Information technology - UPnP Device Architecture - Part 4-10: Audio Video Device Control Protocol - Level 2 - Audio Video Transport Service

Contents

Page

1 Overview and Scope....6
1.1 Introduction....6
1.2 Notation....6
1.2.1 Data Types....6
1.2.2 Strings Embedded in Other Strings....7
1.2.3 Extended Backus-Naur Form....7
1.3 Derived Data Types....8
1.3.1 Comma Separated Value (CSV) Lists....8
1.4 Management of XML Namespaces in Standardized DCPs....9
1.4.1 Namespace Prefix Requirements....12
1.4.2 Namespace Names, Namespace Versioning and Schema Versioning....13
1.4.3 Namespace Usage Examples....15
1.5 Vendor-defined Extensions....16
1.5.1 Vendor-defined Action Names....16
1.5.2 Vendor-defined State Variable Names....16
1.5.3 Vendor-defined XML Elements and attributes....16
1.5.4 Vendor-defined Property Names....16
1.6 References....16
2 Service Modeling Definitions....20
2.1 ServiceType....20
2.2 State Variables....21
2.2.1 *TransportState*....25
2.2.2 *TransportStatus*....26
2.2.3 *CurrentMediaCategory*....26
2.2.4 *PlaybackStorageMedium*....26
2.2.5 *RecordStorageMedium*....26
2.2.6 *PossiblePlaybackStorageMedia*....27
2.2.7 *PossibleRecordStorageMedia*....27
2.2.8 *CurrentPlayMode*....27
2.2.9 *TransportPlaySpeed*....27
2.2.10 *RecordMediumWriteStatus*....27
2.2.11 *CurrentRecordQualityMode*....27
2.2.12 *PossibleRecordQualityModes*....27
2.2.13 *NumberOfTracks*....28
2.2.14 *CurrentTrack*....28
2.2.15 *CurrentTrackDuration*....28
2.2.16 *CurrentMediaDuration*....29
2.2.17 *CurrentTrackMetaData*....29
2.2.18 *CurrentTrackURI*....29
2.2.19 *AVTransportURI*....29
2.2.20 *AVTransportURIMetaData*....29
2.2.21 *NextAVTransportURI*....29
2.2.22 *NextAVTransportURIMetaData*....30
2.2.23 *RelativeTimePosition*....30
2.2.24 *AbsoluteTimePosition*....30

2.2.25 *RelativeCounterPosition* 30
2.2.26 *AbsoluteCounterPosition* 31
2.2.27 *CurrentTransportActions* 31
2.2.28 *LastChange* 31
2.2.29 *DRMState* 31
2.2.30 *A_ARG_TYPE_SeekMode* 32
2.2.31 *A_ARG_TYPE_SeekTarget* 32
2.2.32 *A_ARG_TYPE_InstanceID* 33
2.2.33 *A_ARG_TYPE_DeviceUDN* 33
2.2.34 *A_ARG_TYPE_ServiceType* 33
2.2.35 *A_ARG_TYPE_ServiceID* 33
2.2.36 *A_ARG_TYPE_StateVariableValuePairs* 33
2.2.37 *A_ARG_TYPE_StateVariableList* 34
2.3 Eventing and Moderation 35
2.3.1 Event Model 35
2.4 Actions 37
2.4.1 *SetAVTransportURI()* 37
2.4.2 *SetNextAVTransportURI()* 39
2.4.3 *GetMediaInfo()* 40
2.4.4 *GetMediaInfo_Ext()* 41
2.4.5 *GetTransportInfo()* 42
2.4.6 *GetPositionInfo()* 42
2.4.7 *GetDeviceCapabilities()* 43
2.4.8 *GetTransportSettings()* 43
2.4.9 *Stop()* 44
2.4.10 *Play()* 45
2.4.11 *Pause()* 46
2.4.12 *Record()* 47
2.4.13 *Seek()* 48
2.4.14 *Next()* 50
2.4.15 *Previous()* 51
2.4.16 *SetPlayMode()* 52
2.4.17 *SetRecordQualityMode()* 53
2.4.18 *GetCurrentTransportActions()* 53
2.4.19 *GetDRMState()* 54
2.4.20 *GetStateVariables()* 55
2.4.21 *SetStateVariables()* 55
2.4.22 Common Error Codes 56
2.5 Theory of Operation 58
2.5.1 TransportState Control 58
2.5.2 Transport Settings 60
2.5.3 Navigation 60
2.5.4 AVTransportURI Concept 60
2.5.5 AVTransport Abstraction 61
2.5.6 Supporting Multiple Virtual Transports 63
2.5.7 Playlist Playback 64
3 XML Service Description 65
4 Test 78
Annex A (normative) *SetAVTransportURI()* Protocol Specifics 79

