

---

---

**Information technology — UPnP  
Device Architecture —**

**Part 20-11:  
Audio video device control protocol —  
Level 4 — Connection manager service**

**iTeh STANDARD PREVIEW**  
*Technologies de l'information — Architecture de dispositif UPnP —  
Partie 20-11: Protocole de contrôle de dispositif audio-vidéo —  
Niveau 4 — Service de gestionnaire de connexion*

[ISO/IEC 29341-20-11:2017](https://standards.iso.org/standards/catalog/standards/sist/75cdda49-94c6-4779-8308-48b2848d9df4/iso-iec-29341-20-11-2017)

<https://standards.iso.org/standards/catalog/standards/sist/75cdda49-94c6-4779-8308-48b2848d9df4/iso-iec-29341-20-11-2017>



**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[ISO/IEC 29341-20-11:2017](https://standards.iteh.ai/catalog/standards/sist/75cdda49-94c6-4779-8308-48b2848d9df4/iso-iec-29341-20-11-2017)  
<https://standards.iteh.ai/catalog/standards/sist/75cdda49-94c6-4779-8308-48b2848d9df4/iso-iec-29341-20-11-2017>



**COPYRIGHT PROTECTED DOCUMENT**

© ISO/IEC 2017, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
Ch. de Blandonnet 8 • CP 401  
CH-1214 Vernier, Geneva, Switzerland  
Tel. +41 22 749 01 11  
Fax +41 22 749 09 47  
copyright@iso.org  
www.iso.org

## CONTENTS

<b>1</b>	<b>Scope</b> .....	<b>vi</b>
<b>2</b>	<b>Normative references</b> .....	<b>1</b>
<b>3</b>	<b>Terms, definitions, symbols and abbreviations</b> .....	<b>4</b>
3.1	Provisioning terms .....	4
3.2	Symbols .....	5
<b>4</b>	<b>Notations and Conventions</b> .....	<b>5</b>
4.1	Notation .....	5
4.1.1	Data Types .....	5
4.1.2	Strings Embedded in Other Strings .....	6
4.1.3	Extended Backus-Naur Form .....	6
4.2	Derived Data Types .....	7
4.2.1	Summary .....	7
4.2.2	CSV Lists .....	7
4.3	Management of XML Namespaces in Standardized DCPs .....	8
4.3.1	Namespace Prefix Requirements .....	12
4.3.2	Namespace Names, Namespace Versioning and Schema Versioning .....	13
4.3.3	Namespace Usage Examples .....	15
4.4	Vendor-defined Extensions .....	15
4.4.1	Vendor-defined Action Names .....	15
4.4.2	Vendor-defined State Variable Names .....	15
4.4.3	Vendor-defined XML Elements and attributes .....	16
4.4.4	Vendor-defined Property Names .....	16
<b>5</b>	<b>Service Modeling Definitions</b> .....	<b>16</b>
5.1	ServiceType .....	16
5.2	State Variables .....	17
5.2.1	State Variable Overview .....	17
5.2.2	<u><a href="#">SourceProtocolInfo</a></u> .....	17
5.2.3	<u><a href="#">SinkProtocolInfo</a></u> .....	18
5.2.4	<u><a href="#">CurrentConnectionIDs</a></u> .....	18
5.2.5	<u><a href="#">FeatureList</a></u> .....	18
5.2.6	<u><a href="#">ClockUpdateID</a></u> .....	18
5.2.7	<u><a href="#">DeviceClockInfoUpdates</a></u> .....	19
5.2.8	<u><a href="#">A ARG TYPE ConnectionStatus</a></u> .....	20
5.2.9	<u><a href="#">A ARG TYPE ConnectionManager</a></u> .....	20
5.2.10	<u><a href="#">A ARG TYPE Direction</a></u> .....	20
5.2.11	<u><a href="#">A ARG TYPE ProtocolInfo</a></u> .....	20
5.2.12	<u><a href="#">A ARG TYPE ConnectionID</a></u> .....	20
5.2.13	<u><a href="#">A ARG TYPE AVTransportID</a></u> .....	20
5.2.14	<u><a href="#">A ARG TYPE RcsID</a></u> .....	21
5.2.15	<u><a href="#">A ARG TYPE ItemInfoFilter</a></u> .....	21
5.2.16	<u><a href="#">A ARG TYPE Result</a></u> .....	22
5.2.17	<u><a href="#">A ARG TYPE RenderingInfoList</a></u> .....	22
5.3	Eventing and Moderation .....	28
5.4	Actions .....	28
5.4.1	Action Overview .....	28
5.4.2	<u><a href="#">GetProtocolInfo()</a></u> .....	29

