SOA-EERP Business Quality of Service Version 1.0

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Related work:
This specification is related to:

- SOA-EERP Business Rating of Service specification, Version 1.0, http://docs.oasis-open.org/soa-eerp/rt/v1.0/SOA-EERP-Rating-Specification.pdf
- SOA-EERP Business Service Level Agreement specification, Version 1.0, http://docs.oasis-open.org/soa-eerp/sla/v1.0/SOA-EERP-BSLA-Specification.pdf

This document is one of three closely related specifications, SOA-EERP Business Quality of Service (bQoS), SOA-EERP Business Rating (bRating) and SOA-EERP Business Service Level Agreement (bSLA) which need to be understood in combination.

Declared XML Namespace(s):
http://docs.oasis-open.org/ns/soa-eerp/bqos/200903

Abstract:

This document specifies the XML vocabulary for business quality of service (bQoS), one of three Specifications for end-to-end resource planning (EERP). Business quality of service describes the business-related characteristics or attributes of a service.

Status:

This document was last revised by the SOA-EERP TC on the above date. The level of approval is also listed above. Check the "Latest Version" or "Latest Approved Version" location noted above for possible later revisions of this document.

Technical Committee members should send comments on this specification to the Technical Committee's email list. Others should send comments to the Technical Committee by using the "Send A Comment" button on the Technical Committee's web page at http://www.oasis-open.org/committees/soa-eerp/.

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1 Introduction

This document is the specification for Business Quality of Service (bQoS) for End-to-End Resource Planning (EERP), an XML vocabulary by which a business application may communicate selected characteristics of the service it provides.

According to OASIS Reference Model for Service Oriented Architecture [SOA-RM], the Service Oriented Architecture (SOA) is a paradigm for organizing and utilizing distributed capabilities that may be under the control of different ownership domains. The service within SOA is a mechanism to enable access to one or more capabilities, where the access is provided using a prescribed interface and is exercised consistent with constraints and policies as specified by the service description. This specification further defines the Business Quality of Service for the services that is defined in SOA-RM, within the EERP technology. The applications of this specification are any kind of business services, and they are not limited to only Web Services.

EERP applies the well-known technique for service discovery and optimization in a novel way to improve business results. It models the business process and the range of potential services, and then guides the selection and deployment of services based on the end-to-end business value.

Modeling the business characteristics of a service is a prerequisite for estimating the business value of the process that uses those services. The business characteristics of the service defined in this bQoS specification will enable EERP to determine the varieties of optimization to be supported, and to select optimal end-to-end solution.

In contrast to the QoS in the software/IT world, where the message is network/system oriented measurement indicates that deals with network performance and system availability, the contents of bQoS in this specification is business oriented measurement indicators that deals with business characteristics of a service, such as price, performance, and quality.

1.1 Terminology

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described in **[RFC2119]**.

1.1.1 Notational Conventions

This specification uses the following syntax to define outlines for detailed elements:

- The syntax appears as an XML instance, but values in italics indicate data types instead of literal values.
- Characters are appended to elements and attributes to indicate cardinality:
  - "?" (0 or 1)
  - "*" (0 or more)
  - "+" (1 or more)
- The character "|" is used to indicate a choice between alternatives.
- The characters "(" and ")" are used to indicate that contained items are to be treated as a group with respect to cardinality or choice.
- The characters "[" and "]" are used to call out references and property names.
- Ellipses (i.e., "...") indicate points of extensibility. Additional children and/or attributes MAY be added at the indicated extension points but MUST NOT contradict the semantics of the parent and/or owner, respectively. By default, if a receiver does not recognize an extension, the receiver

SHOULD ignore the extension; exceptions to this processing rule, if any, are clearly indicated below.

- XML namespace prefixes (see Table 1) are used to indicate the namespace of the element being defined.

Elements and Attributes defined by this specification are referred to in the text of this document using XPath 1.0 expressions. Extensibility points are referred to using an extended version of this syntax:

- An element extensibility point is referred to using {any} in place of the element name. This indicates that any element name can be used, from any namespace other than the namespace of this specification.
- An attribute extensibility point is referred to using @{any} in place of the attribute name. This indicates that any attribute name can be used, from any namespace other than the namespace of this specification.

Extensibility points in the exemplar may not be described in the corresponding text.

1.2 Normative References

[RFC2119] S. Bradner, *Key words for use in RFCs to Indicate Requirement Levels*, http://www.ietf.org/rfc/rfc2119.txt, IETF RFC 2119, March 1997.

[SOAP] W3C Note, "SOAP: Simple Object Access Protocol 1.1", 08 May 2000. http://www.w3.org/TR/2000/NOTE-SOAP-20000508/

[SOAP12] W3C Recommendation, "SOAP 1.2 Part 1: Messaging Framework", 24 June 2003. http://www.w3.org/TR/2003/REC-soap12-part1-20030624/

[URI] T. Berners-Lee, R. Fielding, L. Masinter, "Uniform Resource Identifiers (URI): Generic Syntax", RFC 3986, MIT/LCS, Day Software, Adobe Systems, January 2005. http://www.ietf.org/rfc/rfc3986.txt

[UBL-20] OASIS Standard, “Universal Business Language (UBL) v2.0”, 12 December 2006 http://docs.oasis-open.org/ubl/os-UBL-2.0/UBL-2.0.pdf

[UBL-20-cbc] Universal Business Language (UBL) v2.0, Common Basic Components, October 2006 http://docs.oasis-open.org/ubl/os-UBL-2.0/xsd/common/UBL-CommonBasicComponents-2.0.xsd

[UBL-20-udt] Universal Business Language (UBL) v2.0. Unqualified Data Type, February 2005 http://docs.oasis-open.org/ubl/os-UBL-2.0/xsd/common/UnqualifiedDataTypeSchemaModule-2.0.xsd

[XML-Schema1] W3C Recommendation, "XML Schema Part 1: Structures Second Edition", 28 October 2004. http://www.w3.org/TR/2004/REC-xmlschema-1-20041028/

