ISO/IEC 29341-10-12

Edition 1.0 2008-11

INTERNATIONAL STANDARD

Information technology – UPnP Device Architecture – Part 10-12: Quality of Service Device Control Protocol – Quality of Service Policy Holder Service



ISO/IEC 29341-10-12:2008(E)

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2008 ISO/IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester.

If you have any questions about ISO/IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland
Email: inmail@iec.ch
Web: www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

- Catalogue of IEC publications: www.iec.ch/searchpub

The IEC on-line Catalogue enables you to search by a variety of criteria (reference number, text, technical committee,…). It also gives information on projects, withdrawn and replaced publications.

- IEC Just Published: www.iec.ch/online_news/justpub

Stay up to date on all new IEC publications. Just Published details twice a month all new publications released. Available on-line and also by email.

- Electropedia: www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 20 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary online.

- Customer Service Centre: www.iec.ch/webstore/custserv

If you wish to give us your feedback on this publication or need further assistance, please visit the Customer Service Centre FAQ or contact us:

Email: csc@iec.ch
Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00

--`,,```,,,,````-`-`,,`,,`,`,,`---

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS

Not for Resale

ISO/IEC 29341-10-12

Edition 1.0 2008-11

INTERNATIONAL STANDARD

Information technology – UPnP Device Architecture – Part 10-12: Quality of Service Device Control Protocol – Quality of Service Policy Holder Service

INTERNATIONAL ELECTROTECHNICAL COMMISSION

PRICE CODE F

ICS 35.200

ISBN 2-8318-1011-8

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS

Not for Resale

CONTENTS

FOREWORD 4
ORIGINAL UPNP DOCUMENTS (informative) 6
1. Overview and Scope 8
2. Service Modeling Definitions 9
2.1. ServiceType 9
2.2. Namespaces 9
2.3. Referenced Specifications 9
2.3.1. Normative References 9
2.3.2. Informative References 9
2.4. State Variables 10
2.4.1. Derived data types 10
2.4.2. A_ARG_TYPE_TrafficDescriptor 10
2.4.3. A_ARG_TYPE_TrafficPolicy 11
2.4.4. Relationships Between State Variables 11
2.5. Eventing and Moderation 11
2.5.1. Event Model 11
2.6. Actions 12
2.6.1. GetTrafficPolicy 12
2.6.2. Non-Standard Actions Implemented by a UPnP Vendor 13
2.6.3. Relationships Between Actions 13
2.6.4. Common Error Codes 13
3. Supporting Information 15
3.1. Glossary 15
3.2. Namespaces 15
3.2.1. Schema Definition 15
3.2.2. <Any> XML Tag Usage 16
4. Theory of Operation (Informative) 17
5. XML Service Description 18
6. Test 19

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS Not for Resale

LIST OF TABLES

Table 2-1: State Variables 10
Table 2-2: Event Moderation 11
Table 2-3: Actions 12
Table 2-4: Arguments for GetTrafficPolicy 12
Table 2-5: Error Codes for GetTrafficPolicy 13
Table 2-6: Common Error Codes 14

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

INFORMATION TECHNOLOGY – UPNP DEVICE ARCHITECTURE –

Part 10-12: Quality of Service Device Control Protocol Quality of Service Policy Holder Service

FOREWORD

1) ISO (International Organization for Standardization) and IEC (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. Their preparation is entrusted to technical committees; any ISO and IEC member body interested in the subject dealt with may participate in this preparatory work. International governmental and non-governmental organizations liaising with ISO and IEC also participate in this preparation.

2) In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

3) The formal decisions or agreements of IEC and ISO on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC and ISO member bodies.

4) IEC, ISO and ISO/IEC publications have the form of recommendations for international use and are accepted by IEC and ISO member bodies in that sense. While all reasonable efforts are made to ensure that the technical content of IEC, ISO and ISO/IEC publications is accurate, IEC or ISO cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.

5) In order to promote international uniformity, IEC and ISO member bodies undertake to apply IEC, ISO and ISO/IEC publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any ISO/IEC publication and the corresponding national or regional publication should be clearly indicated in the latter.

