

INTERNATIONAL STANDARD

**Digital living network alliance (DLNA) home networked device interoperability
guidelines –
Part 4: DRM interoperability solutions**





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INTERNATIONAL STANDARD

**Digital living network alliance (DLNA) home networked device interoperability
guidelines –
Part 4: DRM interoperability solutions**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**DIGITAL LIVING NETWORK ALLIANCE (DLNA) HOME NETWORKED
DEVICE INTEROPERABILITY GUIDELINES –****Part 4: DRM interoperability solutions**

FOREWORD

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International Standard IEC 62481-4 has been prepared under technical area 8: Multimedia home systems and applications for end-user network, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

This second edition cancels and replaces the first edition published in 2014. This edition constitutes a technical revision.

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

- a) removal of references to Mobile Digital Media Uploader (M-DMU);
- b) removal of references to Mobile Digital Media Downloader (M-DMD).

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

CDV	Report on voting
100/2733/CDV	100/2883/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

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- withdrawn,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

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

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 cater for this need, 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.

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

Part 4: DRM interoperability solutions (DIS)

1 Scope

This part of IEC 62481, the DLNA guidelines, specifies DLNA guidelines for DRM Interoperability Solutions (DIS), which are defined as methods to enable the secure transfer and use of protected commercial content between different implementations on network media devices. This content could be protected by different content protection technologies. In this document, they are referred to as DRMs.

The guidelines are not intended to replace or disable other interoperability mechanisms that could already be in place, for example DLNA Link Protection guidelines stated in IEC 62481-3:2017 or mechanisms provided by underlying DRMs.

2 Normative references

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 62481-3:2017, *Digital living network alliance (DLNA) home networked device interoperability guidelines – Part 3: Link protection*

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

DTCP Volume 1:2007 (informational version), *Digital Transmission Content Protection Specification Volume 1*
<http://www.dtcp.com/specifications.aspx>

DTCP Volume 1 Supplement E:2007 (Informational Version), Mapping DTCP to IP
<http://www.dtcp.com/specifications.aspx>

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

3 Terms, definitions and conventions

For the purposes of this document, the terms and definitions given in IEC 62481-1-1:2017 and the following 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 Terms and definitions

3.1.1

Copy

propagating content from a source device to a destination device such that the source device maintains its original version of this content

3.1.2

Move

propagating content from a source device to a destination device such that the source device no longer maintains a usable copy of this content

3.1.3

DIS

DRM Interoperability System

means for content to be protected by DRM A on one device to be transformed to the same content protected by DRM B on another device

3.1.4

DRM

Digital Rights Management

system for protecting the copyrights of electronic digital media

3.1.5

DTCP-IP DIS

Digital Transmission Content Protection over Internet Protocol Digital Rights Management Interoperability System

Note 1 to entry: DIS implemented according to the DTCP-IP specification.

3.2 Conventions

In IEC 62481-1-1:2017 and this document, a number of terms, conditions, mechanisms, sequences, parameters, events, states, or similar terms are printed with the first letter of each word in uppercase and the rest in lowercase (e.g., Move). Any lowercase uses of these words have the normal technical English meanings.

4 Networking architecture, device models and guideline conventions

4.1 DLNA home networking architecture

See Clause 4 of IEC 62481-1-1:2017 for a full description of the DLNA home networking architecture.

4.2 DLNA device model

See Clause 5 of IEC 62481-1-1:2017 for a full description of the DLNA device model. This document extends the existing DLNA Device Classes and Device Capabilities to include protected content used for the following system usages:

- Upload system usage;
- Download system usage;
- Upload Synchronization system usage;
- Download Synchronization system usage.

4.3 Guideline terminology and conventions

See Clause 6 of IEC 62481-1-1:2017 for a full description of the DLNA document conventions.

5 Guideline requirements

5.1 General

See 7.1 of IEC 62481-1-1:2017, for guideline and attribute table layout descriptions.

5.2 Common DRM interoperability guidelines

5.2.1 General

This document defines the usage guidance for the DTCP-IP DLNA DIS technology. For convenience, the term "DTCP-IP DIS" is used to mean the DTCP-IP technology for a DLNA DIS.

DTCP-IP DIS provides Copy and Move functionality by means of the transcription interoperability scenario. DTCP-IP DIS supports the Upload system usage, Download system usage, Upload Synchronization system usage, and Download Synchronization system usage.

5.2.2 Media management – MM/CP additional MM flags-param (flags parameter)

[GUIDELINE] The primary-flags token as defined in 10.1.3.24.2 (GUN 3WJUU) of IEC 62481-1-1:2017, are extended for DLNA DIS with additional bit mappings. The additional bit mappings of primary-flags for DLNA DIS shall be as follows.

- Bit 31 to Bit 14 are as defined in 10.1.3.24.2 (GUN 3WJUU) of IEC 62481-1-1:2017.
- Bit 13: DIS-DTCP-copy flag (DTCP-IP DIS Copy flag)
 - applies only to the HTTP Media Transport;
 - if the flags-param is omitted then this flag shall have an inferred value of false;
 - see guidelines 5.3.2.2.2 and 5.3.2.2.3 for more information.
- Bit 12: DIS-DTCP-move flag (DTCP-IP DIS Move flag)
 - applies only to the HTTP Media Transport;
 - if the flags-param is omitted then this flag shall have an inferred value of false;
 - see guidelines 5.3.2.3.2 and 5.3.2.3.3 for more information.

All other bits in primary-flags are reserved for future use and shall have a value of false.

[ATTRIBUTES]

M	A	DMS DMP DMC DMR +DN+ +UP+ +PU+ +UPSYNC+ +DNSYNC+	M-DMS M-DMP M-DMC	n/a	IEC 62481-1-1: 2017	N3J8N	A
---	---	--	----------------------	-----	------------------------	-------	---

5.2.3 DRM interoperability technology guidelines requirements – DTCP-IP DIS support

5.2.3.1

[GUIDELINE] A UPnP AV MediaServer or UPnP AV MediaServer control point may implement DTCP-IP DIS.

[ATTRIBUTES]

O	A	DMS +DN+ +UP+ +UPSYNC+ +DNSYNC+	M-DMS	n/a	n/a	BI2KZ	A
---	---	------------------------------------	-------	-----	-----	-------	---

[COMMENT] Implementation of the DTCP-IP DIS guidelines is optional in DLNA.

5.2.3.2

[GUIDELINE] If a UPnP AV MediaServer or UPnP AV MediaServer control point implements the DTCP-IP DIS, then it shall conform to all of the guidelines as defined in 5.3.

