: Improving robustness of IPTV performance

**Security and Content Protection**
- X.1191: Req & arch for IPTV security

There are lots of draft Recommendations and Technical papers under discussion.
End-user functions and Application functions are hot topics now.
ITU IPTV IPv6 Global Testbed
Why IPTV global testbed is necessary?

- ITU IPTV standards are expected to remove vendor locks because they are open standard.
- After ITU output IPTV standards, interoperability events and showcasing events were started to promote ITU IPTV standards in the world from 2010.
- Visitors became interested in IPTV standards, but these events were too short to understand details and test them to know whether these can be used or not.

The global testbed is needed to satisfy these requests.
Steps from understanding standards to real services

In order to spread real commercial services based on standards, testbed is useful

- Understanding global standards
- Decision to adopt standard based products
- Spreading terminals and contents
- Development of new services and growing

- Watching demo
- Listening to tutorials
- Test content develop.
- Test terminal develop.
- Testing of conformance and interoperability

- Showcasing by testbed
- Tutorial and workshop
- Contents contest (eg., Application challenge)
- Testbed
- Testing event by regional/global organization
What is ITU IPTV IPv6 Global Testbed? (1)

ITU IPTV IPv6 Global Testbed (I3GT) (*1) is a testbed for the parties that are interested in ITU IPTV standards and IPv6 network.

I3GT was developed by OKI and HTB(*2) in October, 2012 in the cloud environment of NICT(*3).

I3GT was demonstrated in WTSA-12 and Sappro Snow Festival experiment 2013 by NICT.

What is ITU IPTV IPv6 Global Testbed? (2)

Test items (for examples, not limited)
- A) Network bandwidth and quality (delay, loss) suitable for IPTV
- B) IPTV applications based on LIME standard specifications and so on.
- C) Prototype of your own terminals and/or IPTV applications for future commercial services.

<table>
<thead>
<tr>
<th>IPTV terminal device</th>
<th>IPTV service description provider</th>
</tr>
</thead>
<tbody>
<tr>
<td>A)</td>
<td>JGN-X experimental network</td>
</tr>
<tr>
<td>B)</td>
<td>IPTV service provider</td>
</tr>
<tr>
<td>C)</td>
<td>- LIME service</td>
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<tr>
<td></td>
<td>- VOD service</td>
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<td></td>
<td>- Linear TV</td>
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<tr>
<td></td>
<td>- Other service</td>
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</table>

Testbed operator
What is ITU IPTV IPv6 Global Testbed? (3)

- I3GT is a testbed based on the ITU IPTV reference server, **OKI MediaServer** (*1)

- Integrated IPTV Platform
  - VOD, live streaming, IP broadcasting (linear TV) and their combined services

- Standard based system
  - ITU-T IPTV standards and de-facto standard, IETF HLS, compliant

- Large scale system
  - It supports distributed VOD system for large scale system

**What is ITU IPTV IPv6 Global Testbed? (4)**

- **IPTV STB by Mitsubishi Electric**

**Multiple services (currently deployed STB)**
- Terrestrial and satellite TV broadcast
- Premium channel TV broadcast
- VoD, Revenue-generating interactive services: Karaoke, portal services
- Personal video recorder, Remote scheduled recording

**ITU-T Recommendations supported**
- H.721 IPTV Terminal devices – Basic model
- H.762 Lightweight interactive multimedia environment (LIME) for IPTV services
- H.770 Mechanisms for service discovery and selection

**Specifications**
- Full-HD H.264, MPEG2
- LAN 10/100 Base-TX x1
- USB 2.0 x2 ports for HDD PVR
- HDMI digital Audio/Video
- Stereo audio
- Composite/Component video
- Digital audio
- IR interface (for remote controller)
ITU Secretary-General Hamadoun Touré visited IPTV showcasing and watched the live streaming from Geneva.
What are the outputs of I3GT? (5)

- **Kaleidoscope** event was held in Kyoto, Japan.
- New services below are tested inter research NWs.
  - linear TV (IP multicasting)
  - time-shift service (start over)
  - session-shift service (multiscreen)

Director of Telecommunication Standardization Bureau (TSB) of the International, Malcom Johnson visited IPTV showcasing.

The biggest screen showed linear TV (IP multicasting). The second one showed VOD. The smallest one was a tablet PC for VOD.
Expanded I3GT network

- National Advanced IPv6 Center of Excellence in Universiti Sains Malaysia in Malaysia was connected in March 2013
- CSIR (Council for Scientific and Industrial Research) in South Africa was connected in June 2013

South Africa

Malaysia

Hokkaido

Tokyo (otemachi)
ITU IPTV IPv6 Global testbed

Official Web(1)

http://www.itu.int/en/ITU-T/C-I/interop/I3GT/Pages/default.aspx
ITU Global IPTV Testbed

Official Web(2) Testing sites

SITES

A. Hokkaido Television Broadcasting Co., Ltd. (HTB), Hokkaido, Japan
B. National Institute of Information and Communications Technology (NICT), Tokyo, Japan
C. International Telecommunication Union (ITU), Geneva, Switzerland
D. Institute for Infocomm Research (I2R), Singapore
E. Dubai Convention Centre (during WTS-12) hosted by the government of United Arab Emirates, Dubai, UAE
F. Chulalongkorn University, Bangkok, Thailand
G. University of the Philippines de Manila, Manila, Philippines
H. Universiti Sains Malaysia, Penang, Malaysia
I. Council for Scientific and Industrial Research (CSIR), Johannesburg, South Africa
Where will I3GT go? (1)

- It is planned to connect with more and more countries that are interested in ITU IPTV standards (universities, research laboratories, SDOs, carriers,..)

