

## 9 Appendix

### List of abbreviations

3GPP	Third Generation Partnership Project
AF	Assured Forwarding
API	Application Program Interface
ASP	Active Server Page
BPEL4WS	Business Process Language for Web services
BTP	Business Transactions Protocol
DiffServ	Differentiated Service
DSCP	DiffServ Code Point
GUI	Graphic User Interface
GPRS	General Packet radio Service

HTML	Hypertext Markup Language
HTTP	Hypertext Transfer Protocol
IETF	Internet Engineering Task Force
IIS	Internet Information Server
IntServ	Integrated Service
IP	Internet Protocol
ISO	International Organization for Standardization
MAC	Medium Access Control
OSI	Open System Interconnection
OASIS	Organization for the Advancement of Structured Information Standards
QoS	Quality of Service
RAM	Random Access Memory
SLA	Service Level Agreement
SLO	Service Level Objective
SOA	Service Oriented Architecture
TCP	Transmission Control Protocol
W3C	World Wide Web Consortium
WSB	Web service Broker
WSLA	Web service Level Agreement
WSDL	Web service Description Language
WSOL	Web service Offerings Language

WS-QoS	Web service Quality of Service
UDDI	Universal Description Discovery Interoperability
URI	Universal Resource Identifier
URL	Uniform Resource Locator



