

Contents	Page
1 Overview and Scope.....	5
1.1 Referenced Specifications	5
1.1.1 Normative References	5
1.1.2 Informative References	6
2 Service Modeling Definitions.....	6
2.1 ServiceType	6
2.2 State Variables.....	7
2.2.1 XML Fragments as UPnP Arguments.....	7
2.2.2 A_ARG_TYPE_TrafficDescriptor	8
2.2.3 A_ARG_TYPE_TrafficDescriptorsPerInterface.....	8
2.2.4 A_ARG_TYPE_TrafficHandle	10
2.2.5 A_ARG_TYPE_NumTrafficDescriptors	10
2.2.6 A_ARG_TYPE_QosDeviceCapabilities	10
2.2.7 A_ARG_TYPE_QosDeviceState	11
2.2.8 PathInformation	12
2.2.9 A_ARG_TYPE_QosDeviceInfo	14
2.2.10 A_ARG_TYPE_QosStateId.....	14
2.2.11 A_ARG_TYPE_NumRotameterObservations	14
2.2.12 A_ARG_TYPE_RotameterInformation	15
2.2.13 A_ARG_TYPE_ConfRotameterObservations	20
2.2.14 MostRecentStreamAction.....	21
2.2.15 A_ARG_TYPE_MaxPossibleRotameterObservations	22
2.2.16 A_ARG_TYPE_Resource	22
2.2.17 A_ARG_TYPE_AdmitTrafficQosExtendedResult	23
2.2.18 A_ARG_TYPE_ListOfAdmittedTraffic	26
2.2.19 A_ARG_TYPE_PREFERREDQPH	28
2.2.20 UnexpectedStreamChange.....	29
2.2.21 A_ARG_TYPE_PreemptingTrafficInfo.....	29
2.2.22 A_ARG_TYPE_ListOfMostRecentUnexpectedStreamChanges.....	30
2.2.23 A_ARG_TYPE_QosDeviceExtendedState.....	33
2.2.24 A_ARG_TYPE_Layer2Mapping	38
2.2.25 A_ARG_TYPE_AdmitTrafficQosSucceeded	38
2.2.26 A_ARG_TYPE_TrafficDescriptorsWanted.....	38
2.2.27 A_ARG_TYPE_SetPreferredQphResults	38
2.2.28 A_ARG_TYPE_NumberOfUnexpectedStreamChangesRequested	39
2.2.29 A_ARG_TYPE_NumberOfUnexpectedStreamChangesReported	39
2.2.30 A_ARG_TYPE_NewTrafficLeaseTime	39
2.2.31 A_ARG_TYPE_TrafficDescriptorContainer	39
2.2.32 A_ARG_TYPE_Layer2MappingContainer	41
2.2.33 A_ARG_TYPE_QosDeviceInfoContainer	41
2.3 Eventing and Moderation	43
2.3.1 Event Model.....	43
2.4 Actions.....	44
2.4.1 GetQosDeviceCapabilities()	45
2.4.2 GetQosState()	46

2.4.3	SetupTrafficQos()	47
2.4.4	ReleaseTrafficQos()	49
2.4.5	GetPathInformation	50
2.4.6	GetQosDeviceInfo()	51
2.4.7	ConfigureRotameterObservation()	52
2.4.8	GetRotameterInformation()	53
2.4.9	AdmitTrafficQos()	54
2.4.10	UpdateAdmittedQos()	62
2.4.11	ReleaseAdmittedQos()	65
2.4.12	GetExtendedQosState()	67
2.4.13	SetPreferredQph()	68
2.4.14	GetUnexpectedStreamChanges()	70
2.4.15	VerifyTrafficHandle()	71
2.4.16	UpdateTrafficLeaseTime()	71
2.4.17	SetL2Map()	72
2.4.18	Non-Standard Actions Implemented by a UPnP Vendor	73
2.4.19	Error Code Summary	73
2.4.20	Reason Code Summary	74
2.5	Theory of Operation (Informative)	75
2.5.1	Parameterized QoS	77
2.5.2	Prioritized QoS	80
2.5.3	Hybrid QoS	81
3	XML Service Descriptions	82
4	Test	88
Annex A	(informative) Additional Examples for State Variables	89
A.1	Additional <i>PathInformation</i> Examples	89
A.1.1	Sample argument XML string – PC with two network interfaces that are both end point device and bridged	89
A.1.2	Sample argument XML string –Four port Ethernet Switch	89
A.1.3	Sample argument XML string – Wireless AP with one Ethernet Interface	90
A.1.4	Sample argument XML string – Bridge device between Wireless station and Ethernet	90
A.2	Additional A_ARG_TYPE_RotameterInformation Examples	91
A.2.1	Sample argument XML string – PC with two network interfaces that are both end point devices	91
A.2.2	Sample argument XML string – PC with two network interfaces that are both end point device with TrafficImportanceNumber reporting	94
A.2.3	Sample argument XML string –Four port Ethernet Switch	95
A.2.4	Sample argument XML string – Wireless AP with one Ethernet Interface	95
A.2.5	Sample argument XML string – Bridge device between Wireless station and Ethernet	96
Annex B	(normative) Template for Requirements on the QosDevice Service implementation that are specific for the underlying Network Technologies	98
B.1	<Technology Name>	98
B.1.1	References	98
B.1.2	Priority Mapping	98
B.1.3	<i>QosSegmentId</i> formation	98
B.1.4	<i>Layer2StreamId</i> representation	99

