

STN	Usmernenia DLNA (Aliancia pre digitálnu domácu sieť) na interoperabilitu domácich sieťových zariadení. Časť 1: Architektúra a protokoly.	STN EN 62481-1 36 8036
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Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

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English version

**Digital living network alliance (DLNA) home networked device
interoperability guidelines -
Part 1: Architecture and protocols
(IEC 62481-1:2013)**

Lignes directrices pour l'interopérabilité
des dispositifs domestiques DLNA (Digital
Living Network Alliance) -
Partie 1: Architecture et protocoles (TA9)
(CEI 62481-1:2013)

Digital living network alliance (DLNA)
Interoperabilitäts-Richtlinien für Geräte im
Heimnetzwerk -
Teil 1: Architektur und Protokolle
(IEC 62481-1:2013)

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Foreword

The text of document 100/1992A/CDV, future edition 2 of IEC 62481-1, prepared by technical area 9, "Audio, video and multimedia applications for end-user network", of IEC/TC 100, "Audio, video and multimedia systems and equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62481-1:2014.

The following dates are fixed:

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Annex ZA

(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
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)	EN 60169-24	-
IEC 62481-2	2013	Digital living network alliance (DLNA) home networked device interoperability guidelines - Part 2: DLNA media formats	EN 62481-2	2014
IEC 62481-3	2013	Digital living network alliance (DLNA) home networked device interoperability guidelines - Part 3: Link protection	EN 62481-3	2012
ISO 3166	-	Codes for the representation of names of countries and their subdivisions	-	-
ISO/IEC 13818-1	2000	Information technology - Generic coding of moving pictures and associated audio information - Part 1: Systems	-	-
ISO/IEC 13818-9	1996	Information technology - Generic coding of moving pictures and associated audio information - Part 9: Extension for real time interface for system decoders	-	-
ISO/IEC 14977	1996	Information technology - Syntactic metalanguage - Extended BNF	-	-
ISO/IEC 29341-1	2011	Information technology - UPnP device architecture - Part 1: UPnP Device Architecture	-	-
ISO/IEC 29341-3-2	-	Information technology - UPnP Device Architecture - Part 3-2: Audio Video Device Control Protocol - Media Renderer Device	-	-
ISO/IEC 29341-3-3	-	Information technology - UPnP Device Architecture - Part 3-3: Audio Video Device Control Protocol - Media Server Device	-	-
ISO/IEC 29341-3-10	2008	Information technology - UPnP Device Architecture - Part 3-10: Audio Video Device Control Protocol - Audio Video Transport Service	-	-
ISO/IEC 29341-3-11		Information technology - UPnP Device Architecture - Part 3-11: Audio Video Device Control Protocol - Connection Manager Service	-	-
ISO/IEC 29341-3-12	2008	Information technology - UPnP Device Architecture - Part 3-12: Audio Video Device Control Protocol - Content Directory Service	-	-

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
ISO/IEC 29341-3-13	-	Information technology - UPnP Device Architecture - Part 3-13: Audio Video Device Control Protocol - Rendering Control Service	-	-
ISO/IEC 29341-4-2	-	Information technology - UPnP device architecture - Part 4-2: Audio Video Device Control Protocol - Level 2 - Media Renderer Device	-	-
ISO/IEC 29341-4-3	-	Information technology - UPnP Device Architecture - Part 4-3: Audio Video Device Control Protocol - Level 2 - Media Server Device	-	-
ISO/IEC 29341-4-4	-	Information technology - UPnP device architecture - Part 4-4: Audio Video Device Control Protocol - Level 2 - Audio Video Data Structures	-	-
ISO/IEC 29341-4-10	-	Information technology - UPnP device architecture - Part 4-10: Audio Video Device Control Protocol - Level 2 - Audio Video Transport Service	-	-
ISO/IEC 29341-4-11	-	Information technology - UPnP device architecture - Part 4-11: Audio Video Device Control Protocol - Level 2 - Connection Manager Service	-	-
ISO/IEC 29341-4-12	2008	Information technology - UPnP Device Architecture - Part 4-12: Audio Video Device Control Protocol - Level 2 - Content Directory Service	-	-
ISO/IEC 29341-4-13	-1	Information technology - UPnP device architecture - Part 4-13: Audio Video Device Control Protocol - Level 2 - Rendering Control Service	-	-
ISO/IEC 29341-4-14	-	Information technology - UPnP Device Architecture - Part 4-14: Audio Video Device Control Protocol - Level 2 - Scheduled Recording Service	-	-
ISO/IEC 29341-9-1	-	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	-	-
ISO/IEC 29341-14-12	-	Information technology - UPnP device architecture - Part 14-12: Audio, Video Device Control Protocol - Level 3 - Audio Video Content Directory Service	-	-
IETF RFC 1122	1989	Requirements for Internet Hosts - Communication Layers	-	-
ETSI EN 300 468	-	Digital Video Broadcasting (DVB): Specification for Service Information (SI) in DVB systems	-	-