## WS-QoS XML schema

```

<?xml version="1.0" encoding="UTF-8"?>
<!-- Copyright 2003 Andreas Gramm. All rights reserved. -->
<xs:schema targetNamespace="http://page.inf.fu-berlin.de/~gramm/schemas/wsqs/" xmlns:wsqs="http://page.inf.fu-berlin.de/~gramm/schemas/wsqs/" xmlns:wSDL="http://schemas.xmlsoap.org/wSDL/" xmlns:xs="http://www.w3.org/2001/XMLSchema" elementFormDefault="unqualified" attributeFormDefault="unqualified">
  <xs:element name="wsqs">
    <xs:complexType>
      <xs:sequence>
        <xs:element name="definition">
          <xs:complexType>
            <xs:sequence>
              <xs:choice>
                <xs:element name="ontology" type="wsqs:tOntology"/>
                <xs:element name="requirements" type="wsqs:tQoSDefinition"/>
                <xs:element name="offers">
                  <xs:complexType>
                    <xs:sequence>
                      <xs:element name="include" minOccurs="0" maxOccurs="unbounded">
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                          <xs:attribute name="url" type="xs:string" use="required"/>
                        </xs:complexType>
                      </xs:element>
                      <xs:element name="qoSOffer" minOccurs="0" maxOccurs="unbounded">
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                          <xs:complexContent>
                            <xs:extension base="wsqs:tQoSDefinition">
                              <xs:attribute name="expires" type="xs:dateTime"
use="required"/>
                            </xs:extension>
                          </xs:complexContent>
                        </xs:complexType>
                      </xs:element>
                    </xs:sequence>
                  </xs:complexType>
                </xs:choice>
              </xs:sequence>
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        </xs:sequence>
      </xs:complexType>
    </xs:element>
  </xs:sequence>
</xs:complexType>
</xs:element>
<xs:complexType name="tQoSDefinition">
  <xs:sequence>
    <xs:element name="defaultQoSInfo" type="wsqs:tQoSInfo" minOccurs="0"/>
    <xs:element name="operationQoSInfo" minOccurs="0" maxOccurs="unbounded">
      <xs:complexType>
        <xs:complexContent>
          <xs:extension base="wsqs:tQoSInfo">
            <xs:attribute name="name" type="xs:string" use="required"/>
          </xs:extension>
        </xs:complexContent>
      </xs:complexType>
    </xs:element>
    <xs:element name="contractAndMonitoring" minOccurs="0" maxOccurs="unbounded">
      <xs:complexType>
        <xs:sequence minOccurs="0">
          <xs:element name="protocol" type="wsqs:tProtocol" minOccurs="0"
maxOccurs="unbounded"/>
          <xs:element name="trustedParty" minOccurs="0" maxOccurs="unbounded">
            <xs:complexType>
              <xs:attribute name="name" type="xs:string" use="required"/>
              <xs:attribute name="url" type="xs:string" use="optional"/>
            </xs:complexType>
          </xs:element>
        </xs:sequence>
        <xs:attribute name="name" type="xs:string" use="required"/>
        <xs:attribute name="requires" type="wsqs:tRequires" use="required"/>
      </xs:complexType>
    </xs:element>
  </xs:sequence>
</xs:complexType>

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    <xs:element name="price" type="wsqos:tPrice"/>
    <xs:element name="extension" type="xs:anyType" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="tQoSInfo">
  <xs:sequence>
    <xs:element name="serverQoSMetrics" minOccurs="0">
      <xs:complexType>
        <xs:sequence minOccurs="0">
          <xs:element name="processingTime" type="xs:float" minOccurs="0"/>
          <xs:element name="requestsPerSecond" type="xs:float" minOccurs="0"/>
          <xs:element name="reliability" type="wsqos:tPercentage" minOccurs="0"/>
          <xs:element name="availability" type="wsqos:tPercentage" minOccurs="0"/>
          <xs:element name="customMetric" type="wsqos:tMetric" minOccurs="0"
maxOccurs="unbounded"/>
        </xs:sequence>
      </xs:complexType>
    </xs:element>
    <xs:element name="transportQoSPriorities" minOccurs="0">
      <xs:complexType>
        <xs:sequence>
          <xs:element name="delay" type="wsqos:tIntegerBetweenZeroAndTen" minOccurs="0"/>
          <xs:element name="jitter" type="wsqos:tIntegerBetweenZeroAndTen" minOccurs="0"/>
          <xs:element name="throughput" type="wsqos:tIntegerBetweenZeroAndTen" minOccurs="0"/>
          <xs:element name="packetLoss" type="wsqos:tIntegerBetweenZeroAndTen" minOccurs="0"/>
          <xs:element name="customPriority" type="wsqos:tPriority" minOccurs="0"
maxOccurs="unbounded"/>
        </xs:sequence>
      </xs:complexType>
    </xs:element>
    <xs:element name="securityAndTransaction" minOccurs="0" maxOccurs="unbounded">
      <xs:complexType>
        <xs:sequence minOccurs="0">
          <xs:element name="protocol" type="wsqos:tProtocol" minOccurs="0"
maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:attribute name="name" type="xs:string" use="required"/>
