ITU IPTV standards – the key for the successful development of IPTV

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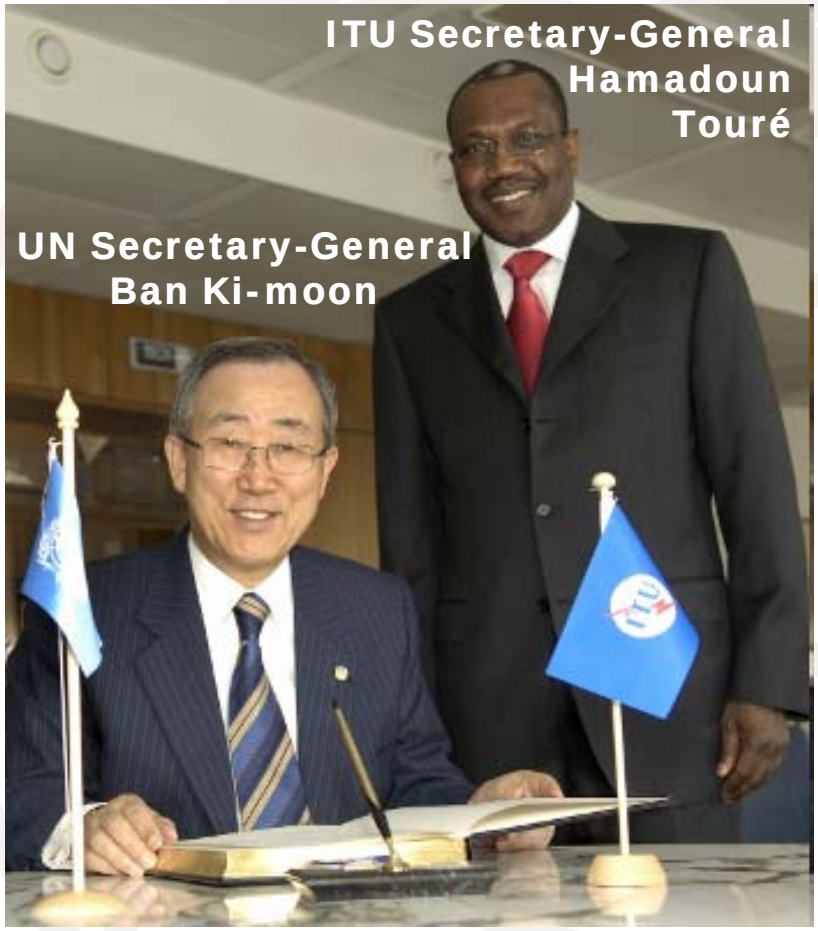
Introduction

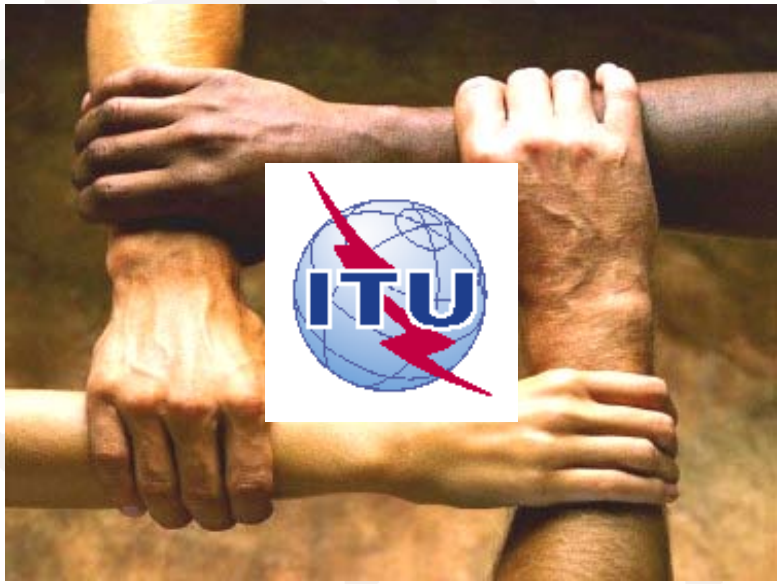
The ITU
INTERNATIONAL TELECOMMUNICATION UNION



- **United Nations agency** for telecommunication and ICTs
- **Members**:
  - **192 Governments** and regulatory bodies
  - **700 Private Sector**
  - **20 Academia**

ITU-T
develops ICT standards

ITU-R
manages radio spectrum and satellite orbits



ITU-D
promotes ICT development

General Secretariat
coordinates work of ITU

Importance of Global Standards

- Global Standards essential in a complex world
- Standards make things easier
- Essential for international communications and global trade
- Drive competitiveness, for individual businesses and world economy
- Help organizations with their efficiency, effectiveness, responsiveness and innovation
- Lower prices and increase availability by reducing technical barriers and promoting compatibility between systems and networks
- Manufacturers, network operators and consumers benefit

Standards proven economic tool

- WTO trade report 2005
- British Standards Institute (BSI): standards make annual contribution GBP 2.5 billion
- German standards body (DIN): economic benefits standardization about 1% GDP
- Canada: 17 % of labour productivity increase and nine per cent of growth of GDP 1981-2004

- Standards have a significant effect on limiting the undesirable outcomes of market failure
- The work of ITU has smoothed the more economical introduction of new technologies

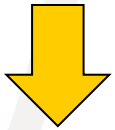
IPTV standardization in ITU

ITU-T's Work on IPTV

- ITU-T has been spearheading the standardization in IPTV
- Focus Group on IPTV (2006-2007)
  - Responding to market demands for standard
  - First set of draft on Architecture, QoS, Security, End-Systems and Multimedia Application
- IPTV Global Standardization Initiative (GSI) (2008-)
  - Building on the work of Focus Group, Coordinating all ITU-T's IPTV related activities
  - Comprising ITU-T Recommendations approved by six Study Groups (SGs 9,11, 12,13,16,17)
  - Every two to three months

IPTV and Next Generation Networks

- IPTV: highly visible, emerging services for Next Generation Networks
- Accelerating the deployment of NGN:
  - business case
  - principal driver
- IPTV subscriptions around the world reached 45.4 million at the end of 2010 (Point Topic, *IPTV Q4 2010 Short Report*)



Need for global standards
– *ITU: Recommendations* –

Standardized IPTV means

- Open infrastructure
- Lower cost
- Wider market
- Wider content availability
- Better Quality of Service & Quality of Experience
- Harmonized security
- Increased revenues from ads
- Focus on innovation and new services

ITU-T IPTV standards

- Enable a marketplace where service providers control their platforms & offerings
  - whether traditional broadcasters, ISPs or telecoms service providers
- Lower cost of entry
- Encourage innovation
- Help mask the complexity of services
- Guarantee QoS
- Ensure interoperability
- **Ultimately:** help players remain competitive