5.4.3	<a href="#"><u>PrepareForConnection()</u></a>	29
5.4.4	<a href="#"><u>ConnectionComplete()</u></a>	31
5.4.5	<a href="#"><u>GetCurrentConnectionIDs()</u></a>	32
5.4.6	<a href="#"><u>GetCurrentConnectionInfo()</u></a>	33
5.4.7	<a href="#"><u>GetRendererItemInfo()</u></a>	34
5.4.8	<a href="#"><u>GetFeatureList()</u></a>	35
5.4.9	Common Error Codes	35
<b>6</b>	<b>XML Service Description</b>	<b>36</b>
<b>7</b>	<b>Test</b>	<b>40</b>
<b>Annex A</b>	<b>(normative) Protocol Specifics</b>	<b>41</b>
A.1	Application to HTTP Streaming	41
A.1.1	<a href="#"><u>ProtocolInfo</u></a> Definition	41
A.1.2	Implementation of <a href="#"><u>PrepareForConnection()</u></a>	41
A.1.3	Implementation of <a href="#"><u>ConnectionComplete()</u></a>	41
A.1.4	Automatic Connection Cleanup	41
A.2	Application to RTSP/RTP/UDP Streaming	42
A.2.1	<a href="#"><u>ProtocolInfo</u></a> Definition	42
A.2.2	Implementation of <a href="#"><u>PrepareForConnection()</u></a>	42
A.2.3	Implementation of <a href="#"><u>ConnectionComplete()</u></a>	42
A.2.4	Automatic Connection Cleanup	42
A.3	Application to Device-Internal Streaming	42
A.4	Application to IEC61883 Streaming	43
A.4.1	<a href="#"><u>ProtocolInfo</u></a> Definition	43
A.4.2	Implementation of <a href="#"><u>PrepareForConnection()</u></a>	44
A.4.3	Implementation of <a href="#"><u>ConnectionComplete()</u></a>	45
A.4.4	Automatic Connection Cleanup	45
A.5	Application to Vendor-specific Streaming	46
<b>Annex B</b>	<b>(normative) CM features</b>	<b>47</b>
B.1	Introduction	47
B.2	Requirements for the <i>CLOCKSYNC</i> feature, Version 1	47
<b>Annex C</b>	<b>(informative) Theory of Operation</b>	<b>53</b>
C.1	Purpose	53
C.2	<a href="#"><u>ProtocolInfo</u></a> Concept	53
C.2.1	4 <sup>th</sup> Field – <additionalInfo>	54
C.2.2	IEC61883 Exception	55
C.2.3	Formal EBNF for the 4 <sup>th</sup> field	55
C.2.4	<a href="#"><u>ProtocolInfo</u></a> Conventions for Protected Content	56
C.3	Typical Control Point Operations	57
C.3.1	Introduction	57
C.3.2	Establishing a New Connection	57
C.3.3	Dealing with Ongoing Connections	58
C.4	Relation to Devices without ConnectionManagers	58
C.5	<a href="#"><u>PrepareForConnection()</u></a> and <a href="#"><u>ConnectionComplete()</u></a>	59
C.5.1	<a href="#"><u>PrepareForConnection()</u></a>	59
C.5.2	<a href="#"><u>ConnectionComplete()</u></a>	59
C.5.3	General Usage Model	59
C.5.4	Relationship to AVTransport and RenderingControl Services	60
C.5.5	<a href="#"><u>ConnectionIDs</u></a>	60

C.5.6 AVTransportIDs and RcsIDs .....	61
C.6 Determining if ContentDirectory items are playable .....	61
C.7 CLOCKS SYNC feature .....	66
C.7.1 Examples of CLOCKS SYNC feature .....	67
<b>Annex D (informative) Bibliography .....</b>	<b>70</b>

## List of Tables

Table 1 — EBNF Operators .....	7
Table 2 — CSV Examples .....	8
Table 3 — Namespace Definitions .....	9
Table 4 — Schema-related Information .....	11
Table 5 — Default Namespaces for the AV Specifications .....	13
Table 6 — State Variables .....	17
Table 7 — allowedValueList for <u>A_ARG_TYPE ConnectionStatus</u> .....	20
Table 8 — allowedValueList for <u>A_ARG_TYPE Direction</u> .....	20
Table 9 — Event Moderation .....	28
Table 10 — Actions .....	28
Table 11 — Arguments for <u>GetProtocolInfo()</u> .....	29
Table 12 — Arguments for <u>PrepareForConnection()</u> .....	30
Table 13 — Error Codes for <u>PrepareForConnection()</u> .....	31
Table 14 — Arguments for <u>ConnectionComplete()</u> .....	32
Table 15 — Error Codes for <u>ConnectionComplete()</u> .....	32
Table 16 — Arguments for <u>GetCurrentConnectionIDs()</u> .....	32
Table 17 — Error Codes for <u>GetCurrentConnectionIDs()</u> .....	33
Table 18 — Arguments for <u>GetCurrentConnectionInfo()</u> .....	33
Table 19 — Error Codes for <u>GetCurrentConnectionInfo()</u> .....	34
Table 20 — Arguments for <u>GetRendererItemInfo()</u> .....	34
Table 21 — Error Codes for <u>GetRendererItemInfo()</u> .....	35
Table 22 — Arguments for <u>GetFeatureList()</u> .....	35
Table 23 — Error Codes for <u>GetFeatureList()</u> .....	35
Table 24 — Common Error Codes .....	36
Table A.1 — <contentFormat> for Protocol IEC61883 .....	44
Table B.1 — CM features .....	47
Table B.2 — Required characteristics of the CLOCKS SYNC feature element .....	49
Table B.3 — Allowed values for the <syncProtocolID> element .....	50
Table B.4 — Allowed formats for the <masterClockID> element .....	51
Table B.5 — Allowed values for the <supportedTimestamps> element .....	51
Table C.1 — Defined Protocols and their associated <u>ProtocolInfo</u> Values .....	54

## Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see <http://www.iso.org/directives>).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of Standard, the meaning of the ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword – Supplementary information](#)

ISO/IEC 29341-20-11 was prepared by UPnP Forum and adopted, under the PAS procedure, by joint technical committee ISO/IEC JTC 1, *Information technology*, in parallel with its approval by national bodies of ISO and IEC.

The list of all currently available parts of ISO/IEC 29341 series, under the general title *Information technology — UPnP Device Architecture*, can be found on the [ISO web site](#).

## Introduction

ISO and IEC draw attention to the fact that it is claimed that compliance with this document may involve the use of patents as indicated below.

ISO and IEC take no position concerning the evidence, validity and scope of these patent rights. The holders of these patent rights have assured ISO and IEC that they are willing to negotiate licenses under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statements of the holders of these patent rights are registered with ISO and IEC.

Intel Corporation has informed IEC and ISO that it has patent applications or granted patents.

Information may be obtained from:

Intel Corporation  
Standards Licensing Department  
5200 NE Elam Young Parkway  
MS: JFS-98  
USA – Hillsboro, Oregon 97124

Microsoft Corporation has informed IEC and ISO that it has patent applications or granted patents as listed below:

6101499 / US; 6687755 / US; 6910068 / US; 7130895 / US; 6725281 / US; 7089307 / US; 7069312 / US; 10/783 524 / US

Information may be obtained from:

Microsoft Corporation [ISO/IEC 29341-20-11:2017](https://standards.iteh.ai/catalog/standards/sist/75cdda49-94c6-4779-8308-48b2848d9d4/iso-iec-29341-20-11-2017)  
One Microsoft Way <https://standards.iteh.ai/catalog/standards/sist/75cdda49-94c6-4779-8308-48b2848d9d4/iso-iec-29341-20-11-2017>  
USA – Redmond WA 98052

Philips International B.V. has informed IEC and ISO that it has patent applications or granted patents.

Information may be obtained from:

Philips International B.V. – IP&S  
High Tech campus, building 44 3A21  
NL – 5656 Eindhoven

NXP B.V. (NL) has informed IEC and ISO that it has patent applications or granted patents.

Information may be obtained from:

NXP B.V. (NL)  
High Tech campus 60  
NL – 5656 AG Eindhoven

Matsushita Electric Industrial Co. Ltd. has informed IEC and ISO that it has patent applications or granted patents.

Information may be obtained from:

Matsushita Electric Industrial Co. Ltd.  
1-3-7 Shiromi, Chuoh-ku  
JP – Osaka 540-6139

## ISO/IEC 29341-20-11:2017(E)

Hewlett Packard Company has informed IEC and ISO that it has patent applications or granted patents as listed below:

5 956 487 / US; 6 170 007 / US; 6 139 177 / US; 6 529 936 / US; 6 470 339 / US; 6 571 388 / US; 6 205 466 / US

Information may be obtained from:

Hewlett Packard Company  
1501 Page Mill Road  
USA – Palo Alto, CA 94304

Samsung Electronics Co. Ltd. has informed IEC and ISO that it has patent applications or granted patents.

Information may be obtained from:

Digital Media Business, Samsung Electronics Co. Ltd.  
416 Maetan-3 Dong, Yeongtang-Gu,  
KR – Suwon City 443-742

Huawei Technologies Co., Ltd. has informed IEC and ISO that it has patent applications or granted patents.

Information may be obtained from:

Huawei Technologies Co., Ltd.  
Administration Building, Bantian Longgang District  
Shenzhen – China 518129

STANDARD PREVIEW  
(standards.iteh.ai)

Qualcomm Incorporated has informed IEC and ISO that it has patent applications or granted patents.

