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# OASIS ebXML Messaging Services

Version 3.0

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This specification focuses on defining a communications-protocol neutral method for exchanging electronic business messages. It defines specific enveloping constructs supporting reliable, secure delivery of business information. Furthermore, the specification defines a flexible enveloping technique, permitting messages to contain payloads of any format type. This versatility ensures legacy electronic business systems employing traditional syntaxes (i.e. UN/EDIFACT, ASC X12, or HL7) can leverage the advantages of the ebXML infrastructure along with users of emerging technologies.

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# 1. Introduction

This specification focuses on defining a communications-protocol neutral method for exchanging electronic business messages. It defines specific enveloping constructs supporting reliable, secure delivery of business information. Furthermore, the specification defines a flexible enveloping technique, permitting messages to contain payloads of any format type. This versatility ensures legacy electronic business systems employing traditional syntaxes (i.e. UN/EDIFACT, ASC X12, or HL7) can leverage the advantages of the ebXML infrastructure along with users of emerging technologies.

# 2. 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 [RFC 2119].

This specification uses capitalization to help make these key words stand out.

# 3. Audience

The target audience for this specification is the community of software developers who will implement the ebXML Message Service.

# 4. Caveats & Assumptions

It is assumed the reader has an understanding of communications protocols, MIME, XML, SOAP, SOAP Messages with Attachments and security technologies.

All examples are to be considered non-normative. If inconsistencies exist between the specification and the examples, the specification supersedes the examples.

It is strongly RECOMMENDED implementors read and understand the Collaboration Protocol Profile/ Agreement [ebCPPA] specification and its implications prior to implementation.

# 5. Concept of Operation

## 5.1. Scope

The ebXML Message Service (ebMS) defines the message enveloping and header document schema used to transfer ebXML messages over a communications protocol such as HTTP or SMTP and the behavior of software sending and receiving ebXML messages. The ebMS is defined as a set of layered extensions to the base [SOAP] and [SOAP w/ Attachments] specifications. This document provides security and reliability features necessary to support international electronic business. These security and reliability features are not provided in the SOAP or SOAP with Attachments specifications.

The ebXML infrastructure is composed of several independent, but related, components. Specifications for the individual components are fashioned as stand-alone documents. The specifications are totally self-contained; nevertheless, design decisions within one document can and do impact the other documents. Considering this, the ebMS is a closely coordinated definition for an ebXML message service handler (MSH).

The ebMS provides the message packaging, routing and transport facilities for the ebXML infrastructure. The ebMS is not defined as a physical component, but rather as an abstraction of a process. An implementation of this specification could be delivered as a wholly independent software application or an integrated component of some larger business process.

## 5.2. Background and Objectives

Traditional business information exchanges have conformed to a variety of standards-based syntaxes. These exchanges were largely based on electronic data interchange (EDI) standards born out of mainframe and batch processing. Some of the standards defined bindings to specific communications protocols. These EDI techniques worked well; however, they were difficult and expensive to implement. Therefore, use of these systems was normally limited to large enterprises possessing mature information technology capabilities.

The proliferation of XML-based business interchanges served as the catalyst for defining a new global paradigm that ensured all business activities, regardless of size, could engage in electronic business activities. The prime objective of ebMS is to facilitate the exchange of electronic business messages within an XML framework. Business messages, identified as the 'payloads' of the ebXML messages, are not necessarily expressed in XML. XML-based messages, as well as traditional EDI formats, are transported by the ebMS. Actually, the ebMS payload can take any digital form—XML, ASC X12, HL7, AIAG E5, database tables, binary image files, etc.

An objective of ebXML Messaging protocol is to be capable of being carried over any available communications protocol. Therefore, this document does not mandate use of a specific communications protocol. This version of the specification provides bindings to HTTP, SMTP and FTP, but other protocols can, and reasonably will, be used.

Another primary objective of ebXML Messaging is to provide a reliable messaging facility. The reliable messaging elements of the ebMS supply reliability to the communications layer; they are not intended as business-level acknowledgments to the applications supported by the ebMS. This is an important distinction. Business processes often anticipate responses to messages they generate. The responses may take the form of a simple acknowledgment of message receipt by the application receiving the message or a companion message reflecting action on the original message. Those messages are outside of the MSH scope. The acknowledgment defined in this specification does not indicate the payload of the ebXML message was syntactically correct. It does not acknowledge the accuracy of the payload information. It does not indicate business acceptance of the information or agreement with the content of the payload. The ebMS is designed to provide the sender with the confidence the receiving MSH has received the message securely and intact.

The underlying architecture of the MSH assumes messages are exchanged between two ebMS-compliant MSH nodes. This pair of MSH nodes provides a hop-to-hop model extended as required to support a multi-hop environment. The multi-hop environment allows the next destination of the message to be an intermediary MSH other than the 'receiving MSH' identified by the original sending MSH. The ebMS architecture assumes the sender of the message MAY be unaware of the specific path used to deliver a message. However, it MUST be assumed the original sender has knowledge of the final recipient of the message and the first of one or more intermediary hops.

The MSH supports the concept of an "Agreement". The flow of a message exchange is controlled by an agreement existing between the parties directly involved in the message exchange. In practice, multiple agreements may be required between the two parties. The agreements might be tailored to the particular needs of the business exchanges. For instance, business partners may have a contract defining the message exchanges related to buying products from a domestic facility and another defining the message exchanges for buying from an overseas facility. Alternatively, the partners might agree to follow the agreements developed by their trade association. Multiple agreements may also exist between the various parties handling the message from the original sender to the final recipient. These agreements could include:

1. an agreement between the MSH at the message origination site and the MSH at the final destination; and
2. agreement between the MSH at the message origination site and the MSH acting as an intermediary; and

3. an agreement between the MSH at the final destination and the MSH acting as an intermediary. There would, of course, be agreements between any additional intermediaries; however, the originating site MSH and final destination MSH MAY have no knowledge of these agreements.

An ebMS-compliant MSH shall respect the in-force agreements between itself and any other ebMS-compliant MSH with which it communicates. In broad terms, these agreements are expressed as Collaboration Protocol Agreements (CPA). This specification identifies the information that must be agreed in Section 5.3, "Operational Policies and Constraints". It does not specify the method or form used to create and maintain these agreements. It is assumed, in practice, the actual content of the contracts may be contained in initialization/configuration files, databases, or XML documents complying with the ebXML Collaboration Protocol Profile and Agreement Specification [ebCPPA].

## 5.3. Operational Policies and Constraints

The ebMS is a service logically positioned between one or more business applications and a communications service. This requires the definition of an abstract service interface between the business applications and the MSH. This document acknowledges the interface, but does not provide a definition for the interface. Future versions of the ebMS MAY define the service interface structure.

Bindings to two communications protocols are defined in this document; however, the MSH is specified independent of any communications protocols. While early work focuses on HTTP for transport, no preference is being provided to this protocol. Other protocols may be used and future versions of the specification may provide details related to those protocols.

### 5.3.1. MSH Operational Parameters

ebXML MSHs rely on external configuration information to drive message exchanges. Throughout this document, we refer to these abstract operational parameters which are defined below.

In a production environment, an MSH may obtain these operational parameters from a CPA or some other source of configuration.

#### 5.3.1.1. OpParam\_ToPartyValue

Identifier(s) of the receiving party in a message exchange.

#### 5.3.1.2. OpParam\_FromPartyValue

Identifier(s) of the sending party in a message exchange.

#### 5.3.1.3. OpParam\_ConversationID

A message's conversation ID.

#### 5.3.1.4. OpParam\_ServiceValue

A message's service identifier.

#### 5.3.1.5. OpParam\_AgreementRef

A message's AgreementRef.

#### 5.3.1.6. OpParam\_ActionValue

A message's action identifier.

#### 5.3.1.7. OpParam\_SecurityProfile

A message's security profile, which contains the following child parameters:

*TBD*

### 5.3.1.8. OpParam\_ReliabilityProfile

A message's reliability profile, which contains the following child parameters:  
*TBD*

### 5.3.1.9. OpParam\_MEPMode

A message's MEP Mode.

## 5.4. Modes of Operation

This specification does not mandate how the MSH will be installed within the overall ebXML framework. It is assumed some MSH implementations will not implement all functionality defined in this specification. All MSH implementations shall comply with the specification with regard to the functions supported in the specific implementation and provide error notifications for functionality requested but not supported. Documentation for a MSH implementation SHALL identify all ebMS features not satisfied in the implementation.

The ebXML Message Service may be conceptually broken down into the following three parts:

1. an abstract Service Interface,
2. functions provided by the MSH and
3. the mapping to underlying transport service(s).

Figure 1, "Component Relationships" depicts a logical arrangement of the functional modules existing within one possible implementation of the ebXML Message Services architecture. These modules are arranged in a manner to indicate their inter-relationships and dependencies.

Following is a description of each module illustrated above. It should be noted that the stack diagram above is abstract, and this specification does not mandate that implementations adopt the architecture suggested by it.

- **ebXML Application** - This is where the business logic for a message exchange / business process exists.
- **Message Service Interface** - This is the interface through which messages are channelled between the MSH core and the the ebXML Application.
- **Authentication, Authorization & Non-Repudiation** - This module performs any authentication and authorization checks, and verifies the sender or receiver's identity.
- **ebMS Packaging & Payload Services** - Handling, (de)enveloping and execution of Payload Services are performed by this module.
- **Reliability Processing** - This module fulfills the WS-Reliability requirements for a message.
- **Digital Signature / Cryptography Processing** - Verification of any digital signatures occurs in this module.
- **Message Transceiver / Transport Liasion** - This module manages interaction with the available transport bindings, acting as a normalizing layer between the MSH and its various transports.
- **Transport Bindings** - These are the actual transport bindings. This specification defines bindings for HTTP (Section 2, "HTTP"), FTP (Section 4, "FTP") and SMTP (Section 3, "SMTP") and supports the addition of other protocols.

## 6. Abstract Message Exchange Patterns

This section defines the Abstract Message Exchange Patterns (MEP) that are supported by this specification.

An ebMS MEP has two characteristics:

- The type of business level exchange: Unidirectional, Bidirectional.
- The mode of transfer: Push, Pull.

Each MEP defined below is a combination of these two characteristics, although not all possible combinations have been specified.

Unidirectional exchange means that a message is sent without the expectation of a related response message.

Bidirectional exchange means that a response message is expected.

Sending a message in Push mode means that the message is sent as either a SOAP one-way MEP instance or as a SOAP Request in a SOAP request-response MEP instance.

Sending a message in Pull mode means that the message is sent as a SOAP response over a SOAP request-response MEP instance, where the SOAP request contains the ebMS PullRequest signal.

## 6.1. Assumed SOAP Message Exchange Patterns

SOAP One-way MEP:

From an RMP perspective, support for this MEP assumes the following:

- The Sending RMP (as a SOAP node) is able to initiate the sending of a SOAP envelope over the underlying protocol (i.e., not as a result of a previous protocol action such as an HTTP GET or POST).
- No response containing a SOAP envelope is sent back – although a non-SOAP response (e.g., an HTTP error code) may be returned.

SOAP Request-response MEP:

From an RMP perspective, support for this MEP assumes the following:

- The Sending RMP is able to initiate the sending of a SOAP envelope over the underlying protocol.
- The Receiving RMP can send back a message with a SOAP envelope (called a response) after somehow associating the response with the request.

The full definition of this MEP can be found in [SOAP] part 1, Adjunct.

## 6.2. Unidirectional Message Exchange Patterns

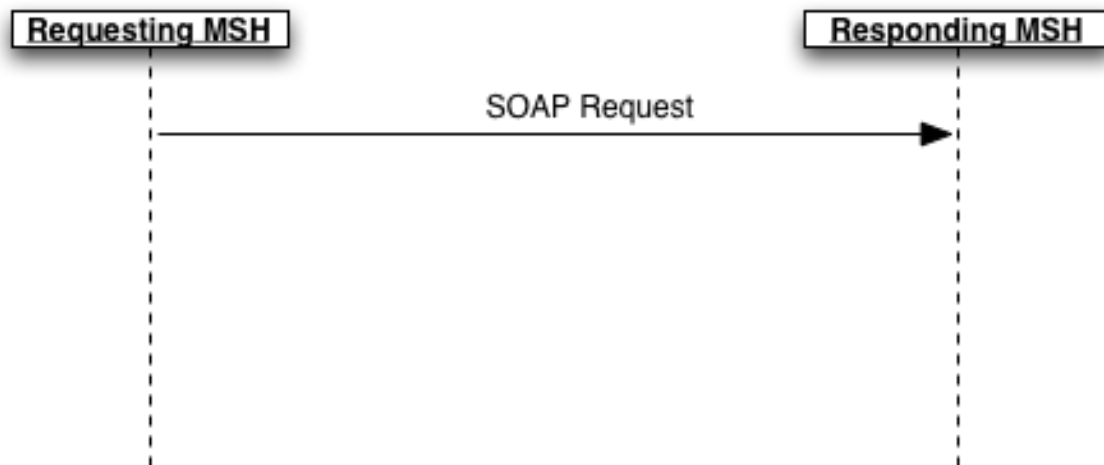
The following unidirectional (one-way) message exchange patterns are defined:

### 6.2.1. Push Message Exchange Pattern

Requesting MSH transmits a SOAP Request. Responding MSH does not return a SOAP response.