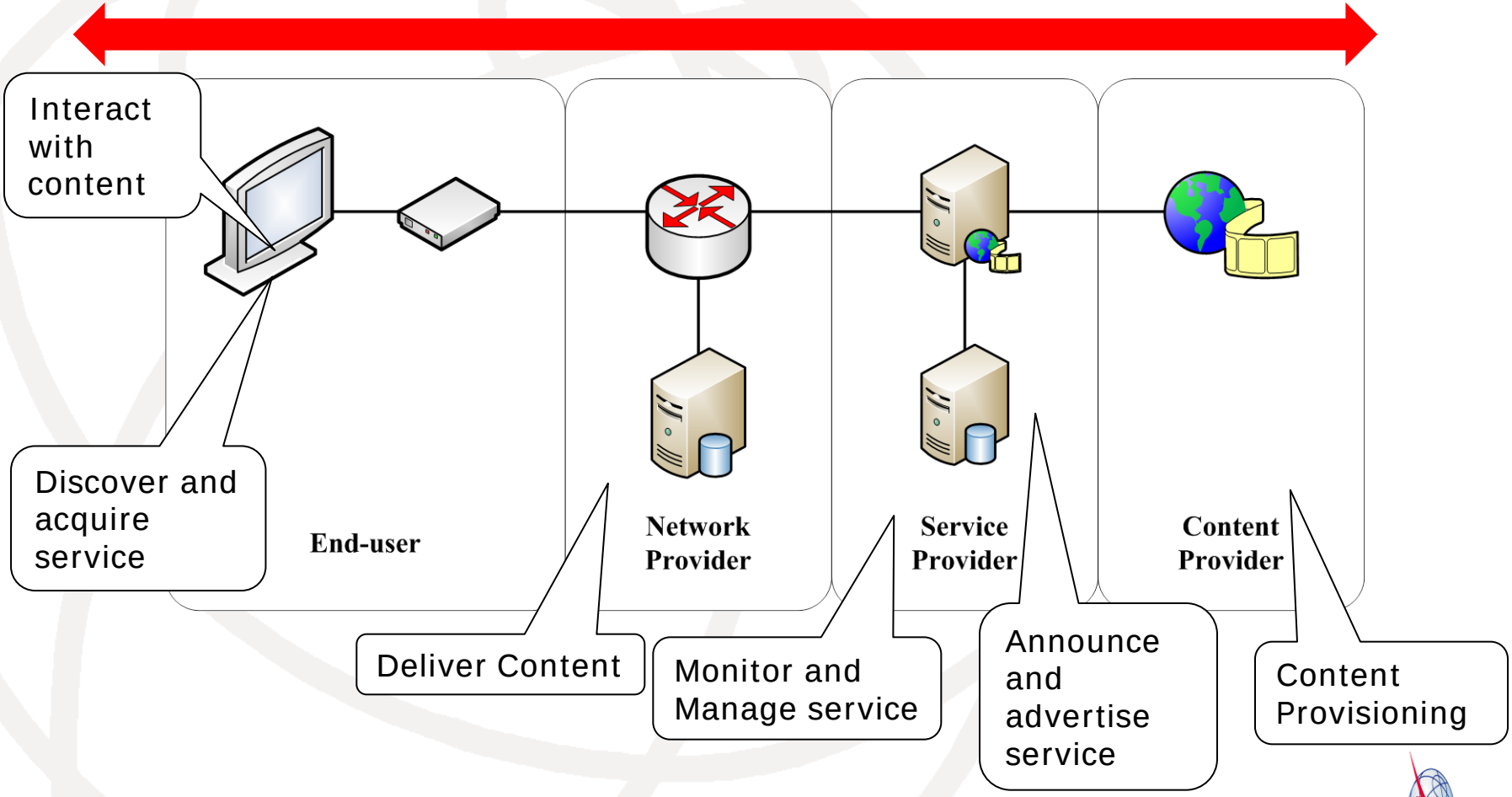
IPTV at ITU

- 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”.
- Three IPTV Architecture Models (Y.1910):
  - Non-NGN IPTV
  - NGN without IMS IPTV
  - NGN with IMS IPTV
- Enables a progressive migration
- Promotes competition and innovation