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IETF RFC 768	1980	User Datagram Protocol	-	-
IEEE 802.3	2002	IEEE Standard for Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) - Access Method and Physical Layer Specifications	-	-
IETF RFC 791	1981	Internet Protocol - DARPA Internet Program Protocol Specification	-	-
IETF RFC 793	1981	Transmission Control Protocol - DARPA Internet Program Protocol Specification	-	-
IETF RFC 826	1982	Ethernet Address Resolution Protocol	-	-
IETF RFC 1305	1992	Network Time Protocol, Version 3 - Specification and Implementation	-	-
IETF RFC 792	1981	Internet Control Message Protocol	-	-
IETF RFC 2474	1998	Definition of the Differentiated Services Field (DS Field) in the IPv4 and IPv6 Headers	-	-
IEEE 802.1D	2004	IEEE Standard for Local and Metropolitan Area Networks - Media Access Control (MAC) Bridges	-	-
IEEE 802.1Q	2003	IEEE Standard for Local and Metropolitan Area Networks - Virtual Bridged Local Area Networks	-	-
IETF RFC 2131	1997	Dynamic Host Configuration Protocol	-	-
IETF RFC 3551	-	RTP Profile for Audio and Video Conferences with Minimal Control	-	-
IETF RFC 3555	-	MIME Type Registration of RTP Payload Formats, S. Casner, Packet Design	-	-
IETF RFC 2326	1998	Real time Streaming protocol (RTSP)	-	-
IETF RFC 3550	-	A Transport Protocol for Real-Time Applications	-	-
IETF RFC 3984	-	RTP Payload Format for H.264 Video	-	-
IETF RFC 2250	-	RTP Payload Format for MPEG1/MPEG2 Video	-	-
IETF RFC 3640	-	RTP Payload Format for Transport of MPEG-4-Elementary Streams	-	-
IETF RFC 3927	-	Dynamic Configuration of IPv4 Link-Local Addresses	-	-
IEEE 802.11	2011	IEEE Standard for Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Area Networks - Specific Requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications	-	-
IETF RFC 1191	1990	Path MTU Discovery	-	-
IETF RFC 1738	1994	Uniform Resource Locators (URL)	-	-