- In order to catch up state-of-the-art technologies and potential user needs, it is planned to support new standards and services, such as:
  - **E-health, e-learning**
  - Mobile (HLS, DASH, Multiple terminal control standards, ..)
  - New codec (ITU-T H.265), new resolution 4K
  - Audience measurement (ITU-T H.741.0-4, ..)
  - Digital signage (ITU-T H.780, ..)
Visualization of your health condition on IPTV

- Audience can see their personal health data such as weight, blood pressure and distance walked on their IPTV screen.
- Visualization of health condition will encourage audience to control their health condition.
- Global standard technologies such as ITU IPTV (LIME*) and Continua** are used to extend services more cost effectively and easily.

After this program, I’ll go to jogging for my health.

(*) LIME is abbreviation of Light Weight Interactive Multimedia Environment for IPTV
(**) Continua health alliance:

- ITU-T H.721 basic terminal
- ITU-T H.762 LIME*
- ITU-T H.264 Video codec, etc
Showcase in “Engagement of Rwandan Academia in ITU Activities”

- Visualization of your health condition on IPTV was demonstrated in the workshop, [*Engagement of Rwandan Academia in ITU Activities”[*] and this SG16

Where will I3GT go? (3) - “a Better Quality of Life by IPTV” -

Simple e-learning by IPTV

- E-learning by IPTV uses remote controller as input devices.
- Students can study interactive multimedia courseware provided by LIME
- Patient care” courseware is considered to be developed as a first example.

E-Learning

Operation is very simple

(*) LIME is abbreviation of Light Weight Interactive Multimedia Environment for IPTV
APT/ITU C&I Event
Objectives of C&I event

- The objective of the interop event is to foster understanding and promote activities on Conformance and Interoperability (C&I) in the APT region.

- And it also contributes directly to build the capability and find the resolution for interoperability issues of APT member countries.

- This event will be organized by APT and supported by ITU.

Japanese contribution to the management committee in November 2012 C&I/INP-03
Outline of the event

1. Date:
   - 9th and 10th September 2013 followed by ASTAP-22

2. Venue:
   - Centara Grand Hotel in Bangkok

3. Contents
   1) Workshop (Afternoon on 9th and 10th September)
   2) Interoperability testing (9th AM September)
      - NGN (VoIP, Video conference)
      - IPTV (including IPTV-MAFR (Multimedia Application Framework))
   3) Showcasing (from 9th PM to 12th September)
      - NGN (VoIP, Video conference)
      - IPTV (including IPTV-MAFR (Multimedia Application Framework))
      - Optical access
IPTV Testing & Showcasing

Conceptual Configuration(1)

Discover and acquire service and consume contents

Deliver contents

TV

Home network

IPTV Terminal (STB)

IPTV network

IPTV Head-end

Contents server
C&I Testing outline

C&I testing for IPTV are based on ITU-T conformance documents.
- ITU-T HSTP.IPTV-H721 (Basic Terminal)
- ITU-T HSTP.IPTV-H762 (LIME)

Basic IPTV services (VOD and Linear TV) operations are tested based on HSTP.IPTV-H721.
Display images and remote controller operations over LIME contents are tested based on HSTP.IPTV-H.762
C&I Testing outline(2)

- HSTP.IPTV-H762 (LIME) describes basic element test, object element test items and et.al.
- HSTP.IPTV-H721 (Basic terminal) was used to test interoperability between a server and a terminal.

### Basic element test

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<thead>
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<th>No.</th>
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<th>Description</th>
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<tbody>
<tr>
<td>1</td>
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<td>2</td>
<td>body-element-test.lime</td>
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<td>5</td>
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### Object element test

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<td>3</td>
<td>object-element-test2.lime</td>
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</tbody>
</table>
Physical architecture for IPTV showcasing

ITU IPTV IPv6 global testbed (I3GT)

JGN-X/Internet

Hotel SW/Router

Interne

OKI table

LOCAL NW

OKI MediaServer

OLT

STB

ONU

Access Point

Tablet

Smart phone

Mitsubishi, OKI, NTT, Chulalongkorn Univ.
Showcasing
IPTV Applications from ITU IPTV Application challenge

- The purpose is to provide a method to direct translation between Thai language and Thai finger spelling of Thai Sign language to bridge communication.
- The application is written in LIME (H.762).
Conclusions

- ITU IPTV IPv6 Global testbed (I3GT) was developed to test ITU IPTV standards easily.

- I3GT will be enhanced to support state-of-the-art standards, including mobile and e-health, and to connect with more parties who are interested in IPTV.

- Several vendors are providing IPTV platform.

- In APT/ITU C&I event in Sept. 2013 in Bangkok, IPTV testing and showcasing were successfully done. APT and ITU are considering the next relevant event near future.
Thank you for your attention

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