[ATTRIBUTES]

M	A	DMS +DN+ +UP+ +UPSYNC+ +DNSYNC+	M-DMS	n/a	n/a	NYTO8	A
---	---	------------------------------------	-------	-----	-----	-------	---

5.3 DTCP-IP DIS guidelines**5.3.1 General**

This subclause contains the guidelines that are specific to the DTCP-IP DIS. Annex A provides the high level description on how the DTCP-IP DIS works in DLNA and some examples of DTCP-IP DIS sequence to enable a better understanding of this subclause.

5.3.2 Media management**5.3.2.1 MM/CP res@dtcp:uploadInfo property**

[GUIDELINE] If a UPnP AV MediaServer control point attempts to upload content using the DTCP-IP Move Protocol, as specified in V1SE.8.4 of DTCP Volume 1 Supplement E:2007, then it shall provide a res@dtcp:uploadInfo property with a value whose bits 31 and 30 are set to one, as defined in V1SE.10.5.2 of DTCP Volume 1 Supplement E:2007 with the CDS:CreateObject request.

[ATTRIBUTES]

M	A	+UP+ +UPSYNC+	n/a	n/a	ISO/IEC 29341-3-12 DTCP Volume 1:2007 DTCP Volume 1 Supplement E:2007	JE3NY	A
---	---	---------------	-----	-----	---	-------	---

[COMMENT] The use of the res@dtcp:uploadInfo property is recommended (optional) in DTCP Volume 1 Supplement E:2007, but in order to provide interoperability this is mandated by this guideline.

5.3.2.2 MM/CP DIS DTCP-copy-flag (DTCP-IP DIS Copy flag)**5.3.2.2.1**

[GUIDELINE] The flag is set in accordance with usage rule (Copy Control Information) associated with the content binary and DTCP compliance rules in DTCP Adopter Agreement.

In the case of Upload system usage, this flag can be returned in the CMS:GetProtocollInfo response, but Upload Controller or +UPSYNC+ cannot rely on this flag to check on availability of DTCP-IP DIS Copy function on the Receiving Endpoint.

5.3.2.2.2

[GUIDELINE] If a UPnP AV MediaServer exposes a content binary that is available for Copy using DTCP-IP DIS, then the DIS-DTCP-copy flag in Guideline 5.2.2 of this content item's res@protocollInfo property shall be set to true.

[ATTRIBUTES]

M	A	DMS	M-DMS	n/a	IEC 62481-1-1: 2017 ISO/IEC 29341-3-12	K6IWN	
---	---	-----	-------	-----	---	-------	--

5.3.2.2.3

[GUIDELINE] If a UPnP AV MediaServer exposes a content binary that is not available for Copy using DTCP-IP DIS, then the DIS-DTCP-copy flag in Guideline 5.2.2 of this content item's res@protocollInfo property shall be set to false.

[ATTRIBUTES]

M	A	DMS	M-DMS	n/a	IEC 62481-1-1: 2017 ISO/IEC 29341-3-12	2CC5J	
---	---	-----	-------	-----	---	-------	--

5.3.2.3 MM/CP DIS-DTCPmove flag (DTCP-IP DIS Move flag)

5.3.2.3.1

[GENERAL] This flag is set in accordance with usage rule (copy control information) associated with the content binary and DTCP COMPLIANCE RULES in DTCP Adopter Agreement.

This flag needs to be consistent with the DTCP-IP content flags (DTCP.COM_FLAGS) defined in V1SE.10.5.1 of DTCP Volume 1 Supplement E:2007 if DTCP.COM_FLAGS is included as an other-param of 4th field in res@protocollInfo property. For example, if the UPnP AV mediaserver sets the DIS-DTCP-move flag in the DLNA.ORG_FLAGS to true and use DTCP.COM_FLAGS for Move capability, then the bits 31 and 30 of the DTCP.COM_FLAGS shall to be set to one.

In the case of Upload system usage, this flag can be returned in the CMS:GetProtocollInfo response, but Upload Controller or +UPSYNC+ cannot rely on this flag to check on availability of DTCP-IP DIS Move function on the Receiving Endpoint.

5.3.2.3.2

[GUIDELINE] If a UPnP AV MediaServer exposes a content binary that is movable using TCP-IP DIS with DTCP-IP Move Protocol defined in V1SE.8.4 of DTCP Volume 1 Supplement E:2007, then the DIS-DTCP-move flag in Guideline 5.2.2 of this content item's res@protocollInfo property shall be set to true.

[ATTRIBUTES]

M	A	DMS	M-DMS	n/a	IEC 62481-1-1:2017 ISO/IEC 29341-3-12 DTCP Volume 1 Supplement E:2007	LIJAN	
---	---	-----	-------	-----	---	-------	--

5.3.2.3.3

[GUIDELINE] If a UPnP AV MediaServer exposes a content binary that is not movable using DTCP-IP DIS with DTCP-IP Move Protocol defined in V1SE.8.4 of DTCP Volume 1 Supplement E:2007, then the DIS-DTCP-move flag in Guideline 5.2.2 of this content item's res@protocolInfo property shall be set to false.

[ATTRIBUTES]

M	A	DMS	M-DMS	n/a	IEC 62481-1-1:2017 ISO/IEC 29341-3-12 DTCP Volume 1 Supplement E:2007	LLDMQ	
---	---	-----	-------	-----	---	-------	--

5.3.2.4 MM/CP CDS item deletion for moved content

[GUIDELINE] A UPnP AV MediaServer shall destroy the CDS item which represents the content deleted or rendered unusable in the consequence of DTCP-IP Move operation within 30 s of a successful DTCP-IP Move transaction.

[ATTRIBUTES]

M	A	DMS	M-DMS	n/a	ISO/IEC 29341-3-12 DTCP Volume 1:2007 DTCP Volume 1 Supplement E:2007	QJH3A	
---	---	-----	-------	-----	---	-------	--

5.3.3 Media Transport**5.3.3.1 MT/CP HTTP header: content type (DTCP socket information)**

[GUIDELINE] If an HTTP Client Endpoint attempts to upload content using DTCP-IP DIS, then it shall provide DTCP Socket information in the Content-Type HTTP header field in an HTTP POST request.

[ATTRIBUTES]

M	C	+UP+ +UPSYNC +	n/a	n/a	IEC 62481-1-1:2017 DTCP Volume 1 Supplement E:2007	YPGP3	A
---	---	----------------	-----	-----	---	-------	---

[COMMENT] This guideline specifies the use of content type header with the MIME-type that includes DTCP Socket information in Upload system usage and Upload Synchronization system usage.

5.3.3.2 MT/CP HTTP header: BLKMove.dtcp.com

5.3.3.2.1

[GUIDELINE] If an HTTP Server Endpoint receives an HTTP POST request without the message body to the res@importUri property value, which specifies that the content will be received using the DTCP-IP Move protocol, then the endpoint shall include the BLKMove.dtcp.com HTTP header as specified in V1SE.10.4 of DTCP Volume 1 Supplement E:2007 when it returns the HTTP status code of 100 (Continue) in the HTTP POST response.