[ISO/IEC 29341-20-11:2017](https://standards.iteh.ai/catalog/standards/sist/75cdda49-94c6-4779-8308-002848d9df4/iso-iec-29341-20-11-2017)

Information may be obtained from <https://standards.iteh.ai/catalog/standards/sist/75cdda49-94c6-4779-8308-002848d9df4/iso-iec-29341-20-11-2017>

Qualcomm Incorporated  
5775 Morehouse Drive  
San Diego, CA – USA 92121

Telecom Italia S.p.A. has informed IEC and ISO that it has patent applications or granted patents.

Information may be obtained from:

Telecom Italia S.p.A.  
Via Reiss Romoli, 274  
Turin - Italy 10148

Cisco Systems informed IEC and ISO that it has patent applications or granted patents.

Information may be obtained from:

Cisco Systems, Inc.  
170 West Tasman Drive  
San Jose, CA – USA 95134

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights other than those identified above. ISO and IEC shall not be held responsible for identifying any or all such patent rights.



**Original UPnP Document**

Reference may be made in this document to original UPnP documents. These references are retained in order to maintain consistency between the specifications as published by ISO/IEC and by UPnP Implementers Corporation and later by UPnP Forum. The following table indicates the original UPnP document titles and the corresponding part of ISO/IEC 29341:

<b>UPnP Document Title</b>	<b>ISO/IEC 29341 Part</b>
UPnP Device Architecture 1.0	ISO/IEC 29341-1:2008
UPnP Device Architecture Version 1.0	ISO/IEC 29341-1:2011
UPnP Device Architecture 1.1	ISO/IEC 29341-1-1:2011
UPnP Device Architecture 2.0	ISO/IEC 29341-1-2
UPnP Basic:1 Device	ISO/IEC 29341-2
UPnP AV Architecture:1	ISO/IEC 29341-3-1:2008
UPnP AV Architecture:1	ISO/IEC 29341-3-1:2011
UPnP AVTransport:1 Service	ISO/IEC 29341-3-10
UPnP ConnectionManager:1 Service	ISO/IEC 29341-3-11
UPnP ContentDirectory:1 Service	ISO/IEC 29341-3-12
UPnP RenderingControl:1 Service	ISO/IEC 29341-3-13
UPnP MediaRenderer:1 Device	ISO/IEC 29341-3-2
UPnP MediaRenderer:2 Device	ISO/IEC 29341-3-2:2011
UPnP MediaServer:1 Device	ISO/IEC 29341-3-3
UPnP AVTransport:2 Service	ISO/IEC 29341-4-10:2008
UPnP AVTransport:2 Service	ISO/IEC 29341-4-10:2011
UPnP ConnectionManager:2 Service	ISO/IEC 29341-4-11:2008
UPnP ConnectionManager:2 Service	ISO/IEC 29341-4-11:2011
UPnP ContentDirectory:2 Service	ISO/IEC 29341-4-12
UPnP RenderingControl:2 Service	ISO/IEC 29341-4-13:2008
UPnP RenderingControl:2 Service	ISO/IEC 29341-4-13:2011
UPnP ScheduledRecording:1	ISO/IEC 29341-4-14
UPnP ScheduledRecording:2	ISO/IEC 29341-4-14:2011
UPnP MediaRenderer:2 Device	ISO/IEC 29341-4-2
UPnP MediaServer:2 Device	ISO/IEC 29341-4-3
UPnP AV Datastructure Template:1	ISO/IEC 29341-4-4:2008
UPnP AV Datastructure Template:1	ISO/IEC 29341-4-4:2011
UPnP DigitalSecurityCamera:1 Device	ISO/IEC 29341-5-1
UPnP DigitalSecurityCameraMotionImage:1 Service	ISO/IEC 29341-5-10
UPnP DigitalSecurityCameraSettings:1 Service	ISO/IEC 29341-5-11
UPnP DigitalSecurityCameraStillImage:1 Service	ISO/IEC 29341-5-12
UPnP HVAC_System:1 Device	ISO/IEC 29341-6-1
UPnP ControlValve:1 Service	ISO/IEC 29341-6-10
UPnP HVAC_FanOperatingMode:1 Service	ISO/IEC 29341-6-11
UPnP FanSpeed:1 Service	ISO/IEC 29341-6-12
UPnP HouseStatus:1 Service	ISO/IEC 29341-6-13
UPnP HVAC_SetpointSchedule:1 Service	ISO/IEC 29341-6-14
UPnP TemperatureSensor:1 Service	ISO/IEC 29341-6-15
UPnP TemperatureSetpoint:1 Service	ISO/IEC 29341-6-16
UPnP HVAC_UserOperatingMode:1 Service	ISO/IEC 29341-6-17
UPnP HVAC_ZoneThermostat:1 Device	ISO/IEC 29341-6-2