6) ISO and IEC provide no marking procedure to indicate their approval and cannot be rendered responsible for any equipment declared to be in conformity with an ISO/IEC publication.

7) All users should ensure that they have the latest edition of this publication.

8) No liability shall attach to IEC or ISO or its directors, employees, servants or agents including individual experts and members of their technical committees and IEC or ISO member bodies for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication of, use of, or reliance upon, this ISO/IEC publication or any other IEC, ISO or ISO/IEC publications.

9) Attention is drawn to the normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.

IEC and ISO 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 the putative patent rights. The holders of the putative patent rights have assured IEC and ISO that they are willing to negotiate free licences or licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statements of the holders of the putative patent rights are registered with IEC and ISO.

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:

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS Not for Resale

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
One Microsoft Way
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

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

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. IEC and ISO shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 29341-10-12 was prepared by UPnP Implementers Corporation 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 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.

--`,,```,,,,````-`-`,,`,,`,`,,`---

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS Not for Resale

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

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS Not for Resale

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

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

1. Overview and Scope

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

This service-type enables modeling of the 'QosPolicyHolder' function capabilities. The functionality for the QosPolicyHolder service can be implemented by any device on the home network. The QosPolicyHolder service is responsible for providing the traffic policy values for any given traffic stream as requested by an entity that manages home network traffic. The traffic policy values are determined by applying the policy rules configured for the home network to the requested traffic information. The configuration and management of home network policy are out of scope within the UPnP QoS architecture [QoS Architecture]. If there is a QosPolicyHolder, then there must be only *one* QosPolicyHolder service that gets advertised (SSDP discovered) within the home network. If more than one service instance gets advertised (discovered) by an entity that manages home network traffic, then that entity must operate as if *no* QosPolicyHolder service is present within the home network and operate with the default policy rules for UPnP QoS [QoS Architecture].

This document does not address the procedure for end to end set up of new traffic or revoking of existing traffic.

--`,,```,,,,````-`-`,,`,,`,`,,`---

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS Not for Resale

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:QosPolicyHolder:1

The shorthand 'QosPolicyHolder service' is used herein to refer to this service type.

2.2. Namespaces

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

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

`xmlns:uph="http://www.upnp.org/schemas/TrafficPolicy.xsd"` [3.2.1]

2.3. 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.

2.3.1. 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:

[IEEE] - 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.

[DEVICE] - *UPnP Device Architecture, version 1.0.1*.

[QoS MGR] – UPnP QosManager Service Document.
Note that only the schema definition used for the A_ARG_TYPE_TrafficDescription is normative for this specification and the schema is defined in this reference.

2.3.2. 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 Document.

[QoS DEV] – UPnP QosDevice Service Document.

--`,,```,,,,````-`-`,,`,,`,`,,`---
Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS Not for Resale

2.4. State Variables

Unlike most other service templates, the QosPolicyHolder service is 'action' based. This service's state variables exist primarily to support argument passing of the service's actions. Information is not exposed directly through explicit state variables. Rather, a client retrieves QosPolicyHolder service information via the return parameters of the actions defined in section 2.6. All of the state variables defined exist simply to enable the various actions of this service. This service is not intended to maintain any persistent state information.

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

2.4.1. Derived data types

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

2.4.1.1. XML Fragments as UPnP Arguments

When an XML fragment is used for a UPnP argument, it places restrictions on the XML string data type. It needs to be represented as well formed XML. An XML fragment used within SOAP actions, in adherence to the UPnP Device Architecture version1.0 [DEVICE], 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. Every QosPolicyHolder service action described in this document requires that the arguments themselves to be XML fragments. 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 (')

Table 2-1: State Variables

Variable Name	Req. or Opt.[1]	Data Type	Allowed Value	Default Value	Eng. Units
A_ARG_TYPE_TrafficDescriptor	R	string (XML fragment)	see section 2.4.2	n/a	n/a
A_ARG_TYPE_TrafficPolicy	R	string (XML fragment)	see section 2.4.3	n/a	n/a

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

2.4.2. A_ARG_TYPE_TrafficDescriptor

This is an escaped XML fragment, as specified in section 2.4.1.1, which contains information about some QoS traffic stream. Refer to the UPnP QosManager Service [QoS MGR] for syntax details of this XML fragment using the namespace,
`xmlns:uqos="http://www.upnp.org/schemas/TrafficDescriptorv1.xsd"`.

