

INTERNATIONAL STANDARD



**Digital living network alliance (DLNA) home networked device interoperability
guidelines –
Part 3: Link protection** **(standards.iteh.ai)**

[IEC 62481-3:2017](#)

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- a) editorial updates;
- b) clarification for some of the guidelines that were ambiguous.

The text of this International Standard is based on the following documents:

CDV	Report on voting
100/2732/CDV	100/2882/RVC

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

This document 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 document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

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INTRODUCTION

Consumers are acquiring, viewing, and managing an increasing amount of digital media (photos, music, and video) on devices in the consumer electronics (CE), mobile, and personal computer (PC) domains. As such, they want to conveniently enjoy the content, regardless of the source, across different devices and locations in the home. 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 achieve this interoperability, a common set of industry design guidelines is needed that allows vendors to participate in a growing marketplace, leading to more innovation, simplicity, and value for consumers. This document serves that purpose and provides vendors with the information needed to build interoperable networked platforms and devices for the digital home.

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

Part 3: Link protection

1 Scope

This part of IEC 62481, the DLNA guidelines, specifies the DLNA Link Protection guidelines, which are an extension of the DLNA guidelines. DLNA Link Protection is defined as the protection of a content stream between two devices on a DLNA network from illegitimate observation or interception using the protocols defined within this part of DLNA guidelines.

Content protection is an important mechanism for ensuring that commercial content is protected from piracy and illegitimate redistribution. Link Protection is a technique that enables distribution of protected commercial content on a home network, thus resulting in greater consumer flexibility while still preserving the rights of copyright holders and content providers.

The guidelines in this part of DLNA guidelines reference existing technologies for Link Protection and provide mechanisms for interoperability between different implementations as well as integration with the DLNA architecture.

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2 Normative references (standards.iteh.ai)

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62481-1-1:2017, *Digital living network alliance (DLNA) home networked device interoperability guidelines – Part 1-1: Architecture and protocols*

IEC 62481-2:2017, *Digital living network alliance (DLNA) home networked device interoperability guidelines – Part 2: DLNA media formats*

ISO/IEC 13818-1, *Information technology – Generic coding of moving pictures and associated audio information: Systems*

ISO/IEC 29341-3-10, *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*

IETF RFC 1191, Path MTU Discovery, J. Mogul, DECWRL, S. Deering, Stanford University
<http://www.ietf.org/rfc/rfc1191.txt>

IETF RFC 2045, Multipurpose Internet Mail Extensions (MIME) Part One

IETF RFC 2327, SDP: Session Description Protocol, M. Handley, V. Jacobson, ISI/LBNL
<https://www.ietf.org/rfc/rfc2327.txt>

IETF RFC 2616, Hypertext Transfer Protocol – HTTP/1.1, R. Fielding, UC Irvine, J. Gettys, Compaq/W3C, J. Mogul, Compaq, H. Frystyk, W3C/MIT, L. Masinter, Xerox, P. Leach, Microsoft*, T. Berners-Lee
<http://www.ietf.org/rfc/rfc2616.txt?number=2616>

IETF RFC 3550, RTP: A Transport Protocol for Real-Time Applications, H. Schulzrinne, Columbia University, S. Casner, Packet Design, R. Frederick, Blue Coat Systems Inc., V. Jacobson, Packet Design
<http://www.ietf.org/rfc/rfc3550.txt>

IETF RFC 3551, RTP Profile for Audio and Video Conferences with Minimal Control, H. Schulzrinne, Columbia University, S. Casner, Packet Design
<http://www.ietf.org/rfc/rfc3551.txt>

IETF RFC 3986, Uniform Resource Identifier (URI): Generic Syntax, T. Berners-Lee, R. Fielding, L. Masinter, January 2005
<http://www.ietf.org/rfc/rfc3986.txt>

DTCP Volume 1 (informational version), Digital Transmission Content Protection Specification Volume1
<http://www.dtcp.com/specifications.aspx>