## ISO/IEC 29341-20-11:2017(E)

UPnP BinaryLight:1 Device	ISO/IEC 29341-7-1
UPnP Dimming:1 Service	ISO/IEC 29341-7-10
UPnP SwitchPower:1 Service	ISO/IEC 29341-7-11
UPnP DimmableLight:1 Device	ISO/IEC 29341-7-2
UPnP InternetGatewayDevice:1 Device	ISO/IEC 29341-8-1
UPnP LANHostConfigManagement:1 Service	ISO/IEC 29341-8-10
UPnP Layer3Forwarding:1 Service	ISO/IEC 29341-8-11
UPnP LinkAuthentication:1 Service	ISO/IEC 29341-8-12
UPnP RadiusClient:1 Service	ISO/IEC 29341-8-13
UPnP WANCableLinkConfig:1 Service	ISO/IEC 29341-8-14
UPnP WANCommonInterfaceConfig:1 Service	ISO/IEC 29341-8-15
UPnP WANDSLLinkConfig:1 Service	ISO/IEC 29341-8-16
UPnP WANEthernetLinkConfig:1 Service	ISO/IEC 29341-8-17
UPnP WANIPConnection:1 Service	ISO/IEC 29341-8-18
UPnP WANPOTSLinkConfig:1 Service	ISO/IEC 29341-8-19
UPnP LANDevice:1 Device	ISO/IEC 29341-8-2
UPnP WANPPPConnection:1 Service	ISO/IEC 29341-8-20
UPnP WLANConfiguration:1 Service	ISO/IEC 29341-8-21
UPnP WANDevice:1 Device	ISO/IEC 29341-8-3
UPnP WANConnectionDevice:1 Device	ISO/IEC 29341-8-4
UPnP WLANAccessPointDevice:1 Device	ISO/IEC 29341-8-5
UPnP Printer:1 Device	ISO/IEC 29341-9-1
UPnP ExternalActivity:1 Service	ISO/IEC 29341-9-10
UPnP Feeder:1.0 Service	ISO/IEC 29341-9-11
UPnP PrintBasic:1 Service	ISO/IEC 29341-9-12
UPnP Scan:1 Service	ISO/IEC 29341-9-13
UPnP Scanner:1.0 Device	ISO/IEC 29341-9-2
UPnP QoS Architecture:1.0	ISO/IEC 29341-10-1
UPnP QosDevice:1 Service	ISO/IEC 29341-10-10
UPnP QosManager:1 Service	ISO/IEC 29341-10-11
UPnP QosPolicyHolder:1 Service	ISO/IEC 29341-10-12
UPnP QoS Architecture:2	ISO/IEC 29341-11-1
UPnP QosDevice:2 Service	ISO/IEC 29341-11-10
UPnP QosManager:2 Service	ISO/IEC 29341-11-11
UPnP QosPolicyHolder:2 Service	ISO/IEC 29341-11-12
UPnP QOS v2 Schema Files	ISO/IEC 29341-11-2
UPnP RemoteUIClientDevice:1 Device	ISO/IEC 29341-12-1
UPnP RemoteUIClient:1 Service	ISO/IEC 29341-12-10
UPnP RemoteUIServer:1 Service	ISO/IEC 29341-12-11
UPnP RemoteUIServerDevice:1 Device	ISO/IEC 29341-12-2
UPnP DeviceSecurity:1 Service	ISO/IEC 29341-13-10
UPnP SecurityConsole:1 Service	ISO/IEC 29341-13-11
UPnP ContentDirectory:3 Service	ISO/IEC 29341-14-12:2011
UPnP MediaServer:3 Device	ISO/IEC 29341-14-3:2011
UPnP ContentSync:1	ISO/IEC 29341-15-10:2011
UPnP Low Power Architecture:1	ISO/IEC 29341-16-1:2011
UPnP LowPowerProxy:1 Service	ISO/IEC 29341-16-10:2011

