Joint ITU - AICTO Workshop on “Interoperability of IPTV in the Arab region”

(Dubai, UAE, 20 – 21 September 2011)

ITU-T H.762 LIME
Interactive Multimedia Application Interoperability

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LIME Background

- Internet ubiquity, faster broadband access
- Enhanced content / datacasting, interactivity
- Early attempts: web browsers in TVs
  - lean forward problem
  - inadequate user interface
  - only remote controller: no mouse/keyboard

LIME:
Lightweight Interactive Multimedia Environment
LIME Background

Standards:
- W3C CSS TV
- CEA-2014: Developed by CEA (USA)
- MHEG: used in UK (red button)
- BML: used extensively in Japanese Digital TV (ISDB)
- LIME: ITU-T Recommendation H.762
  - consented in 2009
  - uses BML and Web standards
  - targets IPTV
LIME design considerations

- Synchronization among multiple sources
- Simplification of navigation (no mouse)
- Rendering tailored to TV

Contextual Information

Live TV

Group C

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LIME (ITU-T H.762)

- LIME: “Lightweight Interactive Multimedia Environment (LIME)”
- Based on common Web-practices like HTML, CSS, DOM and Javascript (= ECMAScript)
- Easy integration of Video (both Linear streaming and VOD)
- Suitable for different types of Terminals; e.g. TV set, STB, Mobile phone, PC, etc.
- Agnostic as to the DTV standard

- Content from ATSC, DVB, ISDB can be used with LIME
- LIME over DVB is being discussed at ITU
Overview of ITU-T Recommendations for IPTV

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

**Applications and end-systems**
- H.721: IPTV Terminal (Basic)
- H.750: Metadata for IPTV Services
- 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

**Architecture, requirements, network**
- Y.2007: NGN Capability Set 2
- Y.sup5 IPTV Service use cases
- Y.sup7 NGN Release 2 Scope
- Y.1910 IPTV Functional Arch
- Y.1901 IPTV Service Requirements

**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
ITU-T IPTV Standards

IPTV domains

ITU-T IPTV end-end solution

Content provider

Service provider

Network provider

Gateway

End user

H.700 Series

H.721

IPTV set-top box

PC

Mobile

TV

Web server provides LIME documents

User agent renders LIME documents
IPTV Terminal w/LIME support

From H.721 Appendix II
ITU-T H.762 LIME

International Telecommunication Union

ITU-T

TELECOMMUNICATION STANDARDIZATION SECTOR OF ITU

H.762
(12/2009)

SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

IPTV multimedia services and applications for IPTV – IPTV multimedia application frameworks

Lightweight interactive multimedia environment (LIME) for IPTV services

Recommendation ITU-T H.762
MAFR Recommendations

H.761 (Ginga-NCL for IPTV)

MAFR.8 (MHEG-5 for IPTV)

MAFR.10 (SVG for IPTV)

MAFR.14 (LUAScript for IPTV)

MAFR.13 (HTML for IPTV)

MAFR.6 (ECMAScript for IPTV)

MAFR.4 (CSS for IPTV)

MAFR.5 (DOM for IPTV)

LIME defines profiles for:
- HTML
- ECMAScript
- CSS
LIME HTML Extensions

- **bevent** and **beitem**
  Event control. Events sent from the station to the receiver to trigger an action. E.g. synchronize contextual data with main content stream (e.g. sports statistics).

- **body**& **invisible**
  switches off the document to let main service (usually a TV program) undisturbed

- **onfocus/onblur** attributes of **div**& **p**& **span**& **object**& address the lack of a mouse
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Extensions (7 elements)
LIME Script Profile

Subset of ECMAScript in LIME-script profile is limited to eight objects

- `global`
- `Object`
- `Function`
- `Array`
- `String`
- `Boolean`
- `Number`
- `Date`
## LIMEScript Profile Extensions

### Browser pseudo object functions

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### Extensions: 8 categories
LIME CSS Profile

- Extended properties for
  - Color
  - Resolution
  - Aspect ratio
  - Navigation assuming a remote controller
# LIME CSS Profile

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LIME Examples
LIME datacasting example

Group C

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Interactivity via focus selection

Interactivity via color buttons

LIME datacasting example

Linear TV

Synchronized contextual data from LIME server

Menu

Standings

Players

MyPage

Blue

Red

Green

Yellow
LIME Remote Controller example

IPTV Remote Controller

Color buttons

Up Down Right Left Arrow buttons

“d” Button
LIME datacasting example

Transition from Linear TV to Datacasting
LIME datacasting example

Transition from a Linear TV program to another program while datacasting is enabled
Interop event for IPTV in Geneva
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

IPTV widget

Normal programme

Blood pressure meter

Pedometer

Scale

Consolidated reports

Phone working as gateway

Server

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
Conclusions

- LIME design requirements target IPTV needs:
  - Presentation restrictions (e.g. color, font appropriate for displaying on a TV)
  - Navigation without a spatial UI device
  - Synchronization of contextual data with IPTV content

- LIME is based on open Web standards
- LIME is lightweight yet powerful enough
- Over 4 M IPTV terminals sold in the open market based on ITU-T Recommendations (STB, TV, PC)
Thank you