#### Figure 2. Push Sequence

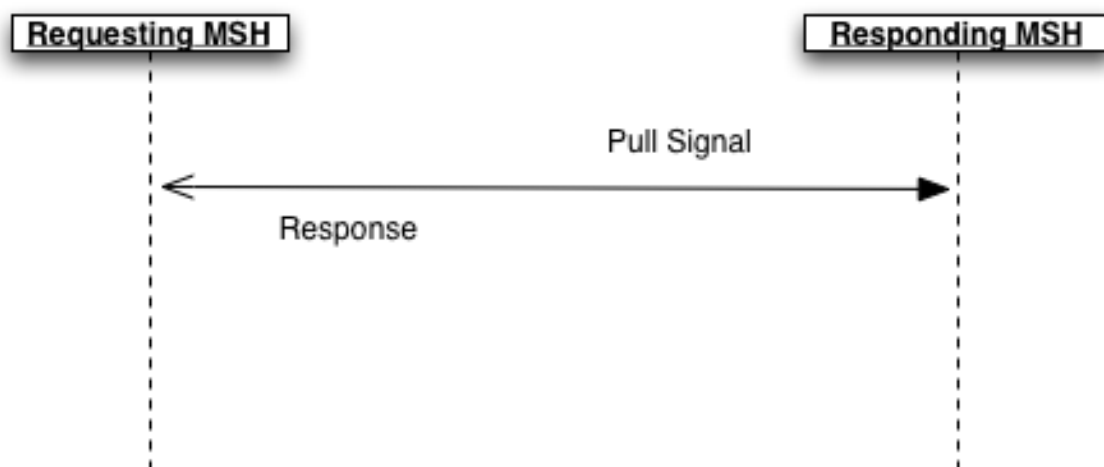




### 6.2.2. Pull Message Exchange Pattern

Requesting MSH transmits a SOAP "Pull" message, and the message requested in the "Pull" message is returned as a SOAP response by the Responding MSH.

**Figure 3. Pull Sequence**



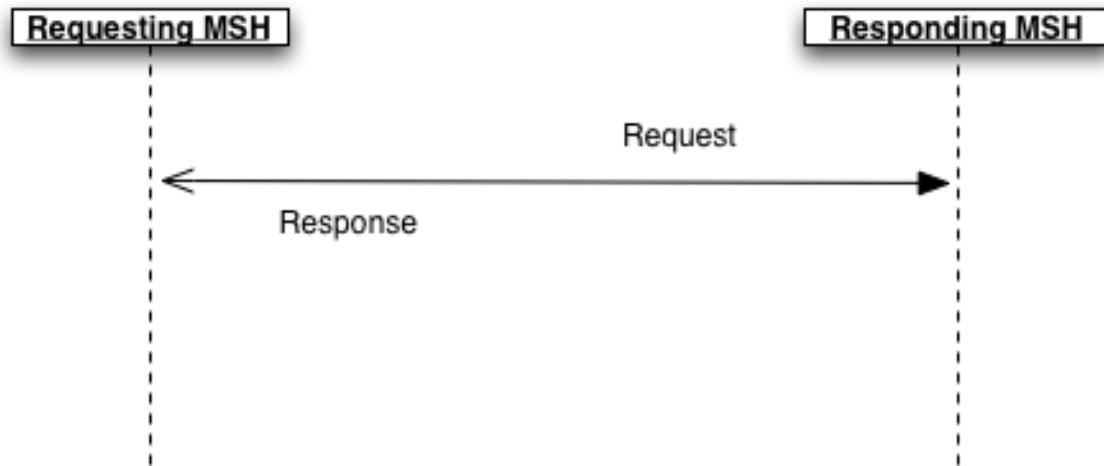
## 6.3. Bidirectional Message Exchange Patterns

The following bidirectional (two-way) message exchange patterns are defined:

### 6.3.1. Synchronous Message Exchange Pattern

The Requesting MSH transmits a SOAP request messages, and the Responding MSH responds with a SOAP response message over the same SOAP Message Exchange Pattern instance.

**Figure 4. Synchronous Sequence**



## 6.4. Aggregate Message Exchange Patterns

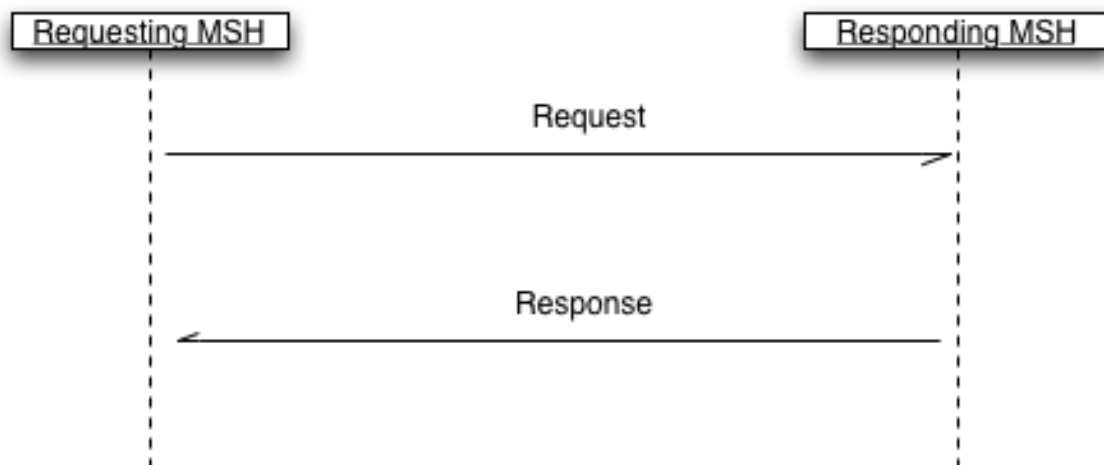
An aggregate message exchange pattern is not limited to the examples in this section, and can be arbitrarily complex. Any sequence of messages correlated by RefToMessageId constitutes a Aggregate Message Exchange Pattern instance.

The following are possible combinations of the unidirectional and bidirectional patterns described earlier.

### 6.4.1. Push/Push Message Exchange Pattern

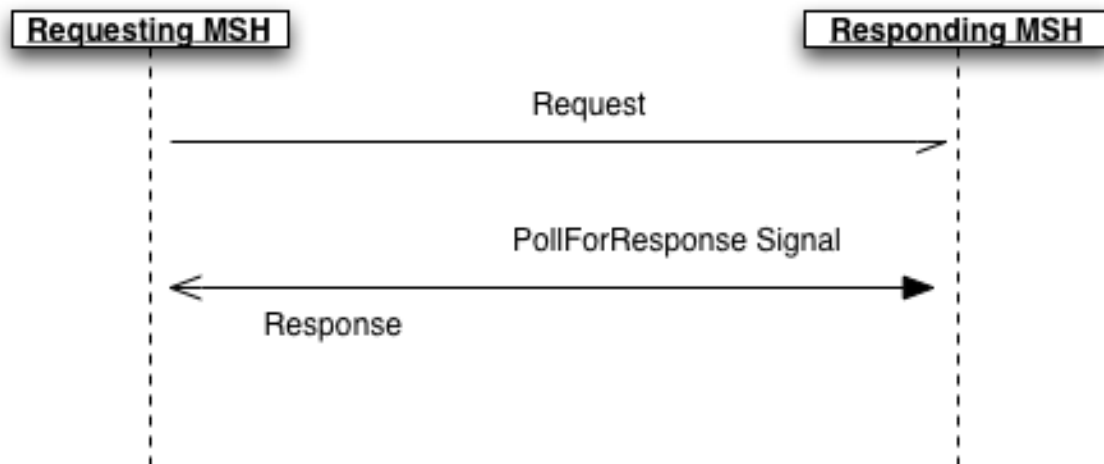
The Requesting MSH transmits a SOAP request. The Responding MSH sends a SOAP request containing the business payload to the original Requesting MSH over a new SOAP Message Exchange Pattern instance.

**Figure 5. Push/Push Sequence**



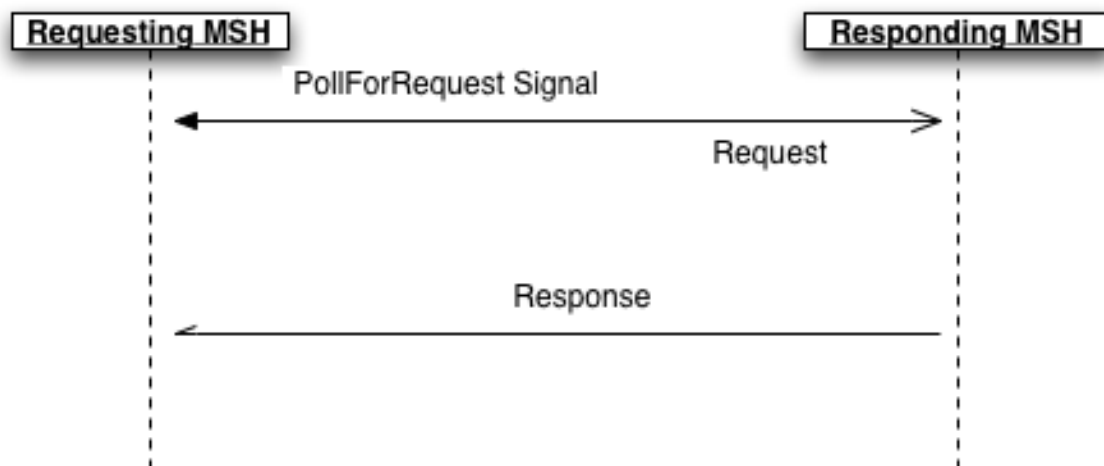
### 6.4.2. Push/Pull Message Exchange Pattern

The Requesting MSH transmits a SOAP request containing a business payload. Later, the Requesting MSH transmits a SOAP request containing a "PollForResponse" signal over another SOAP Message Exchange Pattern instance and the Responding MSH sends the SOAP response on the same SOAP Message Exchange Pattern instance as the "PollForResponse" signal.

**Figure 6. Push/Pull Sequence**

### 6.4.3. Pull/Push Message Exchange Pattern

The Responding MSH transmits a SOAP request containing a "PollForRequests" signal to the Requesting MSH. The Requesting MSH sends a SOAP request containing a business payload over the same SOAP Message Exchange Pattern instance. Responses are transmitted in SOAP requests over a new SOAP Message Exchange Pattern instance(s).

**Figure 7. Pull/Push Sequence**

## 7. Conformance

### 7.1. Minimum Requirements for Conformance

An implementation of this specification **MUST** satisfy **ALL** of the following conditions to be considered a conforming implementation:

1. It supports all the mandatory syntax, features and behavior (as identified by the [RFC 2119] key words MUST, MUST NOT, REQUIRED, SHALL and SHALL NOT) defined in Section 10, “Core Modules”.
2. It supports all the mandatory syntax, features and behavior defined for each of the additional module(s), defined in Section 12, “Additional (optional) Features”, the implementation has chosen to implement.
3. It complies with the following interpretation of the keywords OPTIONAL and MAY: When these keywords apply to the behavior of the implementation, the implementation is free to support these behaviors or not, as meant in [RFC 2119]. When these keywords apply to message contents relevant to a module of features, a conforming implementation of such a module MUST be capable of processing these optional message contents according to the described ebXML semantics.
4. If it has implemented optional syntax, features and/or behavior defined in this specification, it MUST be capable of interoperating with another implementation that has not implemented the optional syntax, features and/or behavior. It MUST be capable of processing the prescribed failure mechanism for those optional features it has chosen to implement.
5. It is capable of interoperating with another implementation that has chosen to implement optional syntax, features and/or behavior, defined in this specification, it has chosen not to implement. Handling of unsupported features SHALL be implemented in accordance with the prescribed failure mechanism defined for the feature.

More details on Conformance to this specification – conformance levels or profiles and on their recommended implementation – are described in a companion document, “Message Service Implementation Guidelines” from the OASIS ebXML Implementation, Interoperability and Conformance (IIC) Technical Committee.

## 8. Message Package Specification

The ebXML Message Service Specification defines a set of namespace-qualified SOAP Header element extensions within the SOAP Envelope. These can be packaged as a plain [SOAP] message, or within a MIME multipart to allow payloads or attachments to be included with the SOAP extension elements. Because either packaging option can be used, Implementations MUST support non-multipart messages. In general, separate ebXML SOAP extension elements are used where:

different software components may be used to generate ebXML SOAP extension elements,  
an ebXML SOAP extension element is not always present or,  
the data contained in the ebXML SOAP extension element MAY be digitally signed separately from the other ebXML SOAP extension elements.