[ATTRIBUTES]

M	A	DMS	M-DMS	n/a	ISO/IEC 29341-3-12 DTCP Volume 1 Supplement E:2007	K5659	
---	---	-----	-------	-----	---	-------	--

[COMMENT] The use of BLKMove.dtcp.com HTTP header is recommended (optional) in the DTCP-IP specification DTCP Volume 1 Supplement E:2007, but in order to provide interoperability this is mandated by this guideline. The res@importUri property value is created by the UPnP AV MediaServer when a CDS:CreateObject request was made and returned to the control point in the response to the CDS:CreateObject action.

5.3.3.2.2

[GUIDELINE] If an HTTP Client Endpoint uploads content using the DTCP-IP Move protocol as defined in V1SE.8.4 of DTCP Volume 1 Supplement E:2007 with an HTTP POST request, then it shall encrypt the Protected Content Packets (PCPs) using the key specified by the BLKMove.dtcp.com HTTP header of an HTTP POST response with status code 100 (Continue).

[ATTRIBUTES]

M	A	+UP+ +UPSYNC +	n/a	n/a	IEC 62481-1-1:2 017 DTCP Volume 1 Supplement E:2007	MKIEQ	A
---	---	----------------	-----	-----	---	-------	---

5.3.3.2.3

[GUIDELINE] If an HTTP Client Endpoint attempts to download a content using the DTCP-IP Move protocol defined in V1SE.8.4 of DTCP Volume 1 Supplement E:2007, then it shall include the BLKMove.dtcp.com HTTP header in the HTTP GET request to specify the key used for the Move Transmission process.

[ATTRIBUTES]

M	A	+UP+ +UPSYNC +	n/a	n/a	IEC 62481-1-1:2 017 DTCP Volume 1 Supplement E:2007	TV5QO	A
---	---	----------------	-----	-----	---	-------	---

[COMMENT] Guidelines 5.3.3.2.2 and 5.3.3.2.3 specify the usage of BLKMove.dtcp.com HTTP header recommended in DTCP Volume 1 Supplement E:2007.

5.3.3.2.4

[GUIDELINE] If an HTTP Server Endpoint received an HTTP GET request with the BLKMove.dtcp.com HTTP header to a content binary exposed with the DIS-DTCP-move flag set to true as specified in Guideline 5.3.2.3.2, then it shall encrypt the Protected Content Packets (PCPs) using the key specified by the BLKMove.dtcp.com HTTP header.

[ATTRIBUTES]

M	A	DMS	M-DMS	n/a	ISO/IEC 29341-3-12 DTCP Volume 1 Supplement E:2007	LCD7X	
---	---	-----	-------	-----	--	-------	--

5.3.3.3 MT/CP content transfer ready for Copy**5.3.3.3.1**

[GUIDELINE] If an HTTP Server Endpoint received an HTTP POST request without the message body to the res@importUri property value for Copy using DTCP-IP DIS, then the endpoint should return an HTTP status code of 100 (Continue) only after successful completion of a DTCP-IP AKE.

[ATTRIBUTES]

S	A	DMS	M-DMS	n/a	IEC 62481-1-1:2 017 DTCP Volume 1:2007 DTCP Volume 1 Supplement E:2007	VGMDQ	
---	---	-----	-------	-----	--	-------	--

[COMMENT] The res@importUri property value for Copy using DTCP-IP DIS signifies the URI that was included in the response following a CDS:CreateObject request with the res@dtcp:uploadInfo property, and that has a value with bit 31 is set to zero or without res@dtcp:uploadInfo property.

5.3.3.3.2

[GUIDELINE] If an HTTP Client Endpoint attempts to acquire content using the DTCP-IP DIS Copy, then it should perform the DTCP-IP AKE that is necessary to decrypt the received content before establishing the HTTP connection with the HTTP Server Endpoint.

[ATTRIBUTES]

S	A	+DN+ +DNSYNC+	n/a	n/a	IEC 62481-1-1:2 017 DTCP Volume 1:2007 DTCP Volume 1 Supplement E:2007	ASRQS	A
---	---	---------------	-----	-----	--	-------	---

[COMMENT] Guidelines 5.3.3.3.1 and 5.3.3.3.2 correspond to 7.6.3.2 (GUN R6EOV) CP: Play Ready guideline in IEC 62481-3:2017.

5.3.3.4 MT/CP DTCP-IP AKE for Move

5.3.3.4.1

[GUIDELINE] If an HTTP Server Endpoint received an HTTP POST request without the message body to the res@importUri property value for Move using DTCP-IP DIS, then it shall return an HTTP status code of 100 (Continue) only after successful completion of a Move RTT-AKE defined in V1SE.8.4.1 of DTCP Volume 1 Supplement E:2007.

[ATTRIBUTES]

M	C	DMS	M-DMS	n/a	IEC 62481-1-1:2017 DTCP Volume 1 Supplement E:2007	LKUA7	
---	---	-----	-------	-----	---	-------	--

[COMMENT] The res@importUri property value for Move using DTCP-IP DIS means the URI that was included in the response following a CDS:CreateObject request with the res@dtcp:uploadInfo property specified in Guideline 5.3.2.1.

5.3.3.4.2

[GUIDELINE] If an HTTP Client Endpoint attempts to acquire content using the DTCP-IP Move protocol defined in V1SE.8.4 of DTCP Volume 1 Supplement E:2007, then it shall perform the Move RTT-AKE before establishing an HTTP connection with the HTTP Server Endpoint for the Move transaction.

[ATTRIBUTES]

M	C	+DN+ +DNSYNC+	n/a	n/a	IEC 62481-1-1:2017 DTCP Volume 1 Supplement E:2007	T8EAW	A
---	---	---------------	-----	-----	---	-------	---

[COMMENT] Guidelines 5.3.3.4.1 and 5.3.3.4.2 correspond to 7.6.3.2 (GUN R6EOV) CP: Play Ready guideline in IEC 62481-3:2017 in the case of DTCP-IP Move operation.

5.3.3.5 MT/CP HTTP Header: Content Type (DTCP Socket Information)

[GUIDELINE] If an HTTP Client Endpoint attempts to upload content using DTCP-IP DIS, then it shall provide DTCP Socket information in the Content-Type HTTP header field in an HTTP POST request.

[ATTRIBUTES]

M	R	+UP+ +UPSYNC+	n/a	n/a	IEC 62481-1-1:2017 DTCP Adopter Agreement	Y65JG	
---	---	---------------	-----	-----	--	-------	--

[COMMENT] This guideline requirement specifies the use of content type header with the MIME-type, which includes DTCP Socket information in Upload system usage and Upload Synchronization system usage.