B.1.5	Mapping of UPnP-QoS Parameters to <i><technology></i> Parameters	99
B.1.6	Blocking traffic stream identification	100
B.1.7	Responsibility for QoS Setup	100
B.1.8	Mapping of <i><technology></i> Returned Parameters to <i>ProtoTspec</i> Parameters	101
B.1.9	Mapping of <i><technology></i> Returned Parameters to <i>AdmitTrafficQosExtendedResult and AllocatedResources</i> Parameters	102
Figure 2-1	— Relationship between ROPeriod and MonitorResolutionPeriod	16
Figure 2-2	— PC with Two Network Interfaces	18
Figure 2-3	— Example of a PC connected to an active network	19
Figure 2-4	— Relationship between End-to-End Delay and QoS Segment Delay	57
Figure 2-5	— Relationship between QoS Segment Delay And MaxCommittedDelay	58
Figure 2-6	— Components of <i>MaxCommittedDelay</i>	59
Figure 2-7	— Containers and How They Nest	78
Figure A.1	— Example of a PC connected to an active network	91
Table 2-1	— State Variables	7
Table 2-2	— Reason Codes For AdmissionStatusNet	24
Table 2-3	— Reason Codes For AdmissionStatusDev	25
Table 2-4	— Containers In Which A Parameter Can Appear	34
Table 2-5	— Reason Codes For <i>A_ARG_TYPE_SetPreferredQphResults</i>	39
Table 2-6	— Event Moderation	43
Table 2-7	— Actions	45
Table 2-8	— Arguments for <i>GetQosDeviceCapabilities()</i>	45
Table 2-9	— Error Codes for <i>GetQosDeviceCapabilities()</i>	46
Table 2-10	— Arguments for <i>GetQosState()</i>	46
Table 2-11	— Error Codes for <i>GetQosState()</i>	47
Table 2-12	— Arguments for <i>SetupTrafficQos()</i>	47
Table 2-13	— Error Codes for <i>SetupTrafficQos()</i>	49
Table 2-14	— Arguments for <i>ReleaseTrafficQos()</i>	49
Table 2-15	— Error Codes for <i>ReleaseTrafficQos()</i>	50
Table 2-16	— Arguments for <i>GetPathInformation()</i>	50
Table 2-17	— Error Codes for <i>GetPathInformation</i>	50
Table 2-18	— Arguments for <i>GetQosDeviceInfo()</i>	51
Table 2-19	— Error Codes for <i>GetQosDeviceInfo()</i>	51
Table 2-20	— Arguments for <i>ConfigureRotameterObservation()</i>	52
Table 2-21	— Error Codes for <i>ConfigureRotameterObservation()</i>	53
Table 2-22	— Arguments for <i>GetRotameterInformation()</i>	53
Table 2-23	— Error Codes for <i>GetRotameterInformation()</i>	54
Table 2-24	— Arguments for <i>AdmitTrafficQos()</i>	54
Table 2-25	— Error Codes for <i>AdmitTrafficQos()</i>	61
Table 2-26	— Reason Codes for <i>AdmitTrafficQos()</i>	61
Table 2-27	— Arguments for <i>UpdateAdmittedQos()</i>	62

Table 2-28 — Error Codes for <u>UpdateAdmittedQos()</u>	65
Table 2-29 — Reason Codes for <u>UpdateAdmittedQos()</u>	65
Table 2-30 — Arguments for <u>ReleaseAdmittedQos()</u>	65
Table 2-31 — Error Codes for <u>ReleaseAdmittedQos()</u>	67
Table 2-32 — Arguments for <u>GetExtendedQosState()</u>	67
Table 2-33 — Error Codes for <u>GetExtendedQosState()</u>	68
Table 2-34 — Arguments for <u>SetPreferredQph()</u>	68
Table 2-35 — <u>SetPreferredQphResults</u> for <u>SetPreferredQph()</u>	69
Table 2-36 — Arguments for <u>GetUnexpectedStreamChanges()</u>	70
Table 2-37 — Error Codes for <u>GetUnexpectedStreamChanges()</u>	70
Table 2-38 — Arguments for <u>VerifyTrafficHandle()</u>	71
Table 2-39 — Error Codes for <u>VerifyTrafficHandle()</u>	71
Table 2-40 — Arguments for <u>UpdateTrafficLeaseTime()</u>	72
Table 2-41 — Error Codes for <u>UpdateTrafficLeaseTime()</u>	72
Table 2-42 — Arguments for <u>SetL2Map()</u>	73
Table 2-43 — Error Codes for <u>SetL2Map()</u>	73
Table 2-44 — Error Code Summary	73
Table 2-45 — Common Reason Codes	75
Table 2-46 — Actions in Version 3 and Version 2	76
Table 2-47 — State Variables in Version 3 and Version 2	77
Table B.1 — Priority Mapping	98
Table B.2 — Traffic Specification Parameters	100
Table B.3 — ProtoTspec Parameters	102
Table B.4 — AllocatedResources Parameters	103