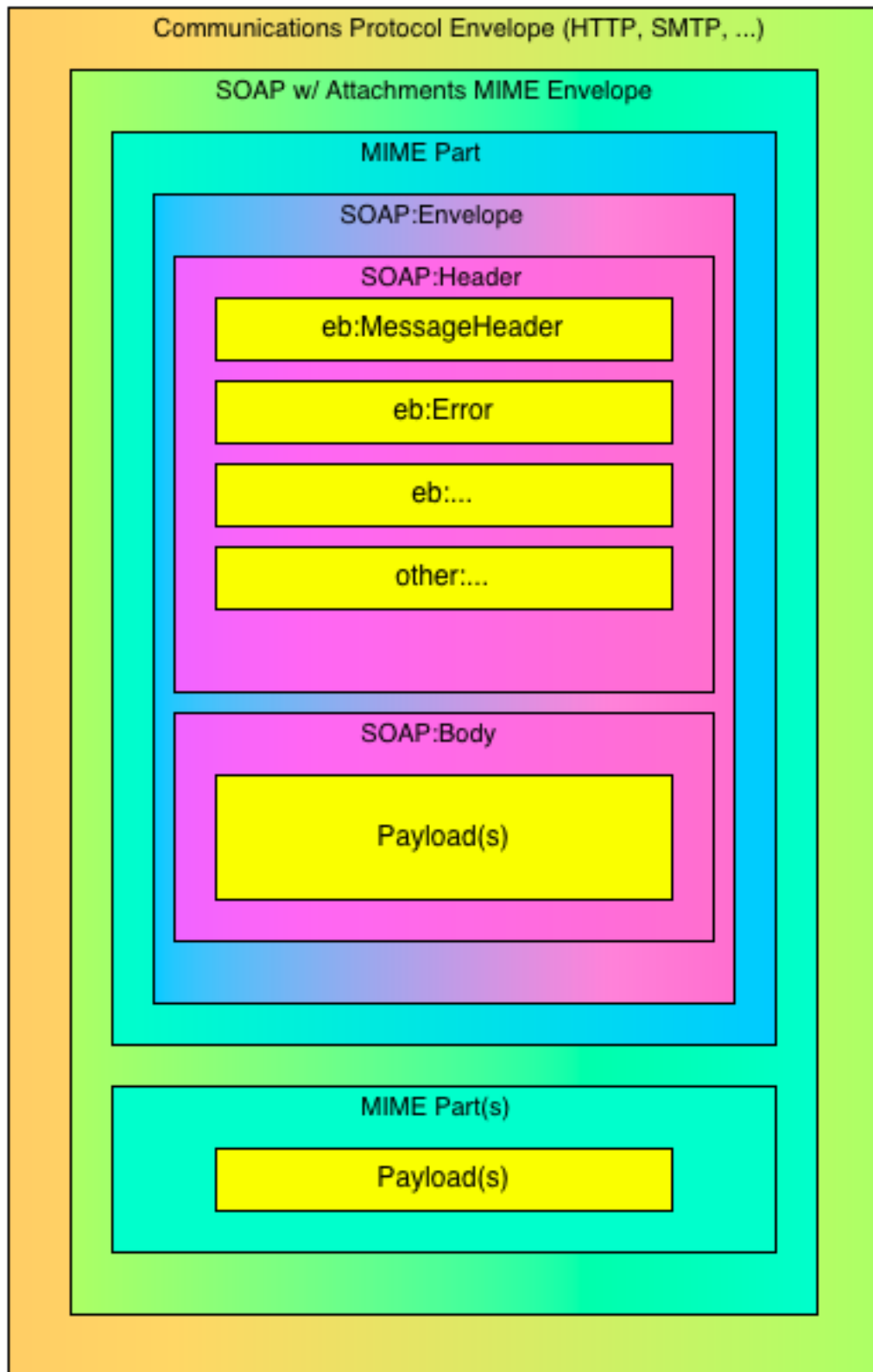
An ebXML Message is a communications protocol independent standard [SOAP] message, or MIME/Multipart message envelope. The MIME/Multipart message envelope MUST be structured in compliance with the SOAP Messages with Attachments [SOAP w/ Attachments] W3C Note, referred to as a Message Package.

There are two logical MIME parts within the Message Package:

The first MIME part, referred to as the Header Container, containing one SOAP 1.2 compliant message. This XML document is referred to as a SOAP Message for the remainder of this specification,  
zero or more additional MIME parts, referred to as Payload Containers, containing application level payloads.

The general structure and composition of an ebXML Message is described in Figure 8, “Structure and Composition of an ebXML Message”.

### Figure 8. Structure and Composition of an ebXML Message



The SOAP Message is an XML document consisting of a SOAP Envelope element. This is the root element of the XML document representing a SOAP Message. The SOAP Envelope element consists of:

One SOAP Header element. This is a generic mechanism for adding features to a SOAP Message, including ebXML specific header elements.

One SOAP Body element. This can be a container for the payload parts of the message.

## 8.1. SOAP Structural Conformance

The ebXML Message packaging complies with the following specifications:

Simple Object Access Protocol (SOAP) 1.1 [SOAP]  
SOAP Messages with Attachments [SOAP w/ Attachments]

Carrying ebXML headers in SOAP Messages does not mean ebXML overrides existing semantics of SOAP, but rather the semantics of ebXML over SOAP maps directly onto SOAP semantics.

## 8.2. Message Package

All MIME header elements of the Message Package are in conformance with the SOAP Messages with Attachments [SOAP w/ Attachments] W3C Note. In addition, the Content-Type MIME header in the Message Package contain a type attribute matching the MIME media type of the MIME body part containing the SOAP Message document. In accordance with the [SOAP] specification, the MIME media type of the SOAP Message has the value "text/xml".

It is strongly RECOMMENDED the initial headers contain a Content-ID MIME header structured in accordance with MIME [RFC 2045], and in addition to the required parameters for the Multipart/Related media type, the start parameter (OPTIONAL in MIME Multipart/Related [RFC 2387]) always be present. This permits more robust error detection. The following fragment is an example of the MIME headers for the multipart/related Message Package:

### Example 1. MIME Header fragment for the multipart/related Message Package

```
Content-Type: multipart/related; type="text/xml";  
  boundary="boundaryValue"; start="<messagepackage-123@example.com>"  
--boundaryValue  
Content-ID: <messagepackage-123@example.com>
```

Because implementations MUST support non-multipart messages, an ebXML message with no payload may be sent either as a plain SOAP message or as a [SOAP w/ Attachments] multipart message with only one body part.

## 8.3. Header Container

The root body part of the Message Package is referred to in this specification as the Header Container. The Header Container is a MIME body part consisting of one SOAP Message as defined in the SOAP Messages with Attachments [SOAP w/ Attachments] W3C Note.

### 8.3.1. Content-Type

The MIME Content-Type header for the Header Container MUST have the value "text/xml" to match the MIME media type of the MIME body part containing the [SOAP] Message document. The Content-Type header MAY contain a "charset" attribute. For example:

```
Content-Type: text/xml; charset="UTF-8"
```

#### 8.3.1.1. charset Attribute

The MIME charset attribute identifies the character set used to create the SOAP Message. The semantics of this attribute are described in the "charset parameter / encoding considerations" of text/xml as specified in XML [XMLMedia]. The list of valid values can be found at <http://www.iana.org/>.

If both are present, the MIME charset attribute SHALL be equivalent to the encoding declaration of the SOAP Message. If provided, the MIME charset attribute MUST NOT contain a value conflicting with the encoding used when creating the SOAP Message.

For maximum interoperability it is RECOMMENDED UTF-8 [UTF-8] be used when encoding this document. Due to the processing rules defined for media types derived from text/xml [XMLMedia], this MIME attribute has no default.

### 8.3.2. Header Container Example

The following fragment represents an example of a Header Container:

```
Content-ID: <messagepackage-123@example.com>
Content-Type: text/xml; charset="UTF-8"

<SOAP:Envelope
  xmlns:SOAP="http://schemas.xmlsoap.org/soap/envelope/">
<SOAP:Header>
...
</SOAP:Header>
<SOAP:Body>
...
</SOAP:Body>
</SOAP:Envelope>
--boundaryValue
```

## 8.4. Payload Container

Zero or more Payload Containers MAY be present within a Message Package in conformance with the SOAP Messages with Attachments [SOAP w/ Attachments] specification. Alternatively, payload(s) may be placed within the SOAP Body element, in conformance with [SOAP]

If the Message Package contains an application payload, it SHOULD be enclosed within a Payload Container.

If there is no application payload within the Message Package then a Payload Container MUST NOT be present.

The contents of each Payload Container MUST be identified in the ebXML Message PayloadInfo element within the SOAP Header (see Section 9.1.4, "PayloadInfo Elements").

The ebXML Message Service Specification makes no provision, nor limits in any way, the structure or content of application payloads. Payloads MAY be simple-plain-text objects or complex nested multipart objects. The specification of the structure and composition of payload objects is the prerogative of the organization defining the business process or information exchange using the ebXML Message Service.

### 8.4.1. Attachment Payload Example

The following fragment represents an application payload as an Attachment:

```
Content-ID: <domainname.example.com>
Content-Type: application/xml

<?xml version="1.0"?>
<Invoice>
  <Invoicedata>
  </Invoicedata>
</Invoice>
```

### 8.4.2. Embedded Payload Container

The following fragment represents an application payload nested within the SOAP Body element:

```
<SOAP-ENV:Body>
  <AppNS:Invoice xmlns:AppNS="http://my.app.com/ns">
    <AppNS:Invoicedata/>
  </AppNS:Invoice>
</SOAP-ENV:Body>
```

### 8.4.4. MIME Considerations

#### 8.4.4.1. Additional MIME Parameters

Any MIME part described by this specification MAY contain additional MIME headers in conformance with the MIME [RFC 2045] specification. Implementations MAY ignore any MIME header not defined in this specification. Implementations MUST ignore any MIME header they do not recognize.

For example, an implementation could include content-length in a message. However, a recipient of a message with content-length could ignore it.

#### 8.4.4.2. Reporting MIME Errors

If a MIME error is detected in the Message Package then it MUST be reported as specified in SOAP with Attachments. [SOAP w/ Attachments].

### 8.4.5. XML Prolog

The SOAP Message's XML Prolog, if present, MAY contain an XML declaration. This specification has defined no additional comments or processing instructions appearing in the XML prolog. For example:

```
Content-Type: text/xml; charset="UTF-8"
<?xml version="1.0" encoding="UTF-8"?>
```

#### 8.4.5.1. XML Declaration

The XML declaration MAY be present in a SOAP Message. If present, it MUST contain the version specification required by the XML Recommendation [XML] and MAY contain an encoding declaration. The semantics described below MUST be implemented by a compliant ebXML Message Service.

#### 8.4.5.2. Encoding Declaration

If both the encoding declaration and the Header Container MIME charset are present, the XML prolog for the SOAP Message SHALL contain the encoding declaration SHALL be equivalent to the charset attribute of the MIME Content-Type of the Header Container (see Section 8.3.1.1, "charset Attribute").

If provided, the encoding declaration MUST NOT contain a value conflicting with the encoding used when creating the SOAP Message. It is RECOMMENDED UTF-8 be used when encoding the SOAP Message.

If the character encoding cannot be determined by an XML processor using the rules specified in section 4.3.3 of XML [XML], the XML declaration and its contained encoding declaration SHALL be provided in the ebXML SOAP Header Document.

#### Note

The encoding declaration is not required in an XML document according to XML v1.0 specification [XML].

### 8.4.6. ebXML SOAP Envelope extensions

In conformance with the [SOAP] specification, all extension element content is namespace qualified. All of the ebXML SOAP extension element content defined in this specification is namespace qualified to the ebXML SOAP Envelope extensions namespace as defined in Section 8.4.6.1, "Namespace pseudo attribute".

Namespace declarations (xmlns pseudo attributes) for the ebXML SOAP extensions may be included in the SOAP Envelope or Header elements, or directly in each of the ebXML SOAP extension elements.

#### 8.4.6.1. Namespace pseudo attribute

The namespace declaration for the ebXML SOAP Envelope extensions (xmlns pseudo attribute) (see [XMLNS]) has a REQUIRED value of:

[http://www.oasis-open.org/committees/ebxml-msg/schema/msg-header-3\\_0.xsd](http://www.oasis-open.org/committees/ebxml-msg/schema/msg-header-3_0.xsd)



### 8.4.6.2. xsi:schemaLocation attribute

The SOAP namespace:

`http://schemas.xmlsoap.org/soap/envelope/`

resolves to a W3C XML Schema specification. All ebXML MSH implementations are strongly RECOMMENDED to include the XMLSchema-instance namespace qualified schemaLocation attribute in the SOAP Envelope element to indicate to validating parsers a location of the schema document that should be used to validate the document. Failure to include the schemaLocation attribute could prevent XML schema validation of received messages.

For example:

```
<SOAP:Envelope xmlns:SOAP="http://schemas.xmlsoap.org/soap/envelope/"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://schemas.xmlsoap.org/soap/envelope/
    http://schemas.xmlsoap.org/soap/envelope/">
```

In addition, ebXML SOAP Header extension element content may be similarly qualified so as to identify the location where validating parsers can find the schema document containing the ebXML namespace qualified SOAP extension element definitions. The ebXML SOAP extension element schema has been defined using the W3C Recommendation version of the XML Schema specification [XMLSchema] (see Appendix A, *The ebXML SOAP Extension Elements Schema*). The XMLSchema-instance namespace qualified schemaLocation attribute should include a mapping of the ebXML SOAP Envelope extensions namespace to its schema document in the same element that declares the ebXML SOAP Envelope extensions namespace.

The schemaLocation for the namespace described above in Section 8.4.6.1, “Namespace pseudo attribute” is:

`http://www.oasis-open.org/committees/ebxml-msg/schema/msg-header-3_0.xsd`

Separate schemaLocation attribute are RECOMMENDED so tools, which may not correctly use the schemaLocation attribute to resolve schema for more than one namespace, will still be capable of validating an ebXML SOAP message. For example:

```
<SOAP:Envelope xmlns:SOAP="http://schemas.xmlsoap.org/soap/envelope/"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://schemas.xmlsoap.org/soap/envelope/
    http://schemas.xmlsoap.org/soap/envelope/">
  <SOAP:Header
    xmlns:eb="http://www.oasis-open.org/committees/ebxml-msg/schema/msg-header-3_0.xsd"
    xsi:schemaLocation="http://www.oasis-open.org/committees/ebxml-msg/schema/msg-header-3_0.xsd
      http://www.oasis-open.org/committees/ebxml-msg/schema/msg-header-3_0.xsd">
    <eb:MessageHeader ...>
      <eb:PayloadInfo eb:version="3.0">...</eb:PayloadInfo>
      ...
    </eb:MessageHeader>
  </SOAP:Header>
  <SOAP:Body
    xmlns:eb="http://www.oasis-open.org/committees/ebxml-msg/schema/msg-header-3_0.xsd"
    xsi:schemaLocation="http://www.oasis-open.org/committees/ebxml-msg/schema/msg-header-3_0.xsd
      http://www.oasis-open.org/committees/ebxml-msg/schema/msg-header-3_0.xsd">
    ...
  </SOAP:Body>
</SOAP:Envelope>
```

### 8.4.6.3. SOAP Header Element

The SOAP Header element is the first child element of the SOAP Envelope element. It MUST have a namespace qualifier that matches the SOAP Envelope namespace declaration for the namespace "http://schemas.xmlsoap.org/soap/envelope/".