5.3.4 DTCP profiling guidelines

5.3.4.1 CP DTCP-IP: profile

5.3.4.1.1

[GUIDELINE] If a UPnP AV MediaServer or UPnP AV MediaServer control point applies DTCP-IP DIS for the Upload and/or Download system usages, then it shall follow the requirements set forth in 8.9 in IEC 62481-3:2017, after the content transfer has been completed.

If the UPnP AV MediaServer control point invokes the CreateObject action to initiate the transfer of content to the UPnP AV MediaServer, it shall not supply the "DTCP1HOST=<host>;DTCP1PORT=<port>" part in the MIME type as defined in 8.8.2.2 (VS3EY) of IEC 62481-3:2017, but all other requirements set forth in 8.9 of IEC 62481-3:2017 apply. The UPnP AV MediaServer shall set the "DTCP1HOST=<host>;DTCP1PORT=<port>" values in the MIME type in the res@protocollInfo property for the uploaded content item after the upload transfer of content has been completed.

[ATTRIBUTES]

M	R	DMS +UP+ +DN+	M-DMS	n/a	IEC 62481-3:2017 7 DTCP Volume 1:2007 DTCP Volume 1 Supplement E:2007	7P7E5	A
---	---	---------------	-------	-----	---	-------	---

5.3.4.1.2

[GUIDELINE] If a UPnP AV MediaServer or UPnP AV MediaServer control point applies DTCP-IP DIS for the Upload Synchronization and/or Download Synchronization system usages, then it shall follow the guidelines set forth in 8.9 in IEC 62481-3:2017.

[ATTRIBUTES]

M	R	DMS +UPSYNC+ +DNSYNC+	M-DMS	n/a	IEC 62481-3:2017 7 DTCP Volume 1:2007 DTCP Volume 1 Supplement E:2007	OIRWP	
---	---	--------------------------	-------	-----	---	-------	--

5.3.4.1.3

[GUIDELINE] If a UPnP AV MediaServer or UPnP AV MediaServer control point applies DTCP-IP DIS for the Upload and/or Upload Synchronization system usages, then it shall follow the requirements in 8.9 of IEC 62481-3:2017 after the content transfer has been completed.

If the UPnP AV MediaServer control point invokes the CreateObject action to initiate the transfer of content to the UPnP AV MediaServer, it shall not supply the "DTCP1HOST=<host>;DTCP1PORT=<port>" part in the MIME type as defined in 8.9.2.2 (VS3EY) of IEC 62481-3:2017, but all other requirements set forth in 8.9 of IEC 62481-3:2017 apply. The UPnP AV MediaServer shall set the "DTCP1HOST=<host>;DTCP1PORT=<port>" values in the MIME type in the res@protocollInfo property for the uploaded content item after the upload transfer of content has been completed.

[ATTRIBUTES]

M	R	DMS +UP+ +UPSYNC+	M-DMS	n/a	IEC 62481-3:2017 DTCP Volume 1:2007 DTCP Volume 1 Supplement E:2007	ADQFR	A
---	---	-------------------	-------	-----	--	-------	---

[COMMENT] During the content transfer for the Upload and Upload Synchronization system usages, the Content-Type HTTP header for the HTTP POST request contains the DTCP-IP socket information as defined in 5.3.3.5 and thus need not be included in the CreateObject request as link protected content is being sent (posted) by the UPnP AV MediaServer control point. The DTCP-IP socket information in the res@protocolInfo is needed only when accessing link protected content on the UPnP AV MediaServer.

5.3.4.1.4

[GUIDELINE] If a UPnP AV MediaServer or UPnP AV MediaServer control point applies DTCP-IP DIS for the Download and/or Download Synchronization system usages, then it shall follow the requirements set forth in 8.9 of IEC 62481-3:2017.

[ATTRIBUTES]

M	R	DMS +DN+ +DNSYNC+	M-DMS	n/a	IEC 62481-3:2017 DTCP Volume 1:2007 DTCP Volume 1 Supplement E:2007	XGFXQ	A
---	---	-------------------	-------	-----	--	-------	---

5.3.5 DTCP-IP DIS requirements

5.3.5.1 CP DTCP-IP Move protocol

5.3.5.1.1

[GUIDELINE] If a UPnP AV MediaServer or a UPnP AV MediaServer control point implements Move of a content using the DTCP-IP DIS in conjunction with the Upload and/or Download system usages, then it shall be capable of performing DTCP-IP Move protocol defined in V1SE.8.4 of DTCP Volume 1 Supplement E:2007.

[ATTRIBUTES]

M	A	DMS +UP+ +DN+	M-DMS	n/a	IEC 62481-1-1:2 017 DTCP Volume 1:2007 DTCP Volume 1 Supplement E:2007	5T8TQ	A
---	---	---------------	-------	-----	--	-------	---

5.3.5.1.2

[GUIDELINE] If a UPnP AV MediaServer or a UPnP AV MediaServer control point implements Move of a content using the DTCP-IP DIS in conjunction with the Upload Synchronization and/or Download Synchronization system usages, then it shall be capable of performing DTCP-IP Move protocol defined in V1SE.8.4 of DTCP Volume 1 Supplement E:2007.

[ATTRIBUTES]

M	A	DMS +UPSYNC+ +DNSYNC+	M-DMS	n/a	IEC 62481-1-1:2 017 DTCP Volume 1:2007 DTCP Volume 1 Supplement E:2007	AJRBZ	
---	---	--------------------------	-------	-----	--	-------	--

5.3.5.2 CP determining DTCP-IP DIS Move/Copy support**5.3.5.2.1**

[GUIDELINE] A UPnP AV MediaServer that implements Copy of a content using the DTCP-IP DIS shall include the <dlina:X_DLNACAP> element (as a child of the <device> element that represents the UPnP AV MediaServer) in the device description document and include the Capability ID "dtcp-copy" in the element's comma-separated value list.

[ATTRIBUTES]

M	A	DMS	M-DMS	n/a	IEC 62481-1-1:2 017 DTCP Volume 1 Supplement E:2007	QHZKN	
---	---	-----	-------	-----	---	-------	--

[COMMENT] Capability ID "dtcp-copy" indicates support for Copy using DTCP-IP DIS as device level. So, even though a UPnP AV MediaServer indicates "dtcp-copy" in the <dlina:X_DLNACAP> element, it can refuse Copy of a content using DTCP-IP DIS for each content level since the DLNA Media Format profile of the specific content is unavailable for uploading to the particular storage, etc. See Guideline 9.2.35.1 (GUN WJUQC) in IEC 62481-1-1:2017 for the formal syntax of the <dlina:X_DLNACAP> element. A sample description is given below:

```
<dlina:X_DLNACAP
xmlns:dlina="urn:schemas-dlna-org:device-1-0">av-upload,dtcp-copy</dlina:X_DL
NACAP>
```

5.3.5.2.2

[GUIDELINE] A UPnP AV MediaServer that implements Move of a content using the DTCP-IP DIS with DTCP-IP Move protocol defined in V1SE.8.4 of DTCP Volume 1 Supplement E:2007 shall include the <dlina:X_DLNACAP> element (as a child of the <device> element that represents the UPnP AV MediaServer) in the device description document and include the Capability ID "dtcp-move" in the element's comma-separated value list.