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
ITU-T G.9954	2007	Recommendation, Home networking transceivers - Enhanced physical, media access, and link layer specifications. ITU-T SG15/Q4 T-REC-G.9954-200701-I	-	-
ETSI TS 102 822-3	-	Broadcast and On-line Services: Search, select, and rightful use of content on personal storage systems ("TV-Anytime") - Part 3: Metadata	-	-
ETSI TS 102 822-4	-	Broadcast and On-line Services: Search, select, and rightful use of content on personal storage systems ("TV-Anytime") - Part 4: Content referencing	-	-
IETF RFC 1812	1995	Requirements for IP version 4 Routers	-	-
IETF RFC 2119	1997	Key words for use in RFCs to Indicate Requirement Levels	-	-
ANSI/ICEA S-90-661-2002	2002	Category 3, 5, & 5e Individually Unshielded Twisted Pair Indoor Cable for Use In General Purpose and LAN Communication Wiring Systems, Insulated Cable Engineers Association	-	-
IETF RFC 2234	1997	Augmented BNF for Syntax Specifications: ABNF	-	-
IETF RFC 2279	1998	UTF-8, a transformation format of ISO 10646	-	-
IETF RFC 2327	1998	SDP: Session Description Protocol	-	-
IETF RFC 2396	1998	Uniform Resource Identifiers (URI): Generic Syntax	-	-
IETF RFC 2429	2004	RTP Payload Format for the 1988 Version of ITU-T Rec. H.263 Video (H.263+)	-	-
IETF RFC 2766	2000	Network Address Translation - Protocol Translation (NAT-PT)	-	-
IETF RFC 2822	2001	Internet Message Format, P. Resnick, QUALCOMM Incorporated	-	-
IETF RFC 2929	2000	Domain Name System (DNS) IANA Considerations	-	-
IETF RFC 3066	2001	Tags for the Identification of Languages	-	-
IETF RFC 3261	2002	SIP: Session Initiation Protocol	-	-
IETF RFC 3267	2002	Real-Time Transport Protocol (RTP) Payload Format and File Storage Format for the Adaptive Multi-Rate (AMR) and Adaptive Multi-Rate Wideband (AMR-WB) Audio Codecs	-	-
IETF RFC 3391	2002	The MIME Application/Vnd.pwg-multiplexed Content-Type	-	-
IETF RFC 3556	2003	Session Description Protocol (SDP) Bandwidth Modifiers for RTP Control Protocol (RTCP) Bandwidth	-	-
IETF RFC 4184	2005	RTP Payload Format for AC-3 Audio	-	-
IETF RFC 4352	2006	RTP Payload Format for the Extended Adaptive Multi-Rate Wideband (AMR-WB+) Audio Codec	-	-

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IETF RFC 4585	2006	Extended RTP Profile for Real-time Transport Control Protocol (RTCP)-based Feedback (RTP/AVPF)	-	-
IETF RFC 4588	2006	RTP Retransmission Payload Format	-	-
IETF RFC 4646	2006	Tags for the Identification of Languages	-	-
ANSI/CEA-766-C	2008	U.S. and Canadian Rating Region Tables (RRT) and Content Advisory Descriptors for Transport of Content Advisory Information Using ATSC Program and System Information Protocol (PSIP)	-	-
ANSI/CEA-2033 A	2008	Specification for Electronic Program Guide Data Interchange	-	-
IETF RFC 2616	1999	Hypertext Transfer Protocol HTTP/1.1.	-	-
IETF RFC 1945	1996	Hypertext Transfer Protocol – HTTP/1.0, T. Berners-Lee, MIT/LCS, R. Fielding, UC Irvine, H. Frystyk	-	-
IETF RFC 2145	1997	Use and Interpretation of HTTP Version Numbers	-	-
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**Digital living network alliance (DLNA) home networked device interoperability
guidelines –
Part 1: Architecture and protocols**



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INTERNATIONAL STANDARD



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

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CONTENTS

FOREWORD.....	8
INTRODUCTION.....	10
1 Scope.....	12
2 Normative references	12
3 Terms, definitions, symbols and abbreviations.....	20
3.1 Terms and definitions	20
3.2 Symbols and abbreviations.....	29
3.3 Conventions	42
4 DLNA home network architecture	42
4.1 General	42
4.2 Networking and connectivity	43
4.2.1 General	43
4.2.2 Network Quality of Service	43
4.3 Device discovery and control.....	43
4.4 Media management.....	43
4.5 Media formats	44
4.6 Media transport	44
4.7 Remote UI	44
5 DLNA device model	45
5.1 Overview	45
5.2 Device model elements	45
5.3 Device Functions.....	47
5.4 Device Categories	48
5.5 Device Classes and roles	48
5.6 Device Capabilities and roles	49
5.7 System Usages	50
5.7.1 General	50
5.7.2 2-Box Pull System Usage	52
5.7.3 2-Box Push System Usage	52
5.7.4 3-Box System Usage	53
5.7.5 2-Box Printing System Usage	54
5.7.6 3-Box Printing System Usage	55
5.7.7 Download System Usage.....	56
5.7.8 Upload System Usage	57
5.7.9 Download Synchronization System Usage	58
5.7.10 Upload Synchronization System Usage	59
5.7.11 2-Box RUI Pull with/without A/V System Usage	60
5.7.12 3-Box UI-only System Usage	61
5.7.13 3-Box UI with A/V System Usage	64
5.7.14 Scheduled Recording System Usage	65
5.7.15 EPG System Usage	66
5.8 Home Infrastructure Device (HID) System Usage	67
5.8.1 General	67
5.8.2 Bridging HND and MHD Network Connectivity	68
5.8.3 Bridging HND and MHD Media Formats	69
5.9 Interoperability Guidelines usage	70