--`,,```,,,,````-`-`,,`,,`,`,,`---

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS Not for Resale

2.4.3. A_ARG_TYPE_TrafficPolicy

This is an escaped XML fragment, as specified in section 2.4.1.1, which contains the prescribed level of QoS for some traffic stream. It is composed of three elements that are summarized briefly below:

- Whether ***AdmissionPolicy*** is enabled or disabled for the network.
- A ***TrafficImportanceNumber*** is an integer with values in the range of 0 through 7. This value follows the numbering scheme for traffic classes as described in IEEE 802.1D Annex G [IEEE] and with additional traffic classes described in [QoS MGR]. This value is used by device(s) in the traffic's path to indicate what priority level to utilize when tagging the traffic's network packets.
- A ***UserImportanceNumber*** is an integer with values in the range of 0 through 255. This will be used by a QoS managing entity for basing traffic admission policy decisions. This value is applicable only when the ***AdmissionPolicy*** is enabled. Note that a value of 255 is the highest user importance and 0 is the lowest.

The formal XML schema definition for "TrafficPolicy" is a defined in section 3.2.1 of this specification.

2.4.4. Relationships Between State Variables

There are no relationships between any of the state variables for this service.

2.5. Eventing and Moderation

Table 2-2: Event Moderation

Variable Name	Evented	Moderated Event	Max Event Rate[1]	Logical Combination	Min Delta per Event[2]

[1] Determined by N, where Rate = (Event)/(N secs).
[2] (N) * (allowedValueRange Step).

2.5.1. Event Model

None of the state variables are evented for this service.

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS Not for Resale

2.6. Actions

The QosPolicyHolder service is added to a UPnP device that will manage the QoS policy for the entire home network. As such, it should be resident within devices that will always be available on the network at any time and should provide an out of band mechanism from UPnP that allows for the disabling of service announcements.

Immediately following Table 2-3 is detailed information about the actions listed in this table, including short descriptions of the actions, the effects of the actions on state variables, and error codes defined by the actions.

Table 2-3: Actions

Name	Req. or Opt. [1]
GetTrafficPolicy	R

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

2.6.1. GetTrafficPolicy

This action will determine what the prescribed level of QoS that will get applied to the requested traffic stream.

If QosManager does not supply ActiveTspecIndex in TrafficDescriptor to the QosPolicyHolder, this action must return error code 723.

If a QosManager does not supply a TrafficHandle in a TrafficDescriptor to QosPolicyHolder, this action must return error code 700.

The QosPolicyHolder only returns the policy for the Tspec indicated by the ActiveTspecIndex.

In the TrafficDescriptor to the QosPolicyHolder, the Tspec for which TrafficPolicy is needed is indicated by the ActiveTspecIndex. ActiveTspecIndex must be one of the TspecIndex values in the AvailableOrderedTspecList. If not, QosPolicyHolder must return an error code 723.

2.6.1.1. Arguments

Table 2-4: Arguments for GetTrafficPolicy

Argument	Direction	relatedStateVariable
RequestedTrafficDescriptor	IN	A_ARG_TYPE_TrafficDescriptor
OutputTrafficPolicy	OUT	A_ARG_TYPE_TrafficPolicy

The RequestedTrafficDescriptor input argument is an escaped XML fragment, as specified in section 2.4.2, which contains information for the traffic stream requiring some level of Qos. This action will then determine what the prescribed level of QoS that will get applied to this requested traffic stream. Refer to the UPnP QosManager Service [QoS MGR] for details on this XML fragment using the namespace, `xmlns:uqos="http://www.upnp.org/schemas/TrafficDescriptorv1.xsd"`.