[ATTRIBUTES]

M	A	DMS	M-DMS	n/a	IEC 62481-1-1:2 017 DTCP Volume 1 Supplement E:2007	PHWOP	
---	---	-----	-------	-----	---	-------	--

[COMMENT] Capability ID "dtcp-move" indicates support for Move using DTCP-IP DIS with DTCP-IP Move Protocol defined in V1SE.8.4 of DTCP Volume 1 Supplement E:2007 as device level. So, even though a UPnP AV MediaServer indicates "dtcp-move" in the <dlina:X_DLNACAP> element, it can refuse the Move of a content using DTCP-IP DIS for each

content level since the DLNA Media Format profile of the specific content is unavailable for uploading to the particular storage, etc. See Guideline 9.2.35.1 (GUN WJUQC) in IEC 62481-1-1:2017 for the formal syntax of the <dlna:X_DLNAACAP> element. A sample description is given below:

```
<dlna:X_DLNAACAP
xmlns:dlna="urn:schemas-dlna-org:device-1-0">av-upload,dtcp-move</dlna:X_DLNAACAP>
```

If a UPnP AV MediaServer supports both Move and Copy using DTCP-IP DIS, the sample description is as follows:

```
<dlna:X_DLNAACAP
xmlns:dlna="urn:schemas-dlna-org:device-1-0">av-upload,dtcp-move,dtcp-copy</dlna:X_DLNAACAP>
```

5.3.5.3 CP DTCP-IP Resumption of Move Commitment

5.3.5.3.1

[GUIDELINE] A UPnP AV MediaServer or a UPnP AV MediaServer control point that implements the Move of a content using DTCP-IP DIS should implement Resumption of Move Commitment defined in V1SE.8.4.3.1 of DTCP Volume 1 Supplement E:2007.

[ATTRIBUTES]

S	A	DMS +UP+ +DN+ +UPSYNC+ +DNSYNC+	M-DMS	n/a	IEC 62481-1-1:2 017 DTCP Volume 1 Supplement E:2007	96VJ3	A
---	---	------------------------------------	-------	-----	---	-------	---

[COMMENT] Implementing this functionality helps to improve user experience when an interruption of Move Commitment process has occurred by loss of TCP connection.

5.3.5.3.2

[GUIDELINE] A UPnP AV MediaServer that implements the Resumption of Move Commitment as defined in V1SE.8.4.3.1 of DTCP Volume 1 Supplement E:2007 shall include the <dlna:X_DLNAACAP> element (as a child of the <device> element that represents the UPnP AV MediaServer) in the device description document and include the Capability ID "dtcp-move-resumption" in the element's comma-separated value list.

[ATTRIBUTES]

M	A	DMS	M-DMS	n/a	IEC 62481-1-1:2 017 DTCP Volume 1 Supplement E:2007	V6NSW	
---	---	-----	-------	-----	---	-------	--

[COMMENT] AV MediaServer devices use the <dlna:X_DLNAACAP> element to indicate support for Resumption of Move Commitment operation. The element is a comma-separated value list that indicates whether the AV MediaServer is capable of Resumption of Move Commitment operation, receive uploads of images, audio-only, or audio/video content, etc. See Guideline 9.2.35.1 (GUN WJUQC) in IEC 62481-1-1:2017 for the formal syntax of the <dlna:X_DLNAACAP> element. A sample description is given below:

```
<dlna:X_DLNA CAP
xmlns:dlna="urn:schemas-dlna-org:device-1-0">av-upload,srs-conflict-resolut
ion,dtcp-move,dtcp-move-resumption</dlna:X_DLNA CAP>
```

5.3.5.3.3

[GUIDELINE] If a UPnP AV MediaServer or a UPnP AV MediaServer control point implements the Resumption of Move Commitment defined in V1SE.8.4.3.1 of DTCP Volume 1 Supplement E:2007, then it shall conform to all guidelines as defined in 5.3.5.4.1 through 5.3.5.4.5.

[ATTRIBUTES]

M	A	DMS +UP+ +UPSYNC+	M-DMS	n/a	IEC 62481-1-1:2017 DTCP Volume 1 Supplement E:2007	3THT6	A
---	---	-------------------	-------	-----	---	-------	---

5.3.5.4 CP HTTP POST request with DTCP-IP information for Resumption of Move Commitment

5.3.5.4.1

[GUIDELINE] After the loss of a TCP connection during the Move Commitment process, an HTTP Client Endpoint that performed the Move Transmission but has not completed the Move Commitment process shall send an HTTP POST request to the HTTP Server Endpoint with the DTCP Socket information in accordance with V1SE.8.4.3.1 of DTCP Volume 1 Supplement E:2007.

[ATTRIBUTES]

M	A	+UP+ +UPSYNC+	n/a	n/a	IEC 62481-1-1:2017 DTCP Volume 1 Supplement E:2007	DQ82O	A
---	---	---------------	-----	-----	---	-------	---

[COMMENT] In the event that an IP address and/or a TCP port number of UPnP AV MediaServer control point has been changed after loss of TCP connection, DTCP Socket information is usable to re-establish the TCP connection.

5.3.5.4.2

[GUIDELINE] After the loss of a TCP connection during the Move Commitment process, an HTTP Client Endpoint that performed the Move Transmission, but has not completed the Move Commitment process, shall resend the HTTP POST request of the performed Move Transmission with the following modifications.

- BLKMove.dtcp.com HTTP header is added, as specified in V1SE.10.4 of DTCP Volume 1 Supplement E:2007, which has the key label used during the interrupted Move Commitment process.
- If the UPnP AV MediaServer control point has changed the DTCP Socket after the loss of TCP connection, the DTCP Socket information in the Content-Type HTTP header is updated.

[ATTRIBUTES]

M	A	+UP+ +UPSYNC+	n/a	n/a	IEC 62481-1-1:2017 DTCP Volume 1 Supplement E:2007	YUM2N	A
---	---	---------------	-----	-----	---	-------	---

5.3.5.4.3

[GUIDELINE] When an HTTP Server Endpoint receives an HTTP POST request as defined in Guideline 5.3.5.4.1, and it attempts to execute the Resumption of Move Commitment defined in V1SE.8.4.3.1 of DTCP Volume 1 Supplement E:2007, it shall respond with an HTTP error status and the BLKMove.dtcp.com HTTP header that has the key label used during the interrupted Move Commitment process.