[XML-Schema2] W3C Recommendation, "XML Schema Part 2: Datatypes Second Edition", 28 October 2004. http://www.w3.org/TR/2004/REC-xmlschema-2-20041028/

[ISO8601] ISO Standard 8601:2004(E), "Data elements and interchange formats – Information interchange - Representation of dates and times", Third edition, December 2004 http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=40874

[CEFACT] CEFACT – Core components specifications, Recommendation 9 January 1996. http://www.unece.org/cefact/recommendations/rec09/rec09_ecetrd203.pdf

[SOA-RM]	OASIS Standard, "OASIS Reference Model for Service Oriented Architecture 1.0", 12 October 2006 http://docs.oasis-open.org/soa-rm/v1.0/soa-rm.pdf

1.2.1 Reference

In this document reference is made to some basic elements and data types in UBL 2.0, in the following schema:

- UBL 2.0 Common Basic Components [UBL-20-cbc], UBL-CommonBasicComponents-2.0.xsd
- UBL 2.0 Unqualified Data Type [UBL-20-udt], UnqualifiedDataTypeSchemaModule-2.0.xsd

This specification is designed to work with the general Web Services framework including WSDL service descriptions, and SOAP message structure and message processing model. The XML vocabulary defined in bQoS should be applicable to any version of SOAP.

1.3 Non-Normative References

None.

2 Quality Measurement Indicators

The Business Quality of Service (bQoS) of the XML vocabulary is defined in XML Schema format that defines many quality measurement indicators.

2.1 Namespaces

The XML namespace URI that MUST be used by implementations of this specification is:

```
http://docs.oasis-open.org/ns/soa-eerp/bqos/200903
```

Table 1 lists XML namespaces that are used in this specification. The choice of any namespace prefix is arbitrary and not semantically significant.

Table 1: Prefixes and XML Namespaces used in this specification.

Prefix	Namespace	Specification(s)
S	http://schemas.xmlsoap.org/soap/envelope/	[SOAP]
S12	http://www.w3.org/2003/05/soap-envelope	[SOAP12]
xsd	http://www.w3.org/2001/XMLSchema	[XML-Schema1], [XML-Schema2]
cbc	urn:oasis:names:specification:ubl:schema:xsd:CommonBasicComponents-2	[UBL-20-cbc]
udt	urn:un:unece:uncefact:data:specification:UnqualifiedDataTypesSchemaModule:2	[UBL-20-udt]
ccts	urn:un:unece:uncefact:documentation:2	[UBL-20]
bqos	http://docs.oasis-open.org/ns/soa-eerp/bqos/200903	This specification

2.2 Schema Files

A normative copy of the XML Schema [XML-Schema1, XML-Schema2] description for this specification can be retrieved from the following address:

```
http://docs.oasis-open.org/soa-eerp/bqos/v1.0/EERP-bQoS-cd04.xsd
```

2.3 BQoS Element

The BQoS is the root element for the Business Quality of Service schema. It can have one or more of the following elements:

- BQoSPrice indicates price or cost for the service
- BQoSPerformance indicates time to complete the service, or in the alternative, throughput and latency.
- BQoSQualities indicates additional properties and attributes.
- Any additional elements for quality of service can be either:
    - Technical aspect such as service availability, accessibility, integrity, reliability, and security; or
    - Business aspects such as regulatory, geo location, operation hours, and payment methods.

Syntax

```
<bqos:BQoS xmlns:bqos="..." ...>
  <bqos:BQoSPrice ...>bqos:BQoSPriceType</bqos:BQoSPrice>
  <bqos:BQoSPerformance ...>bqos:BQoSPerformanceType</bqos:BQoSPerformance> ?
  <bqos:BQoQualities...>bqos:BQoSQualitiesType</bqos:BQoSQualities> ?
  ...
</bqos:BQoS>
```

The following describes the attributes and elements listed in the schema outlined above:

/bqos:BQoS

The root element for bQoS

/bqos:BQoS/bqos:BQoSPrice

Price aspect of the service, including the price and other optional elements, see Section 3 for more details.

/bqos:BQoS/bqos:BQoSPrice/@{any}

This is an extensibility mechanism to allow additional attributes, based on schemas, to be added to the BQoSPrice element in the future. Unrecognized attributes MAY cause a fault or be silently ignored.

/bqos:BQoS/bqos:BQoSPerformance

Performance aspect of the service that has time period for the time to complete the whole service, the throughput for duration to complete number of jobs, or optional elements, see Section 4 for more details.

/bqos:BQoS/bqos:BQoSPerformance/@{any}

This is an extensibility mechanism to allow additional attributes, based on schemas, to be added to the BQoSPerformance element in the future. Unrecognized attributes MAY cause a fault or be silently ignored.

/bqos:BQoS/bqos:BQoSQualities

Quality aspect of the service that has additional properties and attributes to describe the quality of the service, see Section 5 for more details.

/bqos:BQoS/bqos:BQoSQualities/@{any}

This is an extensibility mechanism to allow additional attributes, based on schemas, to be added to the BQoSQualities element in the future. Unrecognized attributes MAY cause a fault or be silently ignored.

/bqos:BQoS/@{any}

This is an extensibility mechanism to allow additional attributes, based on schemas, to be added to the BQoS element in the future. Unrecognized attributes MAY cause a fault or be silently ignored.

/bqos:BQoS/bqos:BQoSExtension

BQoSExtension element is an optional element that keeps different (extensible) elements to be specified in the future.

/bqos:BQoS/bqos:BQoSExtension/{any}

This is an extensibility mechanism to allow different (extensible) elements to be specified in the future. Unrecognized elements MAY cause a fault or be silently ignored.

3 BQoSPrice

BQoSPrice, the Price element for bQoS, describes the price for the service. Price can be expressed in various ways.

There SHOULD be one BQoSPrice element present in the business quality of service.

