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INTERNATIONAL STANDARD

Information technology – UPnP Device Architecture – Part 11-10: Quality of Service Device Control Protocol – Level 2 – Quality of Service Device Service

ISO/IEC 29341-11-10:2008(E)

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INFORMATION TECHNOLOGY – UPNP DEVICE ARCHITECTURE –

Part 11-10: Quality of Service Device Control Protocol – Level 2 – Quality of Service Device Service

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The list of all currently available parts of the ISO/IEC 29341 series, under the general title *Universal plug and play (UPnP) architecture*, can be found on the IEC web site.

This International Standard has been approved by vote of the member bodies, and the voting results may be obtained from the address given on the second title page.

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ORIGINAL UPNP DOCUMENTS
(informative)

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. The following table indicates the original UPnP document titles and the corresponding part of ISO/IEC 29341:

UPnP Document Title	ISO/IEC 29341 Part
UPnP Device Architecture 1.0	ISO/IEC 29341-1
UPnP Basic:1 Device	ISO/IEC 29341-2
UPnP AV Architecture:1	ISO/IEC 29341-3-1
UPnP MediaRenderer:1 Device	ISO/IEC 29341-3-2
UPnP MediaServer:1 Device	ISO/IEC 29341-3-3
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: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
UPnP AVTransport:2 Service	ISO/IEC 29341-4-10
UPnP ConnectionManager:2 Service	ISO/IEC 29341-4-11
UPnP ContentDirectory:2 Service	ISO/IEC 29341-4-12
UPnP RenderingControl:2 Service	ISO/IEC 29341-4-13
UPnP ScheduledRecording:1	ISO/IEC 29341-4-14
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 HVAC_ZoneThermostat:1 Device	ISO/IEC 29341-6-2
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 BinaryLight:1 Device	ISO/IEC 29341-7-1
UPnP DimmableLight:1 Device	ISO/IEC 29341-7-2
UPnP Dimming:1 Service	ISO/IEC 29341-7-10
UPnP SwitchPower:1 Service	ISO/IEC 29341-7-11
UPnP InternetGatewayDevice:1 Device	ISO/IEC 29341-8-1
UPnP LANDevice:1 Device	ISO/IEC 29341-8-2
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 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 WANPPPConnection:1 Service	ISO/IEC 29341-8-20
UPnP WLANConfiguration:1 Service	ISO/IEC 29341-8-21
UPnP Printer:1 Device	ISO/IEC 29341-9-1
UPnP Scanner:1.0 Device	ISO/IEC 29341-9-2
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 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 QOS v2 Schema Files	ISO/IEC 29341-11-2

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UPnP Document Title	ISO/IEC 29341 Part
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 RemoteUIClientDevice:1 Device	ISO/IEC 29341-12-1
UPnP RemoteUIServerDevice:1 Device	ISO/IEC 29341-12-2
UPnP RemoteUIClient:1 Service	ISO/IEC 29341-12-10
UPnP RemoteUIServer:1 Service	ISO/IEC 29341-12-11
UPnP DeviceSecurity:1 Service	ISO/IEC 29341-13-10
UPnP SecurityConsole:1 Service	ISO/IEC 29341-13-11

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1. Overview and Scope

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

This service-type enables modeling of the 'QoS Device' function capabilities. The QosDevice:2 service is a function typically implemented in source, sink and intermediate network elements that are in the path of the traffic. The QosDevice Service is responsible for providing the appropriate network resources to traffic and state of the device as requested by QoS Management Entity as defined in the QosManager:2 Service. [QM]

This document does not address the procedure for end-to-end set up of a new traffic stream nor revoke an existing traffic stream.

1.1. Referenced Specifications

Unless explicitly stated otherwise herein, implementation of the mandatory provisions of any standard referenced by this specification shall be mandatory for compliance with this specification.

1.1.1. Normative References

This section lists the normative references used in this document and includes the tag inside square brackets that is used for each sub reference:

[Annex_G] – IEEE 802.1D-2004, Annex G, *IEEE Standard for Information technology - Telecommunications and information exchange between systems - IEEE standard for local and metropolitan area networks - Common specifications - Media access control (MAC) Bridges*, 2004.

[XML] – *Extensible Markup Language (XML) 1.0 (Second Edition)*, T. Bray, J.Paoli, C. M. Sperberg-McQueen, E Maler, eds. W3C Recommendations, 6 October 2000.

[QM] – UPnP QosManager:2 Service Document: Note that only the schema definition used for the A_ARG_TYPE_TrafficDescriptor is normative for UPnP QosDevice:2 service specification and the schema is defined in the UPnP QosManager:2 document.

[DEVICE] - *UPnP Device Architecture, version 1.0*.