[ATTRIBUTES]

M	A	DMS	M-DMS	n/a	IEC 62481-1-1:2017 DTCP Volume 1 Supplement E:2007	52OVV	
---	---	-----	-------	-----	---	-------	--

[COMMENT] Responding with the HTTP error status means that the UPnP AV MediaServer cannot accept Move Transmission.

5.3.5.4.4

[GUIDELINE] When an HTTP Server Endpoint receives the HTTP POST request as defined in Guideline 5.3.5.4.1 and it cannot execute the Resumption of Move Commitment defined in V1SE.8.4.3.1 of DTCP Volume 1 Supplement E:2007, it shall respond without the BLKMove.dtcp.com HTTP header.

[ATTRIBUTES]

M	A	DMS	M-DMS	n/a	IEC 62481-1-1:2017 DTCP Volume 1 Supplement E:2007	E42TM	
---	---	-----	-------	-----	---	-------	--

5.3.5.4.5

[GUIDELINE] In conjunction with Guideline 5.3.5.4.3, an HTTP Server Endpoint should respond with an error code of 500 (Internal Server Error).

[ATTRIBUTES]

S	A	DMS	M-DMS	n/a	IEC 62481-1-1:2017	RG88L	
---	---	-----	-------	-----	--------------------	-------	--

Annex A (informative)

DTCP-IP DIS behaviour explanations

A.1 Overview of DTCP-IP DIS behaviour

DTCP-IP DIS is a transcription-based DRM interoperability solution. Figure A.1 depicts the overview of the flow of content and its associated usage rules over DTCP-IP DIS between devices that use different DRMs.

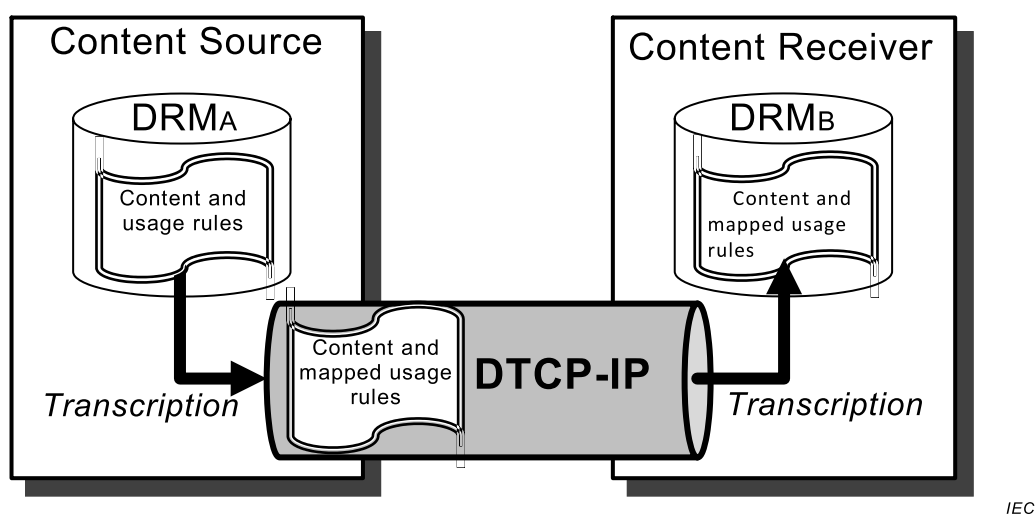


Figure A.1 – Overview of DTCP-IP DIS behaviour

The following sequence is an overview of DTCP-IP DIS sequence behaviour.

- In the Content Source, a piece of content and its associated usage rules protected by DRMA are transcribed into those protected by DTCP-IP.
- The protected content and the usage rules are transferred over DTCP-IP from the Content Source to the Content Receiver.
- In the Content Receiver, the content and the usage rules protected by DTCP-IP are transcribed into those protected by DRMB.

As the result of the above sequence, a piece of content and its associated usage rules protected by DRMA can be transcribed into those protected by DRMB using DTCP-IP. Therefore, DTCP-IP can act as a DRM Interoperability Solution (DIS) in the above situation.

Note that the availability of DTCP-IP DIS is dependent on the compliance rules of DTCP-IP, DRMA and DRMB.

A.2 Example of DTCP-IP DIS sequences

A.2.1 General

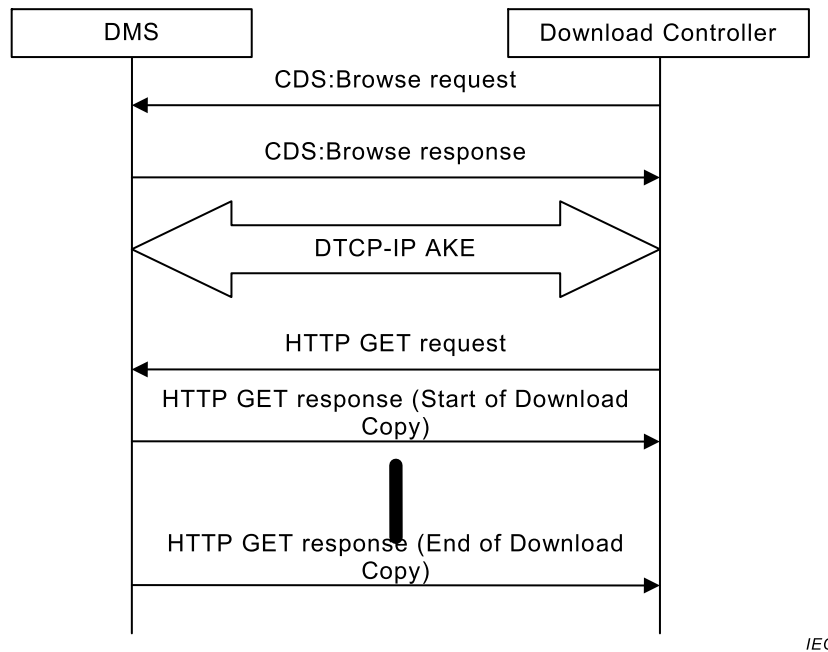
Clause A.2 provides a set of examples, each describing DTCP-IP DIS protocol sequence in order to facilitate the reader's understanding.

The following system usages using DTCP-IP DIS are described in the examples:

- Download system usage with Copy (see Figure A.2);
- Download system usage with Move (see Figure A.3);
- Upload system usage with Copy (see Figure A.4);
- Update system usage with Move (see Figure A.5).

A.2.2 Download Copy sequence

Figure A.2 and the explanation following Figure A.2 describe the Download Copy sequence example.