Syntax

```
<bqos:BQoSPrice xmlns:bqos="..." ...>
  <bqos:Price>bqos:PriceType
    <bqos:Unit unitCode="clm66411:UnitCodeContentType"
>cbc:BaseUnitMeasureType</bqos:Unit> ?
    <bqos:Amount currencyID="
clm54217:CurrencyCodeContentType">cbc:AmountType</bqos:Amount>
  </bqos:Price>
  ...
</bqos:BQoSPrice>
```

The following describes the attributes and elements listed in the schema outlined above:

/bqos:BQoS/bqos:BQoSPrice

Price aspects of the service, including the price and other optional elements

/bqos:BQoS/bqos:BQoSPrice/bqos:Price

Price element that represent the single price for BQoSPrice

/bqos:BQoS/bqos:BQoSPrice/bqos:Price/bqos:Unit

Number of units is a optional element that includes the unit of measurement using cbc:BaseUnitMeasureType

/bqos:BQoS/bqos:BQoSPrice/bqos:Price/bqos:Unit/@unitCode

Unit of measurement in cbc:BaseUnitMeasureType. It is a required attribute using clm66411:unitCodeContentType, xmlns:clm66411="urn:un:unece:uncefact:codelist:specification:66411:2001"

/bqos:BQoS/bqos:BQoSPrice/bqos:Price/bqos:Amount

Amount is a required element in the Price element. It uses cbc:AmountType from UBL that has a required currencyID attribute for currency code.

/bqos:BQoS/bqos:BQoSPrice/bqos:Price/bqos:Amount/@currencyID

Currency ID in cbc:AmountType. It is a required attribute using clm54217:CurrencyCodeContentType, xmlns:clm54217="urn:un:unece:uncefact:codelist:specification:54217:2001"

/bqos:BQoS/bqos:BQoSPrice/{any}

This is an extensibility mechanism to allow different (extensible) price elements to be specified in the future. Unrecognized elements MAY cause a fault or be silently ignored.

Example

The following non-normative example illustrates the use of bQoS price element. It describes 10 units for price of $171.50 US dollar:

```
(001) <?xml version="1.0" encoding="utf-8"?>
(002) <BQoSPrice xmlns="..." ...>
(003)   <Price>
(004)     <Unit unitCode="EA">10</Unit>
(005)      <Amount currencyID="USD">171.50</Amount>
(006)   </Price>
```

```
(007) </BQoSPrice>
```

4 BQoSPerformance

BQoSPerformance element for bQoS is the quality of service measured in the time to complete, or alternatively as throughput and latency.

There MAY be zero or one BQoSPerformance element present in the business quality of service.

Syntax

```
<bqos:BQoSPerformance xmlns:bqos="..." ...>
  <bqos:TimePeriod ... >bqos:TimePeriodType
    <bqos:Duration
unitCode="clm66411:UnitCodeContentType">cbc:DurationMeasureType</bqos:Duration
>
    <bqos:Latency
unitCode=="clm66411:UnitCodeContentType">cbc:DurationMeasureType</bqos:Latency
> ?
    <bqos:StartTime>udt:DateTimeType</bqos:StartTime> ?
    </bqos:TimePeriod> |
  <bqos:Throughput ...>
    <bqos:Quantity unitCode="clm66411:UnitCodeContentType"> ...
</bqos:Quantity>
    <bqos:Duration unitCode="clm66411:UnitCodeContentType">
cbc:DurationMeasureType</bqos:Duration>
    <bqos:Latency unitCode="clm66411:UnitCodeContentType">
cbc:DurationMeasureType</bqos:Latency> ?
  </bqos:Throughput> |
  ...
</bqos:BQoSPerformance>
```

The following describes the attributes and elements listed in the schema outlined above:

/bqos:BQoS/bqos:BQoSPerformance

Performance aspect of the service that has time period for the time to complete the whole service job, the throughput for duration to complete number of jobs, or an optional elements.

/bqos:BQoS/bqos:BQoSPerformance/bqos:TimePeriod

TimePeriod is the time period to complete the service, including the duration to complete the service, and optional elements for start time and latency.

/bqos:BQoS/bqos:BQoSPerformance/bqos:TimePeriod/bqos:Duration

Duration element is a required element in the TimePeriod element which is the duration to complete the service. It uses cbc:DurationMeasureType from UBL that has a required unitCode attribute for unit of measurement on the time.

/bqos:BQoS/bqos:BQoSPerformance/bqos:TimePeriod/bqos:Duration/@unitCode

Unit of measurement in cbc:BaseUnitMeasureType. It is a required attribute for the duration time, such as Second, Minute, Hour, Day, Week, etc, using clm66411:unitCodeContentType, xmlns:clm66411="urn:un:unece:uncefact:codelist:specification:66411:2001".

/bqos:BQoS/bqos:BQoSPerformance/bqos:TimePeriod/bqos:StartTime

StartTime is an optional element for the date and time to start the service. It uses udt:DateTimeType which is in UTC time format [ISO8601].

/bqos:BQoS/bqos:BQoSPerformance/bqos:TimePeriod/bqos:Latency

Latency is an optional element that describes the time delay before a service is expected to begin. It uses cbc:DurationMeasureType from UBL that has a required unitCode attribute for unit of measurement on the time.

/bqos:BQoS/bqos:BQoSPerformance/bqos:TimePeriod/bqos:Latency/@unitCode

Unit of measurement in cbc:BaseUnitMeasureType. It is a required attribute for the duration time, such as Second, Minute, Hour, Day, Week, etc, using clm66411:unitCodeContentType, xmlns:clm66411="urn:un:unece:uncefact:codelist:specification:66411:2001".

/bqos:BQoS/bqos:BQoSPerformance/bqos:Throughput

Throughput of the performance which is measured by is the amount of work that a service can provide in a given time period. It includes the quantity of the item and the duration to complete the work.

/bqos:BQoS/bqos:BQoSPerformance/bqos:Throughput/bqos:Duration

Duration element is a required element in the Throughput element. This is the duration to complete the service. It uses cbc:DurationMeasureType from UBL that has a required unitCode attribute for unit of measurement on the time.