The OutputTrafficPolicy output argument is an escaped XML string, as specified in section 2.4.3, which contains the prescribed level of QoS for the requested traffic stream.

Illustrated below are two separate examples for possible results returned (OutputTrafficPolicy), when executing the GetTrafficPolicy action. XML escaping is not shown to provide better readability.

--`,,```,,,,````-`-`,,`,,`,`,,`---

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS Not for Resale

Example 1:

```
<uph:TrafficPolicy
    xmlns:uph="http://www.upnp.org/schemas/TrafficPolicy.xsd">
    <uph:AdmissionPolicy>Enabled</uph:AdmissionPolicy>
    <uph:TrafficImportanceNumber>3</uph:TrafficImportanceNumber>
    <uph:UserImportanceNumber>128</uph:UserImportanceNumber>
</uph:TrafficPolicy>
```

Example 2:

```
<uph:TrafficPolicy
    xmlns:uph="http://www.upnp.org/schemas/TrafficPolicy.xsd">
    <uph:AdmissionPolicy>Disabled</uph:AdmissionPolicy>
    <uph:TrafficImportanceNumber>5</uph:TrafficImportanceNumber>
</uph:TrafficPolicy>
```

The formal XML schema definition for "TrafficPolicy" is a defined in section 3.2.1 of this specification.

2.6.1.2. Dependency on State (if any)

There is no dependency on the current state of this service when this action gets executed.

2.6.1.3. Effect on State (if any)

There is no effect on the state of this service when this action gets executed.

2.6.1.4. Errors

The only error codes returned by this action are those that are related to the UPnP Device Architecture [DEVICE]. There are not any additional error codes that are unique only to this service.

Table 2-5: Error Codes for GetTrafficPolicy

errorCode	errorDescription	Description

2.6.2. Non-Standard Actions Implemented by a UPnP Vendor

To facilitate certification, non-standard actions implemented by UPnP vendors should be included in this service template. The UPnP Device Architecture [DEVICE] specifies naming requirements for non-standard actions (see the section on Description).

2.6.3. Relationships Between Actions

There is no relationship between the actions for this service.

2.6.4. Common Error Codes

The following table lists error codes common to actions for this service type. If an action results in multiple errors, the most specific error must be returned. These common error codes are defined in the UPnP Device Architecture [DEVICE] and other Technical Committee documents.

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS Not for Resale

Table 2-6: Common Error Codes

errorCode	errorDescription	Description
400-499	TBD	See UPnP Device Architecture section on Control.
500-599	TBD	See UPnP Device Architecture section on Control
600-699	TBD	See UPnP Device Architecture section on Control
700-799	*Not Applicable*	Common action errors defined by the UPnP Forum working committees.
800-899	*TBD*	*(Specified by UPnP vendor.)*

--`,,```,,,,````-`-`,,`,,`,`,,`---

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS Not for Resale

3. Supporting Information

3.1. Glossary

Refer to the UPnP QoS Architecture [QoS Architecture] document for glossary of terms.

3.2. Namespaces

In XML [XML], an element name is not just the local part but that part combined with a namespace ID (explicit or default) to form a qualified name. XML processing requires that one deals with qualified names rather than merely local parts. See the UPnP Device Architecture [DEVICE] document for more details.

3.2.1. Schema Definition

This following is the formal XML schema definition for the UPnP QosPolicyHolder service namespace "http://www.upnp.org/schemas/TrafficPolicy".

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema
  targetNamespace="http://www.upnp.org/schemas/TrafficPolicy.xsd"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  xmlns="http://www.upnp.org/schemas/TrafficPolicy.xsd"
  elementFormDefault="qualified"
  id="TrafficPolicy.xsd"
  attributeFormDefault="unqualified">

  <xs:annotation>
    <xs:documentation>
    See Section 2.4.3 in the QosPolicyHolder  service specification
    Copyright 2004, 2005 UPnP(tm). All rights reserved.
    </xs:documentation>
  </xs:annotation>