### 8.4.6.4. SOAP Body Element

The SOAP Body element is the second child element of the SOAP Envelope element. It MUST have a namespace qualifier that matches the SOAP Envelope namespace declaration for the namespace "http://schemas.xmlsoap.org/soap/envelope/".

## 8.4.7. ebXML SOAP Extensions

An ebXML Message extends the SOAP Message with the following principal extension elements:

### 8.4.7.1. SOAP Header Extensions

*MessageHeader* – a REQUIRED element containing routing information for the message (To/From, etc.) as well as other context information about the message.

*PayloadInfo* – an element pointing to any data present either in the Payload Container(s) or elsewhere, e.g. on the web. This element MAY also contain optional payload services elements. This element MAY be omitted. see Section 10.3, “Payload Services Module”

### 8.4.7.2. SOAP Body Extensions

ebXML Messaging does not define any extension elements for SOAP Body.

### 8.4.7.3. Core ebXML Modules

- Error Handling Module

*ErrorList* - a SOAP Header element containing a list of the errors being reported against a previous message. The ErrorList element is only used if reporting an error or warning on a previous message. This element MAY be omitted.

- Security Module

*Security* – an element that contains a digital signature that conforms to [XMLDSIG] that signs data associated with the message. This element MAY be omitted.

## 8.4.8. #wildcard Element Content

Some ebXML SOAP extension elements, as indicated in the schema, allow for foreign namespace-qualified element content to be added for extensibility. The extension element content MUST be namespace-qualified in accordance with XMLNS [XMLNS] and MUST belong to a foreign namespace. A foreign namespace is one that is NOT

[http://www.oasis-open.org/committees/ebxml-msg/schema/msg-header-3\\_0.xsd](http://www.oasis-open.org/committees/ebxml-msg/schema/msg-header-3_0.xsd).

The wildcard elements are provided wherever extensions might be required for private extensions or future expansions to the protocol.

An implementation of the MSH MAY ignore the namespace-qualified element and its content.

## 8.4.9. id Attribute

Each of the ebXML SOAP extension elements defined in this specification has an id attribute which is an XML ID that MAY be added to provide for the ability to uniquely identify the element within the SOAP Message. This MAY be used when applying a digital signature to the ebXML SOAP Message as individual ebXML SOAP extension elements can be targeted for inclusion or exclusion by specifying a URI of "#<idvalue>" in the Reference element.

## 8.4.10. version Attribute

The REQUIRED version attribute indicates the version of the ebXML Message Service Header Specification to which the ebXML SOAP Header extensions conform. Its purpose is to provide future versioning capabilities. For conformance to this specification, all of the version attributes on any SOAP extension elements defined in this specification MUST have a value of "3.0". An ebXML message MAY contain SOAP header extension elements that have a value other than "3.0". An implementation conforming to this specification that receives a message with ebXML SOAP extensions qualified with a version other than "3.0" MAY process the message if it recognizes the version identified and is capable of processing it. It MUST respond with an error (details TBD) if it does not recognize the identified version. The version attribute MUST be namespace qualified for the ebXML

SOAP Envelope extensions namespace defined above.

Use of multiple versions of ebXML SOAP extensions elements within the same ebXML SOAP document, while supported, should only be used in extreme cases where it becomes necessary to semantically change an element, which cannot wait for the next ebXML Message Service Specification version release.

### 8.4.11. SOAP mustUnderstand Attribute

The REQUIRED SOAP mustUnderstand attribute on SOAP Header extensions, namespace qualified to the SOAP namespace (<http://schemas.xmlsoap.org/soap/envelope/>), indicates whether the contents of the element MUST be understood by a receiving process or else the message MUST be rejected in accordance with SOAP [SOAP]. This attribute with a value of "1" indicates the element MUST be understood or rejected. This attribute with a value of "0", the default, indicates the element may be ignored if not understood.

### 8.4.12. ebXML "Next MSH" role URI

The URI `urn:oasis:names:tc:ebxml-msg:role:nextMSH` when used in the context of the SOAP actor attribute value SHALL be interpreted to mean an entity that assumes the role of an instance of the ebXML MSH conforming to this specification.

This role URI has been established to allow for the possibility that SOAP nodes that are NOT ebXML MSH nodes MAY participate in the message path of an ebXML Message. An example might be a SOAP node that digitally signs or encrypts a message.

All ebXML MSH nodes MUST assume this role.

### 8.4.13. ebXML "To Party MSH" role URI

The URI `urn:oasis:names:tc:ebxml-msg:role:toPartyMSH` when used in the context of the SOAP actor attribute value SHALL be interpreted to mean an instance of an ebXML MSH node, conforming to this specification, assuming the role of the Party identified in the MessageHeader/To/PartyId element of the same message. An ebXML MSH MAY be configured to play in this role. How this is done is outside the scope of this specification.

The MSH that is the ultimate destination of ebXML messages MUST assume the role of the To Party MSH actor URI in addition to assuming the standardized "next" role as defined by SOAP.

## 9. Core Extension Elements

### 9.1. MessageHeader Element

The MessageHeader element is REQUIRED in all ebXML Messages. It MUST be present as a child element of the SOAP Header element.

The MessageHeader element is a composite element comprised of the following subordinate elements:

- an id attribute (see section 3.3.7 for details).
- a version attribute (see section 3.3.8 for details).
- a SOAP mustUnderstand attribute with a value of "1" (see section 3.3.9 for details).
- From element.
- To element.
- CollaborationInfo element.
- MessageInfo element.

- PayloadInfo element.
- Description element.

### 9.1.1. From and To Elements

The REQUIRED From element identifies the Party that originated the message. The REQUIRED To element identifies the Party that is the intended recipient of the message. Both To and From can contain logical identifiers, such as a DUNS number, or identifiers that also imply a physical location such as an eMail address.

The From and the To elements each contains:

- PartyId elements – occurs one or more times.
- Role element – occurs zero or one times.

If either the From or To elements contains multiple PartyId elements, all members of the list MUST identify the same organization. Unless a single type value refers to multiple identification systems, the value of any given type attribute MUST be unique within the list of PartyId elements contained within either the From or To element.

#### Note

This mechanism is particularly useful when transport of a message between the parties may involve multiple intermediaries. More generally, the From Party should provide identification in all domains it knows in support of intermediaries and destinations that may give preference to particular identification systems.

The From and To elements contain zero or one Role child element that, if present, SHALL immediately follow the last PartyId child element.

#### 9.1.1.1. PartyId Element

The PartyId element has a single attribute, type and the content is a string value. The type attribute indicates the domain of names to which the string in the content of the PartyId element belongs. The value of the type attribute MUST be mutually agreed and understood by each of the Parties. It is RECOMMENDED that the value of the type attribute be a URI. It is further recommended that these values be taken from the EDIRA (ISO 6523), EDIFACT ISO 9735 or ANSI ASC X12 I05 registries.

If the PartyId type attribute is not present, the content of the PartyId element MUST be a URI [RFC2396], otherwise the Receiving MSH SHOULD report an error (see section 5.1.5) with errorCode set to Inconsistent and severity set to Error. It is strongly RECOMMENDED that the content of the PartyId element be a URI.

#### 9.1.1.2. Role Element

The Role element identifies the authorized role (fromAuthorizedRole or toAuthorizedRole) of the Party sending (when present as a child of the From element) and/or receiving (when present as a child of the To element) the message. The value of the Role element is a non-empty string, which is specified in the CPA.

#### Note

Role is better defined as a URI – e.g. <http://rosettanet.org/roles/buyer>.

The following fragment demonstrates usage of the From and To elements.

```
<eb:From>
  <eb:PartyId eb:type="urn:duns">123456789</eb:PartyId>
  <eb:PartyId eb:type="SCAC">RDWY</PartyId>
  <eb:Role>http://rosettanet.org/roles/Buyer</eb:Role>
</eb:From>
```

```
<eb:To>  
  <eb:PartyId>mailto:joe@example.com</eb:PartyId>  
  <eb:Role>http://rosettanet.org/roles/Seller</eb:Role>  
</eb:To>
```

## 9.1.2. CollaborationInfo Element

The required CollaborationInfo Element identifies the parameters governing the exchange of messages between the parties.

The CollaborationInfo element contains:

- AgreementRef element.
- Service element.
- Action element.

### 9.1.2.1. AgreementRef Element

The REQUIRED AgreementRef element is a string that identifies the entity or artifact governing the exchange of messages between the parties. The recipient of a message **MUST** be able to resolve the AgreementRef to an individual set of parameters, taking into account the sender of the message.

The value of a AgreementRef element **MUST** be unique within a namespace mutually agreed by the two parties. This could be a concatenation of the From and To PartyId values, a URI prefixed with the Internet domain name of one of the parties, or a namespace offered and managed by some other naming or registry service. It is **RECOMMENDED** that the AgreementRef be a URI.

The AgreementRef **MAY** reference an instance of a CPA as defined in the ebXML Collaboration Protocol Profile and Agreement Specification [ebCPPA]. An example of the CPAId element follows:

```
<eb:AgreementRef>http://example.com/cpas/ourcpawithyou.xml</eb:AgreementRef>
```

The messaging parameters are determined by the appropriate elements from the CPA, as identified by the AgreementRef element.

If a receiver determines that a message is in conflict with the CPA, the appropriate handling of this conflict is undefined by this specification. Therefore, senders **SHOULD NOT** generate such messages unless they have prior knowledge of the receiver's capability to deal with this conflict.

If a Receiving MSH detects an inconsistency, then it **MUST** report it with an `errorCode` of `Inconsistent` and a severity of Error. If the AgreementRef is not recognized, then it **MUST** report it with an `errorCode` of `NotRecognized` and a severity of Error.

### 9.1.2.2. Service Element

The REQUIRED Service element identifies the service that acts on the message and it is specified by the designer of the service. The designer of the service may be:

- a standards organization, or
- an individual or enterprise.

#### Note

In the context of an ebXML business process model, an action equates to the lowest possible role based activity in the Business Process (see [BPSS]) (requesting or responding role) and a service is a set of related actions for an authorized role within a party.

An example of the Service element follows:

```
<eb:Service>urn:services:SupplierOrderProcessing</eb:Service>
```

## Note

URIs in the Service element that start with the namespace `urn:oasis:names:tc:ebxml-msg:service` are reserved for use by this specification.

The Service element has a single type attribute.

### 9.1.2.2.1. 9.1.2.2.1 type Attribute

If the type attribute is present, it indicates the parties sending and receiving the message know, by some other means, how to interpret the content of the Service element. The two parties MAY use the value of the type attribute to assist in the interpretation.

If the type attribute is not present, the content of the Service element MUST be a URI (see [RFC 2396]). If it is not a URI then report an error with errorCode of Inconsistent and severity of Error (see Section 10.2, “Error Handling Module”).

### 9.1.2.3. Action Element

The REQUIRED Action element identifies a process within a Service that processes the Message. Action SHALL be unique within the Service in which it is defined. The value of the Action element is specified by the designer of the service. An example of the Action element follows:

```
<eb:Action>NewOrder</eb:Action>
```

If the value of either the Service or Action element are unrecognized by the Receiving MSH, then it MUST report the error with an errorCode of NotRecognized and a severity of Error.

## 9.1.3. MessageInfo Element

The REQUIRED MessageInfo element provides a means of uniquely identifying an ebXML Message. It contains the following:

- MessageId element.
- RefToMessageId element.
- ConversationId element.
- Timestamp element

The following fragment demonstrates the structure of the MessageInfo element:

```
<eb:MessageInfo>  
  <eb:MessageId>20001209-133003-28572@example.com</eb:MessageId>  
  <eb:RefToMessageId>20001209-133003-28571@example.com</eb:RefToMessageId>  
  <eb:ConversationId>20001209-133003-28572</eb:ConversationId>  
  <eb:Timestamp>2004-06-15T11:12:12</eb:Timestamp>  
</eb:MessageInfo>
```

### 9.1.3.1. MessageId Element

The REQUIRED element MessageId is a globally unique identifier for each message conforming to MessageId [RFC2822].

## Note

In the Message-Id and Content-Id MIME headers, values are always surrounded by angle brackets. However references in mid: or cid: scheme URI's and the MessageId and RefToMessageId elements MUST NOT include these delimiters.

### 9.1.3.2. RefToMessageId Element

The RefToMessageId element has a cardinality of zero or one. When present, it MUST contain the MessageId value of an ebXML Message to which this message relates.

For Error messages, the RefToMessageId element is REQUIRED and its value MUST be the MessageId value of the message in error (as defined in Section 10.2, "Error Handling Module").

### 9.1.3.3. ConversationId Element

The REQUIRED ConversationId element is a string identifying the set of related messages that make up a conversation between two Parties. It MUST be unique within the context of the specified CPAId. The Party initiating a conversation determines the value of the ConversationId element that SHALL be reflected in all messages pertaining to that conversation.

The ConversationId enables the recipient of a message to identify the instance of an application or process that generated or handled earlier messages within a conversation. It remains constant for all messages within a conversation.

The value used for a ConversationId is implementation dependent. An example of the ConversationId element follows:

```
<eb:ConversationId>20001209-133003-28572</eb:ConversationId>
```

### Note

Implementations are free to choose how they will identify and store conversational state related to a specific conversation. Implementations SHOULD provide a facility for mapping between their identification scheme and a ConversationId generated by another implementation.