/bqos:BQoS/bqos:BQoSPerformance/bqos:Throughput/bqos:Duration/@unitCode

Unit of measurement in cbc:BaseUnitMeasureType. It is a required attribute for the duration time, such as Second, Minute, Hour, Day, Week, etc, using clm66411:unitCodeContentType, xmlns:clm66411="urn:un:unece:uncefact:codelist:specification:66411:2001"

/bqos:BQoS/bqos:BQoSPerformance/bqos:Throughput/bqos:Quantity

Quantity is a required element in the Throughput element. It is the numbers for the throughput, with an attribute of unit of measurement, such as EA, pounds, cubic-feet, etc.

/bqos:BQoS/bqos:BQoSPerformance/bqos:Throughput/bqos:Latency

Latency is an optional element for the time delay for starting the service. It uses cbc:DurationMeasureType from UBL that has a required unitCode attribute for unit of measurement on the time.

/bqos:BQoS/bqos:BQoSPerformance/bqos:Throughput/bqos:Latency/@unitCode

Unit of measurement in cbc:BaseUnitMeasureType. It is a required attribute for the duration time, such as Second, Minute, Hour, Day, Week, etc, using clm66411:unitCodeContentType, xmlns:clm66411="urn:un:unece:uncefact:codelist:specification:66411:2001".

/bqos:BQoS/bqos:BQoSPerformance/{any}

This is an extensibility mechanism to allow different (extensible) performance or time elements to be specified in the future. Unrecognized elements MAY cause a fault or be silently ignored.

Examples

The following non-normative example illustrates the use of bQoS Performance element using the Throughput element instead of TimePeriod element. It describes the throughput of 10 units per day:

```
(001) <?xml version="1.0" encoding="utf-8"?>
(002) <BQoSPerformance xmlns="..." ...>
(003)   <Throughput>
(004)     <Duration unitCode="DAY">1</Duration>
(005)     <Quantity unitCode="EA">10.0</Quantity>
(006)   </Throughput>
(007) </BQoSPerformance>
```

The following non-normative example illustrates the use of bQoS Performance element using the TimePeriod element. It describes the 8 hours of the duration, and can be started on October 17, 2009, 9:30:47.02 Zulu time:

```
(001) <?xml version="1.0" encoding="utf-8"?>
```

```
(002) <BQoSPerformance xmlns="..." ...>
(003)   <TimePeriod>
(004)     <Duration unitCode="HUR">8</Duration>
(005)     <StartTime>2009-10-17T09:30:47.0Z</StartTime>
(006)   </TimePeriod>
(007) </BQoSPerformance>
```

5 BQoSQualities

The BQoSQualities, the Quality elements for bQoS, describes additional properties and attributes for the service. While any quality name/value can be asserted by a Service Provider to represent the quality of the service, this specification is not addressing issues of namespace management for qualities beyond the three pre-defined EERP namespaces.

There SHOULD be zero or one BQoSQualities element present in the business quality of service.

Syntax

```
<bqos:BQoSQualities xmlns:bqos="..." ...>
   <bqos:Property>bqos:PropertyType
      <bqos:PropertyName ...>bqos:PropertyNameType</bqos:PropertyName>
      <bqos:PropertyValue ...>bqos:PropertyValue</bqos:PropertyValue> ?
   </bqos:Property> +
    ...
</bqos:BQoSQualities>
```

The following describes the attributes and elements listed in the schema outlined above:

/bqos:BQoS/bqos:BQoSQualities

Quality aspect of the service is measured in terms of additional properties and attributes. It has a list of property for BQoSQualities and other optional elements.

/bqos:BQoS/bqos:BQoSQualities/bqos:Property

Property element is for additional property or attribute for quality measurement of the service in bQoS that has name and value pair to describe the quality of the service.

/bqos:BQoS/bqos:BQoSQualities/bqos:PropertyName

Property name is a required element for the name in the name and value pair in the Property element. It uses bqos:PropertyNameType which is a cbc:NamType from UBL that has a optional languageID attribute for language code.

/bqos:BQoS/bqos:BQoSQualities/bqos:Property/bqos:PropertyName/@languageID

Language ID is an optional attribute in the PropertyName element, using xsd:language type. The value can be those defined in urn:un:unece:uncefact:codelist:specification:5639:1988.

/bqos:BQoS/bqos:BQoSQualities/bqos:Property/bqos:PropertyName/@{any}

This is an extensibility mechanism to allow additional attributes, based on schemas, to be added to the PropertyName element in the future. This can be the namespace and the format for the Property. Unrecognized attributes MAY cause a fault or be silently ignored.

/bqos:BQoS/bqos:BQoSQualities/bqos:Property/bqos:PropertyValue

The property value is an optional element for the value in the name and value pair in the Property element. It uses bqos:PropertyValueType which is a cbc:NamType from UBL that has a optional languageID attribute for language code.

/bqos:BQoS/bqos:BQoSQualities/bqos:Property/bqos:PropertyValue/@languageID

Language ID is an optional attribute in the PriceValue element, using xsd:language type. The value can be those defined in urn:un:unece:uncefact:codelist:specification:5639:1988.

/bqos:BQoS/bqos:BQoSQualities/bqos:Property/@{any}

This is an extensibility mechanism to allow additional attributes, based on schemas, to be added to the Property element in the future. Unrecognized attributes MAY cause a fault or be silently ignored.

/bqos:BQoS/bqos:BQoSQualities/{any}

This is an extensibility mechanism to allow different (extensible) properties or attribute elements to be specified in the future. Unrecognized elements MAY cause a fault or be silently ignored. For example, one or more /bqos:BQoS/bqos:BQoSQualities/Performance:QualityAssertion elements can be placed in here for the Service Provider to assert the specific Qualities of its services.

Example

The following non-normative example illustrates the use of bQoS price element. It describes the Class is Golden and it has “Network Connection” as additional property for this service:

```
(001) <?xml version="1.0" encoding="utf-8"?>
(002) <BQoSQualities xmlns="..." ...>
(003)   <Property>
(004)     <PropertyName languageID="EN">Class</PropertyName>
(005)      <PropertyValue>Golden</PropertyValue>
(006)   </Property>
(003)   <Property>
(004)     <PropertyName languageID="EN">Network Connection</PropertyName>
(006)   </Property>
(007) </BQoSQualities>
```

6 BQoS Examples

The examples in this section are non-normative.