[RFC3339] – Date and Time on the Internet: Timestamps, G. Klyne, July 2002.
http://www.ietf.org/rfc/rfc3339.txt

1.1.2. Informative References

This section lists the informative references used in this document and includes the tag inside square brackets that is used for each sub reference:

[Qos Architecture] – UPnP Qos Architecture:2 Document

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2. Service Modeling Definitions

2.1. ServiceType

The following service type identifies a service that is compliant with this template:

urn:schemas-upnp-org:service:QosDevice:2

The shorthand QosDevice is used herein to refer to this type of service.

2.2. Namespaces

The XML [XML] in this document should be read as if the following namespace definitions are in effect.

`xmlns="http://www.upnp.org/schemas/TrafficDescriptorv1.xsd"[QM]`

2.3. State Variables

Reader Note: For first-time reader, it may be more insightful to read the action definitions before reading the state variable definitions.

2.3.1. Derived data Types

This section defines some derived data types that are represented as UPnP string data types with special syntax.

2.3.1.1. XML Fragments as UPnP Arguments

The UPnP QoS Framework often uses XML Fragments as arguments in UPnP actions. The containing UPnP data type is a string. This places restrictions on a string's content; it has to represent a well-formed XML fragment (this includes a complete XML document).

In their XML fragments, implementations may use an explicit reference to appropriate name spaces.

At several places in the XML schemas there is room for vendor differentiation or future revisions through the use of the "any"-tag. When extending UPnP-QoS with their own XML tags, vendors should use a name space to prevent collisions of their tags with those of other vendors. It is recommended that implementations are not required to retrieve the corresponding schemas from the Internet.

In order to maintain the extensibility of the namespace, all future modification of the schema definition will be proper supersets. The URN will not change even when the service version number changes.

Finally, an XML fragment, in adherence to the UPnP V1.0 architecture [Qos Architecture], needs to be escaped by using the normal XML rules, [XML] Section 2.4 Character Data and Markup, before embedding it in a SOAP request or response message. The XML escaping rules are summarized from the [XML] reference mentioned above:

- The (<) character is encoded as (<)
- The (>) character is encoded as (>)
- The (&) character is encoded as (&)
- The (") character is encoded as (")
- The (') character is encoded as (')

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Table 2-1: State Variables

Variable Name	Req. or Opt.[1]	Data Type	Allowed Value [2]	Default Value [2]	Eng. Units
A_ARG_TYPE_TrafficDescriptor	R	String (XML fragment)	See §2.3.2	n/a	n/a
A_ARG_TYPE_TrafficDescriptorsPerInterface	R	String (XML fragment)	See §2.3.3	n/a	n/a
A_ARG_TYPE_TrafficHandle	R	String	See §2.3.4	n/a	n/a
A_ARG_TYPE_NumTraffficDescriptors	R	ui4	See §2.3.5	n/a	n/a
A_ARG_TYPE_QosDeviceCapabilities	R	String (XML fragment)	See §2.3.6	n/a	n/a
A_ARG_TYPE_QosDeviceState	R	String (XML fragment)	See §2.3.7	n/a	n/a
PathInformation	O	String (XML fragment)	See §2.3.8	n/a	n/a
A_ARG_TYPE_QosDeviceInfo	O	String (XML fragment)	See §2.3.9	n/a	n/a
A_ARG_TYPE_QosStateId	R	String		n/a	n/a
A_ARG_TYPE_NumRotameterObservations	O	ui4	See §2.3.10	1	n/a
A_ARG_TYPE_RotameterInformation	O	String (XML fragment)	See §2.3.11	n/a	n/a
A_ARG_TYPE_ConfRotameterObservations	O	String (XML fragment)	See §2.3.12	n/a	n/a
MostRecentStreamAction	O	String (XML fragment)	See §2.3.13	n/a	n/a
A_ARG_TYPE_MaxPossibleRotameterObservations	O	ui4	See §2.3.14	1	n/a

1. R = Required, O = Optional, X = Non-standard.

2. Values listed in this column are required. To specify standard optional values or to delegate assignment of values to the vendor, you must reference a specific instance of an appropriate table below.

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2.3.2. A_ARG_TYPE_TrafficDescriptor

This is an escaped XML string, as specified in section 2.3.1.1, which contains QoS related information for a traffic stream. Refer to [QM] document, for details of this XML fragment using the namespace, `xmlns="http://www.upnp.org/schemas/TrafficDescriptorv1.xsd"`.

2.3.3. A_ARG_TYPE_TrafficDescriptorsPerInterface

This is an escaped XML string, as specified in section 2.3.1.1, which contains the list of traffic descriptors that are associated with a network interface on a given QosDevice.

This argument is described by the schema identified by
"`http://www.upnp.org/schemas/TrafficDescriptorsPerInterface.xsd`" and located at
"`http://www.upnp.org/schemas/qos/TrafficDescriptorsPerInterface-v2.xsd`".