DTCP Volume 1 Supplement E (informational version), DTCP Volume 1 Supplement E Mapping DTCP to IP
<http://www.dtcp.com/specifications.aspx>

DTCP Audio Compliance Rules EXHIBIT B-2, Compliance rules for licensed products that receive or transmit commercial audio works
<http://www.dtcp.com/agreements.aspx> <https://standards.iteh.ai/catalog/standards/sist/3ee466b1-807c-4ad8-bf0b-b19b16ba150d/iec-62481-3-2017>

DTCP Adopter Agreement, DTCP Adopter Agreement, Digital Transmission Protection License Agreement, DTLA Digital Transmission Licensing Administrator
<http://www.dtcp.com/>

IEEE 802.1Q, IEEE standard for information technology – Telecommunications and information exchange between systems – IEEE standard for local and metropolitan area networks – Common specifications – Virtual Bridged Local Area Networks

IEEE 802.11, 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

WMDRM-ND, Windows Media DRM for Network Devices, Windows Media Technologies
<http://wmlicense.smdisp.net/licenserequest/default.asp>

RTP Payload format for WMV and WMA, RTP Payload Format for Windows Media Audio and Video, Microsoft Corporation
http://download.microsoft.com/download/5/5/a/55a7b886-b742-4613-8ea8-d8b8b5c27bbc/RTPPayloadFormat_for_WMAandWMV_v1.doc

3 Terms, definitions, abbreviated terms and conventions

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1.1

AKE

Authentication and Key Exchange

step in a Link Protection System where the receiving device is authenticated and given the correct keys for the content

3.1.2

ASF

Advanced System Format

media format encapsulation for the transmission of content

3.1.3

AV

Audio with Video

media content that contains both moving pictures and sound

3.1.4

AVT

Audio Video Transport

UPnP service that provides network-based control for common transport operations such as play, stop, pause, next, previous, and seek.

Note 1 to entry: The AVTransport service specification is a standard UPnP DCP.

3.1.5

Cleartext

unencrypted content

Note 1 to entry: Within this standard, the content stream after decryption by the upstream content protection system and before encryption by the Link Protection System.

3.1.6

Cleartext Byte Domain

specification of a byte position in the Cleartext content stream

Note 1 to entry: For a complete explanation of seek operations on link protected content, see Annex A.

3.1.7

Cleartext Byte Seek Request Header

request that a certain position in the Cleartext byte stream be returned

Note 1 to entry: This term is used to signify any of these different transport layer request headers.

Note 2 to entry: When used in a guideline, Cleartext Byte Seek Request Header implies that the guideline applies to all uses of any of the request headers.

3.1.8

Cleartext Byte Seek Response Header

response that declares the range of bytes returned in the Cleartext byte stream

Note 1 to entry: This term is used to signify any of these different transport layer response headers.

Note 2 to entry: When used in a guideline, this implies that the guideline applies to all uses of any of the request headers.

3.1.9 comply conform

be in accordance with referenced requirements; where the reference includes both mandatory and optional requirements, only the mandatory elements are considered necessary for compliance

Note 1 to entry: Optional requirements continue to be optional. Any variation from these expectations shall be specifically noted.

Note 2 to entry: "Comply with" can be used interchangeably with "conform to" (includes the variations of complies, complying, compliance, compliant; conforms, conforming, conformance, conformant).

3.1.10 CMS ConnectionManager:1 Service

UPnP service that provides information about the supported transport protocols and media formats of a UPnP device

Note 1 to entry: The CMS specification is a standard UPnP DCP.

3.1.11 CSRC Contributing SouRCe

source used for the RTP Media Transport

3.1.12 Decoder Friendly Alignment Position

position in the bitstream defined for decoder friendly alignment

Note 1 to entry: A Decoder Friendly Alignment Position is always the start of a Media Format Alignment Element. Generally, the decoder can begin to process data without any other internal state information about the stream. The decoder can begin processing at that point and create a valid output ending. This value is defined for the individual media format profiles that have Decoder Friendly Alignment Positions.