IPTV Value Chain

ITU-T IPTV standards cover all IPTV value chain

End-to-end solution

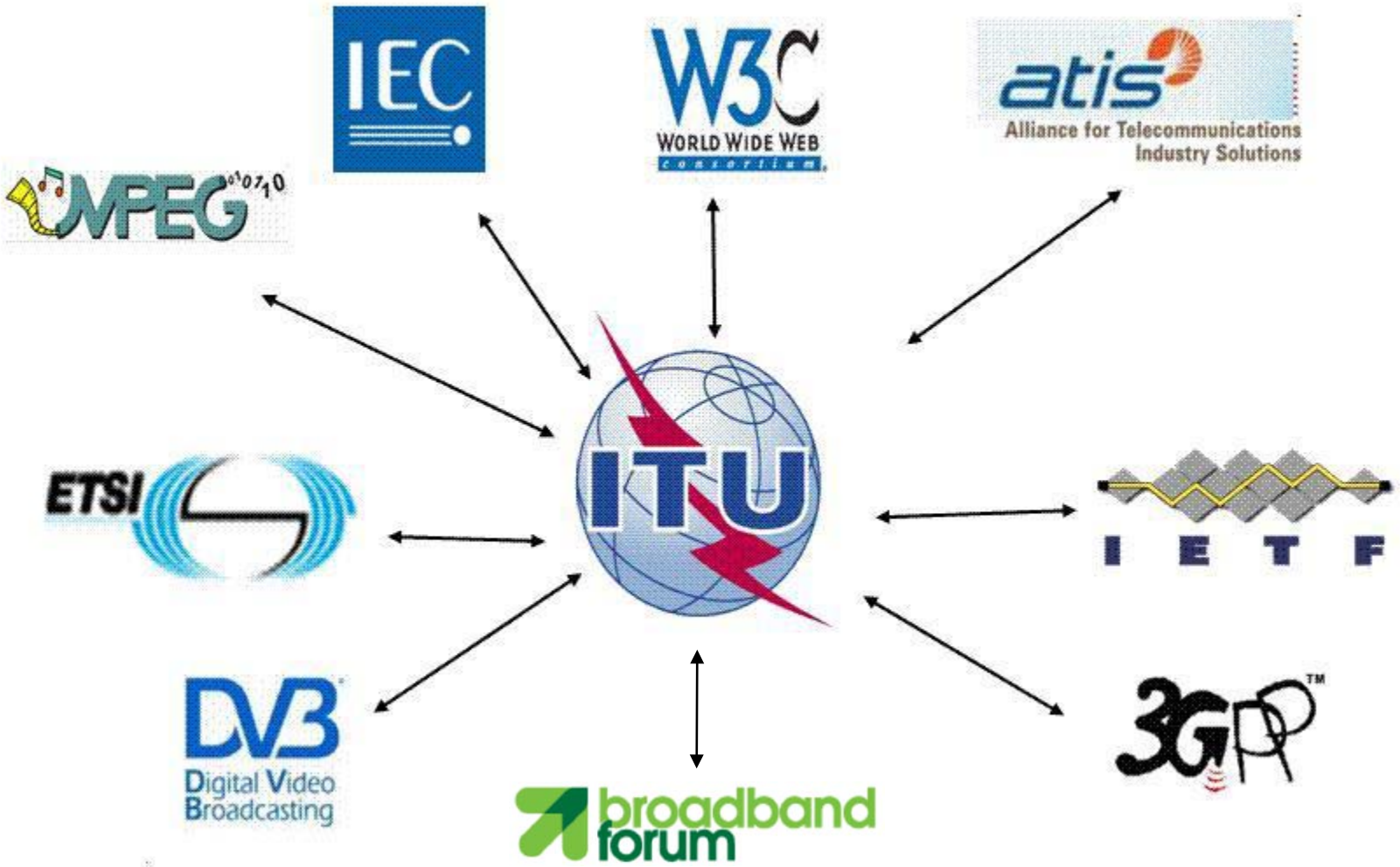


Characteristics of ITU-T IPTV

- End-to-End Solution
- Not to “reinvent the wheels” – Use existing standards as much as possible
- Practical approach for faster deployment and for meeting industry demands
- Close collaboration with key IPTV ecosystem players:
  - Other SDOs
  - Broadcasters
  - CE manufacturers
- Conformance and Interop testing events
- Truly interoperable global standard

ITU-T Liaisons on IPTV

ITU-T IPTV is working with many SDOs:
ensuring interoperability and quality of standards



Status

Current Status

- "Basic IPTV Service" Recommendations are ready
  - TV services, VoD & interactivity
- Advanced features actively discussed
  - Audience measurement
  - Digital signage
  - 3D
  - Internet-sourced contents
  - Service over multiple devices
  - Widgets
- Conformance and Interoperability
  - Agenda of interoperability events (2010, 2011, ...)
    - IPTV conformance and interoperability tested
  - Conformance specifications ready, more to come
  - Implementation Guidelines – ongoing work

Overview of ITU-T Recommendations for IPTV

Home networking

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

Applications and end-systems

- H.750: Metadata for IPTV Services
- H.721: IPTV Terminal (Basic)
- H.770 : IPTV Service discovery
- H.761: Ginga-NCL
- H.740: Application Event Handling
- H.762: LIME
- H.763.1: Cascading style sheets for IPTV services
- 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.1911: Req & arch for IPTV security

IPTV Services discussed in ITU-T

- 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

Adoption and deployment

- UK's DTG (Digital TV Group) has adopted ITU-T Y.1910 as its Connected TV Architecture
- ITU-T H.264 widely adopted and used as IPTV video content format
- ITU-T IPTV Recommendations implemented, sold in the open market & deployed over 4 million terminals (set-top boxes, TVs, PCs):
  - ITU-T H.721 (terminal device)
  - ITU-T H.701 (error recovery)
  - ITU-T H.762 (LIME interactive framework)
  - ITU-T H.770 (service discovery)
  - ITU-T H.750 (metadata)

Examples

T-Commerce with IPTV

Ginga-NCL (ITU-T H.761) enabling a product purchase

Purchasing Wine on IPTV

LIME (ITU-T H.762) enabling wine purchase in VoD using interactivity

Fixed / Mobile Converged IPTV

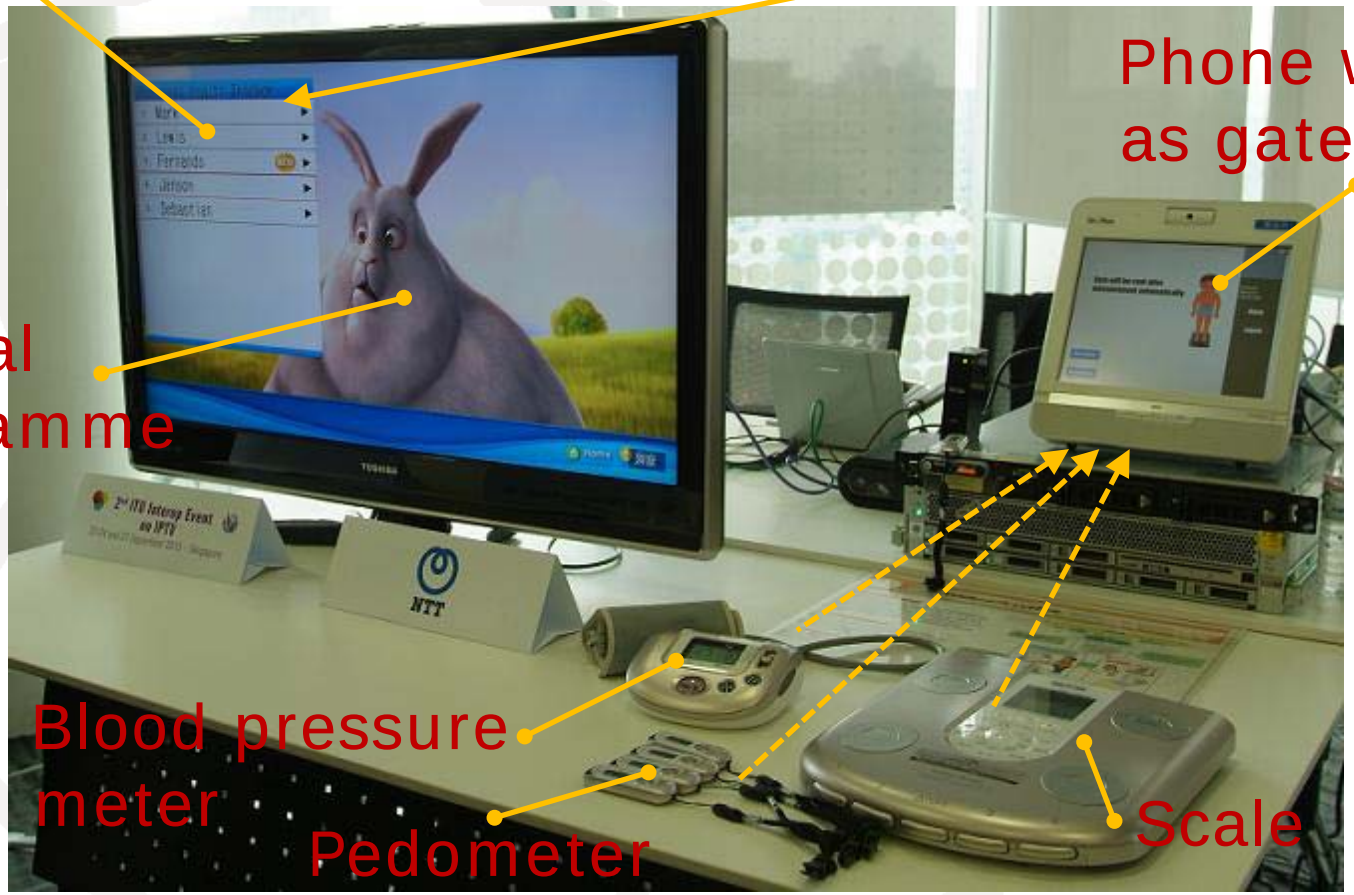
Ginga-NCL (ITU-T H.761) using mobile terminal to display content metadata without affecting main content display