UPnP LowPowerDevice:1 Service	ISO/IEC 29341-16-11:2011
UPnP QoS Architecture:3	ISO/IEC 29341-17-1:2011
UPnP QoSDevice:3 Service	ISO/IEC 29341-17-10:2011
UPnP QoSManager:3 Service	ISO/IEC 29341-17-11:2011
UPnP QoSPolicyHolder:3 Service	ISO/IEC 29341-17-12:2011
UPnP QoSDevice:3 Addendum	ISO/IEC 29341-17-13:2011
UPnP RemoteAccessArchitecture:1	ISO/IEC 29341-18-1:2011
UPnP InboundConnectionConfig:1 Service	ISO/IEC 29341-18-10:2011
UPnP RADAConfig:1 Service	ISO/IEC 29341-18-11:2011
UPnP RADASync:1 Service	ISO/IEC 29341-18-12:2011
UPnP RATAConfig:1 Service	ISO/IEC 29341-18-13:2011
UPnP RAClient:1 Device	ISO/IEC 29341-18-2:2011
UPnP RAServer:1 Device	ISO/IEC 29341-18-3:2011
UPnP RADiscoveryAgent:1 Device	ISO/IEC 29341-18-4:2011
UPnP SolarProtectionBlind:1 Device	ISO/IEC 29341-19-1:2011
UPnP TwoWayMotionMotor:1 Service	ISO/IEC 29341-19-10:2011
UPnP AV Architecture:2	ISO/IEC 29341-20-1
UPnP AVTransport:3 Service	ISO/IEC 29341-20-10
UPnP ConnectionManager:3 Service	ISO/IEC 29341-20-11
UPnP ContentDirectory:4 Device	ISO/IEC 29341-20-12
UPnP RenderingControl:3 Service	ISO/IEC 29341-20-13
UPnP ScheduledRecording:2 Service	ISO/IEC 29341-20-14
UPnP MediaRenderer:3 Service	ISO/IEC 29341-20-2
UPnP MediaServer:4 Device	ISO/IEC 29341-20-3
UPnP AV Datastructure Template:1	ISO/IEC 29341-20-4
UPnP InternetGatewayDevice:2 Device	ISO/IEC 29341-24-1
UPnP WANIPConnection:2 Service	ISO/IEC 29341-24-10
UPnP WANIPv6FirewallControl:1 Service	ISO/IEC 29341-24-11
UPnP WANConnectionDevice:2 Service	ISO/IEC 29341-24-2
UPnP WANDevice:2 Device	ISO/IEC 29341-24-3
UPnP Telephony Architecture:2	ISO/IEC 29341-26-1
UPnP CallManagement:2 Service	ISO/IEC 29341-26-10
UPnP MediaManagement:2 Service	ISO/IEC 29341-26-11
UPnP Messaging:2 Service	ISO/IEC 29341-26-12
UPnP PhoneManagement:2 Service	ISO/IEC 29341-26-13
UPnP AddressBook:1 Service	ISO/IEC 29341-26-14
UPnP Calendar:1 Service	ISO/IEC 29341-26-15
UPnP Presense:1 Service	ISO/IEC 29341-26-16
UPnP TelephonyClient:2 Device	ISO/IEC 29341-26-2
UPnP TelephonyServer:2 Device	ISO/IEC 29341-26-3
UPnP Friendly Info Update:1 Service	ISO/IEC 29341-27-1
UPnP MultiScreen MultiScreen Architecture:1	ISO/IEC 29341-28-1
UPnP MultiScreen Application Management:1 Service	ISO/IEC 29341-28-10
UPnP MultiScreen Screen:1 Device	ISO/IEC 29341-28-2
UPnP MultiScreen Application Management:2 Service	ISO/IEC 29341-29-10
UPnP MultiScreen Screen:2 Device	ISO/IEC 29341-29-2
UPnP IoT Management and Control Architecture Overview:1	ISO/IEC 29341-30-1

## ISO/IEC 29341-20-11:2017(E)

UPnP DataStore:1 Service	ISO/IEC 29341-30-10
UPnP IoT Management and Control Data Model:1 Service	ISO/IEC 29341-30-11
UPnP IoT Management and Control Transport Generic:1 Service	ISO/IEC 29341-30-12
UPnP IoT Management and Control:1 Device	ISO/IEC 29341-30-2
UPnP Energy Management:1 Service	ISO/IEC 29341-31-1

## iTeh STANDARD PREVIEW (standards.iteh.ai)

[ISO/IEC 29341-20-11:2017](https://standards.iteh.ai/catalog/standards/sist/75cdda49-94c6-4779-8308-48b2848d9df4/iso-iec-29341-20-11-2017)

<https://standards.iteh.ai/catalog/standards/sist/75cdda49-94c6-4779-8308-48b2848d9df4/iso-iec-29341-20-11-2017>

## 1 Scope

This service definition is compliant with the UPnP Device Architecture version 1.0 [14].

This service-type enables modeling of streaming capabilities of A/V devices, and binding of those capabilities between devices. Each device that is able to send or receive a stream according to the UPnP AV Architecture will have 1 instance of the ConnectionManager service. This service provides a mechanism for control points to:

- a) Perform capability matching between source/server devices and sink/renderer devices,
- b) Find information about currently ongoing transfers in the network,
- c) Setup and teardown connections between devices (when required by the streaming protocol).

The ConnectionManager service is generic enough to properly abstract different kinds of streaming mechanisms, such as HTTP-based streaming, RTSP/RTP-based and 1394-based streaming.

The ConnectionManager enables control points to abstract from physical media interconnect technology when making connections. The term 'stream' used in this service template refers to both analog and digital data transfer.

## 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.

[1] – *XML Schema for RenderingControl AllowedTransformSettings*, UPnP Forum, March 31, 2013.

Available at: <http://www.upnp.org/schemas/av/AllowedTransformSettings-v1-20130331.xsd>.  
Latest version available at: <http://www.upnp.org/schemas/av/AllowedTransformSettings.xsd>.

[2] – *AV Datastructure Template:1*, UPnP Forum, March 31, 2013.