  <xs:element name="TrafficPolicy" type="TrafficPolicyType" />

  <xs:complexType name="TrafficPolicyType">
    <xs:sequence>
      <xs:element name="AdmissionPolicy" minOccurs="1" maxOccurs="1">
        <xs:simpleType>
          <xs:restriction base='xs:string' >
            <xs:enumeration value='Disabled'/>
            <xs:enumeration value='Enabled'/>
          </xs:restriction>
        </xs:simpleType>
      </xs:element>
      <xs:element name="TrafficImportanceNumber" minOccurs="1"
maxOccurs="1">
        <xs:simpleType>
          <xs:restriction base='xs:nonNegativeInteger'>
            <xs:maxInclusive value="7"/>
          </xs:restriction>
        </xs:simpleType>
      </xs:element>
      <xs:element name="UserImportanceNumber" minOccurs="0" maxOccurs="1">
        <xs:simpleType>
          <xs:restriction base='xs:nonNegativeInteger' >
            <xs:maxInclusive value="255"/>
          </xs:restriction>
        </xs:simpleType>
      </xs:element>
      <xs:element name="v2" type="v2ExtensionType" minOccurs="0" />
      <!-- allow any element except those from (v1) target namespace -->
```

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS Not for Resale

```
      <xs:choice minOccurs="0" maxOccurs="unbounded" >
        <xs:any namespace="##other" processContents="lax"/>
        <xs:any namespace="##local" processContents="lax"/>
      </xs:choice>
    </xs:sequence>
  </xs:complexType>

  <xs:complexType name="v2ExtensionType">
    <xs:sequence>
      <xs:any namespace="##targetNamespace" processContents="lax"
maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:anyAttribute />
  </xs:complexType>
</xs:schema>
```

3.2.2. <Any> XML Tag Usage

The <any> tag within a schema allows for vendors to add their own additions to this schema definition without impacting implementations that verifies XML text using the schema defined above. To prevent name collisions, vendors should define and use their own namespace to prevent name collision of their tags with those of other vendors. It's recommended that implementations do not require the retrieval of their corresponding schemas from the Internet.

The any tag is required for future extensibility of schema definitions without versioning the schema. The following examples demonstrate the usage of any tag in TrafficPolicy.