### 9.1.3.4. Timestamp Element

The REQUIRED Timestamp is a value representing the time that the message header was created conforming to a dateTime (see [XMLSchema]) and MUST be expressed as UTC. Indicating UTC in the Timestamp element by including the 'Z' identifier is optional.

## 9.1.4. PayloadInfo Elementls

The PayloadInfo element MAY be present as a child of the SOAP Header element. The PayloadInfo element is a composite element consisting of one or more Payload elements. Each Payload element identifies payload data associated with the message, whether included as part of the message as payload document(s) contained in a Payload Container, or remote resources accessible via a URL. The purpose of the PayloadInfo is:

- to make it easier to directly extract a particular payload associated with this ebXML Message,
- to allow an application to determine whether it can process the payload without having to parse it.
- to define pre and post processing payload services to be performed by the MSH.

The PayloadInfo element is comprised of the following:

- an id attribute (see Section 8.4.9, "id Attribute" for details)
- a version attribute (see Section 8.4.10, "version Attribute" for details)

- one or more Payload elements

#### 9.1.4.1. Payload Element

The Payload element is a composite element consisting of the following subordinate elements:

- zero or more Schema elements – information about the schema(s) that define the instance document identified in the parent Reference element
- zero or more Description elements – a textual description of the payload object referenced by the parent Reference element
- zero or one PreProcessing elements - a list of pre processing steps to be performed by the MSH
- zero or one PostProcessing elements - a list of post processing steps to be performed by the MSH

The Reference element itself is a simple link [XLINK]. It should be noted that the use of XLINK in this context is chosen solely for the purpose of providing a concise vocabulary for describing an association. Use of an XLINK processor or engine is NOT REQUIRED, but may prove useful in certain implementations.

*See <http://www.w3.org/TR/xptr-framework/> for fragment identifier definition. Replaced the xlink:\* attributes with URI for now. JWT.*

The Reference element has the following attribute content in addition to the element content described above:

- id – an XML ID for the Payload element,
- payloadRef – this REQUIRED attribute has a value that is the CID URI or fragment identifier of the payload object referenced. For example "cid:foo" or "#idref".
- Any other namespace-qualified attribute MAY be present. A Receiving MSH MAY choose to ignore any foreign namespace attributes other than those defined above.

The designer of the business process or information exchange using ebXML Messaging decides what payload data is referenced by the Manifest and the values to be used for xlink:role.

##### 9.1.4.1.1. Schema Element

If the item being referenced has schema(s) of some kind that describe it (e.g. an XML Schema, DTD and/or a database schema), then the Schema element SHOULD be present as a child of the Reference element. It provides a means of identifying the schema and its version defining the payload object identified by the parent Reference element. The Schema element contains the following attributes:

- location – the REQUIRED URI of the schema
- version – a version identifier of the schema

##### 9.1.4.1.2. Description Element

See Section 9.1.5, "Description Element" for more information.

#### 9.1.4.2. PayloadInfo Validation

If an eb:payloadRef attribute contains a URI that is a content id (URI scheme "cid") then a MIME part with that content-id MUST be present in the corresponding Payload Container of the message. If it is not, then the error SHALL be reported to the From Party with an errorCode of MimeProblem and a severity of Error.

If an eb:payloadRef attribute contains a hash mark ('#') followed by a string value then an XML element con-



taining an `xml:id` attribute with its value matching the string value, excluding the hash mark **MUST** be present in the SOAP Body element. If it is not, then the error **SHALL** be reported to the From Party with an `errorCode` of `MimeProblem` and a severity of `Error`.

If an `eb:payloadRef` attribute contains a URI, not a content id (URI scheme "cid"), and the URI cannot be resolved, it is an implementation decision whether to report the error. If the error is to be reported, it **SHALL** be reported to the From Party with an `errorCode` of `MimeProblem` and a severity of `Error`.

Note: If a payload exists, which is not referenced by the Manifest, that payload **SHOULD** be discarded.

### 9.1.4.3. PayloadInfo Sample

```
<eb:PayloadInfo>
  <eb:Payload eb:id="..." eb:payloadRef="cid:foo | #idref">
    <eb:Schema eb:location="http://foo/bar.xsd" eb:version="1.0"/>
    <eb:Description xml:lang="en-US">Purchase Order for 100,000 foo widgets</eb:Description>
    <eb:Processing>
      <eb:Step eb:sequence="0" eb:id="urn:foo:ps:CompressionSvc">
        <eb:Parameter eb:name="command" eb:value="uncompress" />
        <eb:Parameter eb:name="algorithm" eb:value="gzip" />
      </eb:Step>
    </eb:PostProcessing>
  <eb:Payload>
</eb:PayloadInfo>
```

### 9.1.5. Description Element

The Description element may be present zero or more times. Its purpose is to provide a human readable description of the purpose or intent of the message. The language of the description is defined by a required `xml:lang` attribute. The `xml:lang` attribute **MUST** comply with the rules for identifying languages specified in XML [XML]. Each occurrence **SHOULD** have a different value for `xml:lang`.

### 9.1.6. MessageHeader Sample

The following fragment demonstrates the structure of the MessageHeader element within the SOAP Header:

```
<eb:MessageHeader eb:id="..." eb:version="3.0" SOAP:mustUnderstand="1">
  <eb:From>
    <eb:PartyId>uri:example.com</eb:PartyId>
    <eb:Role>http://rosettanet.org/roles/Buyer</eb:Role>
  </eb:From>
  <eb:To>
    <eb:PartyId eb:type="someType">QRS543</eb:PartyId>
    <eb:Role>http://rosettanet.org/roles/Seller</eb:Role>
  </eb:To>
  <eb:CollaborationInfo>
    <eb:AgreementRef>http://www.oasis-open.org/cpa/123456</eb:AgreementRef>
    <eb:Service eb:type="myservicetypes">QuoteToCollect</eb:Service>
    <eb:Action>NewPurchaseOrder</eb:Action>
  </eb:CollaborationInfo>
  <eb:MessageInfo>
    <eb:MessageId>UUID-2@example.com</eb:MessageId>
    <eb:RefToMessageId>UUID-1@example.com</eb:RefToMessageId>
    <eb:ConversationId>987654321</eb:ConversationId>
    <eb:Timestamp>2000-07-25T12:19:05</eb:Timestamp>
  </eb:MessageInfo>
</eb:MessageHeader>
```

## 10. Core Modules

### 10.1. Security Module

*Currently reworking this section to reflect the use of WS-Security. JWT : MM->JT: remove ebTA refs, reeval risk statements.*

The ebXML Message Service, by its very nature, presents certain security risks. A Message Service may be at risk by means of:

- Unauthorized access
- Data integrity and/or confidentiality attacks (e.g. through man-in-the-middle attacks)
- Denial-of-Service and spoofing

Each security risk is described in detail in the ebXML Technical Architecture Risk Assessment Technical Report [secRISK].

Each of these security risks may be addressed in whole, or in part, by the application of one, or a combination, of the countermeasures described in this section. This specification describes a set of profiles, or combinations of selected countermeasures, selected to address key risks based upon commonly available technologies. Each of the specified profiles includes a description of the risks that are not addressed. See Appendix C, *Supported Security Services* for a table of security profiles.

Application of countermeasures SHOULD be balanced against an assessment of the inherent risks and the value of the asset(s) that might be placed at risk. For this specification, a Signed Message is any message containing a Signature element.

### 10.1.1. Signature Element

An ebXML Message MAY be digitally signed to provide security countermeasures. Zero or more Signature elements, belonging to the XML Signature [XMLDSIG] defined namespace, MAY be present as a child of the SOAP Header. The Signature element MUST be namespace qualified in accordance with XML Signature [XMLDSIG]. The structure and content of the Signature element MUST conform to the XML Signature [XMLDSIG] specification. If there is more than one Signature element contained within the SOAP Header, the first MUST represent the digital signature of the ebXML Message as signed by the From Party MSH in conformance with section 5.1. Additional Signature elements MAY be present, but their purpose is undefined by this specification.

Refer to Section 10.1.3, “Signature Generation” for a detailed discussion on how to construct the Signature element when digitally signing an ebXML Message.

### 10.1.2. Security and Management

No technology, regardless of how advanced it might be, is an adequate substitute to the effective application of security management policies and practices.

It is strongly RECOMMENDED that the site manager of an ebXML Message Service apply due diligence to the support and maintenance of its security mechanisms, site (or physical) security procedures, cryptographic protocols, update implementations and apply fixes as appropriate. (See <http://www.cert.org/> and <http://ciac.llnl.gov/>)

#### 10.1.2.1. Collaboration Protocol Agreement

The configuration of Security for MSHs is specified in the CPA. Two areas of the CPA have security definitions as follows:

- The Document Exchange section addresses security to be applied to the payload of the message. The MSH is not responsible for any security specified at this level but may offer these services to the message sender.
- The Transport section addresses security applied to the entire ebXML Document, which includes the header and the payload(s).

### 10.1.3. Signature Generation

An ebXML Message is signed using [XMLDSIG] following these steps:

1. Create a SignedInfo element with SignatureMethod, CanonicalizationMethod and Reference elements for

the SOAP Envelope and any required payload objects, as prescribed by XML Signature [XMLDSIG].

2. Canonicalize and then calculate the SignatureValue over SignedInfo based on algorithms specified in SignedInfo as specified in XML Signature [XMLDSIG].
3. Construct the Signature element that includes the SignedInfo, KeyInfo (RECOMMENDED) and SignatureValue elements as specified in XML Signature [XMLDSIG].
4. Include the namespace qualified Signature element in the SOAP Header just signed.

The SignedInfo element SHALL have a CanonicalizationMethod element, a SignatureMethod element and one or more Reference elements, as defined in XML Signature [XMLDSIG].

The RECOMMENDED canonicalization method applied to the data to be signed is

```
<CanonicalizationMethod Algorithm="http://www.w3.org/TR/2001/REC-xml-c14n-20010315"/>
```

described in [XMLC14N]. This algorithm excludes comments.

The SignatureMethod element SHALL be present and SHALL have an Algorithm attribute. The RECOMMENDED value for the Algorithm attribute is:

```
<SignatureMethod Algorithm="http://www.w3.org/2000/09/xmldsig#dsa-sha1"/>
```

This RECOMMENDED value SHALL be supported by all compliant ebXML Message Service software implementations.

The [XMLDSIG] Reference element for the SOAP Envelope document SHALL have a URI attribute value of "" to provide for the signature to be applied to the document that contains the Signature element.

The [XMLDSIG] Reference element for the SOAP Envelope MAY include a Type attribute that has a value "http://www.w3.org/2000/09/xmldsig#Object" in accordance with XML Signature [XMLDSIG]. This attribute is purely informative. It MAY be omitted. Implementations of the ebXML MSH SHALL be prepared to handle either case. The Reference element MAY include the id attribute.

The [XMLDSIG] Reference element for the SOAP Envelope SHALL include a child Transforms element. The Transforms element SHALL include the following Transform child elements.

The first Transform element has an Algorithm attribute with a value of:

```
<Transform Algorithm="http://www.w3.org/2000/09/xmldsig#enveloped-signature"/>
```

The result of this statement excludes the parent Signature element and all its descendants.

The second Transform element has a child XPath element that has a value of:

```
<Transform Algorithm="http://www.w3.org/TR/1999/REC-xpath-19991116">  
  <XPath> not(ancestor-or-self::() [ @SOAP:actor="urn:oasis:names:tc:ebxml-msg:actor:nextMSH" ] |  
    ancestor-or-self::() [ @SOAP:actor="http://schemas.xmlsoap.org/soap/actor/next" ] ) </XPath>  
</Transform>
```

The result of this [XPath] statement excludes all elements within the SOAP Envelope which contain a SOAP:actor attribute targeting the nextMSH, and all their descendants. It also excludes all elements with actor attributes targeting the element at the next node (which may change en route). Any intermediate node or MSH MUST NOT change, format or in any way modify any element not targeted to the intermediary. Intermediate nodes MUST NOT add or delete white space. Any such change may invalidate the signature.

The last Transform element SHOULD have an Algorithm attribute with a value of:

```
<Transform Algorithm="http://www.w3.org/TR/2001/REC-xml-c14n-20010315"/>
```

The result of this algorithm is to canonicalize the SOAP Envelope XML and exclude comments.

## Note

These transforms are intended for the SOAP Envelope and its contents. These transforms are NOT intended for the payload objects. The determination of appropriate transforms for each payload is left to the implementation.

Each payload object requiring signing SHALL be represented by a [XMLDSIG] Reference element that SHALL have a URI attribute resolving to the payload object. This can be either the Content-Id URI of the MIME body part of the payload object, or a URI matching the Content-Location of the MIME body part of the payload object, or a URI that resolves to a payload object external to the Message Package. It is strongly RECOMMENDED that the URI attribute value match the xlink:href URI value of the corresponding Manifest/Reference element for the payload object.

## Note

When a transfer encoding (e.g. base64) specified by a Content-Transfer-Encoding MIME header is used for the SOAP Envelope or payload objects, the signature generation MUST be executed before the encoding.