A.1 Application to HTTP Streaming 79
A.1.1 *AVTransportURI* Definition 79
A.1.2 Control Point Behavior for *SetAVTransportURI()* 79
A.1.3 Implementation of *SetAVTransportURI()* 79
A.1.4 Cleanup 79
A.2 Application to RTSP/RTP/UDP Streaming 79
A.2.1 *AVTransportURI* Definition 79
A.2.2 Control Point behavior for *SetAVTransportURI()* 80
A.2.3 Implementation of *SetAVTransportURI()* 80
A.2.4 Cleanup 80
A.2.5 Implementation of Transport Controls 81
A.3 Application to Internal Streaming 81
A.3.1 *AVTransportURI* Definition 81
A.3.2 Implementation of *SetAVTransportURI()* 81
A.3.3 Cleanup 81
A.4 Application to IEC61883 Streaming 81
A.4.1 *AVTransportURI* Definition 81
A.4.2 Implementation of *SetAVTransportURI()* 82
A.4.3 Cleanup 82
A.5 Application to Vendor-specific Streaming 82
A.5.1 *AVTransportURI* Definition 82
A.5.2 Implementation of *SetAVTransportURI()* 82
A.5.3 Cleanup 82

Figure 1: *TransportState* Transitions - INFORMATIVE 59

Table 1-1 — EBNF Operators 7
Table 1-2 — CSV Examples 9
Table 1-3 — Namespace Definitions 11
Table 1-4 — Schema-related Information 12
Table 1-5 — Default Namespaces for the AV Specifications 13
Table 2-6 — State Variables 21
Table 2-7 — allowedValueList for *TransportState* 22
Table 2-8 — allowedValueList for *CurrentMediaCategory* 22
Table 2-9 — allowedValueList for *PlaybackStorageMedium* and *RecordStorageMedium* 23
Table 2-10 — allowedValueList for *CurrentPlayMode* 24
Table 2-11 — allowedValueList for *RecordMediumWriteStatus* 24
Table 2-12 — allowedValueList for *CurrentRecordQualityMode* 24
Table 2-13 — allowedValueRange for *NumberOfTracks* 24
Table 2-14 — allowedValueRange for *CurrentTrack* 24
Table 2-15 — allowedValueList for *CurrentTransportActions* 25
Table 2-16 — allowedValueList for *DRMState* 25
Table 2-17 — allowedValueList for *A_ARG_TYPE_SeekMode* 25
Table 2-18 — Format of *A_ARG_TYPE_SeekTarget* 33
Table 2-19 — Event Moderation 35

Table 2-20 — Actions 37
Table 2-21 — Arguments for *SetAVTransportURI()* 38
Table 2-22 — Error Codes for *SetAVTransportURI()* 38
Table 2-23 — Arguments for *SetNextAVTransportURI()* 39
Table 2-24 — Error Codes for *SetNextAVTransportURI()* 40
Table 2-25 — Arguments for *GetMediaInfo()* 40
Table 2-26 — Error Codes for *GetMediaInfo()* 41
Table 2-27 — Arguments for *GetMediaInfo_Ext()* 41
Table 2-28 — Error Codes for *GetMediaInfo_Ext()* 41
Table 2-29 — Arguments for *GetTransportInfo()* 42
Table 2-30 — Error Codes for *GetTransportInfo()* 42
Table 2-31 — Arguments for *GetPositionInfo()* 42
Table 2-32 — Error Codes for *GetPositionInfo()* 43
Table 2-33 — Arguments for *GetDeviceCapabilities()* 43
Table 2-34 — Error Codes for *GetDeviceCapabilities()* 43
Table 2-35 — Arguments for *GetTransportSettings()* 44
Table 2-36 — Error Codes for *GetTransportSettings()* 44
Table 2-37 — Arguments for *Stop()* 44
Table 2-38 — Error Codes for *Stop()* 45
Table 2-39 — Arguments for *Play()* 45
Table 2-40 — Error Codes for *Play()* 46
Table 2-41 — Arguments for *Pause()* 47
Table 2-42 — Error Codes for *Pause()* 47
Table 2-43 — Arguments for *Record()* 47
Table 2-44 — Error Codes for *Record()* 48
Table 2-45 — Arguments for *Seek()* 49
Table 2-46 — Error Codes for *Seek()* 50
Table 2-47 — Arguments for *Next()* 50
Table 2-48 — Error Codes for *Next()* 51
Table 2-49 — Arguments for *Previous()* 51
Table 2-50 — Error Codes for *Previous()* 52
Table 2-51 — Arguments for *SetPlayMode()* 52
Table 2-52 — Error Codes for *SetPlayMode()* 53
Table 2-53 — Arguments for *SetRecordQualityMode()* 53
Table 2-54 — Error Codes for *SetRecordQualityMode()* 53
Table 2-55 — Arguments for *GetCurrentTransportActions()* 54
Table 2-56 — Error Codes for *GetCurrentTransportActions()* 54
Table 2-57 — Arguments for *GetDRMState()* 54
Table 2-58 — Error Codes for *GetDRMState()* 54
Table 2-59 — Arguments for *GetStateVariables()* 55
Table 2-60 — Error Codes for *GetStateVariables()* 55
Table 2-61 — Arguments for *SetStateVariables()* 56
Table 2-62 — Error Codes for *SetStateVariables()* 56

Table 2-63 — Common Error Codes 57
Table 2-64 — Allowed AVTransportURIs 61
Table 2-65 — Example mappings of resources type to track sequences 62
Table 2-66 — Example seek modes, play modes and transport actions, per resource type 63