Public Info Board on IPTV (Bus traffic Info)

Widget implemented with LIME (ITU-T H.762) for traffic information

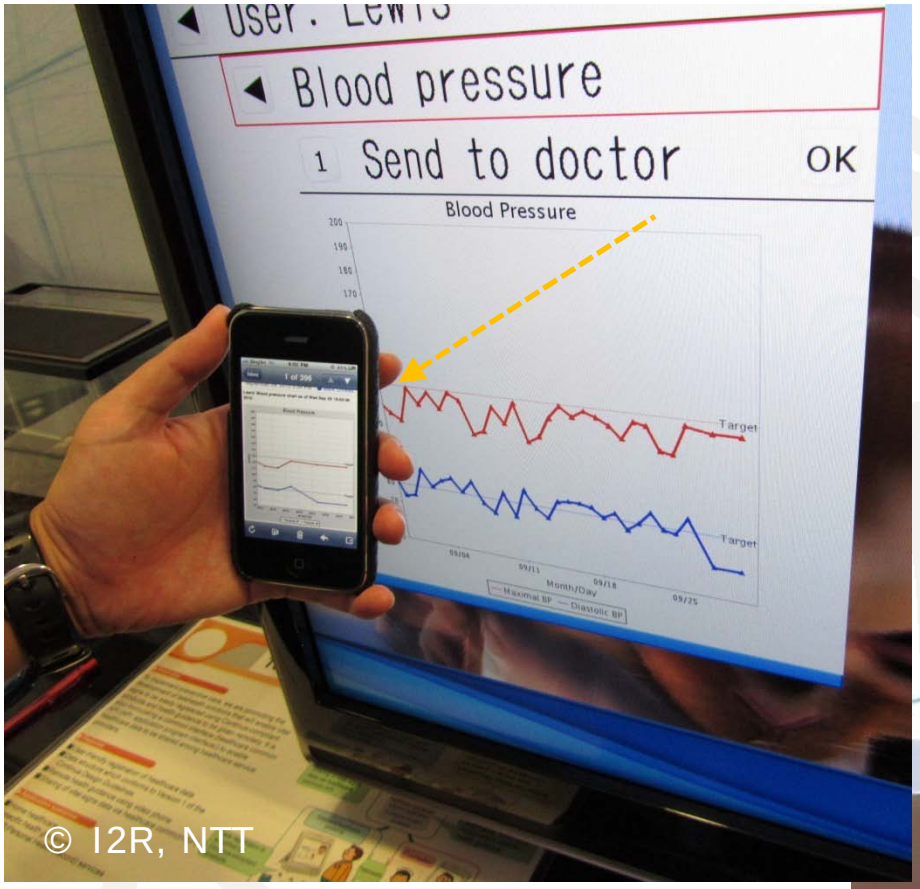
- Check the route on the map
- Traffic condition of the bus routes
- Length of the Waiting queues (how long you would have to wait.)
- Signals your bus is arriving just 5 min. before the bus comes

E-health Apps



Widget implemented with LIME (ITU-T H.762) for e-health information collected from the user site, consolidated in the server backend and displayed on users' IPTV terminal device as a widget.

E-Health



LIME app does:

- Obtain health data and shows it on TV
- Allows the user to send data to the doctor via e-mail
- TV screen displays reply from the doctor with his professional advice

Private and “SOHO” Broadcasting

- Local community broadcasting and VoD service can be very easily provided with IPTV

Widget implemented with LIME (ITU-T H.762) for local aquarium information in Sendai, Japan

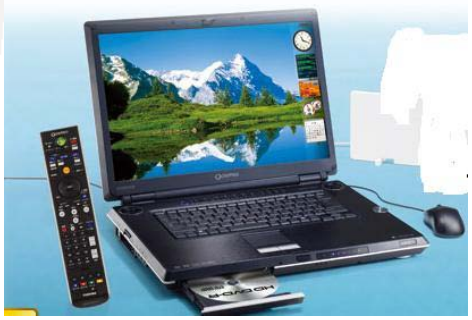
ITU-T H.721 IPTV Terminals

- Terminals based on ITU-T H.721 are available in the retail market
- Customer can buy a TV or PC at a shop, connect to network, and receive an IPTV service
- Conformance Tests ongoing to ensure conformance and interoperability