2.3.3.1. Description of fields in the TrafficDescriptorsPerInterface structure

The TrafficDescriptorsPerInterface is a complex structure that consists of one or more entries of 'TdInterfacePair'. TdInterfacePair lists one TrafficDescriptor, followed by the InterfaceId of the associated of the interface. Here are the details about these two parameters:

TrafficDescriptor: This field describes a TrafficDescriptor associated with an Interface. An Interface can have multiple associated TrafficDescriptor objects.

InterfaceId: This is a required field. The value is of type string and is a unique value for a given device and is used to identify the interface.

2.3.3.2. Sample argument XML string

```
<?xml version="1.0" encoding="UTF-8"?>
<TrafficDescriptorsPerInterface
xmlns="http://www.upnp.org/schemas/TrafficDescriptorsPerInterface.xsd"
xmlns:td="http://www.upnp.org/schemas/TrafficDescriptorv1.xsd"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.upnp.org/schemas/TrafficDescriptorsPerInterface.xsd
http://www.upnp.org/schemas/qos/TrafficDescriptorsPerInterface-v2.xsd">
        <TdInterfacePair>
                <TrafficDescriptor>
                        <td:TrafficHandle>kiwin</td:TrafficHandle>
                        <td:TrafficId>
                                <td:SourceAddress>
                                        <td:Ipv4>192.168.1.50</td:Ipv4>
                                </td:SourceAddress>
                                <td:SourcePort>23</td:SourcePort>
                                <td:DestinationAddress>
                                        <td:Ipv4>192.168.1.50</td:Ipv4>
                                </td:DestinationAddress>
                                <td:DestinationPort>23</td:DestinationPort>
                                <td:IpProtocol>1</td:IpProtocol>
                        </td:TrafficId>
                        <td:AvailableOrderedTspecList>
                                <td:Tspec>
                                        <td:TspecIndex>300</td:TspecIndex>
                                        <td:TrafficClass>AV</td:TrafficClass>
                                </td:Tspec>
                                <td:Tspec>
                                        <td:TspecIndex>2</td:TspecIndex>
                                        <td:TrafficClass>Audio</td:TrafficClass>
                                </td:Tspec>
                        </td:AvailableOrderedTspecList>
                        <td:ActiveTspecIndex>300</td:ActiveTspecIndex>
                        <td:TrafficImportanceNumber>5</td:TrafficImportanceNumber>
                        <td:OptionalPolicyParams>
                                <td:CpName>Amy's CP</td:CpName>
                        </td:OptionalPolicyParams>
                </TrafficDescriptor>
                <InterfaceId>eth0</InterfaceId>
        </TdInterfacePair>
</TrafficDescriptorsPerInterface>
```

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2.3.4. A_ARG_TYPE_TrafficHandle

A_ARG_TYPE_TrafficHandle is a string to identify a traffic stream. Refer to the [QM] document for more details.

2.3.5. A_ARG_TYPE_NumTrafficDescriptors

This is an integer argument. Refer to the [QM] document for more details.

2.3.6. A_ARG_TYPE_QosDeviceCapabilities

This is an escaped XML fragment, as specified in section 2.3.1.1, and contains information describing a device's QoS capabilities.

This argument is described by the schema identified by "`http://www.upnp.org/schemas/QosDeviceCapabilities.xsd`" and located at "`http://www.upnp.org/schemas/qos/QosDeviceCapabilities-v2.xsd`".

2.3.6.1. Description of fields in the QosDeviceCapabilities structure

Interface: This is a required field and defined as an XML element. This field describes a network interface on the QosDevice. An Interface definition is required for each interface supported by the device. This information is provided even if the physical interface is down at a given time.

MacAddress: This is a required field if a given interface has an associated MacAddress. Provides the MAC address of the Interface.

InterfaceId: This is a required field. The value is of type string and is a unique value for a given device and is used to identify the interface.

IanaTechnologyType: The IanaTechnologyType is an integer that indicates media interface type, such as 802.3 (value=6) or 802.11 (value=71). The allowed integer values for this parameter are specified in the IANA reference ifType-MIB <http://www.iana.org/assignments/ianaiftype-mib>.

AdmissionControlSupported: This is a required field. AdmissionControlSupported field indicates whether the interface on the device is capable of performing device level admission control. For this version of the specification the device must set this parameter to a value of "No".

PacketTaggingSupported: This is a required field. PacketTaggingSupported field indicates whether the device is capable of tagging layer2 priorities on the outgoing interface. This field can report only one of two values "Yes" or "No".

NativeQos: This is an optional field. Contains one of the 2 values (Prioritized, BestEffort).

MaxPhyRate: Indicates the maximum PHY rate of the interface and expressed as a value of type UnsignedInt. This parameter is optional and indicates (Units) phy rate measured in bits/sec.

ChannelInformation: Indicates the channel number of the IanaTechnologyType, if the technology supports channels. For example, 802.11 (value=71) supports multiple channels. Expressed as a value of type UnsignedInt.

Documents
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