6.1 Service Price with a Batch of Products Examples

This bQoS example will show the following quality indicators:

1. The service price is CNY 120000 per service, including 1000 gas-meters for one batch.
2. The throughput is usually 1 week or 7 days for the service. In another words, it will cost 1 week or 7 days to provide and delivery 1000 gas-meters as one batch of product.
3. The service has additional attributes to provide the IC card gas-meters integrated with iron IC-card box for the quality indicators.

Example

The following example illustrates the whole bQoS document for quality indicators:

```
(1)   <?xml version="1.0" encoding="UTF-8"?>
(2)   <bqos:BQoS xmlns:bqos="..." ... >
(3)     <bqos:BQoSPrice
(4)       <bqos:Price>
(5)         <bqos:Unit unitCode="EA">1000</bqos:Unit>
(6)         <!-- CNY: Chinese Yuan -->
(7)         <bqos:Amount currencyID="CNY">120000</bqos:Amount>
(8)       </bqos:Price>
(9)     </bqos:BQoSPrice>
(10)    <bqos:BQoSPerformance>
(11)      <bqos:Throughput>
(12)        <!-- delivery: 1 week -->
(13)        <bqos:Duration unitCode="DAY">7</bqos:Duration>
(14)        <!-- batch production, generally 1000 sets a batch -->
(15)        <bqos:Quantity>1000</bqos:Quantity>
(16)        <bqos:Latency unitCode="DAY">0</bqos:Latency>
(17)      </bqos:Throughput>
(18)    </bqos:BQoSPerformance>
(19)    <bqos:BQoSQualities>
(20)      <bqos:Property>
(21)        <bqos:PropertyName languageID="zh-cn">□□</bqos:PropertyName>
(22)        <bqos:PropertyValue languageID="zh-cn">□□</bqos:PropertyValue>
(23)      </bqos:Property>
(24)      <bqos:Property>
(25)        <bqos:PropertyName languageID="en">MeterType</bqos:PropertyName>
(26)        <bqos:PropertyValue languageID="en">IC card gas-
      meter</bqos:PropertyValue>
(27)      </bqos:Property>
(28)      <bqos:Property>
(29)        <bqos:PropertyName languageID="en">IC-Card-Box</bqos:PropertyName>
(30)        <bqos:PropertyValue
      languageID="en">integrated</bqos:PropertyValue>
(31)      </bqos:Property>
(32)    </bqos:BQoSQualities>
(33)  </bqos:BQoS>
```

6.2 Storage Service Examples

This bQoS example will show a storage service with the following quality indicators:

1. The storage service price is 600 Euro in total.
2. The time period for the storage service is 4 day, starting from July 15, 2009, 16:30, UTC time.

3. The service has additional attributes of internet tracking and temperature from 70 to 85 degree Fahrenheit the quality indicators.

Example

The following example illustrates the storage service bQoS for quality indicators:

```
(1)   <?xml version="1.0" encoding="UTF-8"?>
(2)   <bqos:BQoS xmlns:bqos="..." ... >
(3)       <BQoSPrice>
(4)       <Price>
(5)         <Amount currencyID="EUR">600</Amount>
(6)       </Price>
(7)     </BQoSPrice>
(8)     <BQoSPerformance>
(9)       <TimePeriod>
(10)        <Duration unitCode="DAY">4</Duration>
(11)        <StartTime>2009-07-15T16:30:00.0Z</StartTime>
(12)      </TimePeriod>
(13)    </BQoSPerformance>
(14)    <BQoSQualities>
(15)      <Property>
(16)        <PropertyName>Internet Tracking</PropertyName>
(17)      </Property>
(18)      <Property>
(19)        <PropertyName>Temperature</PropertyName>
(20)        <PropertyValue>70F-78F</PropertyValue>
(21)      </Property>
(22)     </BQoSQualities>
(23)  </bqos:BQoS>
```

7 Conformance

An implementation conforms to this specification if it satisfies all of the MUST or REQUIRED level requirements defined within this specification. A SOAP Node MUST NOT use the XML namespace identifier for this specification (listed in Section 1.1) within SOAP Envelopes unless it is compliant with this specification.

This specification references a number of other specifications (listed in Section 1.4.2). In order to comply with this specification, an implementation MUST implement the portions of referenced specifications necessary to comply with the required provisions of this specification. Additionally, the implementation of the portions of the referenced specifications that are specifically cited in this specification MUST comply with the rules for those portions as established in the referenced specification.

Normative text within this specification takes precedence over normative outlines (as described in section 1.4.1), which in turn take precedence over the XML Schema [XML Schema Part 1, Part 2] and WSDL [WSDL 1.1] descriptions. That is, the normative text in this specification further constrains the schemas and/or WSDL that are part of this specification; and this specification contains further constraints on the elements defined in referenced schemas.

The minimum set of information exchange for bQoS that would allow conforming applications to exchange information and satisfy the conformance should at least to have /bqos:BQoS/bqos:BQoSPrice/bqos:Price/bqos:Amount element, like this:

```
(001) <?xml version="1.0" encoding="utf-8"?>
(002) <BQoS xmlns="http://docs.oasis-open.org/ns/soa-eerp/bqos/200903">
(003)   <BQoSPrice>
(004)     <Price>
(005)       <Amount currencyID="USD">0.0</Amount>
(006)     </Price>
(007)   </BQoSPrice>
(008)  </BQoS>
```

A nearly empty artifact does not conform to this specification. The following are three non-conform examples.