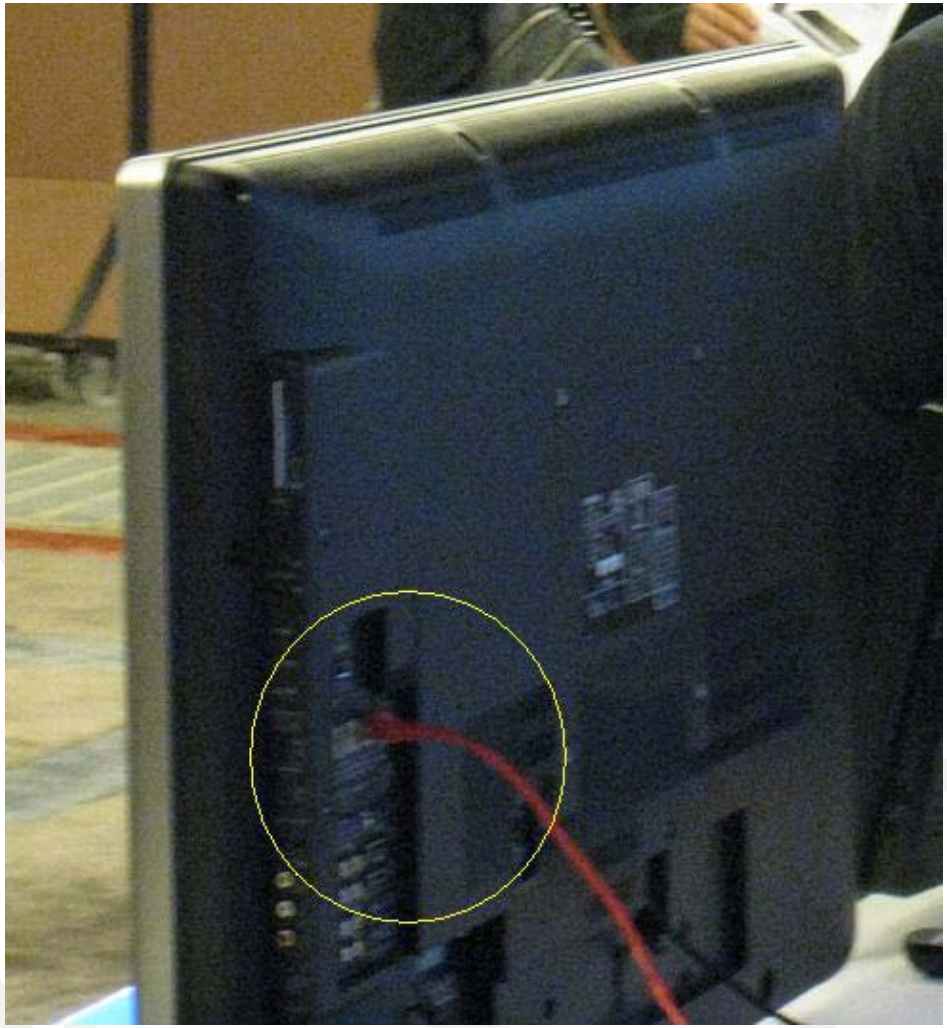
Set-top boxes

TV sets (also 3D!)

PC



Standard Managed “Connected TV”



- H.721 terminals support ***managed*** “connected TV”.
- Multiple remote service providers can provide managed IPTV services on any of these standardized terminals (H.721).

Back of REGZA for H.721 with direct connect of an Ethernet cable

And many more things …

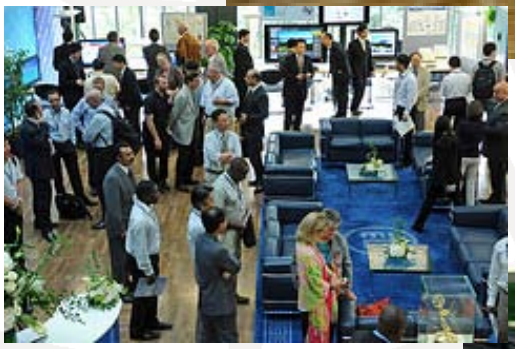
Interop Events

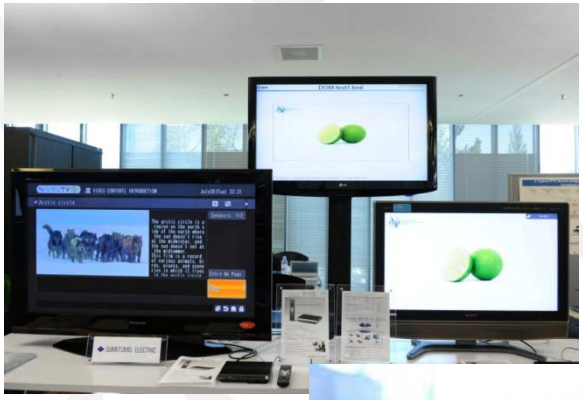
- Geneva, July 2010
- Singapore, September 2010
- Pune, India, December 2010
- **Rio de Janeiro, Brazil, 18-22 July 2011**
  - **At Sofitel Copacabana Hotel**
  - **Hosted by Pontifical University of Rio de Janeiro (PUC-Rio) and the Brazilian Internet Steering Committee (CGI.br)**
  - **Testing: 18-20 July 2011**
  - **Showcasing: 21-22 July 2011 (open to the public)**
  - **Seminar on 22 July 2011**
    "ITU-T Recommendations on IPTV and video distribution trends in Brazil"

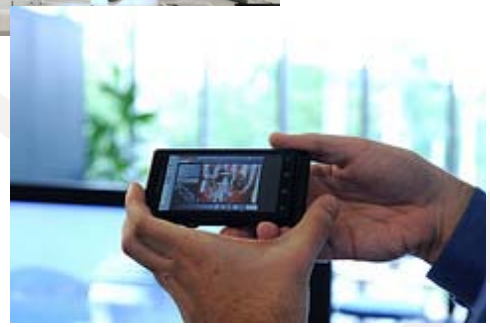
Interop Events

- Companies like Cisco, Mitsubishi, NEC, NTT, OKI, Panasonic, Sumitomo, TVStorm
  - Tested products conforming to ITU-T Recommendations
  - Showcased their solutions
- Attracting numerous participants from many countries from Africa, Asia, Europe, and Americas
- The events called the attention of various international organizations – e.g. EBU, WHO, WIPO

Interop event for IPTV in Geneva







IPTV App challenge

- Open call: promote original and creative IPTV applications compliant to ITU's suite of IPTV standards
  - ITU-T H.761 (Ginga-NCL) and H.762 (LIME) platforms
  - Criteria: Degree of innovation, level of engagement, ease of use, value to society
- Award ceremony and demo during ITU Telecom World event (Geneva, October 2011)
- Sponsorship opportunities
  - http://itu.int/en/ITU-T/challenges

Conclusion

Conclusions

- ITU IPTV Recommendations will encourage innovation, ensure interoperability and –ultimately– help players remain competitive
- They are enablers of innovation on broadband and Next Generation Networks
- ITU IPTV (e.g. H.721) are already implemented and deployed
  - Turnkey solutions
- Interoperability events in 2010, more in 2011 and beyond
- Open architecture of ITU IPTV standards are truly global & open standards that can be deployed across a wide range of applications

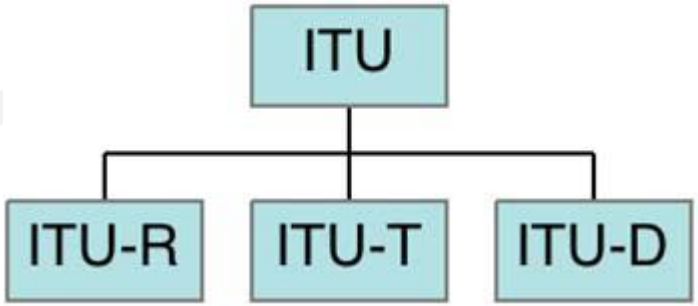
Thank you!

