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Information technology – UPnP Device Architecture – Part 11-12: Quality of Service Device Control Protocol – Level 2 – Quality of Service Policy Holder Service

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INFORMATION TECHNOLOGY – UPNP DEVICE ARCHITECTURE –

Part 11-12: Quality of Service Device Control Protocol – Level 2 – Quality of Service Policy Holder 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.

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

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

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, typically a QoS Management Entity. 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]. Each *QosPolicyHolder* service must be advertised (SSDP discoverable) within the home network.

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

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:2

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

2.2. 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.

2.2.1. 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:

[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*.

[QoS MGR] – UPnP QosManager :2 Service Document.
Note that only the schema definition used for the A_ARG_TYPE_TrafficDescriptor is normative for this specification and the schema is defined in this reference.

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

2.2.2. 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.

[QoS DEV] – UPnP QosDevice Service:2 Document.

[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.

2.3. State Variables

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 2.5. 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.

2.3.1. 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

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 V1.0 architecture [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 2.3.2	n/a	n/a
A_ARG_TYPE_TrafficPolicy	R	string (XML fragment)	see section 2.3.3	n/a	n/a

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

2.3.2. A_ARG_TYPE_TrafficDescriptor

This is an escaped XML fragment, as specified in section 2.3.1.1, 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:td2="http://www.upnp.org/schemas/TrafficDescriptorv1.xsd"`.

2.3.3. A_ARG_TYPE_TrafficPolicy

This is an escaped XML fragment, as specified in section 2.3.1.1, which contains the prescribed level of QoS for some traffic stream. It is composed of seven 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 Management 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.
- A ***PolicyHolderId*** is a value that uniquely identifies a network device implementing the QosPolicyHolder service. This value informs the QosManager which QosPolicyHolder to query for a TrafficPolicy. The value must be of the following form:

  `uuid:<UUID>:urn:upnp-org:serviceId:<SERVICEID>`

  for example:

  `uuid:0000481030110c68f9480:urn:upnp-org:serviceId:QosPolicyHolder-2a`

  - UUID: The UDN of the QosPolicyHolder service not including the prefix "`uuid:`" (refer to Section 2.1 of [DEVICE])
  - `SERVICEID`: The serviceId of the QosPolicyHolder service not including the prefix "`urn:upnp-org:serviceId:`". (refer to Section 2.1 of [DEVICE]).
- ***PolicyLastModified*** is an RFC3339 compliant string [IETF] that identifies the date/time when the policy on a QosPolicyHolder device was last modified (policy modification is out-of-scope to UPnP). This optional field, if present, shall identify the wall clock time when a policy is added or altered. It is recognized that device clocks may not be synchronized. This field is valuable for implementations to provide diagnostic information to the end user.

- ***PolicyModifyingUserName*** is a string that identifies the user who last changed the policy (policy modification is out-of-scope to UPnP). This optional field, if present, must be <= 64 UTF-8 characters. At present this specification does not define the semantics for this field. Examples include, “Dad”, “Jimmy”, etc. This field is valuable for implementations to provide diagnostic information to the end user.

- ***PolicyHolderConfigUrl*** is an optional string containing the URL on the device that provides the QosPolicyHolder service. If the device provides the URL, containing "HTTP" or "HTTPS" as the <protocol>, for its configuration, then the control point may retrieve a page using the provided URL to allow a user to configure the policy holder (the configuration method is out-of-scope). The host portion of the URL must be in dotted-decimal IP address form, e.g. "http://10.0.0.131/ config_policy.html".

  URL Format: <protocol>:// <host> [:<port>] [<path> [? <query>]]

The formal XML schema definition for “TrafficPolicy” is a defined by the following xsd:

`http://www.upnp.org/schemas/TrafficPolicy.xsd`

and the schema location is given by:

`http://www.upnp.org/schemas/qos/TrafficPolicy-v2.xsd`

2.3.4. Relationships Between State Variables

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

2.4. 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).

2.4.1. Event Model

None of the state variables are evented for this service.

2.5. 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.

