Digital Home Standards: Choosing and Implementing the Right Ones

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Topics

• DLNA Technology
• Complimentary Initiatives
  – UPnP Forum
  – Coral Consortium
  – Marlin Developer Community
• Summary
• Q&A
The DLNA Technology Solution
DLNA Interoperability Guidelines

Connectivity

• Ethernet
• Wireless
DLNA Interoperability Guidelines

Networking

- IP foundation
  - Allows applications to run over different networks
  - Enables connecting devices to the Internet
  - Widely used and cost-effective
DLNA Interoperability Guidelines

Media Transport

• HTTP is the baseline transport for media streaming or transfer
• HTTP must be supported by all digital home devices that source or render media content
• RTP is optional

IPv4 Protocol Suite

IPv4 Protocol Suite

HTTP 1.0/1.1

UPnP Device Architecture 1.0

UPnP AV 1.0

JPEG, LPCM, MPEG2

Wired: 802.3i, 802.3u

Wireless: 802.11a/b/g
DLNA Interoperability Guidelines

Device Discovery & Control

• UPnP Device Architecture 1.0
  – Device and service discovery through Auto-IP and DHCP

- JPEG, LPCM, MPEG2
- UPnP AV 1.0
- UPnP Device Architecture 1.0
- HTTP 1.0/1.1
- IPv4 Protocol Suite
  - Wired: 802.3i, 802.3u
  - Wireless: 802.11a/b/g
DLNA Interoperability Guidelines

Media Management
- UPnP AV 1.0 Device and service descriptions
  - Examples:
    - MediaServer
    - MediaRenderer
    - RenderingControl
    - ContentDirectory
DLNA Interoperability Guidelines

Media Formats

- Required formats establish an interoperability baseline
- Mandatory and optional formats for transport and rendering
- Content in an optional format must be transcoded to the corresponding required format, if necessary for content interchange between devices
DLNA Interoperability Guidelines

Link Protection

- DTCP/IP Required to establish an interoperability baseline
- WMDRM-ND optional to provide access to additional content
DLNA Link Protection Guidelines

• DTCP/IP required
  – Defines link protection technology for the secure handling of commercial content
    • Establishes a Secure Authenticated Channel (SAC)
    • Generates an ephemeral session key that updates periodically
    • Supports streaming only, with limited copy permissions:
      – Copy one time
      – Never copy
      – Copy restriction right not asserted
Applications of the DLNA Interoperability Platform
DLNA Device Classes

- **Home Network Devices**
  - Digital Media Server (DMS)
  - Digital Media Player (DMP)
  - Digital Media Renderer (DMR)
  - Digital Media Controller (DMC)
  - Digital Media Printer (DMPr)

- **Mobile Handheld Devices**
  - Mobile Digital Media Server (M-DMS)
  - Mobile Digital Media Player (M-DMP)
  - Mobile Digital Media Downloader (M-DMD)
  - Mobile Digital Media Uploader (M-DMU)
  - Mobile Digital Media Controller (M-DMC)

- **Home Interoperability Devices**
  - Mobile Interoperability Unit (MIU)
  - Mobile Network Connectivity Function (M-NCF)

- **V1.0 Device Class**
- **New Device Class**
New Device Capabilities

• Capabilities exist in an underlying device class
  – Capabilities cannot exist independently

• Upload / Download Controllers
  – +UP+ - Upload Controller
  – +DN+ - Download Controller

• Push Controller
  – +PU+ - Supports 2 Box Push with DMR

• Printer Controllers
  – +PR1+ - Printer Controller + Image Content Source
  – +PR2+ - Printer Controller (interacts with External Image Content Source such as DMS)

• DLNA Product Capability Terms:
  – FIND(s), FIND(s) (for printer), FIND(s) (3box) SEND(s) (to player, to storage, to printer), GET(s), PLAY(s), STORE(s), PRINT(s)
2 & 3 Box Pull System Usages

2 Box Pull

Digital Media Server (DMS or M-DMS) SENDs (to player)

Digital Media Player (DMP or M-DMP) PLAYs, FINDs

3 Box Pull

Digital Media Server (DMS or M-DMS) SENDs (to player)

Digital Media Controller (DMC or M-DMC) – FINDs (‘3box’, “control point”)

Digital Media Renderer (DMR) - PLAYs
New DLNA Guideline Enhancements

2 Box Push System Usage

2 Box Push

Push Controller
(+PU+)
SENDs (to player)

Digital Media Renderer
(DMR)
PLAYs

Control
Content
New DLNA Guideline Enhancements

Upload & Download System Usages

Upload

Upload Controller (+UP+) or M-DMU SENDs (to storage)

Digital Media Server (DMS or M-DMS) STOREs

Download

Digital Media Server (DMS or M-DMS) SENDs (to player, to storage)

Download Controller (+DN+) or M-DMD GETs
New DLNA Guideline Enhancements

2 & 3 Box Printing
System Usages

2 Box Print

Printer Controller
(+PR1+)
SENDs (to printer)

Digital Media Printer
(DMPr)
PRINTs

3 Box Print

Digital Media Server
(DMS or M-DMS)
SENDs (to printer)

Printer Controller
(+PR2+)
FINDs (‘3box’, photos to print)

Digital Media Printer
(DMPr)
PRINTs
Complimentary Initiatives

- **DLNA**
  - [www.dlna.org](http://www.dlna.org)
- **UPnP**
  - [www.upnp.org](http://www.upnp.org)
- **Marlin Developer Community**
  - Defines DRM system in an open standard setting
  - [www.marlin-community.com](http://www.marlin-community.com)
- **Coral Consortium**
  - Defines DRM interoperability framework
  - [www.coral-interop.org](http://www.coral-interop.org)
- **Open IPTV Forum**
  - Defines interoperability services from head-end to residential premises
  - [http://www.openiptvforum.org/](http://www.openiptvforum.org/)
Summary
Ultimate Challenge and Goal

- Consumer digital AV product choice should be a price, design, feature, function, brand choice, not a technology choice
  - Utility of products and access to content should not be constrained by the specific vendor or the technologies that are or are not incorporated
- Consumer content choice should be a personal, emotional choice, not a technology choice
  - Access to content from digital AV products should not be constrained by where or how you purchased the content or by the devices you own or who manufactured them
- The rights of all stakeholders in the content-to-device value chain must be protected
  - Consumer’s should get what they pay for by participating in a healthy ecosystem comprised of broad and diverse product, service and content offerings driven and sustained by growing business opportunity
Backup
DLNA Certified Products

- Sony Corporation TVs
  - BRAVIA KDL-46X100
  - BRAVIA KDL-40X100
  - BRAVIA KDL-40J500
  - BRAVIA KDL-40J300
  - BRAVIA KDL-32J300
  - BRAVIA KDL-32J500
  - BRAVIA KDL-26J300
  - BRAVIA KDL-20J300

- Sony VAIO PCs
  - All of them, world wide

- Audio products
  - NetJuke NAS-M7HD
  - MUSIC BAR CPF-IX001

- Digital Cameras
  - Cyber-shot DSC-G1
Questions ?