Non-conform example 1:

```
(001) <?xml version="1.0" encoding="utf-8"?>
(002) <BQoS xmlns="http://docs.oasis-open.org/ns/soa-eerp/bqos/200903">
(003)   <BQoSPrice />
(004)  </BQoS>
```

Non-conform example 2:

```
 (001) <?xml version="1.0" encoding="utf-8"?>
(002) <BQoS xmlns="http://docs.oasis-open.org/ns/soa-eerp/bqos/200903">
(003)   < BQoSPerformance />
(004)  </BQoS>
```

Non-conform example 3:

```
 (001) <?xml version="1.0" encoding="utf-8"?>
(002) <BQoS xmlns="http://docs.oasis-open.org/ns/soa-eerp/bqos/200903">
(003)   <BQoSPrice>
(004)     <Price />
```

```
(005)    </BQoSPrice>
(006)  </BQoS>
```

This specification defines a number of extensions; compliant services are NOT REQUIRED to implement those extensions defined in this specification. However, if a service implements an aspect of the specification, it MUST comply with the requirements specified (e.g. related "MUST" statements). If an implementation silently ignores unrecognized attributes where any attribute is allowed, or silently ignores unrecognized elements where any element is allowed, it should be considered as an interoperable implementation.

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Participants:

Rex Brooks	Individual
Szu Chang	Changfeng Open Standards Platform Software Alliance
William Cox,	Individual
Andy Lee	Changfeng Open Standards Platform Software Alliance
Carl Mattocks	Individual
Yulin Xu	Changfeng Open Standards Platform Software Alliance
Paul Yang	Changfeng Open Standards Platform Software Alliance
James Zhili Zhang	TIBCO Software Inc.
Hong Zhou	Changfeng Open Standards Platform Software Alliance