2.5.1. GetTrafficPolicy

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

2.5.1.1. 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 2.3.2, 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, "`http://www.upnp.org/schemas/TrafficDescriptorv1.xsd`".

The OutputTrafficPolicy output argument is an escaped XML string, as specified in section 2.3.3, which contains the prescribed level of QoS for the requested traffic stream.

2.5.1.2. Service requirements

If the input parameter is not a TrafficDescriptor (including non-XML input), QosPolicyHolder must return error code 799.

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

If a QosManager does not supply a TrafficHandle, or if TrafficHandle has a NULL value, in a TrafficDescriptor to QosPolicyHolder, the QosPolicyHolder 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 ActiveTspecIndex indicates the Tspec for which TrafficPolicy is needed. ActiveTspecIndex must be one of the TspecIndex values in the AvailableOrderedTspecList. If not, QosPolicyHolder must return an error code 720.

If the PolicyHolderId is specified by the requesting Control Point, and if this PolicyHolderId is not the ID of the QosPolicyHolder service (QosPolicyHolder verifies this), the QosPolicyHolder must return error code 781.

If the QosManager provides any elements of TrafficPolicy in the input TrafficDescriptor, then the QosPolicyHolder will ignore those elements and their values.

Whenever this error condition as well as another 700-799 error condition applies, the QPH must return error code 781.

2.5.1.3. CP requirements when calling the action

A Control Point (QoS Management Entity) must supply the ActiveTspecIndex in TrafficDescriptor to QosPolicyHolder when calling the **GetTrafficPolicy** action.

A Control Point (QoS Management Entity) must supply the TrafficHandle in TrafficDescriptor to QosPolicyHolder when calling the **GetTrafficPolicy** acion.

A Control Point (QoS Management Entity) must supply an ActiveTspecIndex that is one of the TspecIndex values in the AvailableOrderedTspecList in TrafficDescriptor to QosPolicyHolder when calling the **GetTrafficPolicy** action.

2.5.1.4. Examples

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.

Example 1:

```
<?xml version="1.0" encoding="UTF-8"?>
<TrafficPolicy
  xmlns="http://www.upnp.org/schemas/TrafficPolicy.xsd"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation=" http://www.upnp.org/schemas/TrafficPolicy.xsd
    http://www.upnp.org/schemas/qos/TrafficPolicy-v2.xsd">
    <AdmissionPolicy>Enabled</AdmissionPolicy>
    <TrafficImportanceNumber>3</TrafficImportanceNumber>
    <UserImportanceNumber>128</UserImportanceNumber>
    <v2>
      <PolicyHolderId>uuid:0000481030110c68f9480:serviceId:QPH-2a</PolicyHolderId>
      <PolicyLastModified>2004-11-26T15:03:23-08:00</PolicyLastModified>
      <PolicyModifyingUserName>Jimmy</PolicyModifyingUserName>
      <PolicyHolderConfigUrl>http://10.0.0.50/ConfigPolicy.html </PolicyHolderConfigUrl>
    </v2>
</TrafficPolicy>
```

Example 2:

```
<?xml version="1.0" encoding="UTF-8"?>
<TrafficPolicy
  xmlns="http://www.upnp.org/schemas/TrafficPolicy.xsd"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation=" http://www.upnp.org/schemas/TrafficPolicy.xsd
    http://www.upnp.org/schemas/qos/TrafficPolicy-v2.xsd">
    <AdmissionPolicy>Disabled</AdmissionPolicy>
    <TrafficImportanceNumber>5</TrafficImportanceNumber>
    <v2>
      <PolicyHolderId>uuid:0000481030110c68f9480:serviceId:QPH-2b</PolicyHolderId>
      <PolicyHolderConfigUrl>http://10.0.0.50/ConfigPolicy.html</PolicyHolderConfigUrl>
    </v2>
</TrafficPolicy>
```