        <xs:attribute name="requires" type="wsqos:tRequires" use="required"/>
      </xs:complexType>
    </xs:element>
    <xs:element name="extension" type="xs:anyType" minOccurs="0" maxOccurs="unbounded"/>
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</xs:complexType>
<xs:complexType name="tOntology">
  <xs:sequence>
    <xs:choice>
      <xs:element name="metricDefinition" type="wsqos:tMetricDefinition" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="priorityDefinition" type="wsqos:tPriorityDefinition" minOccurs="0"
maxOccurs="unbounded"/>
      <xs:element name="protocolDefinition" type="wsqos:tProtocolDefinition" minOccurs="0"
maxOccurs="unbounded"/>
    </xs:choice>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="tMetric">
  <xs:simpleContent>
    <xs:extension base="xs:double">
      <xs:attribute name="name" type="xs:string" use="required"/>
      <xs:attribute name="ontology" type="xs:anyURI" use="optional"/>
    </xs:extension>
  </xs:simpleContent>
</xs:complexType>
<xs:complexType name="tMetricDefinition" abstract="false">
  <xs:simpleContent>
    <xs:extension base="xs:string">
      <xs:attribute name="name" type="xs:string" use="required"/>
      <xs:attribute name="direction" type="wsqos:tDirection" use="required"/>
      <xs:attribute name="unit" type="wsqos:tUnit" use="required"/>
      <xs:attribute name="percentile" type="wsqos:tPercentage" use="optional"/>
      <xs:attribute name="dataOwner" type="wsqos:tDataOwner" use="required"/>
    </xs:extension>
  </xs:simpleContent>

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    <xs:attribute name="dataScope" type="wsqos:tDataScope" use="required"/>
    <xs:attribute name="measurementIntervalLengthInSec" type="xs:float" use="required"/>
    <xs:attribute name="description" type="xs:string" use="optional"/>
  </xs:extension>
</xs:simpleContent>
</xs:complexType>
<xs:complexType name="tPriority">
  <xs:simpleContent>
    <xs:extension base="wsqos:tIntegerBetweenZeroAndTen">
      <xs:attribute name="name" type="xs:string" use="required"/>
      <xs:attribute name="ontology" type="xs:anyURI" use="optional"/>
    </xs:extension>
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  <xs:attribute name="name" type="xs:string" use="required"/>
  <xs:attribute name="description" type="xs:string" use="optional"/>
</xs:complexType>
<xs:complexType name="tProtocol">
  <xs:simpleContent>
    <xs:extension base="xs:string">
      <xs:attribute name="name" type="xs:string" use="required"/>
      <xs:attribute name="ontology" type="xs:anyURI" use="optional"/>
    </xs:extension>
  </xs:simpleContent>
</xs:complexType>
<xs:complexType name="tProtocolDefinition" abstract="false">
  <xs:attribute name="name" type="xs:string" use="required"/>
  <xs:attribute name="specificationUrl" type="xs:anyURI" use="optional"/>
  <xs:attribute name="description" type="xs:string" use="optional"/>
</xs:complexType>
<xs:complexType name="tPrice">
  <xs:simpleContent>
    <xs:extension base="wsqos:tFloatGreaterOrEqualToZero">
      <xs:attribute name="currency" type="xs:string" use="optional" default="USD"/>
    </xs:extension>
  </xs:simpleContent>
</xs:complexType>
<xs:simpleType name="tUnit">
  <xs:restriction base="xs:string">
    <xs:enumeration value="MS"/>
    <xs:enumeration value="S"/>
    <xs:enumeration value="M"/>
    <xs:enumeration value="H"/>
    <xs:enumeration value="D"/>
    <xs:enumeration value="REQPERSEC"/>
    <xs:enumeration value="BYTEPERSEC"/>
    <xs:enumeration value="BITPERSEC"/>
    <xs:enumeration value="PERCENT"/>
    <xs:enumeration value="NONE"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="tRequires">
  <xs:restriction base="xs:string">
    <xs:enumeration value="none"/>
    <xs:enumeration value="one"/>
    <xs:enumeration value="all"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="tDirection">
  <xs:restriction base="xs:string">
    <xs:enumeration value="inc"/>
    <xs:enumeration value="dec"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="tDataOwner">
  <xs:restriction base="xs:string">
    <xs:enumeration value="all"/>
    <xs:enumeration value="user"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="tDataScope">
  <xs:restriction base="xs:string">

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        <xs:enumeration value="provider"/>
        <xs:enumeration value="service"/>
        <xs:enumeration value="port"/>
    </xs:restriction>
</xs:simpleType>
<xs:simpleType name="tIntegerBetweenZeroAndTen">
    <xs:restriction base="xs:int">
        <xs:minInclusive value="0"/>
        <xs:maxInclusive value="10"/>
    </xs:restriction>
</xs:simpleType>
<xs:simpleType name="tFloatGreaterOrEqualToZero">
    <xs:restriction base="xs:float">
        <xs:minInclusive value="0"/>
    </xs:restriction>
</xs:simpleType>
<xs:simpleType name="tPercentage">
    <xs:restriction base="xs:float">
        <xs:minInclusive value="0"/>
        <xs:maxInclusive value="1"/>
    </xs:restriction>
</xs:simpleType>
</xs:schema>
```