6	Guideline terminology and conventions	73
6.1	Guideline compliance classifiers	73
6.2	Standard or specification usage classifiers	73
6.3	Guideline font usage conventions	73
6.4	Guideline syntax notation conventions	74
6.5	Guideline normative and informative text conventions	74
6.6	DLNA XML namespaces and schemas	74
6.7	General rules on XML documents and fragments	74
7	Guideline requirements	75
7.1	Guidelines overview	75
7.1.1	General	75
7.1.2	Conditions for measuring time in message exchanges	78
7.2	Networking and Connectivity	78
7.2.1	General	78
7.2.2	Normative definitions of NC-PS modes	78
7.2.3	Networking and Connectivity: General capability requirements	79
7.2.4	Networking and Connectivity: QoS requirements	92
7.2.5	Networking and Connectivity: device requirements	99
7.3	Device discovery and control	125
7.3.1	General	125
7.3.2	Device discovery and control guidelines	125
7.4	Media management	171
7.4.1	AV media management	171
7.4.2	Image printing media management	384
7.4.3	Content synchronization MM/CM guidelines	399
7.4.4	Scheduled Recording Media Management guidelines	413
7.4.5	Extended Tuner media management guidelines	464
7.4.6	EPG Media management guidelines	493
7.5	Media Transport	529
7.5.1	General	529
7.5.2	Uniform Client Data Availability Model	531
7.5.3	Media Operations	533
7.5.4	Media Transport protocols	534
7.6	Content transformation device virtualization	738
7.6.1	Theory of operations	738
7.6.2	Virtual device implementation	739
7.6.3	Virtual device, Device Discovery and Control (DDC)	740
7.6.4	Virtual device Media Management (MM)	744
7.6.5	Virtual device Media Formats (MF)	760
7.6.6	Virtual device Media Transport (MT)	761
7.7	Media Interoperability Unit (MIU)	762
7.7.1	General	762
7.7.2	MIU Media Management guidelines	763
7.8	Remote User Interfaces (RUI)	766
7.8.1	General	766
7.8.2	RUI guidelines	766
Annex A (informative)	Network Infrastructure Device (NID) recommendations	797
Annex B (informative)	Basic Tuner representation	810

Annex C (informative) UPNP devices with multiple network interfaces.....	814
Annex D (informative) Printer support	819
Annex E (informative) Example applications of the Uniform Client Data Availability Model	825
Annex F (informative) Auto-IP developer guidance	831
Annex G (informative) Mobile Network Connectivity and Power Saving operation principles	838
Annex H (informative) RTP Protocol Stack and SDP/RTSP/RTCP Parameters.....	842
Annex I (informative) Guidance on address conflict resolution in Auto-IP	845
Annex J (informative) Wi-Fi Direct for DLNA	846
Annex K (informative) EPG Theory of Operation	857
Annex L (normative) Rating systems.....	864
Bibliography.....	874
Figure 1 – DLNA functional components	42
Figure 2 – DLNA device model terms hierarchy.....	47
Figure 3 – 2-Box Pull System Usage interaction model	52
Figure 4 – 2-Box Push System Usage interaction model	53
Figure 5 – 3-Box System Usage interaction model	54
Figure 6 – 2-Box Printing System Usage interaction model	55
Figure 7 – 3-Box Printing System Usage interaction model	56
Figure 8 – Download System Usage interaction model.....	57
Figure 9 – Upload System Usage interaction model	58
Figure 10 – Download Synchronization System Usage interaction model	59
Figure 11 – Upload Synchronization System Usage interaction model.....	60
Figure 12 – RUI Pull without A/V System Usage interaction model.....	60
Figure 13 – RUI Pull with A/V System Usage interaction model.....	61
Figure 14 – 3-Box UI-only System Usage interaction model	62
Figure 15 – Physical box configuration for 3-Box UI-only System Usage model.....	63
Figure 16 – Physical box configuration for 3-Box UI-only System Usage model.....	63
Figure 17 – Combining 2 instances of 3-Box UI-only System Usage.....	64
Figure 18 – 3-Box UI with 3-Box A/V System Usage interaction model.....	65
Figure 19 – Scheduled Recording System Usage interaction model	66
Figure 20 – EPG System Usage interaction model	67
Figure 21 – 2-Box Pull System Usage interaction model between Device Categories	68
Figure 22 – M-NCF Bridging the Network Connectivity gap between MHD and HND	68
Figure 23 – Media interoperability between Device Categories	69
Figure 24 – Guideline layout and definitions.....	76
Figure 25 – Visual map of possible values for the attribute tables	77
Figure 26 – DLNA QoS visual organization	93
Figure 27 – UPNP discovery robustness.....	133
Figure 28 – DLNA PlayContainer URI example	275
Figure 29 – Recording conflict behavior	441
Figure 30 – CDS and SRS object lifetimes	459