2.5.1.5. Dependency on State (if any)

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

2.5.1.6. Effect on State (if any)

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

2.5.1.7. Errors

Table 2-5: Error Codes for GetTrafficPolicy

errorCode	errorDescription	Description
700	Traffic Handle missing or empty	Traffic Handle must be filled in as input to this action.
715	Policy parameters must not be specified by the control point	PolicyLastModified, PolicyModifyingUserName, or PolicyHolderConfigURL must not be specified by the Control Point
716	Input parameter does not validate against XML schema.	One of the XML-based input arguments does not follow the schema
720	ActiveTspecIndex is not a TspecIndex	
723	ActiveTspecIndex missing	Valid ActiveTspecIndex must be filled in as input to this action.
781	PolicyHolderId does not match	This QosPolicyHolder service is not the same as the PolicyHolderId specified in A_ARG_TYPE_TrafficPolicy.
799	Invalid Input Parameter	The input parameter supplied to Action is invalid.

2.5.2. 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).

2.5.3. Relationships Between Actions

There is no relationship between the actions for this service.

2.5.4. 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.

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	Traffic Handle missing or empty	Traffic Handle must be filled in as input to this action.
715	Policy parameters must not be specified by the control point	PolicyLastModified, PolicyModifyingUserName, or PolicyHolderConfigURL must not be specified by the Control Point
716	Input parameter does not validate against XML schema.	One of the XML-based input arguments does not follow the schema
720	ActiveTspecIndex is not a TspecIndex	
723	ActiveTspecIndex missing	Valid ActiveTspecIndex must be filled in as input to this action.
781	PolicyHolderId does not match	This QosPolicyHolder service is not the same as the PolicyHolderId specified in A_ARG_TYPE_TrafficPolicy.
800-899	*TBD*	*(Specified by UPnP vendor.)*

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. <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.

For example, a vendor may provide their own enhancements within the v2 element. This allows for extension of TrafficPolicy:

```
<?xml version="1.0" encoding="UTF-8"?>
<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
    http://www.upnp.org/schemas/qos/TrafficPolicy-v2.xsd">
    <AdmissionPolicy>Enabled</AdmissionPolicy>
    <TrafficImportanceNumber>3</TrafficImportanceNumber>
    <UserImportanceNumber>128</UserImportanceNumber>
    <v2>
       <PolicyHolderId>uuid:0000481030110c68f9480:serviceId:qph-2a</PolicyHolderId>
       <PolicyLastModified>2004-11-26T15:03:23-08:00</PolicyLastModified>
       <PolicyModifyingUserName>Jimmy</PolicyModifyingUserName>
       <PolicyHolderConfigUrl>http://10.0.0.50/ConfigPolicy.html</PolicyHolderConfigUrl>
       <v3>
          <Whatever>whatever</Whatever>
       </v3>
       <prv2:MyPrivate2>whatever</prv2:MyPrivate2>
    </v2>
    <prv:MyPrivate1>whatever</prv:MyPrivate1>
</TrafficPolicy>
```

3.2.2. <v3> XML Tag Usage

The v3 tag within a schema allows for the UPnP Forum to add new elements to this schema definition without impacting implementations based on previous version(s) of the schema.

4. Theory of Operation (Informative)

The sole purpose of this service is to provide a simple interface to a network entity that will host policy. 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. 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). 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. If a PolicyHolderId is specified in the TrafficDescriptor which does not correspond to the PolicyHolderId of the QosPolicyHolder service on which the action is invoked, then an error is returned. 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***.

- A ***PolicyHolderId*** with value of form discussed in section 2.3.3. This value identifies which QosPolicyHolder supplied the TrafficPolicy for the TrafficDescriptor specified by the Control Point.

- A ***PolicyLastModified*** RFC3339 [IETF] compliant date/time string value indicates the wall clock time when the policy (out of scope to UPnP) that the TrafficPolicy result is based was last modified.

- A ***PolicyModifyingUserName*** string value that identifies which user modified the policy at the date/time specified by *PolicyLastModified*.

- A ***PolicyHolderConfigUrl*** element that identifies a location which may be used to configure the QosPolicyHolder.

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 2.5.1 respectively.

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>
        </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>
```

6. Test

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