3.1.13 DLNA Digital Living Network Alliance

organization that created this series of documents, the DLNA guidelines

3.1.14 DLNA Link Protection

protection, using DLNA protocol elements as defined in these guidelines, of a content stream between two devices on a DLNA network from illegitimate observation or interception

3.1.15 DLNAQOS_UP DLNA QoS User Priority

DLNA-defined QoS label used to correlate an underlying IEEE 802.1Q user priority and WMM access category to a DLNA traffic type(s)

3.1.16 DTCP Digital Transmission Content Protection

Link Protection System

3.1.17 DTCP-IP Digital Transmission Content Protection over IP networks

DTCP as applied to IP based networks

3.1.18

GOP

Group Of Pictures

defined grouping of information in the MPEG 2 media format

3.1.19

HTTP

Hyper Text Transfer Protocol

protocol for transferring files across the Internet

Note 1 to entry: Requires an HTTP client program on one end, and an HTTP server program on the other end.

3.1.20

Link Protection

protection of a content stream between two devices on a DLNA network from illegitimate observation or interception

3.1.21

Link Protection Alignment Element

unit of content carried within a link-protected content stream

Note 1 to entry: This typically starts with a packet header that is defined by the Link Protection System and contains bytes of the link-protected stream.

3.1.22

Link Protection System

specific collection of technologies with corresponding rules that enable secure content transfer between two endpoints

3.1.23

Media Format Alignment Element

unit of content carried within an unprotected content stream

Note 1 to entry: This typically starts at a Decoder Friendly Alignment Position for the given media format and contains an integral number of units of content as defined by the media format in use. This value is defined within the media format profile specification.

3.1.24

MIME

Multipurpose Internet Mail Extension

standard system for identifying the type of data contained in a file

Note 1 to entry: MIME is an internet protocol that allows sending binary files across the internet as attachments to e-mail messages. This includes graphics, photos, sound, video files, and formatted text documents.

3.1.25

Network Byte Domain

specification of a byte position in the content stream as it is carried on the network transport

Note 1 to entry: For content binaries that use a Link Protection System, this will include encryption and any headers or padding necessary for the Link Protection System.

3.1.26

PCP

Protected Content Packet

packet format for DTCP-IP link protected content as defined in DTCP Volume 1 and DTCP Volume 1 Supplement E

3.1.27

PS

Program Stream

MPEG-2 AV stream format

3.1.28**RTP****Real Time Protocol**

media transport that provides end-to-end network transport functions for transmitting real-time data, such as AV

Note 1 to entry: RTP provides services such as payload type identification, sequence numbering, time-stamping, and delivery monitoring.

3.1.29**RTSP****Real Time Streaming Protocol**

protocol within the RTP protocol suite

3.1.30**RTT****Round Trip Time**

time between sending a network packet to a remote host and the time that the response is received

3.1.31**SDP****Session Description Protocol**

protocol within the RTP protocol suite

3.1.32**SOAP****Simple Object Access Protocol**

XML based messaging protocol used to exchange service requests and responses over a network

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3.1.33**Time Domain**

specification of a position in the content stream in time units

3.1.34**TS****Transport Stream**

MPEG-2 AV stream format

3.1.35**UCDAM****Uniform Client Data Availability Model**

model for representing which bytes of a content binary are available on a server for seek operations

Note 1 to entry: See clause 10 of IEC 62481-1-1:2017 for a full definition.

3.1.36**UPnP**

architecture for pervasive peer-to-peer network connectivity of devices of all form factors

Note 1 to entry: UPnP is designed to bring easy-to-use, flexible, standards-based connectivity to ad-hoc or unmanaged networks whether in the home, in a small business, public spaces, or attached to the Internet.

Note 2 to entry: UPnP is a distributed, open networking architecture that leverages TCP/IP and Web technologies to enable seamless proximity networking in addition to control and data transfer among networked devices in the home, office, and public spaces.