Example of digitally signed ebXML SOAP Message:

```
<?xml version="1.0" encoding="utf-8"?>
<SOAP:Envelope xmlns:xlink="http://www.w3.org/1999/xlink" xmlns:SOAP="http://schemas.xmlsoap.org/soap/envelope/"
  xmlns:eb="http://www.oasis-open.org/committees/ebxml-msg/schema/msg-header-3_0.xsd"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://schemas.xmlsoap.org/soap/envelope/
    http://www.oasis-open.org/committees/ebxml-msg/schema/soap12.xsd
    http://www.oasis-open.org/committees/ebxml-msg/schema/msg-header-3_0.xsd
    http://www.oasis-open.org/committees/ebxml-msg/schema/msg-header-3_0.xsd">
  <SOAP:Header>
    <eb:MessageHeader eb:id="..." eb:version="2.0" SOAP:mustUnderstand="1">...</eb:MessageHeader>
    <eb:Manifest eb:id="Mani01" eb:version="2.0">
      <eb:Reference xlink:href="cid://blahblahblah/" xlink:role="http://ebxml.org/gci/invoice">
        <eb:Schema eb:version="2.0" eb:location="http://ebxml.org/gci/busdocs/invoice.dtd"/>
      </eb:Reference>
    </eb:Manifest>
    <Signature xmlns="http://www.w3.org/2000/09/xmldsig#">
      <SignedInfo>
        <CanonicalizationMethod Algorithm="http://www.w3.org/TR/2001/REC-xml-c14n-20010315"/>
        <SignatureMethod Algorithm="http://www.w3.org/2000/09/xmldsig#dsa-sha1"/>
        <Reference URI="">
          <Transforms>
            <Transform Algorithm="http://www.w3.org/2000/09/xmldsig#enveloped-signature"/>
            <Transform Algorithm="http://www.w3.org/TR/1999/REC-xpath-19991116">
              <XPath> not(ancestor-or-self::() [ @SOAP:actor=&quot;urn:oasis:names:tc:ebxml-msg:actor:nextMSH&quot;
                ancestor-or-self::() [ @SOAP:actor=&quot;http://schemas.xmlsoap.org/soap/actor/next&quot; ] ) )
            </Transform>
            <Transform Algorithm="http://www.w3.org/TR/2001/REC-xml-c14n-20010315"/>
          </Transforms>
          <DigestMethod Algorithm="http://www.w3.org/2000/09/xmldsig#sha1"/>
          <DigestValue>...</DigestValue>
        </Reference>
        <Reference URI="cid://blahblahblah/">
          <DigestMethod Algorithm="http://www.w3.org/2000/09/xmldsig#sha1"/>
          <DigestValue>...</DigestValue>
        </Reference>
      </SignedInfo>
      <SignatureValue>...</SignatureValue>
      <KeyInfo>...</KeyInfo>
    </Signature>
  </SOAP:Header>
  <SOAP:Body>
    ...
  </SOAP:Body>
</SOAP:Envelope>
```

## 10.1.4. Countermeasure Technologies

### 10.1.4.1. Persistent Digital Signature

The only available technology that can be applied to the purpose of digitally signing an ebXML Message (the ebXML SOAP Header and Body and its associated payload objects) is provided by technology that conforms to

the W3C/IETF joint XML Signature specification [XMLDSIG]. An XML Signature conforming to this specification can selectively sign portions of an XML document(s), permitting the documents to be augmented (new element content added) while preserving the validity of the signature(s).

If signatures are being used to digitally sign an ebXML Message then XML Signature [XMLDSIG] MUST be used to bind the ebXML SOAP Header and Body to the ebXML Payload Container(s) or data elsewhere on the web that relate to the message.

An ebXML Message requiring a digital signature SHALL be signed following the process defined in this section of the specification and SHALL be in full compliance with XML Signature [XMLDSIG].

#### **10.1.4.2. Persistent Signed Receipt**

An ebXML Message that has been digitally signed MAY be acknowledged with an Acknowledgment Message that itself is digitally signed in the manner described in the previous section. The Acknowledgment Message MUST contain a [XMLDSIG] Reference element list consistent with those contained in the [XMLDSIG] Signature element of the original message.

#### **10.1.4.3. Non-persistent Authentication**

Non-persistent authentication is provided by the communications channel used to transport the ebXML Message. This authentication MAY be either in one direction or bi-directional. The specific method will be determined by the communications protocol used. For instance, the use of a secure network protocol, such as TLS [RFC 2246] or IPSec [RFC 2402] provides the sender of an ebXML Message with a way to authenticate the destination for the TCP/IP environment.

#### **10.1.4.4. Non-persistent Integrity**

A secure network protocol such as TLS [RFC 2246] or IPSec [RFC 2402] MAY be configured to provide for digests and comparisons of the packets transmitted via the network connection.

#### **10.1.4.5. Persistent Confidentiality**

XML Encryption is a W3C/IETF joint activity actively engaged in the drafting of a specification for the selective encryption of an XML document(s). It is anticipated that this specification will be completed within the next year. The ebXML Transport, Routing and Packaging team for v1.0 of this specification has identified this technology as the only viable means of providing persistent, selective confidentiality of elements within an ebXML Message including the SOAP Header.

Confidentiality for ebXML Payload Containers MAY be provided by functionality possessed by a MSH. Payload confidentiality MAY be provided by using XML Encryption (when available) or some other cryptographic process (such as S/MIME [SMIME], [SMIMEV3], or PGP MIME [PGPMIME]) bilaterally agreed upon by the parties involved. The XML Encryption standard shall be the default encryption method when XML Encryption has achieved W3C Recommendation status.

#### **Note**

When both signature and encryption are required of the MSH, sign first and then encrypt.

#### **10.1.4.6. Non-persistent Confidentiality**

A secure network protocol, such as TLS [RFC 2246] or IPSEC [RFC 2402], provides transient confidentiality of a message as it is transferred between two ebXML adjacent MSH nodes.

#### **10.1.4.7. Persistent Authorization**

The OASIS Security Services Technical Committee (TC) is actively engaged in the definition of a specification that provides for the exchange of security credentials, including Name Assertion and Entitlements, based on Security Assertion Markup Language [SAML]. Use of technology based on this anticipated specification may provide persistent authorization for an ebXML Message once it becomes available.

[[[DALE TO PROVIDE NEW DETAILS]]]

#### 10.1.4.8. Non-persistent Authorization

A secure network protocol such as TLS [RFC 2246] or IPSEC [RFC 2402] MAY be configured to provide for bilateral authentication of certificates prior to establishing a session. This provides for the ability for an ebXML MSH to authenticate the source of a connection and to recognize the source as an authorized source of ebXML Messages.

#### 10.1.4.9. Trusted Timestamp

At the time of this specification, services offering trusted timestamp capabilities are becoming available. Once these become more widely available, and a standard has been defined for their use and expression, these standards, technologies and services will be evaluated and considered for use in later versions of this specification.

[[[INVESTIGATE]]]

### 10.1.5. Security Considerations

Implementers should take note, there is a vulnerability present even when an XML Digital Signature is used to protect to protect the integrity and origin of ebXML messages. The significance of the vulnerability necessarily depends on the deployed environment and the transport used to exchange ebXML messages.

The vulnerability is present because ebXML messaging is an integration of both XML and MIME technologies. Whenever two or more technologies are conjoined there are always additional (sometimes unique) security issues to be addressed. In this case, MIME is used as the framework for the message package, containing the SOAP Envelope and any payload containers. Various elements of the SOAP Envelope make reference to the payloads, identified via MIME mechanisms. In addition, various labels are duplicated in both the SOAP Envelope and the MIME framework, for example, the type of the content in the payload. The issue is how and when all of this information is used.

Specifically, the MIME Content-ID: header is used to specify a unique, identifying label for each payload. The label is used in the SOAP Envelope to identify the payload whenever it is needed. The MIME Content-Type: header is used to identify the type of content carried in the payload; some content types may contain additional parameters serving to further qualify the actual type. This information is available in the SOAP Envelope.

The MIME headers are not protected, even when an XML-based digital signature is applied. Although XML Encryption is not currently available and thus not currently used, its application is developing similarly to XML digital signatures. Insofar as its application is the same as that of XML digital signatures, its use will not protect the MIME headers. Thus, an ebXML message may be at risk depending on how the information in the MIME headers is processed as compared to the information in the SOAP Envelope.

The Content-ID: MIME header is critical. An adversary could easily mount a denial-of-service attack by mixing and matching payloads with the Content-ID: headers. As with most denial-of-service attacks, no specific protection is offered for this vulnerability. However, it should be detected since the digest calculated for the actual payload will not match the digest included in the SOAP Envelope when the digital signature is validated.

The presence of the content type in both the MIME headers and SOAP Envelope is a problem. Ordinary security practices discourage duplicating information in two places. When information is duplicated, ordinary security practices require the information in both places to be compared to ensure they are equal. It would be considered a security violation if both sets of information fail to match.

An adversary could change the MIME headers while a message is en route from its origin to its destination and this would not be detected when the security services are validated. This threat is less significant in a peer-to-peer transport environment as compared to a multi-hop transport environment. All implementations are at risk if the ebXML message is ever recorded in a long-term storage area since a compromise of that area puts the message at risk for modification.

The actual risk depends on how an implementation uses each of the duplicate sets of information. If any processing beyond the MIME parsing for body part identification and separation is dependent on the information in the MIME headers, then the implementation is at risk of being directed to take unintended or undesirable actions. How this might be exploited is best compared to the common programming mistake of permitting buffer overflows: it depends on the creativity and persistence of the adversary.

Thus, an implementation could reduce the risk by ensuring that the unprotected information in the MIME headers is never used except by the MIME parser for the minimum purpose of identifying and separating the body parts. This version of the specification makes no recommendation regarding whether or not an implementation should compare the duplicate sets of information nor what action to take based on the results of the comparison.

## 10.2. Error Handling Module

This section describes how one ebXML Message Service Handler (MSH) reports errors it detects in an ebXML Message to another MSH. The ebXML Message Service error reporting and handling module is to be considered as a layer of processing above the SOAP processor layer. This means the ebXML MSH is essentially an application-level handler of a SOAP Message from the perspective of the SOAP Processor. The SOAP processor MAY generate a SOAP Fault message if it is unable to process the message. A Sending MSH MUST be prepared to accept and process these SOAP Fault values.

It is possible for the ebXML MSH software to cause a SOAP Fault to be generated and returned to the sender of a SOAP Message. In this event, the returned message MUST conform to the [SOAP] specification processing guidelines for SOAP Fault values.

An ebXML SOAP Message reporting an error with a highestSeverity of Warning SHALL NOT be reported or returned as a SOAP Fault.

### 10.2.1. Definitions

For clarity, two phrases are defined for use in this section:

- "message in error" – A message containing or causing an error or warning of some kind
- "message reporting the error" – A message containing an ebXML ErrorList element that describes the warning(s) and/or error(s) found in a message in error (also referred to as an Error Message elsewhere in this document).

### 10.2.2. Types of Errors

One MSH needs to report errors to another MSH. For example, errors associated with:

- ebXML namespace qualified content of the SOAP Message document (see Section 8.4.6.1, "Namespace pseudo attribute")
- reliable messaging failures [[[see section 7.5.7]]]
- security (see Section 10.1, "Security Module")

Unless specified to the contrary, all references to "an error" in the remainder of this specification imply any or all of the types of errors listed above or defined elsewhere.

Errors associated with data communications protocols are detected and reported using the standard mechanisms supported by that data communications protocol and do not use the error reporting mechanism described here.

### 10.2.3. ErrorList Element

The existence of an ErrorList extension element within the SOAP Header element indicates the message identified by the RefToMessageId in the MessageHeader element has an error.

The ErrorList element consists of:

- id attribute (see Section 8.4.9, "id Attribute" for details)

- a version attribute (see Section 8.4.10, “version Attribute” for details)
- a SOAP mustUnderstand attribute with a value of "1" (see Section 8.4.11, “SOAP mustUnderstand Attribute” for details)
- highestSeverity attribute
- one or more Error elements

If there are no errors to be reported then the ErrorList element **MUST NOT** be present.

#### **10.2.3.1. highestSeverity attribute**

The highestSeverity attribute contains the highest severity of any of the Error elements. Specifically, if any of the Error elements have a severity of Error, highestSeverity **MUST** be set to Error; otherwise, highestSeverity **MUST** be set to Warning.

#### **10.2.3.2. Error Element**

An Error element consists of:

- id attribute (see Section 8.4.9, “id Attribute” for details)
- codeContext attribute
- errorCode attribute
- severity attribute
- location attribute
- Description element

##### **10.2.3.2.1. codeContext Attribute**

The codeContext attribute identifies the namespace or scheme for the errorCodes. It **MUST** be a URI. Its default value is urn:oasis:names:tc:ebxml-msg:service:errors. If it does not have the default value, then it indicates an implementation of this specification has used its own errorCode attribute values.

Use of a codeContext attribute value other than the default is **NOT RECOMMENDED**. In addition, an implementation of this specification should not use its own errorCode attribute values if an existing errorCode as defined in this section has the same or very similar meaning.

##### **10.2.3.2.2. errorCode attribute**

The **REQUIRED** errorCode attribute indicates the nature of the error in the message in error. Valid values for the errorCode and a description of the code’s meaning are given in the next section.

##### **10.2.3.2.3. severity Attribute**

The **REQUIRED** severity attribute indicates the severity of the error. Valid values are:

- Warning – This indicates other messages in the conversation could be generated in the normal way in spite of this problem.
- Error – This indicates there is an unrecoverable error in the message and no further message processing should occur. Appropriate failure conditions should be communicated to the Application.

##### **10.2.3.2.4. location Attribute**



The location attribute points to the part of the message containing the error.

If an error exists in an ebXML element and the containing document is "well formed" (see XML [XML]), then the content of the location attribute **MUST** be an XPointer [XPointer].

If the error is associated with an ebXML Payload Container, then location contains the content-id of the MIME part in error, using URI scheme "cid".

If the error is associated with Payload Services, the location should contain the value of the sequence attribute of the Processing Step that caused the error.

#### 10.2.3.2.5. id Attribute

If the error is a part of an ebXML element, the id of the element **MAY** be provided for error tracking.

#### 10.2.3.2.6. Description Attribute

The content of the Description element provides a narrative description of the error in the language defined by the xml:lang attribute. The XML parser or other software validating the message typically generates the message. The content is defined by the vendor/developer of the software that generated the Error element (See Section 10.2.3.2, "Error Element").