```
<TrafficPolicy
  xmlns="http://www.upnp.org/schemas/TrafficPolicy.xsd"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:prv="http://myPrivate.com"
  xmlns:prv2="http://myPrivate2.com"
  xsi:schemaLocation="http://www.upnp.org/schemas/TrafficPolicy.xsd
TrafficPolicy.xsd">
    <AdmissionPolicy>Enabled</AdmissionPolicy>
    <TrafficImportanceNumber>3</TrafficImportanceNumber>
    <UserImportanceNumber>128</UserImportanceNumber>
    <v2>
        <PolicyHolderId>urn:10.0.0.50:port:1024</PolicyHolderId>
         <prv2:MyPrivate2>whatever</prv2:MyPrivate2>
    </v2>
    <prv:MyPrivate1>whatever</prv:MyPrivate1>
</TrafficPolicy>
```

The xml tags in xml fragments must be in the same order as they are described in the XSD schema definitions.

The XSD files and the XML arguments have xsi:schemaLocation specified. This is strictly for unique identification purposes only. The location will not contain the XSD files.

--`,,```,,,,````-`-`,,`,,`,`,,`---

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS Not for Resale

4. Theory of Operation (Informative)

The sole purpose of this service is to provide a simple interface to some network entity that will host policy decisions for the home network, such as the LAN side of an Internet Gateway Device. While the policy enforcement, decision making, and configuration is out of scope for UPnP Qos, it is necessary for such an entity, within the LAN, to provide some traffic policy values for any network traffic stream that wants to have QoS that is better than "BestEffort". This is accomplished by this service, which has a single action named *GetTrafficPolicy*. The QoS network entities that will manage QoS for the LAN, such as a UPnP device with the QosManager [QoS MGR] service, will discover a UPnP device that contains the QosPolicyHolder service. Only a single UPnP device containing the QosPolicyHolder service can be active within the LAN. If none or more than one UPnP device containing the QosPolicyHolder service exists, then the network entities managing QoS for the LAN will use the default traffic policy rules and values for the network traffic stream requesting Qos. Any UPnP device containing the QosPolicyHolder service should provide a method, that's out of band to UPnP, to disable service announcements (e.g. disable the service). This will allow for a mechanism to resolve to only a single QosPolicyHolder service being visible on the network. When only a single QosPolicyHolder service exists, the *GetTrafficPolicy* action will accept as input a traffic descriptor, defined as an XML string [QoS MGR], which contains all the information needed to generate QoS traffic policy values for this traffic stream. Again to reiterate, the rules that this network policy entity uses to generate these traffic policy values are out of scope for UPnP Qos. The QoS traffic policy values, as an XML string, that are returned by the *GetTrafficPolicy* action for a requested traffic descriptor are as summarized below:

- Whether ***AdmissionPolicy*** logic, such as parameterized Qos, is to be used for all requested traffic by the QoS network entities that manage QoS for the LAN. Possible values are enumerated as either ***Enabled*** or ***Disabled***.

- A ***TrafficImportanceNumber*** with a value from ***0*** through ***7*** inclusive. This value is an IEEE 802.1D Annex G [IEEE] number that is provided to device(s) in the traffic's path. Device(s) must interpret this number according the IEEE 802.1D Annex G specification and apply to network packets for this traffic stream. Basically it's tagging a priority value to the traffic's network packets.

- A ***UserImportanceNumber*** with a value from ***0*** through ***255*** inclusive. This value will be used by the QoS network entities that manage QoS for the LAN for admission policy decisions. Note that this value is not used when the ***AdmissionPolicy*** value for the requested traffic stream is ***Disabled***.

In summary, network admission decisions, when ***AdmissionPolicy*** is ***Enabled***, are made by using the ***UserImportanceNumber***. Once that traffic stream is admitted it will then use the ***TrafficImportanceNumber*** for priority based QoS implementations. The schemas definitions used by the *GetTrafficPolicy* action for its input and output arguments are defined in reference [QoS MGR] and section 3.2.1 respectively.

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS Not for Resale

5. XML Service Description

```
<?xml version="1.0"?>
<scpd xmlns="urn:schemas-upnp-org:service-1-0">
  <specVersion> <!-- UPnP version 1.0 -->
    <major>1</major>
    <minor>0</minor>
  </specVersion>
  <actionList>
    <action>
      <name>GetTrafficPolicy</name>
      <argumentList>
        <argument>
          <name>RequestedTrafficDescriptor</name>

<relatedStateVariable>A_ARG_TYPE_TrafficDescriptor</relatedStateVariable>
          <direction>in</direction>
        </argument>
        <argument>
          <name>OutputTrafficPolicy</name>

<relatedStateVariable>A_ARG_TYPE_TrafficPolicy</relatedStateVariable>
          <direction>out</direction>
          <retval/>
        </argument>
      </argumentList>
    </action>
</actionList>
 <serviceStateTable>
    <stateVariable sendEvents="no">
      <name>A_ARG_TYPE_TrafficDescriptor</name>
      <dataType>string</dataType>
    </stateVariable>
    <stateVariable sendEvents="no">
      <name>A_ARG_TYPE_TrafficPolicy</name>
      <dataType>string</dataType>
    </stateVariable>
  </serviceStateTable>
</scpd>
```

--`,,```,,,,````-`-`,,`,,`,`,,`---

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS Not for Resale

6. Test

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS Not for Resale

--`,,```,,,,````-`-`,,`,,`,`,,`---

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS

Not for Resale

--`,,```,,,,````-`-`,,`,,`,`,,`---
Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

3, rue de Varembé
PO Box 131
CH-1211 Geneva 20
Switzerland

Tel: + 41 22 919 02 11
Fax: + 41 22 919 03 00
info@iec.ch
www.iec.ch

Copyright International Organization for Standardization
Provided by IHS under license with ISO
No reproduction or networking permitted without license from IHS

Not for Resale