Available at: <http://www.upnp.org/specs/av/UPnP-av-AVDataStructureTemplate-v1-20130331.pdf>.

Latest version available at: <http://www.upnp.org/specs/av/UPnP-av-AVDataStructureTemplate-v1.pdf>.

[3] – *XML Schema for UPnP AV Common XML Data Types*, UPnP Forum, March 31, 2013.

Available at: <http://www.upnp.org/schemas/av/av-v3-20130331.xsd>.  
Latest version available at: <http://www.upnp.org/schemas/av/av.xsd>.

[4] – *XML Schema for UPnP AV Common XML Structures*, UPnP Forum, March 31, 2013.

Available at: <http://www.upnp.org/schemas/av/avs-v3-20130331.xsd>.  
Latest version available at: <http://www.upnp.org/schemas/av/avs.xsd>.

[5] – *AVTransport:3*, UPnP Forum, March 31, 2013.

Available at: <http://www.upnp.org/specs/av/UPnP-av-AVTransport-v3-Service-20130331.pdf>.  
Latest version available at: <http://www.upnp.org/specs/av/UPnP-av-AVTransport-v3-Service.pdf>.

[6] – *XML Schema for AVTransport LastChange Eventing*, UPnP Forum, September 30, 2008.

Available at: <http://www.upnp.org/schemas/av/avt-event-v2-20080930.xsd>.  
Latest version available at: <http://www.upnp.org/schemas/av/avt-event.xsd>.

[7] – *ContentDirectory:4*, UPnP Forum, March 31, 2013.

Available at: <http://www.upnp.org/specs/av/UPnP-av-ContentDirectory-v4-Service-20130331.pdf>.  
Latest version available at: <http://www.upnp.org/specs/av/UPnP-av-ContentDirectory-v4-Service.pdf>.

## ISO/IEC 29341-20-11:2017(E)

[8] – *XML Schema for ContentDirectory LastChange Eventing*, UPnP Forum, September 30, 2008.

Available at: <http://www.upnp.org/schemas/av/cds-event-v1-20080930.xsd>.

Latest version available at: <http://www.upnp.org/schemas/av/cds-event.xsd>.

[9] – *ConnectionManager:3*, UPnP Forum, March 31, 2013.

Available at: <http://www.upnp.org/specs/av/UPnP-av-ConnectionManager-v3-Service-20130331.pdf>.

Latest version available at: <http://www.upnp.org/specs/av/UPnP-av-ConnectionManager-v3-Service.pdf>.

[10] – *XML Schema for ConnectionManager DeviceClockInfoUpdates*, UPnP Forum, December 31, 2010.

Available at: <http://www.upnp.org/schemas/av/cm-deviceClockInfoUpdates-v1-20101231.xsd>.

Latest version available at: <http://www.upnp.org/schemas/av/cm-deviceClockInfoUpdates.xsd>.

[11] – *XML Schema for ConnectionManager Features*, UPnP Forum, December 31, 2010.

Available at: <http://www.upnp.org/schemas/av/cm-featureList-v1-20101231.xsd>.

Latest version available at: <http://www.upnp.org/schemas/av/cm-featureList.xsd>.

[12] – *XML Schema for UPnP AV Dublin Core*.

Available at: <http://www.dublincore.org/schemas/xmls/simpledc20020312.xsd>.

[13] – *DCMI term declarations represented in XML schema language*.

Available at: <http://www.dublincore.org/schemas/xmls>.

[14] – *UPnP Device Architecture, version 1.0*, UPnP Forum, October 15, 2008.

Available at: <http://www.upnp.org/specs/arch/UPnP-arch-DeviceArchitecture-v1.0-20081015.pdf>.

Latest version available at: <http://www.upnp.org/specs/arch/UPnP-arch-DeviceArchitecture-v1.0.pdf>.

[15] – *XML Schema for ContentDirectory Structure and Metadata (DIDL-Lite)*, UPnP Forum, March 31, 2013.

Available at: <http://www.upnp.org/schemas/av/didl-lite-v3-20130331.xsd>.

Latest version available at: <http://www.upnp.org/schemas/av/didl-lite.xsd>.

[16] – *XML Schema for ContentDirectory DeviceMode*, UPnP Forum, December 31, 2010.

Available at: <http://www.upnp.org/schemas/av/dmo-v1-20101231.xsd>.

Latest version available at: <http://www.upnp.org/schemas/av/dmo.xsd>.

[17] – *XML Schema for ContentDirectory DeviceModeRequest*, UPnP Forum, December 31, 2010.

Available at: <http://www.upnp.org/schemas/av/dmor-v1-20101231.xsd>.

Latest version available at: <http://www.upnp.org/schemas/av/dmor.xsd>.

[18] – *XML Schema for ContentDirectory DeviceModeStatus*, UPnP Forum, December 31, 2010.