### 10.2.3.3. ErrorList Sample

An example of the ErrorList element is given below.

```
<eb:ErrorList eb:id="3490sdo", eb:highestSeverity="error"
  eb:version="3.0" SOAP:mustUnderstand="1">
  <eb:Error eb:errorCode="SecurityFailure"
    eb:severity="Error" eb:location="URI_of_ds:Signature">
    <eb:Description xml:lang="en-US">Validation of signature failed<eb:Description>
  </eb:Error>
  <eb:Error ...> ... </eb:Error>
</eb:ErrorList>
```

### 10.2.3.4. errorCode Values

This section describes the values for the errorCode attribute used in a message reporting an error. They are described in a table with three headings:

- the first column contains the value to be used as an errorCode, e.g. SecurityFailure.
- the second column contains a "Short Description" of the errorCode. This narrative **MUST NOT** be used in the content of the Error element.
- the third column contains a "Long Description" that provides an explanation of the meaning of the error and provides guidance on when the particular errorCode should be used.

#### 10.2.3.4.1. Errors in the ebXML Elements

[[[todo table]]]

#### 10.2.3.4.2. Non-XML Document Errors

[[[todo table]]]

## 10.2.4. Implementing Error Reporting and Handling

### 10.2.4.1. When to Generate Error Messages

When a MSH detects an error in a message it is strongly **RECOMMENDED** the error is reported to the MSH that sent the message in error. This is possible when:

- the Error Reporting Location (see Section 10.2.4.2, “Identifying the Error Reporting Location”) to which the message reporting the error should be sent can be determined.
- the message in error does not have an ErrorList element with highestSeverity set to Error.
- If the Error Reporting Location cannot be found or the message in error has an ErrorList element with highestSeverity set to Error, it is RECOMMENDED:

The error is logged, and/or the problem is resolved by other means, and no further action is taken.

#### **10.2.4.2. Identifying the Error Reporting Location**

The Error Reporting Location is a URI specified by the sender of the message in error that indicates where to send a message reporting the error.

The ErrorURI implied by the CPA, identified by the CPAId on the message, SHOULD be used. Otherwise, the recipient MAY resolve an ErrorURI using the From element of the message in error. If neither is possible, no error will be reported to the sending Party.

Even if the message in error cannot be successfully analyzed, MSH implementers MAY try to determine the Error Reporting Location by other means. How this is done is an implementation decision.

#### **10.2.4.3. Service and Action Element Values**

An ErrorList element can be included in a SOAP Header that is part of a message being sent as a result of processing of an earlier message. In this case, the values for the Service and Action elements are set by the designer of the Service. This method MUST NOT be used if the highestSeverity is Error.

An ErrorList element can also be included in an independent message. In this case the values of the Service and Action elements MUST be set as follows:

- The Service element MUST be set to: `urn:oasis:names:tc:ebxml-msg:service`
- The Action element MUST be set to MessageError.

### **10.3. Payload Services Module**

#### **10.3.1. Introduction**

Payload services refers to functionality implemented by the messaging server to automatically perform some manipulation on payload content either before envelope digital signing (if non repudiation is being used) and message transmission, or after digital signature verification (if non repudiation is being used) and before passing the payload(s) in question to the application.

Payload services are not meant to be used as application level message handlers, rather, they should be treated as "filters".

#### **10.3.2. Example Use Cases for Payload Services**

##### **10.3.2.1. Transparently converting XML content to ASN.1 and vice-versa**

There are cases where it is desirable to use a more compact format, such as Abstract Syntax Notation to transmit data between partners, while still maintaining the easy-to-process and display qualities of XML. By using ASN.1's XML Encoding Rules (XER), it is possible to convert between ASN.1 and XML.

Payload services could be used to automatically create ASN.1 representations of XML payloads prior to the message being transmitted. On the receiver's side, the same payload service could be used to convert back to XML. The net result being that the application developers only see XML on both sides.

### 10.3.2.2. Compression

Sometimes, using a specialized compression algorithm can yield impressive reductions in a server's network utilization.

Payload services could be used to automatically compress and decompress payload content.

### 10.3.2.3. Encryption

Users often apply encryption at the payload level to ensure confidentiality of their payloads. Often, all that is needed to ensure confidentiality is to encrypt a single payload, as opposed to heavy weight approaches such as using S/MIME to encrypt an entire message.

Payload services could be used to encrypt and decrypt payloads.

### 10.3.2.4. XSL Transforms

As XML vocabularies evolve, business processes making use of XML messages will need to evolve with changes to their XML vocabularies. In cases where it would be too costly to modify the application(s) producing and consuming the XML, XSL can be used to perform structural transformations.

Payload services could be used to automatically execute an XSL stylesheet prior to transmission, or before being delivered to the application.

## 10.3.3. Payload Service Invocation

Payload service invocation can be requested using two methods: SOAP Header Extensions, or CPA entries.

In cases where invocation requests are specified in both the CPA and the SOAP header, the CPA takes precedence. If the CPA entry explicitly forbids the use of payload services, then the Payload Services SOAP Headers MUST be ignored.

Payload services MAY NOT be invoked on the 0th attachment -- the SOAP envelope.

### 10.3.3.1. Invocation by SOAP Header Extension

Payload services may be invoked upon payloads by inserting the Processing element into the Payload entry within the message's PayloadInfo block. See Section 9.1.4.3, "PayloadInfo Sample" and Appendix A, *The ebXML SOAP Extension Elements Schema* for more information. The Processing element that is inserted into the PayloadInfo header block is meant to define the processing step, if any, required to be performed on the receiving end of a messaging exchange.

It is anticipated that implementations of Payload Services will export the concept of Pre and Post processing steps via their message service interfaces, although specifying in the Payload element what action was taken on the sending side is not required.

As the example above illustrates, it is possible to chain payload services together using the *sequence* attribute. When interpreting the *order* attribute, lower numbers have higher priorities, and must be executed first. The value of the *sequence* attribute does not have to start at 0, although that convention is recommended for the sake of simplicity.

### 10.3.3.2. Error Handling

If an error is encountered during the payload services processing phase, it must be reported back to the sender with an errorCode attribute value of PayloadServicesFailure and severity of Error. The location attribute of the Error element should refer to the value of the sequence attribute of the Processing Step causing the error.

## 10.3.4. Required Services

This section defines services that every ebMS 3.0 compliant message handler must implement.

### 10.3.4.1. Compression Service

This service, named *urn:oasis-open:committees:ebxml-msg:ps:compression:3\_0* provides a way of compressing payloads using a variety of algorithms. This specification defines that the gzip compression method, which is a variation of Lempel-Ziv (LZ77), MUST be supported.

The compression service defines the following mandatory parameters:

- `algorithm` - specify which compression algorithm will be used by the compression service. The default is 'gzip'.

In addition to the mandatory parameters above, the following parameters MAY be used to configure the default compression method (gzip):

- `compression-level` - a value between 1 and 9, where 1 is faster and less CPU intensive, while 9 provides the best compression at the cost of speed.

### Example 2. Sample CPA entry

TODO

## 10.4. Message Service Handler Ping Service

The OPTIONAL Message Service Handler Ping Service enables one MSH to determine if another MSH is operating. It consists of one MSH sending a Message Service Handler Ping message to a MSH, and another MSH, receiving the Ping, responding with a Message Service Handler Pong message.

If a Receiving MSH does not support the service requested, it SHOULD return an Error Message with an error-Code of NotSupported and a highestSeverity attribute set to Error.

### 10.4.1. Message Service Handler Ping Message

A Message Service Handler Ping (MSH Ping) message consists of an ebXML Message containing no ebXML Payload Container and the following:

- a MessageHeader element containing the following:
- a From element identifying the Party creating the MSH Ping message.
- a To element identifying the Party being sent the MSH Ping message.
- a CollaborationInfo element containing:
  - a AgreementRef element.
  - a Service element containing: `urn:oasis:names:tc:ebxml-msg:service` [[[WHAT @type???]]]
  - an Action element containing Ping.
- a MessageInfo element containing:
  - a MessageId element.

- a ConversationId element.
- a Timestamp element.
- an [XMLDSIG] Signature element (see Section 10.1, “Security Module” for details).

The message is then sent to the To Party.

An example Ping:

```
. . .Transport Headers
SOAPAction: "ebXML"
Content-type: multipart/related; boundary="ebXMLBoundary"

--ebXMLBoundary
Content-Type: text/xml

<?xml version="1.0" encoding="UTF-8"?>
<SOAP:Envelope xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:SOAP="http://schemas.xmlsoap.org/soap/envelope/"
  xsi:schemaLocation="http://schemas.xmlsoap.org/soap/envelope/
    http://schemas.xmlsoap.org/soap/envelope/">
  <SOAP:Header xmlns:eb="http://www.oasis-open.org/committees/ebxml-msg/schema/msg-header-3_0.xsd"
    xsi:schemaLocation="http://www.oasis-open.org/committees/ebxml-msg/schema/msg-header-3_0.xsd
      http://www.oasis-open.org/committees/ebxml-msg/schema/msg-header-3_0.xsd">
    <eb:MessageHeader version="3.0" SOAP:mustUnderstand="1">
      <eb:From>
        <eb:PartyId>urn:duns:123456789</eb:PartyId>
      </eb:From>
      <eb:To>
        <eb:PartyId>urn:duns:912345678</eb:PartyId>
      </eb:To>
      <eb:CollaborationInfo>
        <eb:AgreementRef>20001209-133003-28572</eb:AgreementRef>
        <eb:Service>urn:oasis:names:tc:ebxml-msg:service</eb:Service>
        <eb:Action>Ping</eb:Action>
      </eb:CollaborationInfo>
      <eb:MessageInfo>
        <eb:MessageId>20010215-111212-28572@example.com</eb:MessageId>
        <eb:ConversationId>20010215-111213-28572</eb:ConversationId>
        <eb:Timestamp>2001-02-15T11:12:12</eb:Timestamp>
      </eb:MessageInfo>
    </eb:MessageHeader>
  </SOAP:Header>
  <SOAP:Body/>
</SOAP:Envelope>

--ebXMLBoundary--
```

## Note

The above example shows a Multipart/Related MIME structure with only one bodypart.

### 10.4.2. Message Service Handler Pong Message

Once the To Party receives the MSH Ping message, they MAY generate a Message Service Handler Pong (MSH Pong) message consisting of an ebXML Message containing no ebXML Payload Container and the following:

A MessageHeader element containing the following:

- a From element identifying the creator of the MSH Pong message.
- a To element identifying a Party that generated the MSH Ping message.
- a CollaborationInfo element containing:
  - a AgreementRef element.

- a Service element containing: urn:oasis:names:tc:ebxml-msg:service [[[WHAT @type???]]]
- an Action element containing Pong.
- a MessageInfo element containing:
  - a MessageId element.
  - a RefToMessageId identifying the MSH Ping message.
  - a ConversationId element.
  - a Timestamp element.
- an [XMLDSIG] Signature element (see Section 10.1, “Security Module” for details).

An example Pong:

```
. . .Transport Headers
SOAPAction: "ebXML"
Content-type: multipart/related; boundary="ebXMLBoundary"

--ebXMLBoundary
Content-Type: text/xml

<?xml version="1.0" encoding="UTF-8"?>
<SOAP:Envelope xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:SOAP="http://schemas.xmlsoap.org/soap/envelope/"
  xsi:schemaLocation="http://schemas.xmlsoap.org/soap/envelope/
    http://schemas.xmlsoap.org/soap/envelope/"
  >
  <SOAP:Header xmlns:eb="http://www.oasis-open.org/committees/ebxml-msg/schema/msg-header-3_0.xsd"
    xsi:schemaLocation="http://www.oasis-open.org/committees/ebxml-msg/schema/msg-header-3_0.xsd
      http://www.oasis-open.org/committees/ebxml-msg/schema/msg-header-3_0.xsd"
    >
    <eb:MessageHeader version="3.0" SOAP:mustUnderstand="1">
      <eb:From>
        <eb:PartyId>urn:duns:912345678</eb:PartyId>
      </eb:From>
      <eb:To>
        <eb:PartyId>urn:duns:123456789</eb:PartyId>
      </eb:To>
      <eb:CollaborationInfo>
        <eb:AgreementRef>20001209-133003-28572</eb:AgreementRef>
        <eb:Service>urn:oasis:names:tc:ebxml-msg:service</eb:Service>
        <eb:Action>Pong</eb:Action>
      </eb:CollaborationInfo>
      <eb:MessageInfo>
        <eb:MessageId>20010215-111315-28573@example.com</eb:MessageId>
        <eb:RefToMessageId>20010215-111212-28572@example.com</eb:RefToMessageId>
        <eb:ConversationId>20010215-111213-28572</eb:ConversationId>
        <eb:Timestamp>2001-02-15T11:12:12</eb:Timestamp>
      </eb:MessageInfo>
    </eb:MessageHeader>
  </SOAP:Header>
  <SOAP:Body/>
</SOAP:Envelope>

--ebXMLBoundary--
```

## Note

This example shows a non-multipart MIME structure.

### 10.4.3. Security Considerations

Parties who receive a MSH Ping message SHOULD always respond to the message. However, there is a risk

some parties might use the MSH Ping message to determine the existence of a Message Service Handler as part of a security attack on that MSH. Therefore, recipients of a MSH Ping MAY ignore the message if they consider that the sender of the message received is unauthorized or part of some attack. The decision process that results in this course of action is implementation dependent.

## 10.5. Pull Module

TBD

### 10.5.1. Pull Message Structure

A Pull Message consists of the following:

- The Service element MUST contain "urn:oasis:names:tc:msh:service".
- The Action element MUST contain "Pull".
- The PullRequest element, can occur zero or one time.
- The PullResponse element, can occur zero or one time. (The PullRequest and PullResponse elements are mutually exclusive)

## 10.6. Reliable Messaging Module

This ebXML Messaging Specification relies on the WS-Reliability 1.1 specification for its reliable messaging functionality. This module MUST be implemented by a conforming implementation.

