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Digital living network alliance (DLNA) home networked device interoperability guidelines –
Part 1: Architecture and protocols

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

DIGITAL LIVING NETWORK ALLIANCE (DLNA) HOME NETWORKED DEVICE INTEROPERABILITY GUIDELINES –

Part 1: Architecture and protocols

FOREWORD

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International Standard IEC 62481-1 has been prepared technical area 9: Audio, video and multimedia applications for end-user network, by IEC technical committee 100: Audio, video and multimedia systems and equipment.

This second edition cancels and replaces the first edition published in 2007 and constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) inclusion of variable play (trick mode) support;
b) addition of the Scheduled Recording feature;
c) addition of the EPG feature;
d) additon fo the RUI feature;
e) addition of the Upload and Download Synchronziation feature;
f) additon of Wi-Fi Direct, MoCA, and HPNA Phys;
g) inclusion of updates to resolve interoperability issues.

The text of this standard is based on the following documents:

CDV	Report on voting
100/1992A/CDV	100/2080A/RVC

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of IEC 62481 series, published under the general title *Digital living network alliance (DLNA) home networked device interoperability guidelines,* can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

Overview

Consumers are acquiring, viewing, and managing an increasing amount of digital media (photos, music, and video) on devices in the Consumer Electronics (CE), Mobile Device, and Personal Computer (PC) domains. Consumers want to conveniently enjoy that content, regardless of the source, across different devices and locations in their homes. The digital home vision integrates the Internet, mobile, and broadcast networks through a seamless, interoperable network, which will provide a unique opportunity for manufacturers and consumers alike. In order to deliver on this vision, it was recognized that a common set of industry design guidelines would be required to allow companies to participate in a growing marketplace, leading to more innovation, simplicity, and value for consumers.

The Digital Living Network Alliance answered this challenge by taking the initiative to develop a workable framework for interoperable product design. The DLNA Home Networked Device Interoperability Guidelines have been created in a unique cross-industry effort that combined the efforts of over 100 Consumer Electronics, PC-industry and Mobile Device companies from around the world that worked together with the aim of achieving the world's first substantial platform for true interoperability between personal computer and consumer electronic devices. The Interoperability Guidelines provide product developers with a long-term architectural view, plus specific guidance for IP-networked platforms, devices and applications in the home. The Interoperability Guidelines will be introduced in phases over several years to accompany the market adoption of usages and the availability of needed technology and standards.

The Interoperability Guidelines that are the object of this standard are based on an architecture (see Clause 4) that defines interoperable components for devices and software infrastructure. It covers physical media, network transports, device discovery and control, media management and control, media formats, media transport protocols, and remote user interfaces. Table 1 shows a summary of the key functional components and technology ingredients that are covered by these Interoperability Guidelines.

Table 1 – Key technology ingredients

Functional components	Technology ingredients
Connectivity	Ethernet*, IEEE 802.11, MoCA, HPNA and Bluetooth
Networking	IPv4 Suite
Device Discovery and Control	UPnP* Device Architecture v1.0
Media Management and Control	UPnP AV and UPnP Printer:1
Media Formats	Required and Optional Format Profiles
Media Transport	HTTP (Mandatory) and RTP (Optional)
Remote User Interfaces	CEA-2014-A

Version Number

For version control, the protocols defined in this standard constitute version 1.5 of the specifications. Device implementations advertise adherence to the protocols selecting value 1.5 in the fields and flags designed to expose the DLNA protocol version.

Audience

The Interoperability Guidelines are intended for the following audiences:

- Marketing professionals who specify requirements for home networked media products.
- Developers who design and build home networked media products.
- Quality assurance personnel who test and validate home networked media products.

DIGITAL LIVING NETWORK ALLIANCE (DLNA) HOME NETWORKED DEVICE INTEROPERABILITY GUIDELINES –

Part 1: Architecture and protocols

1 Scope

This part of IEC 62481 specifies the core architecture and protocols of DLNA implementations.

The interoperability guidelines consist of five parts covering Architecture and Protocols, Media Formats, Link Protection, DRM Interoperability Systems and Device Profiles. This part of IEC 62481 provides vendors with the information needed to build interoperable networked platforms and devices for the digital home. The necessary standards and technologies are now available to enable products to be built for networked entertainment centric usages. However, standards and technologies need to be clarified and options limited to ensure interoperability. The five parts of the DLNA Home Networked Device Interoperability Guidelines fulfill that role.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60169-24, *Radio-frequency connectors – Part 24: Radio-frequency coaxial connectors with screw coupling, typically for use in 75 ohm cable distribution systems (Type F)*

IEC 62481-2:2013, *Digital Living Network Alliance (DLNA) Guidelines – Part 2: Media format profiles*

IEC 62481-3:2013, *Digital Living Network Alliance (DLNA) Guidelines – Part 3: Link protection*

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ISO/IEC 14977:1996, *Information technology – Syntactic metalanguage – Extended BNF*

ISO/IEC 29341-1:2011, *Information technology – UPnP Device Architecture – Part 1-1: UPnP Device Architecture Version 1.0*

ISO/IEC 29341-3-2, *Information technology – UPnP Device Architecture – Part 3-2: Audio Video Device Control Protocol – Media Renderer Device*[1]

ISO/IEC 29341-3-3, *Information technology – UPnP Device Architecture – Part 3-3: Audio Video Device Control Protocol – Media Server Device*[1]

[1] In this International Standard also referred to as AVv1.

ISO/IEC 29341-3-10:2008, *Information technology – UPnP Device Architecture – Part 3-10: Audio Video Device Control Protocol – Audio Video Transport Service*[2]

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ISO/IEC 29341-3-12:2008, *Information technology – UPnP Device Architecture – Part 3-12: Audio Video Device Control Protocol – Content Directory Service*[2]

ISO/IEC 29341-3-13, *Information technology – UPnP Device Architecture – Part 3-13: Audio Video Device Control Protocol – Rendering Control Service*[2]

ISO/IEC 29341-4-2, *Information technology – UPnP Device Architecture – Part 4-2: Audio Video Device Control Protocol – Level 2 – Media Renderer Device*[3]

ISO/IEC 29341-4-3, *Information technology – UPnP Device Architecture – Part 4-3: Audio Video Device Control Protocol – Level 2 – Media Server Device*[4]

ISO/IEC 29341-4-4, *Information technology – UPnP Device Architecture – Part 4-4: Audio Video Device Control Protocol – Level 2 – Audio Video Data Structures*[3]

ISO/IEC 29341-4-10, *Information technology – UPnP Device Architecture – Part 4-10: Audio Video Device Control Protocol – Level 2 – Audio Video Transport Service*[3]

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ISO/IEC 39342-9-1, *Information technology – UPnP Device Architecture – Part 9-1: Imaging Device Control Protocol – Printer Device*

ISO/IEC 29341-9-12, *Information technology – UPnP Device Architecture – Part 9-12: Imaging Device Control Protocol – Print Basic Service*

ISO/IEC 29341-14-3, *Information technology – UPnP Device Architecture – Part 14-3: Audio Video Device Control Protocol – Level 3 – Media Server Device*[5]

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2 In this International Standard also referred to as AVv1.

3 In this International Standard also referred to as AVv2, AVv3.

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5 In this International Standard also referred to as AVv3.

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