B. XML Schema

Note: The separate machine readable schema document, listed on Section 2.2, is normative. The text included here is non-normative.

```
 <?xml version="1.0" encoding="UTF-8"?>
<!--
  Document Type:    EERP-bQoS CD04
  Create On:       09/12/2010

-->
<!-- ===== xsd:schema Element With Namespaces Declarations ===== -->
<!-- ===== Copyright Notice ===== -->
<!--
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  PARTICULAR PURPOSE.
-->
<xsd:schema xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns="http://docs.oasis-
open.org/ns/soa-eerp/bqos/200903" xmlns:bqos="http://docs.oasis-open.org/ns/soa-eerp/bqos/200903"
xmlns:cbc="urn:oasis:names:specification:ubl:schema:xsd:CommonBasicComponents-2"
xmlns:udt="urn:un:unece:uncefact:data:specification:UnqualifiedDataTypesSchemaModule:2"
xmlns:xs="http://www.w3.org/2001/XMLSchema" targetNamespace="http://docs.oasis-open.org/ns/soa-
eerp/bqos/200903" elementFormDefault="qualified" attributeFormDefault="unqualified"
version="1.0">
  <!-- ===== Imports ===== -->
```

```
  <xsd:import namespace="urn:oasis:names:specification:ubl:schema:xsd:CommonBasicComponents-2"
schemaLocation="http://docs.oasis-open.org/ubl/os-UBL-2.0/xsd/common/UBL-CommonBasicComponents-
2.0.xsd"/>
  <xsd:import
namespace="urn:un:unece:uncefact:data:specification:UnqualifiedDataTypesSchemaModule:2"
schemaLocation="http://docs.oasis-open.org/ubl/os-UBL-
2.0/xsd/common/UnqualifiedDataTypeSchemaModule-2.0.xsd"/>
  <!-- ===== Root Element ===== -->
  <xsd:element name="BQoS" type="BQoSType">
    <xsd:annotation>
      <xsd:documentation>Root element of Business Quality of Service (bQoS)</xsd:documentation>
    </xsd:annotation>
  </xsd:element>
  <!-- ===== Element Declarations ===== -->
  <xsd:element name="Amount" type="cbc:AmountType">
    <xsd:annotation>
      <xsd:documentation>Amount element</xsd:documentation>
    </xsd:annotation>
  </xsd:element>
  <xsd:element name="BQoSPerformance" type="BQoSPerformanceType">
    <xsd:annotation>
      <xsd:documentation>Performance aspect of the service that has time period for the time to
complete the whole service job, the throughput for duration to complete number of jobs, or an
optional elements.  </xsd:documentation>
    </xsd:annotation>
  </xsd:element>
  <xsd:element name="BQoSPrice" type="BQoSPriceType">
    <xsd:annotation>
      <xsd:documentation>The Price element for bQoS,  price aspects of the service, describes the
price for the service,  including the price and other optional elements.  </xsd:documentation>
    </xsd:annotation>
  </xsd:element>
  <xsd:element name="BQoSQualities" type="BQoSQualitiesType">
    <xsd:annotation>
      <xsd:documentation>Quality aspect of the service is measured in terms of additional
properties and attributes. It has a list of property for BQoSQualities and other optional
elements. </xsd:documentation>
    </xsd:annotation>
  </xsd:element>
  <xsd:element name="Duration" type="cbc:DurationMeasureType">
    <xsd:annotation>
      <xsd:documentation>Duration element is the duration to complete the service. It uses
cbc:DurationMeasureType from UBL that has a required unitCode  attribute for unit of measurement
on the time.  </xsd:documentation>
    </xsd:annotation>
  </xsd:element>
  <xsd:element name="Latency" type="cbc:DurationMeasureType">
    <xsd:annotation>
      <xsd:documentation>Latency describes the time delay before a service is expected to begin.
It uses cbc:DurationMeasureType from UBL that has a required unitCode attribute for unit of
measurement on the time.      </xsd:documentation>
    </xsd:annotation>
  </xsd:element>
  <xsd:element name="Price" type="PriceType">
    <xsd:annotation>
      <xsd:documentation>Price element for bQoS that is the single price </xsd:documentation>
    </xsd:annotation>
  </xsd:element>
  <xsd:element name="Property" type="PropertyType">
    <xsd:annotation>
      <xsd:documentation>Property element is for additional property or attribute for quality
measurement of the service in bQoS that has name and value pair to describe the quality of the
service.</xsd:documentation>
    </xsd:annotation>
  </xsd:element>
  <xsd:element name="PropertyName" type="PropertyNameType">
    <xsd:annotation>
      <xsd:documentation>Property name is a required element for the name in the name and value
pair in the Property element. It uses bqos:PropertyNameType which is a cbc:NamType from UBL that
has a optional languageID attribute for language code.  </xsd:documentation>
    </xsd:annotation>
  </xsd:element>
  <xsd:element name="PropertyValue" type="PropertyValueType">
```

```
      <xsd:annotation>
        <xsd:documentation>Value of the Property or Attribute</xsd:documentation>
      </xsd:annotation>
    </xsd:element>
    <xsd:element name="Quantity" type="cbc:BaseQuantityType">
      <xsd:annotation>
        <xsd:documentation>Quantity is the numbers for the throughput, with an attribute of unit of
measurement, such as EA, pounds, cubic-feet, etc. </xsd:documentation>
      </xsd:annotation>
    </xsd:element>
    <xsd:element name="StartTime" type="udt:DateTimeType">
      <xsd:annotation>
        <xsd:documentation>StartTime is  the date and time to start the
service.</xsd:documentation>
      </xsd:annotation>
    </xsd:element>
    <xsd:element name="TimePeriod" type="TimePeriodType">
      <xsd:annotation>
        <xsd:documentation>TimePeriod is the time period to complete the service, including the
duration to complete the service, and optional elements for start time and latency
</xsd:documentation>
      </xsd:annotation>
    </xsd:element>
    <xsd:element name="Throughput" type="ThroughputType">
      <xsd:annotation>
        <xsd:documentation>The performance is measured by is the amount of work that a service can
provide in a given time period. </xsd:documentation>
      </xsd:annotation>
    </xsd:element>
    <xsd:element name="Unit" type="cbc:BaseUnitMeasureType">
      <xsd:annotation>
        <xsd:documentation>Number of units  with unit of measurement</xsd:documentation>
      </xsd:annotation>
    </xsd:element>
    <!-- Extension -->
    <xsd:element name="BQoSExtension">
      <xsd:annotation>
        <xsd:documentation>Additional bQoS elements </xsd:documentation>
      </xsd:annotation>
      <xsd:complexType mixed="true">
        <xsd:choice minOccurs="0" maxOccurs="unbounded">
          <xsd:any processContents="skip" minOccurs="0" maxOccurs="unbounded"/>
        </xsd:choice>
        <xsd:attribute name="optional" type="xsd:boolean" use="optional" default="true"/>
      </xsd:complexType>
    </xsd:element>
    <!-- ===== Type Definitions ===== -->
    <xsd:complexType name="BQoSPerformanceType">
      <xsd:annotation>
        <xsd:documentation>Complex type for the performance aspect of the service
bQoS</xsd:documentation>
      </xsd:annotation>
      <xsd:choice>
        <xsd:element ref="TimePeriod">
          <xsd:annotation>
            <xsd:documentation>TimePeriod is the time period to complete the service, including the
duration to complete the service, and optional elements for start time and
latency.</xsd:documentation>
          </xsd:annotation>
        </xsd:element>
        <xsd:element ref="Throughput"/>
        <xsd:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
      </xsd:choice>
      <xsd:anyAttribute namespace="##any" processContents="lax"/>
    </xsd:complexType>
    <xsd:complexType name="BQoSPriceType">
      <xsd:annotation>
        <xsd:documentation>Complex type for the price/cost aspect of the service
bQoS</xsd:documentation>
      </xsd:annotation>
      <xsd:sequence>
        <xsd:element ref="Price">
          <xsd:annotation>
```

```
          <xsd:documentation>Price element that represent the single price for
BQoSPrice.</xsd:documentation>
        </xsd:annotation>
      </xsd:element>
      <xsd:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xsd:sequence>
    <xsd:anyAttribute namespace="##any" processContents="lax"/>
  </xsd:complexType>
  <xsd:complexType name="BQoSQualitiesType">
    <xsd:annotation>