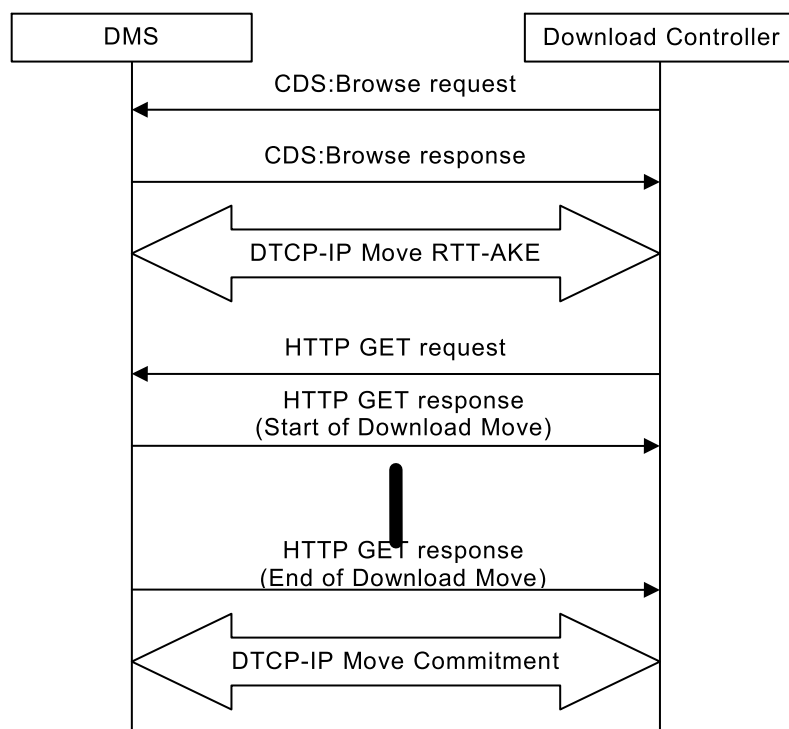
IEC

Figure A.2 – Example of Download Copy sequence

- The following sequence is for DTCP-IP DIS Download Copy. Download Controller obtains URI, DTCP Socket information and availability of DTCP-IP DIS Copy for a specific content by the CDS:Browse action. The availability is indicated by the DIS-DTCP-copy flag in the DLNA.ORG_FLAGS parameter.
- The Download Controller initiates DTCP-IP AKE to that DTCP Socket. As the result of DTCP-IP AKE, a DMS and the Download Controller share an encryption key for a content transfer.
- The Download Controller invokes HTTP GET request to the URI. The DMS sends the corresponding content encrypted using the encryption key shared previously.

A.2.3 Download Move sequence

Figure A.3 and the explanation following Figure A.3 describe the Download Move sequence example.



IEC

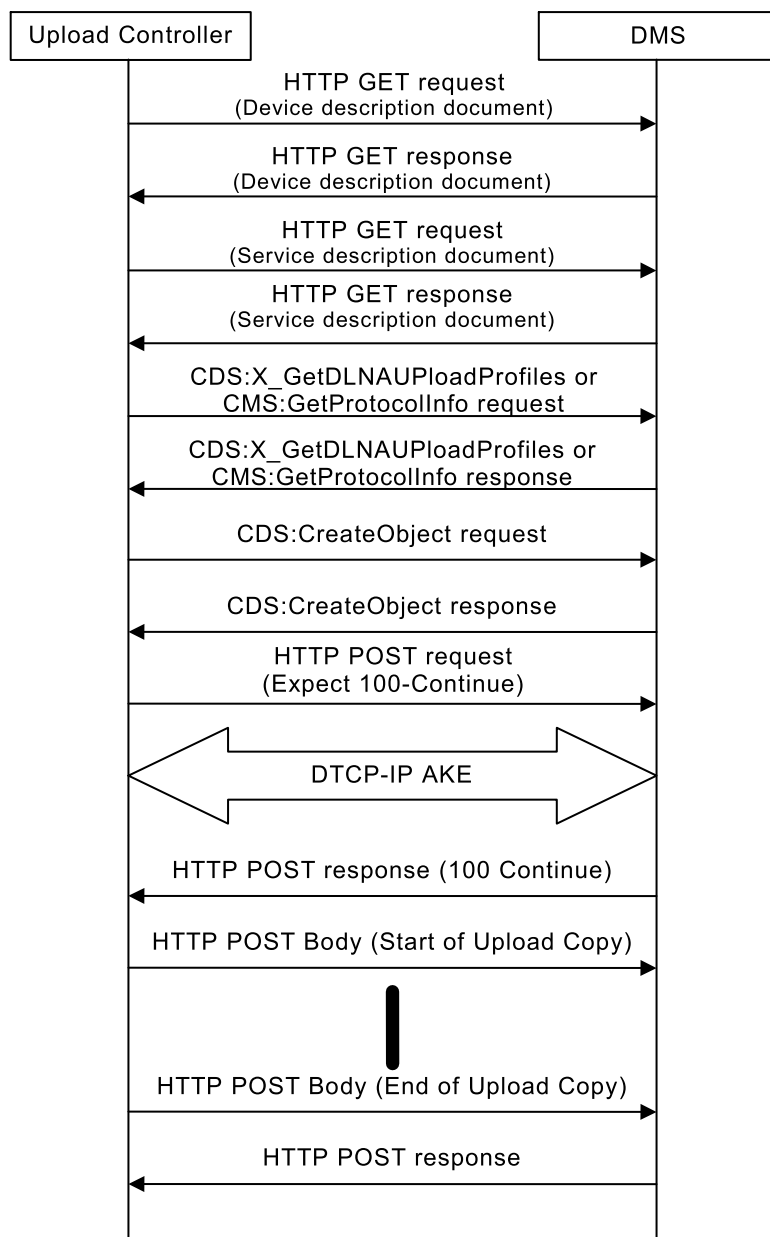
Figure A.3 – Example of Download Move sequence

The following sequence is for DTCP-IP DIS Download Move.

- A Download Controller obtains URI, DTCP Socket information and availability of DTCP-IP DIS Move for a specific content by the CDS:Browse action. The availability is indicated by the DIS-DTCP-move flag in DLNA.ORG_FLAGS parameter.
- The Download Controller initiates DTCP-IP Move RTT-AKE to the DTCP Socket. As the result of DTCP-IP Move RTT-AKE, the DMS and the Download Controller share an encryption key for Move Transmission identified by KXM_label.
- The Download Controller invokes HTTP GET request with KXM_label as a value of BLKMove.dtcp.com HTTP header to the URI. The DMS sends the corresponding content encrypted using the encryption key identified by the KXM_label.
- After the Move Transmission completes, the Download Controller initiates DTCP-IP Move Commitment process. As a result of this process, the content on the DMS becomes unusable and the content on the Download Controller becomes usable.

A.2.4 Upload Copy sequence

Figure A.4 and the explanation following Figure A.4 describe the Upload Copy sequence example.