- For more information
  - http://itu.int/ITU-T/iptv
  - http://itu.int/interop
  - http://itu.int/en/ITU-T/challenges

Extra slides

ITU Organization

- **ITU (International Telecommunication Union) is a UN agency with the following structure**



ITU	International Telecommunication Union
ITU-R	Radiocommunication Sector
ITU-T	Telecommunication Standardization Sector
ITU-D	Telecommunication Development Sector

- **Note wel!!**

Standardization work: driven by the private sector

*** All major ICT companies are members of ITU**

- **ITU is uniquely different from other UN organizations in that the private sector has rights to participate on equal footing with governments, and actually are responsible for all technical standards developed by ITU, which are called "*Recommendations*"**

http://itu.int/aboutitu/structure

ITU-T "Questions" in IPTV-GSI (1/2)

- **Questions:** "*projects*" where technical work is done

- Multimedia
  - Q13/16: Multimedia application platforms and end systems for IPTV
  - Q21/16: Multimedia Architecture
- Network architecture and NGN
  - Q1/13: Coordination and planning
  - Q3/13: Requirements and implementation scenarios for emerging services in NGN
  - Q4/13: Requirements and framework for QoS for NGN
  - Q5/13: Principles and functional architecture for NGN
  - Q12/13: Evolution towards integrated multi-service networks and interworking

“Questions” in IPTV-GSI (2/2)

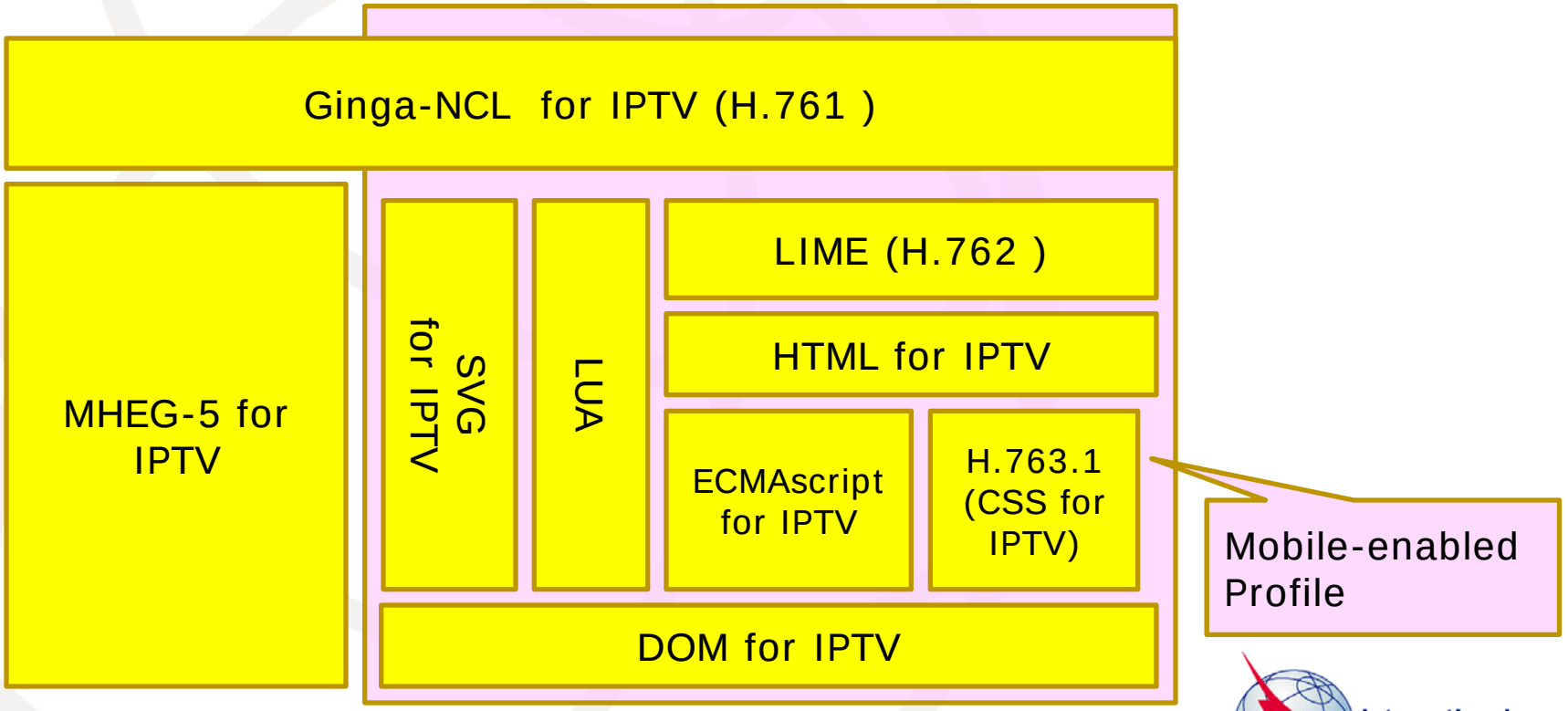
- Quality of experience, Quality of service (QoE/QoS)
  - Q13/12: QoE/QoS performance requirements and assessment methods for multimedia including IPTV
- Security
  - Q7/17: Secure Communication Services
- Signaling protocols
  - Q1/11: Network signaling and control functional architectures in emerging NGN environments
- Secondary distribution
  - Q4/9: API for advanced cable television and sound program distribution within the scope of SG9
  - Q8/9: Voice and video IP applications over cable television networks

Some existing Recommendations

- Architecture, Network and General Requirements
  - Y.1910 and Y.1901
- Quality of Service and Experience
  - G.1080 series
- Multimedia and Interactive Application
  - H.264, H.760 series
- IPTV Terminal Devices (Set-top boxes, TV set, Mobile)
  - H.720 series
- Metadata and Service Discovery
  - H.750 and H.770
- Home-networking: H.622.1
- Protocols: Q.3010
- Security: X.1191

ITU-T H.760 series: Standard Common Suite for Interactivity

- ITU-T H.760 (Multimedia Application Framework) Series defines Standard Common Suite of Multimedia Application Platform that gives multimedia interactivity to IPTV content.
- With this Common Suite, IPTV Terminals can support interactivity anywhere in the world



H.761

- ITU-T H.761 (Ginga-NCL for IPTV) is an adaptation of Ginga-NCL,
  - the middleware standard for Brazilian digital TV broadcasting
  - ISDB - adopted in most of Latin America - Argentina, Peru, Chile, Venezuela, etc.)
- Based on XML
- Scripting by Lua (script language)
- Harmonized with W3C SMIL
- Often used as a glue language for other multimedia frameworks, such as HTML, LIME, SVG.
  - Good integration with Video streaming
  - Can be used for mobile as well as fixed
  - Strong Community support in Latin America

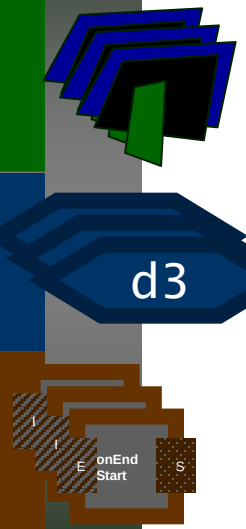
head 1

```
<head>
    <regionBase>
        ...
    </regionBase>
    <descriptorBase>
        ...
    </descriptorBase>
    <connectorBase>
        ...
    </connectorBase>
</head>
```

regions - *where*

descriptors - *how*

connectors - *when*



body 2

```
<body>
    <port id=”pMain" component="video1" />
    <!-- nodes -->
    <!-- links -->
</body>
```