Figure 31 – Extended Tuner and its containers	465
Figure 32 – Modeling DLNA Extended Tuner	467
Figure 33 – UCDAM summary.....	532
Figure 34 – Example of a valid and invalid pipelined POST transaction.....	636
Figure 35 – Calculated Line	653
Figure 36 – Wall Clock Time sample accuracy distribution	653
Figure 37 – Packet with Wall Clock Time Sample header extension	656
Figure 38 – Packet with another header extension following Wall Clock Time Sample.....	657
Figure 39 – BFR packet format	664
Figure 40 – Content transformation with a virtual MediaServer.....	739
Figure 41 – Content transformation with a virtual MediaRenderer	739
Figure C.1 – UPnP Device representation	814
Figure C.2 – UPnP device on multiple networks	815
Figure C.3 – Representation at the CDS level.....	816
Figure C.4 – Content URIs over multiple networks	817
Figure D.1 – Photo layout options	821
Figure D.2 – DMP _r architecture components.....	822
Figure E.1 – Abstract representation of a stream	825
Figure E.2 – A stored content stream.....	826
Figure E.3 – Stream with no random access support.....	826
Figure E.4 – Stream with random access support	826
Figure E.5 – Live stream with growing buffer and no random access	827
Figure E.6 – Live stream with growing buffer and random access	827
Figure E.7 – Live stream with sliding buffer and random access support.....	828
Figure E.8 – Time-delayed live stream with sliding buffer and random access support.....	828
Figure F.1 – IP mixed network (Auto-IP and DHCP).....	832
Figure F.2 – Communication in mixed IP network.....	834
Figure F.3 – New routes in address transition flow	837
Figure G.1 – Illustration of the abstraction introduced by the NC-PS modes.....	840
Figure G.2 – NC-PS mode transition diagram	841
Figure H.1 – Overview of the protocol stack for RTP transport	842
Figure H.2 – SDP and RTSP Parameters	843
Figure H.3 – RTCP Parameters.....	844
Figure J.1 – P2P Group	847
Figure J.2 – Group formation simplified diagram	847
Figure J.3 – Device discovery procedure	848
Figure J.4 – Intra-BSS distribution and Cross-connection	850
Figure J.5 – 2-Box System Usage: Step 1	851
Figure J.6 – 2-Box System Usage: Step 2a	852
Figure J.7 – 2-Box System Usage: Step 2b.1	852
Figure J.8 – 2-Box System Usage: step 2b.2.....	853
Figure J.9 – 3-Box System Usage: Step 1	854
Figure J.10 – 3-Box System Usage: Step 2a	854