Available at: <http://www.upnp.org/schemas/av/dmos-v1-20101231.xsd>.

Latest version available at: <http://www.upnp.org/schemas/av/dmos.xsd>.

[19] – ISO/IEC 14977, *Information technology - Syntactic metalanguage - Extended BNF*, December 1996.

[20] – *XML Schema for ContentDirectory PermissionsInfo*, UPnP Forum, December 31, 2010.

Available at: <http://www.upnp.org/schemas/av/pi-v1-20101231.xsd>.

Latest version available at: <http://www.upnp.org/schemas/av/pi.xsd>.

[21] – *RenderingControl:3*, UPnP Forum, March 31, 2013.

Available at: <http://www.upnp.org/specs/av/UPnP-av-RenderingControl-v3-Service-20130331.pdf>.

Latest version available at: <http://www.upnp.org/specs/av/UPnP-av-RenderingControl-v3-Service.pdf>.

- [22] – *XML Schema for RenderingControl LastChange Eventing*, UPnP Forum, December 31, 2010.  
Available at: <http://www.upnp.org/schemas/av/rcs-event-v3-20101231.xsd>.  
Latest version available at: <http://www.upnp.org/schemas/av/rcs-event.xsd>.
- [23] – *XML Schema for ConnectionManager RendererInfo*, UPnP Forum, December 31, 2010.  
Available at: <http://www.upnp.org/schemas/av/rii-v1-20101231.xsd>.  
Latest version available at: <http://www.upnp.org/schemas/av/rii.xsd>.
- [24] – *XML Schema for AVTransport PlaylistInfo*, UPnP Forum, March 31, 2013.  
Available at: <http://www.upnp.org/schemas/av/rpl-v1-20130331.xsd>.  
Latest version available at: <http://www.upnp.org/schemas/av/rpl.xsd>.
- [25] – *ScheduledRecording:2*, UPnP Forum, March 31, 2013.  
Available at: <http://www.upnp.org/specs/av/UPnP-av-ScheduledRecording-v2-Service-20130331.pdf>.  
Latest version available at: <http://www.upnp.org/specs/av/UPnP-av-ScheduledRecording-v2-Service.pdf>.
- [26] – *XML Schema for ScheduledRecording Metadata and Structure*, UPnP Forum, March 31, 2013.  
Available at: <http://www.upnp.org/schemas/av/srs-v2-20130331.xsd>.  
Latest version available at: <http://www.upnp.org/schemas/av/srs.xsd>.
- [27] – *XML Schema for ScheduledRecording LastChange Eventing*, UPnP Forum, September 30, 2008.  
Available at: <http://www.upnp.org/schemas/av/srs-event-v1-20080930.xsd>.  
Latest version available at: <http://www.upnp.org/schemas/av/srs-event.xsd>.
- [28] – *XML Schema for RenderingControl TransformSettings*, UPnP Forum, March 31, 2013.  
Available at: <http://www.upnp.org/schemas/av/TransformSettings-v1-20130331.xsd>.  
Latest version available at: <http://www.upnp.org/schemas/av/TransformSettings.xsd>.
- [29] – *XML Schema for ContentDirectory Metadata*, UPnP Forum, March 31, 2013.  
Available at: <http://www.upnp.org/schemas/av/upnp-v4-20130331.xsd>.  
Latest version available at: <http://www.upnp.org/schemas/av/upnp.xsd>.
- [30] – *The “xml:” Namespace*, November 3, 2004.  
Available at: <http://www.w3.org/XML/1998/namespace>.
- [31] – *XML Schema for the “xml:” Namespace*.  
Available at: <http://www.w3.org/2001/xml.xsd>.
- [32] – *Namespaces in XML*, Tim Bray, Dave Hollander, Andrew Layman, eds., W3C Recommendation, January 14, 1999.  
Available at: <http://www.w3.org/TR/1999/REC-xml-names-19990114>.
- [33] – *XML Schema Part 1: Structures, Second Edition*, Henry S. Thompson, David Beech, Murray Maloney, Noah Mendelsohn, W3C Recommendation, 28 October 2004.  
Available at: <http://www.w3.org/TR/2004/REC-xmlschema-1-20041028>.
- [34] – *XML Schema Part 2: Data Types, Second Edition*, Paul V. Biron, Ashok Malhotra, W3C Recommendation, 28 October 2004.  
Available at: <http://www.w3.org/TR/2004/REC-xmlschema-2-20041028>.
- [35] – *XML Schema for XML Schema*.  
Available at: <http://www.w3.org/2001/XMLSchema.xsd>.
- [36] – *IETF RFC 4122, A Universally Unique Identifier (UUID) URN Namespace*, P. Leach, Microsoft, M. Mealling, Refactored Networks LLC, R. Salz, DataPower Technology, Inc., July 2005.  
Available at: <http://www.ietf.org/rfc/rfc4122.txt>.