Contexts & media – *what*

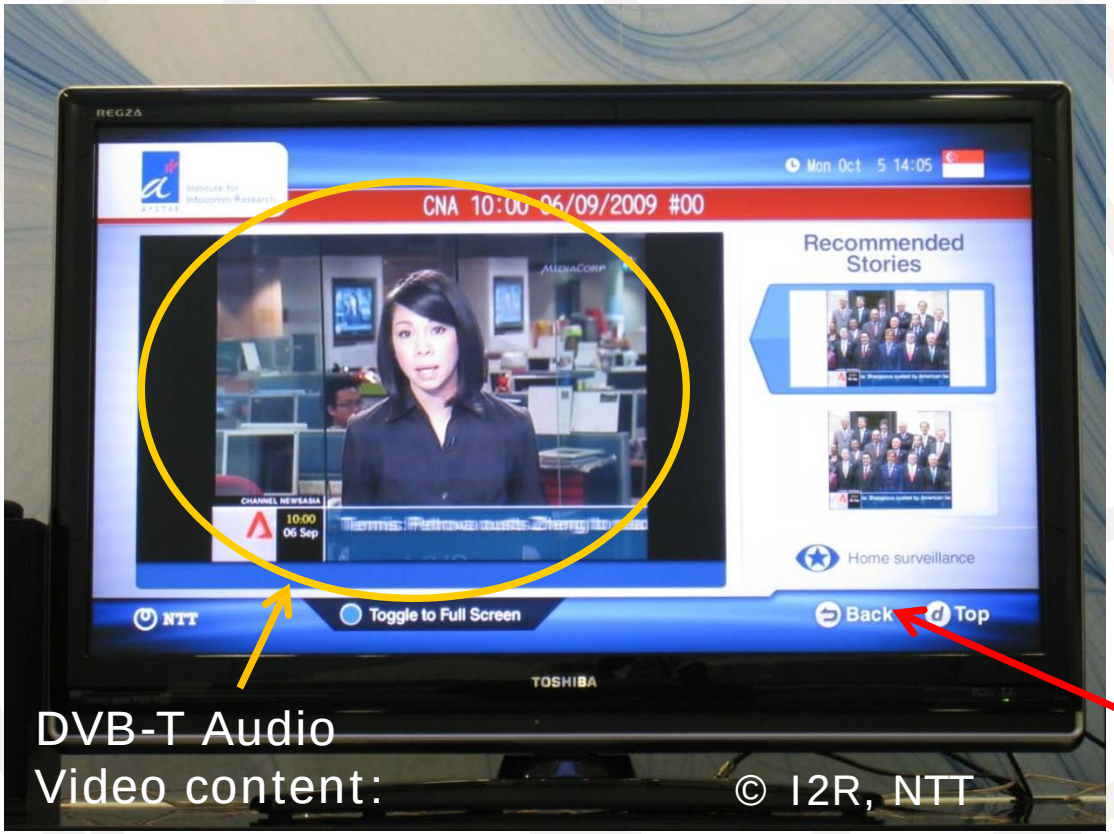
Links - *when*

LIME (H.762)

- ITU-T H.762 – LIME (Lightweight Interactive Multimedia Environment)
  - Evolved from BML, the interactive application platform for Digital TV (ISDB)
  - Not a new “language” but a simple profile of HTML and Javascript for creating Interactive content
- Some specific features for IPTV – APIs for VOD, Remote control, color buttons, focus control, etc.
- Based on simple HTML and JavaScript
  - Just like very Simple Web designing
- Suitable for any type of terminals, esp. poor ones like TV sets
- Mobile as well as Fixed
- Integration of Web technologies and Multimedia
  - Asynchronous (AJAX-like) Applications
  - Java Server Page (JSP)
  - CGI

LIME Testbed in Singapore

- Singapore's Institute for Infocom Research (I^2R) of Agency of Science, Technology and Research (A*STAR) is running a test service using LIME (H.762)



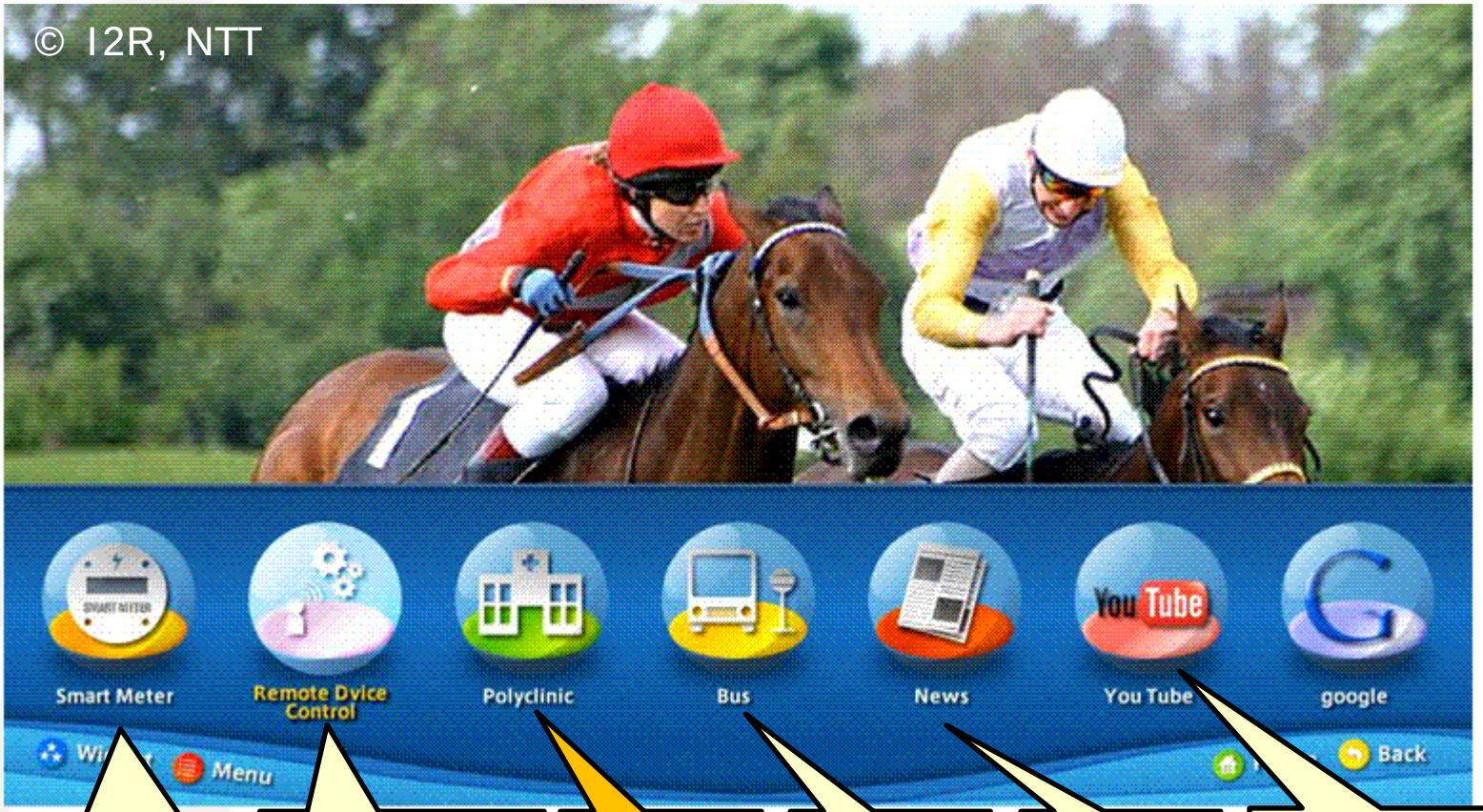
- DVB-T content is packetized into IP and consumed on an H.721 terminal with LIME (H.762) browser, showing LIME can easily interoperate with different DTV standards