Figure J.11 – 3-Box System Usage: Step 2b.1	855
Figure J.12 – 3-Box System Usage: Step 2b.2	855
Table 1 – Key technology ingredients	10
Table 2 – Collocation possibilities of +RUIPL+ and +RUISRC+ capabilities for A/V	61
Table 3 – Collocation possibilities of +RUISRC+ and +RUISINK+ capabilities for A/V.....	64
Table 4 – DLNA Device Classes in the HND Device Category.....	70
Table 5 – DLNA Device Capabilities.....	71
Table 6 – DLNA Device Classes in the MHD Device Category	72
Table 7 – DLNA Device Classes in the HID Device Category	72
Table 8 – DLNA namespace values	74
Table 9 – Allowed values for change indicator fields in attribute tables	78
Table 10 – Normative definitions of Network Connectivity Power Saving modes.....	79
Table 11 – Normative priorities for DLNA traffic types	93
Table 12 – BT-IEEE 802.11 DLNAQOS access category mapping.....	123
Table 13 – IEEE 802.1D user priority values	123
Table 14 – Color depth of device icons	166
Table 15 – DMR serviceType and serviceID values.....	176
Table 16 – DMS/M-DMS serviceType and serviceID values	179
Table 17 – CDS and UPnP maximum byte length.....	183
Table 18 – Namespace prefixes.....	190
Table 19 – Recommended metadata properties	190
Table 20 – CDS:Search minimum support of operators	254
Table 21 – UPnP:class for searching all CDS objects	255
Table 22 – Capability ID syntax	267
Table 23 – DLNA state variables for Controller-byte seek operations	321
Table 24 – Arguments for AVT:X_DLNA_GetBytePositionInfo	323
Table 25 – Error codes for AVT:X_DLNA_GetBytePositionInfo.....	324
Table 26 – Capability IDs for AnyContainer support	336
Table 27 – Required Media Class UPnP values	345
Table 28 – Required UPnP createClass elements	351
Table 29 – DMPPr serviceType and serviceId values	386
Table 30 – UPnP Printer dlna:X_DLNAACAP element.....	387
Table 31 – Media size dimensions	397
Table 32 – Capability ID syntax	403
Table 33 – UPnP AV MediaServer Metadata SearchCriteria.....	406
Table 34 – dlna:objectType values.....	415
Table 35 – Guidelines for recorded CDS properties based on srs:class values	417
Table 36 – Recommended recorded CDS properties based on srs:class value.....	417
Table 37 – dlna:openDuration Property Type and Multi Value	451
Table 38 – dlna:desiredPN property type and multi value.....	454
Table 39 – dlna:PN property type and multi value	455
Table 40 – Capability ID syntax	463

Table 41 – Modulation format values.....	473
Table 42 – CDS:X_DLNA_SelectChange action parameters.....	486
Table 43 – CDS:X_DLNA_SelectChange action error codes	487
Table 44 – A_ARG_TYPE_DLNAChannelID state variable	488
Table 45 – A_ARG_TYPE_DLNAConnectionID state variable	489
Table 46 – DLNA Media Transfer modes.....	529
Table 47 – Permitted combinations of DLNAQOS_UP and Transfer Mode per Media Class	530
Table 48 – DLNA Streaming Media Operation definitions	533
Table 49 – MT Media Class Transfer Modes	535
Table 50 – HTTP prohibited operations references	614
Table A.1 – NID functions	797
Table A.2 – WMM Access Category mapping	801
Table A.3 – WMM access and IEEE 802.1D priority	801
Table A.4 – MoCA Priority mapping	805
Table A.5 – MoCA Access and IEEE 802.1D Priority.....	805
Table A.6 – HPNA Priority mapping	807
Table A.7 – HPNA Access and IEEE 802.1D Priority.....	808
Table D.1 – DMPr Printer verses PC attached Printer	819
Table D.2 – Printing Controller (+PR1+, +PR2+) UI Components.....	820
Table D.3 – Printer Status – Response	821
Table D.4 – UPnP PrintEnhanced:1 Actions summary.....	823
Table D.5 – Evented variables	823
Table F.1 – Auto-IP route.....	833
Table F.2 – DHCP route.....	833
Table F.3 – Windows routing table example for device w/DHCP address	835
Table F.4 – Windows routing table example for device w/Auto-IP address.	835
Table F.5 – Linux routing table example for device w/DHCP address	835
Table F.6 – Linux routing table example for device w/Auto-IP address	836
Table G.1 – Dynamic behavior of the M-NCF depending on the current NC-PS mode	841
Table L.1 – Rating sytems	865

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.

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