      <xsd:documentation>Complex type for the Quality related aspects of the service BQoS
</xsd:documentation>
    </xsd:annotation>
    <xsd:sequence>
      <xsd:element ref="Property" maxOccurs="unbounded">
        <xsd:annotation>
          <xsd:documentation>Property element is for additional property or attribute for quality
measurement of the service in bQoS that has name and value pair to describe the quality of the
service.</xsd:documentation>
        </xsd:annotation>
      </xsd:element>
      <xsd:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xsd:sequence>
    <xsd:anyAttribute namespace="##any" processContents="lax"/>
  </xsd:complexType>
  <xsd:complexType name="BQoSType">
    <xsd:annotation>
      <xsd:documentation>Complex type for the Business QoS</xsd:documentation>
    </xsd:annotation>
    <xsd:sequence>
      <xsd:element ref="BQoSPrice">
        <xsd:annotation>
          <xsd:documentation>The Price element for bQoS that describes the price for the service.
Price can be expressed in various ways.</xsd:documentation>
        </xsd:annotation>
      </xsd:element>
      <xsd:element ref="BQoSPerformance" minOccurs="0">
        <xsd:annotation>
          <xsd:documentation>BQoSPerformance element for bQoS is the quality of service measured
in the time to complete, or alternatively as throughput and latency.</xsd:documentation>
        </xsd:annotation>
      </xsd:element>
      <xsd:element ref="BQoSQualities" minOccurs="0">
        <xsd:annotation>
          <xsd:documentation>The Quality elements for bQoS that describes additional properties
and attributes for the service. It has a list of property for BQoSQualities and other optional
elements. </xsd:documentation>
        </xsd:annotation>
      </xsd:element>
      <xsd:element ref="BQoSExtension" minOccurs="0" maxOccurs="unbounded">
        <xsd:annotation>
          <xsd:documentation>Other aspects of “quality of business”</xsd:documentation>
        </xsd:annotation>
      </xsd:element>
    </xsd:sequence>
    <xsd:anyAttribute namespace="##any" processContents="lax"/>
  </xsd:complexType>
  <xsd:complexType name="PriceType">
    <xsd:annotation>
      <xsd:documentation>Complex type for Pricing or Billing for the service</xsd:documentation>
    </xsd:annotation>
    <xsd:sequence>
      <xsd:element ref="Unit" minOccurs="0">
        <xsd:annotation>
          <xsd:documentation>Number of units is a optional element that includes the unit of
measurement. </xsd:documentation>
        </xsd:annotation>
      </xsd:element>
      <xsd:element ref="Amount">
        <xsd:annotation>
          <xsd:documentation>Amount is a required element in the Price element. It uses
cbc:AmountType from UBL that has a required currencyID attribute for currency
code.</xsd:documentation>
```

```
        </xsd:annotation>
      </xsd:element>
    </xsd:sequence>
  </xsd:complexType>
  <xsd:complexType name="PropertyType">
    <xsd:annotation>
      <xsd:documentation>Complex type for addtional property or attribute for
quality</xsd:documentation>
    </xsd:annotation>
    <xsd:sequence>
      <xsd:element ref="PropertyName"/>
      <xsd:element ref="PropertyValue" minOccurs="0">
        <xsd:annotation>
          <xsd:documentation>Value of the Property or Attribute. It uses bqos:PropertyValueType
which is a cbc:NamType from UBL that has a optional languageID attribute for language code.
</xsd:documentation>
        </xsd:annotation>
      </xsd:element>
    </xsd:sequence>
    <xsd:anyAttribute namespace="##any" processContents="lax"/>
  </xsd:complexType>
  <xsd:complexType name="PropertyNameType">
    <xsd:annotation>
      <xsd:documentation>Complex type for property or attribute name </xsd:documentation>
    </xsd:annotation>
    <xsd:simpleContent>
      <xsd:extension base="cbc:NameType">
        <xsd:anyAttribute namespace="##any" processContents="lax"/>
      </xsd:extension>
    </xsd:simpleContent>
  </xsd:complexType>
  <xsd:complexType name="PropertyValueType">
    <xsd:annotation>
      <xsd:documentation>Complex type for property or attribute value.   </xsd:documentation>
    </xsd:annotation>
    <xsd:simpleContent>
      <xsd:extension base="cbc:ValueType"/>
    </xsd:simpleContent>
  </xsd:complexType>
  <xsd:complexType name="QualitiesType">
    <xsd:annotation>
      <xsd:documentation>Complex type for Quality elements </xsd:documentation>
    </xsd:annotation>
    <xsd:sequence>
      <xsd:element ref="Property" maxOccurs="unbounded"/>
      <xsd:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xsd:sequence>
    <xsd:anyAttribute namespace="##any" processContents="lax"/>
  </xsd:complexType>
  <xsd:complexType name="TimePeriodType">
    <xsd:annotation>
      <xsd:documentation>Complex type for Time period  </xsd:documentation>
    </xsd:annotation>
    <xsd:sequence>
      <xsd:element ref="Duration">
        <xsd:annotation>
          <xsd:documentation>Duration to complete  the service. It uses cbc:DurationMeasureType
from UBL that has a required unitCode  attribute for unit of measurement on the time.
</xsd:documentation>
        </xsd:annotation>
      </xsd:element>
      <xsd:element ref="Latency" minOccurs="0">
        <xsd:annotation>
          <xsd:documentation>Latency is an optional element that describes the time delay before a
service is expected to begin. It uses cbc:DurationMeasureType from UBL that has a required
unitCode attribute for unit of measurement on the time.    </xsd:documentation>
        </xsd:annotation>
      </xsd:element>
      <xsd:element ref="StartTime" minOccurs="0">
        <xsd:annotation>
          <xsd:documentation>StartTime is an optional element for the date and time to start the
service. It uses udt:DateTimeType which is in UTC  time format .</xsd:documentation>
        </xsd:annotation>
```

```
      </xsd:element>
    </xsd:sequence>
    <xsd:anyAttribute namespace="##any" processContents="lax"/>
  </xsd:complexType>
  <xsd:complexType name="ThroughputType">
    <xsd:annotation>
      <xsd:documentation>Complex type for the throughput </xsd:documentation>
    </xsd:annotation>
    <xsd:sequence>
      <xsd:element ref="Duration">
        <xsd:annotation>
          <xsd:documentation>Duration element is a required element in the Throughput element.
This is the duration to complete the service. It uses cbc:DurationMeasureType from UBL that has a
required unitCode  attribute for unit of measurement on the time.  </xsd:documentation>
        </xsd:annotation>
      </xsd:element>
      <xsd:element ref="Quantity">
        <xsd:annotation>
          <xsd:documentation>Quantity is the numbers for the throughput, with an attribute of unit
of measurement, such as EA, pounds, cubic-feet, etc. The numbers for the throughput, with
attribute of Unit of measurement, such as EA, lb, cubic-feet, etc.</xsd:documentation>
        </xsd:annotation>
      </xsd:element>
      <xsd:element ref="Latency" minOccurs="0"/>
    </xsd:sequence>
    <xsd:anyAttribute namespace="##any" processContents="lax"/>
  </xsd:complexType>
</xsd:schema>
```

C. Non-Normative Text

None

D. Revision History

Revision	Date	Editor	Changes Made
0.8	03/02/2009	Szu Chang	Initial draft
0.9	03/09/2009	Szu Chang	Change the syntax to include the data type
WD01	04/15/2009	Szu Chang	Rename draft 0.9 to working draft 0.1
WD02	04/29/2009	Szu Chang	Added whole example and some minor edits
WD03	05/07/2009	Szu Chang	Added issue list and some minor edits. This is to get ready for CD01
WD04	05/17/2009	Szu Chang	Added conformance section
WD05	06/24/2009	Szu Chang	Fixed issues I022, I026, I029, I032, I036, I039, and I045.
WD06	07/03/2009	Szu Chang	Fixed issues I026, I029, I033, I042, I044, I049 and I053.
CD02	07/11/2009	Szu Chang	Changed WD06 to CD02 after approved by TC
CD03	01/06/2010	Szu Chang	Changed NS and fixed URIs from CD02 to CD03
WD08	05/10/2010	Szu Chang	Changed after the public review comments
WD09	06/23/2010	Szu Chang	Changed after the first round of review PR comments
CD04	09/12/2010	Szu Chang	TC approved, changed from WS09 to CD04