ITU-T H.721 terminal with LIME browser (bought on the open market). Interactivity is provided by LIME.

Widget Apps on LIME

- LIME-Widget Apps for various services

LIME



Smart Meter App. that monitors energy consumption

Remote Device Control

Clinic Watch

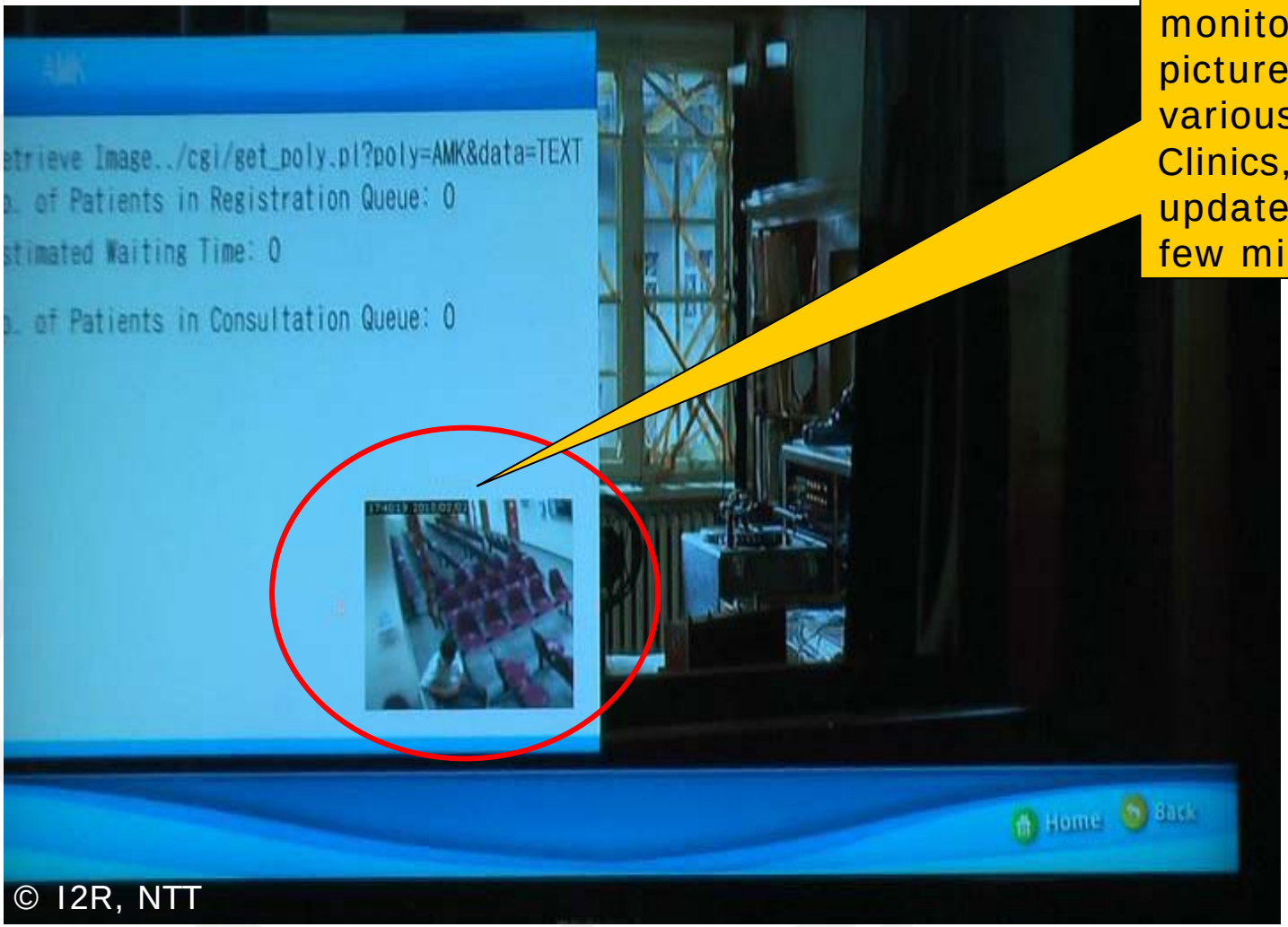
Bus traffic Info

News Update Clips

Links to 3rd Party Content

49

Clinics Watch



Widget implemented with LIME (ITU-T H.762): display of clinic information

Ginga-NCL Deployments

- ISDB Service already started in Brazil
- Peru, Chile, Argentina, Venezuela, Bolivia, Ecuador, Philippines, etc. are expecting to start soon
- Hybrid receivers (Terrestrial/IPTV) in Brazilian market with Ginga-NCL
- Many Ginga vendors in Brazil. At least 4 non-Brazilian companies are developing their Ginga products
  - Many more expected: Argentina, Chile, China, Japan, Peru ...

LIME Deployment

- IPTV Forum Japan's "BML for IPTV"
- ARIB-STD-B24 (ISDB) –
  - MHEG-5 (UK, Hong Kong, Australia, New Zealand) based on the same terminal architecture
  - Ginga-NCL (ISDB) based on similar implementation
- Terminals (TV sets for IPTV) deployed and sold in retail market
- Many vendors in Canada, China, Japan, Korea make (and sell) LIME compliant browsers
- High-quality content creation tools in the market
  - Combination with Broadcasting, E-publishing, Digital Signage
- Professional (broadcast-level) high-quality content creators already doing business

Resources for NCL and LIME

- Ginga Community (http://softwarepublico.gov.br)
  - NCL Club (http://club.ncl.org.br)
  - Ginga-NCL Virtual STB freely available

- "Programming in LUA (2006, Lua.Org)
- "Introducing Lua" (2006, O'reilley)
- "Beginning Lua with World of Warcraft Addons" (2009, Apress)
- "LIME Technical Handbook 2010" (to be published, Impress)

LIME