IEC

Figure A.4 – Example of Upload Copy sequence

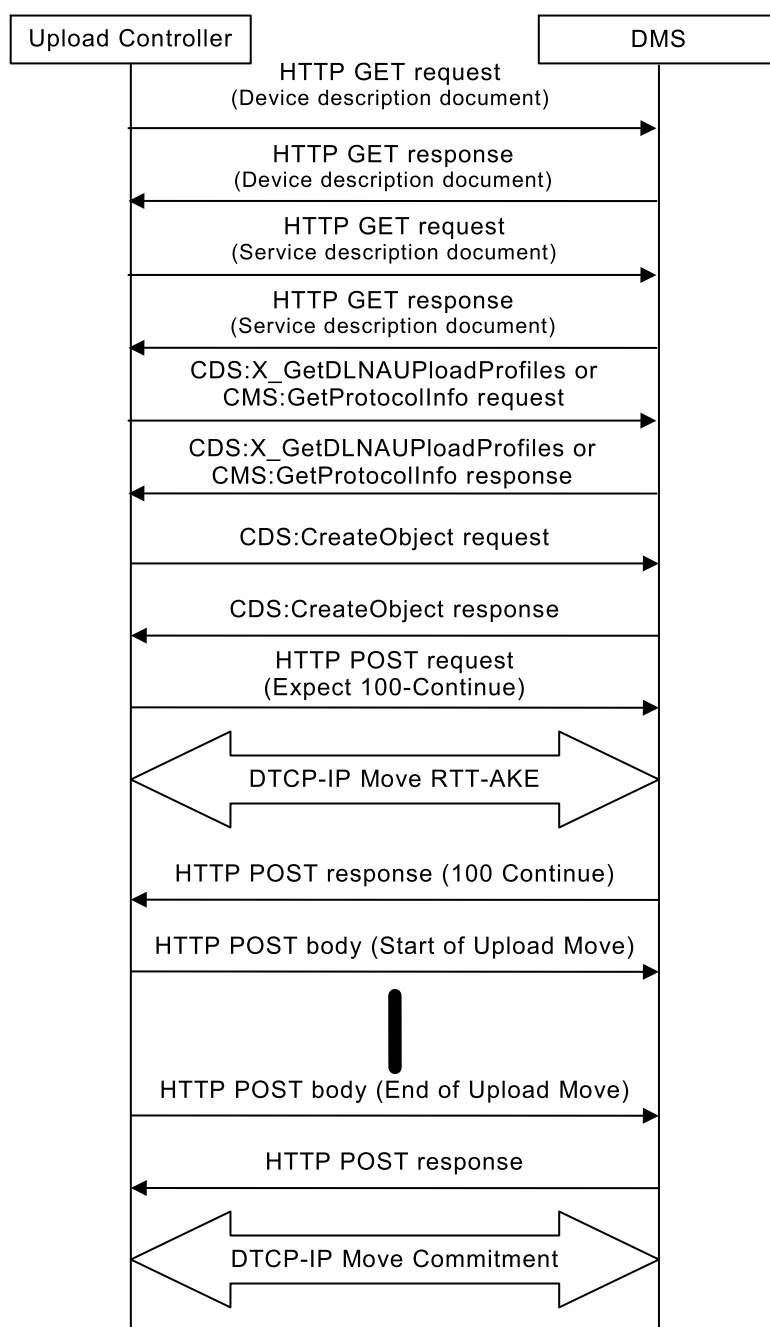
The following sequence is for DTCP-IP DIS Upload Copy.

- An Upload Controller obtains Device Description and checks whether a <dlina:X_DLNA CAP> element includes the av-upload and dtcp-copy Capability ID in order to know an Upload Copy capability of a DMS for a content of AV Media Class. Next the Upload Controller obtains Service Description and checks whether the DMS implements CDS:X_GetDLNAUploadProfiles action. If the DMS implements CDS:X_GetDLNAUploadProfiles action, the Upload Controller invokes CDS:X_GetDLNAUploadProfiles request in order to know the acceptable DLNA Media Format Profile ID(s) of the uploading content. If not, the Upload Controller invokes CMS:GetProtocolInfo request.
- The Upload Controller invokes CDS:CreateObject request to create CDS item for a content which will be copied. The DMS returns a URI for HTTP POST with res@importUri property in CDS:CreateObject response.

- To initiate a content transfer, the Upload Controller sends HTTP POST request header to the URI which is a value of the res@importUri property. It includes Content-Type HTTP header with DTCP Socket information.
- The DMS initiates DTCP-IP AKE to that DTCP Socket. As the result of DTCP-IP AKE, the DMS and the Upload Controller share an encryption key for the content transfer, and then the DMS returns the HTTP status code of 100 (Continue).
- The Upload Controller sends the corresponding content encrypted, using the encryption key shared previously to the URI.

A.2.5 Upload Move sequence

Figure A.5 and the explanation following Figure A.5 describe the Upload Move sequence example.



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Figure A.5 – Example of Upload Move sequence

The following sequence is for DTCP-IP DIS Upload Move.

- An Upload Controller obtains Device Description and checks whether a <dlina:X_DLNAACAP> element includes the av-upload and dtcp-move Capability ID in order to know an Upload Move capability of a DMS for a content of AV Media Class. Next the Upload Controller obtains Service Description and checks whether the DMS implements CDS:X_GetDLNAUploadProfiles action. If the DMS implements CDS:X_GetDLNAUploadProfiles action, the Upload Controller invokes CDS:X_GetDLNAUploadProfiles request in order to know acceptable DLNA Media Format Profile ID(s) of the uploading content. If not, the Upload Controller invokes CMS:GetProtocolInfo request.
- The Upload Controller invokes CDS:CreateObject request to create CDS item for a content which will be moved. The CDS:CreateObject request includes res@dtcp:uploadInfo property

since the subsequent content transfer follows the DTCP-IP Move. The DMS returns a URI for HTTP POST with `res@importUri` property in `CDS:CreateObject` response.

- To initiate the Move transaction, the Upload Controller sends HTTP POST request header to the URI which is value of the `res@importUri` property. It includes Content-Type HTTP header with DTCP Socket information.
 - The DMS initiates DTCP-IP Move RTT-AKE to the DTCP Socket. As the result of DTCP-IP Move RTT-AKE, the DMS and the Upload Controller share an encryption key for Move Transmission identified by `KXM_label`, and then the DMS returns the HTTP status code of 100 (Continue). It includes `BLKMove.dtcp.com` HTTP header whose value is `KXM_label`.
 - The Upload Controller sends the corresponding content encrypted using the encryption key identified by the `KXM_label` to the URI.
 - After the Move Transmission completes, the DMS initiates DTCP-IP Move Commitment process. As a result of this process, the content on the Upload Controller becomes unusable and the content on the DMS becomes usable.
-

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