### 10.6.1. WS-Reliability Implementation Requirements

This specification places the following constraints upon the use of WS-Reliability:

The following RM features MUST be supported:

- GuaranteedDelivery
- NoDuplicateDelivery
- OrderedDelivery
- GroupMaxIdleDuration
- GroupExpiryTime
- ExpiryTime
- ReplyPattern

The following Reply patterns MUST be supported:

- Response RM-Reply Pattern.
- Callback RM-Reply Pattern.
- Synchronous Poll RM-Reply.

### 10.6.2. Reliability of SOAP Requests

To achieve Reliability of a SOAP request message a Sending MSH MUST enable the WS-Reliability 1.1 GuaranteedDelivery RM Agreement item.

### 10.6.3. Reliability of SOAP Responses

The WS-Reliability 1.1 specification does not support the Reliability of the response portion of the SOAP Request-response MEP.

As a consequence of this restriction, the Reliability of ebXML messages returned in the SOAP response of the Pull MSH Signal is not supported.

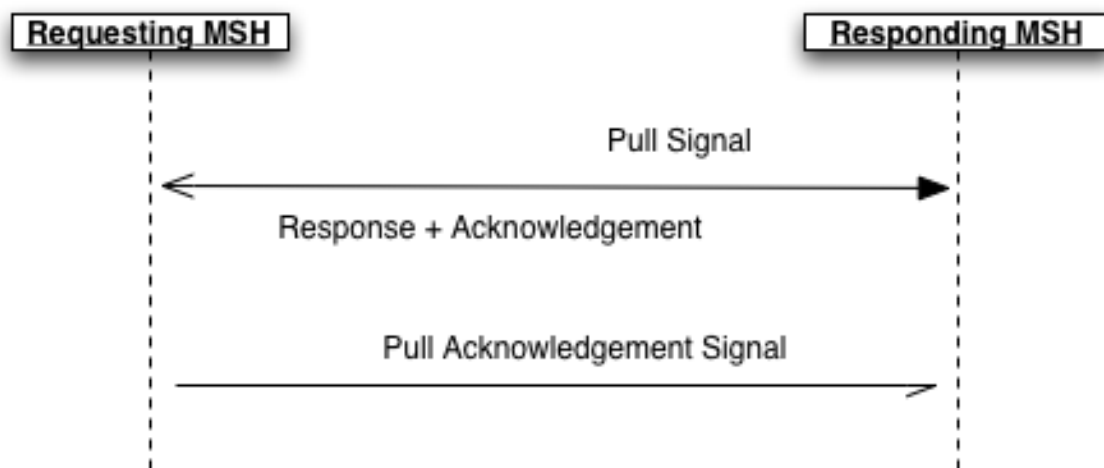
### 10.6.4. Reliability of Pull Message Exchange Patterns

To achieve Reliability of a Pull MEP instance the following WS-Reliability 1.1 RM Agreement items MUST be enabled for the ebMS MSH PullRequest Signal:

- GuaranteedDelivery
- NoDuplicateDelivery
- Response RM-Reply Pattern

Although WS-Reliability 1.1 does not support the Reliability of SOAP responses, the MSH PullAcknowledgment Signal is used for acknowledging an ebXML message returned in the response of a Pull request. The MSH PullAcknowledgment Signal supports acknowledging multiple responses in a single Signal message.

**Figure 9. Reliable Pull Sequence**



### 10.6.5. Message Delivery Semantics

Message Delivery is an abstract operation that transfers a payload from the Receiving MSH to the Consumer. A message is only acknowledged after successful Message Delivery. The interpretation of the WS-Reliability 1.1 RMP "Deliver" operation MUST be as follows:

The RMP "Deliver" operation includes the MSH Message Delivery operation. Failure of the MSH Message Delivery operation results in the failure of the RMP "Deliver" operation.

### 10.6.6. Fault Handling



Any processing error that results in the received message not being delivered to the consumer **MUST** be reported as an RMP delivery failure as defined in WS-Reliability 1.1, generating a MessageProcessingFailure Fault to the sending RMP.

## 11. Combining ebXML SOAP Extension Elements

This section describes how the various ebXML SOAP extension elements may be used in combination.

### 11.1. MessageHeader Element Interaction

The MessageHeader element **MUST** be present in every message.

### 11.2. PayloadInfo Element Interaction

The PayloadInfo element **MUST** be present if there is any data associated with the message not present in the Header Container. This applies specifically to data in the Payload Container(s), the SOAP Body or elsewhere, e.g. on the web.

### 11.3. Signature Element Interaction

One or more XML Signature [XMLDSIG] Signature elements **MAY** be present on any message.

### 11.4. Errorlist Element Interaction

If the highestSeverity attribute on the ErrorList is set to Warning, then this element **MAY** be present with any element.

If the highestSeverity attribute on the ErrorList is set to Error, then this element **MUST NOT** be present with the Manifest element.

### 11.5. PayloadServices Element Interaction

The PayloadServices element **MAY** be present on any message sent or received.

## 12. Additional (optional) Features

### 12.1. Message Status Service

The Message Status Request Service consists of the following:

- Message Status Request message containing details regarding a message previously sent is sent to a Message Service Handler (MSH).
- The Message Service Handler receiving the request responds with a Message Status Response message.

A Message Service Handler **SHOULD** respond to Message Status Requests for messages that have been sent reliably and the MessageId in the RefToMessageId is present in persistent storage (see Section 12.1.1, “Message Status Messages”).

A Message Service Handler **MAY** respond to Message Status Requests for messages that have not been sent reliably.

A Message Service **SHOULD NOT** use the Message Status Request Service to implement Reliable Messaging.

If a Receiving MSH does not support the service requested, it **SHOULD** return an Error Message with an error-Code of NotSupported and a highestSeverity attribute set to Error. Each service is described below.

## **12.1.1. Message Status Messages**

### **12.1.1.1. Message Status Request Message**

A Message Status Request message consists of an ebXML Message with no ebXML Payload Container and the following:

A MessageHeader element containing:

- a From element identifying the Party that created the Message Status Request message.
- a To element identifying a Party who should receive the message.
- a CollaborationInfo element containing:
  - an AgreementRef element.
  - a Service element that contains: urn:oasis:names:tc:ebxml-msg:service
  - an Action element that contains StatusRequest.
- a MessageInfo element containing:
  - a MessageId element.
  - a ConversationId element.
  - a Timestamp element.
- A StatusRequest element (see Section 12.1.2, “StatusRequest Element”) containing:
  - a RefToMessageId element in StatusRequest element containing the MessageId of the message whose status is being queried.
- an [XMLDSIG] Signature element (see Section 10.1, “Security Module” for more details).

The message is then sent to the To Party.

### **12.1.1.2. Message Status Response Message**

Once the To Party receives the Message Status Request message, they **SHOULD** generate a Message Status Response message with no ebXML Payload Container consisting of the following:

A MessageHeader element containing:

- a From element that identifies the sender of the Message Status Response message.
- a To element set to the value of the From element in the Message Status Request message

- a CollaborationInfo element containing:
  - an AgreementRef element.
  - a Service element that contains: urn:oasis:names:tc:ebxml-msg:service.
  - an Action element that contains StatusResponse.
- An Action element that contains StatusResponse
- A MessageInfo element containing a RefToMessageId that identifies the Message Status Request message.
  - a MessageId element.
  - a RefToMessageId element that identifies the Message Status Request message.
  - a ConversationId element.
  - a Timestamp element.
- StatusResponse element (see Section 12.1.3, “StatusResponse Element”)
- an [XMLDSIG] Signature element (see Section 10.1, “Security Module” for more details).

The message is then sent to the To Party.

### 12.1.1.3. Security Considerations

Parties who receive a Message Status Request message SHOULD always respond to the message. However, they MAY ignore the message instead of responding with messageStatus set to Unauthorized if they consider the sender of the message to be unauthorized. The decision process resulting in this course of action is implementation dependent.

## 12.1.2. StatusRequest Element

The OPTIONAL StatusRequest element is an immediate child of a SOAP Body and is used to identify an earlier message whose status is being requested (see Section 12.1.3.5, “StatusResponse Element Interaction”).

The StatusRequest element consists of the following:

- an id attribute (see Section 8.4.9, “id Attribute” for details)
- a version attribute (see Section 8.4.10, “version Attribute” for details)
- a RefToMessageId element

### 12.1.2.1. RefToMessageId Element

A REQUIRED RefToMessageId element contains the MessageId of the message whose status is being requested.

### 12.1.2.2. StatusRequest Sample

An example of the StatusRequest element is given below:

```
<eb:StatusRequest eb:version="3.0" >
  <eb:RefToMessageId>323210:e52151ec74:-7ffc@xtacy</eb:RefToMessageId>
</eb:StatusRequest>
```

### 12.1.2.3. StatusRequest Element Interaction

A StatusRequest element **MUST NOT** be present with the following elements:

- a PayloadInfo element
- a StatusResponse element
- an ErrorList element

### 12.1.3. StatusResponse Element

The **OPTIONAL** StatusResponse element is an immediate child of a SOAP Body and is used by one MSH to describe the status of processing of a message.

The StatusResponse element consists of the following elements and attributes:

- an id attribute (see Section 8.4.9, “id Attribute” for details).
- a version attribute (see Section 8.4.10, “version Attribute” for details).
- a RefToMessageId element.
- a Timestamp element.
- a messageStatus attribute.

#### 12.1.3.1. RefToMessageId Element

A **REQUIRED** RefToMessageId element contains the MessageId of the message whose status is being reported. RefToMessageId element child of the MessageInfo element of a message containing a StatusResponse element **SHALL** have the MessageId of the message containing the StatusRequest element to which the StatusResponse element applies. The RefToMessageId child element of the StatusRequest or StatusResponse element **SHALL** contain the MessageId of the message whose status is being queried.

#### 12.1.3.2. Timestamp Element

The Timestamp element contains the time the message, whose status is being reported, was received (see Section 9.1.3.4, “Timestamp Element”). This **MUST** be omitted if the message, whose status is being reported, is NotRecognized or the request was Unauthorized.

#### 12.1.3.3. messageStatus attribute

The **REQUIRED** messageStatus attribute identifies the status of the message identified by the RefToMessageId element. It **SHALL** be set to one of the following values:

- Unauthorized – the Message Status Request is not authorized or accepted.
- NotRecognized – the message identified by the RefToMessageId element in the StatusResponse element is not recognized.
- Received – the message identified by the RefToMessageId element in the StatusResponse element has been received by the MSH.
- Processed – the message identified by the RefToMessageId element in the StatusResponse element has been processed by the MSH.
- Forwarded – the message identified by the RefToMessageId element in the StatusResponse element has

been forwarded by the MSH to another MSH.

## Note

If a Message Status Request is sent after the elapsed time indicated by PersistDuration has passed since the message being queried was sent, the Message Status Response may indicate the MessageId was NotRecognized – the MessageId is no longer in persistent storage.

### 12.1.3.4. StatusResponse Sample

An example of the StatusResponse element is given below:

```
<eb:StatusResponse eb:version="3.0" eb:messageStatus="Received">
  <eb:RefToMessageId>323210:e52151ec74:-7ffc@xtacy</eb:RefToMessageId>
  <eb:Timestamp>2001-03-09T12:22:30</eb:Timestamp>
</eb:StatusResponse>
```

### 12.1.3.5. StatusResponse Element Interaction

This element MUST NOT be present with the following elements:

- a Manifest element.
- a StatusRequest element.
- an ErrorList element with a highestSeverity attribute set to Error.

## 12.2. Multi-Hop Module

# The ebXML SOAP Extension Elements Schema

The OASIS ebXML Messaging Technical Committee has provided a version of the SOAP 1.1 envelope schema specified using the schema vocabulary that conforms to the W3C XML Schema Recommendation specification [XMLSchema].

SOAP1.1- <http://www.oasis-open.org/committees/ebxml-msg/schema/envelope.xsd>

It was necessary to craft a schema for the XLINK [XLINK] attribute vocabulary to conform to the W3C XML Schema Recommendation [XMLSchema]. This schema is referenced from the ebXML SOAP extension elements schema and is available from the following URL: Xlink - <http://www.oasis-open.org/committees/ebxml-msg/schema/xlink.xsd>

```
<?xml version="1.0" encoding="UTF-8"?>
<!-- Some parsers may require explicit declaration of xmlns:xml="http://www.w3.org/XML/1998/namespace".
In that case, a copy of this schema augmented with the above declaration should be cached and used
for the purpose of schema validation on ebXML messages. -->
<schema attributeFormDefault="qualified" elementFormDefault="qualified"
  targetNamespace="http://www.oasis-open.org/committees/ebxml-msg/schema/msg-header-3_0.xsd"
  version="1.0" xmlns="http://www.w3.org/2001/XMLSchema"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:tns="http://www.oasis-open.org/committees/ebxml-msg/schema/msg-header-3_0.xsd"
  xmlns:ns2="http://www.w3.org/1999/xhtml"
  xmlns:ns="http://www.w3.org/2001/XMLSchema"
  xmlns:hfp="http://www.w3.org/2001/XMLSchema-hasFacetAndProperty"
  xmlns:ds="http://www.w3.org/2000/09/xmldsig#"
  <import namespace="http://www.w3.org/XML/1998/namespace"
    schemaLocation="http://www.w3.org/2001/03/xml.xsd" />
```

```

<import namespace="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-utility-1.0.xsd"
        schemaLocation="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-utility-1.0.xsd"/>

<import namespace="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-secext-1.0.xsd"
        schemaLocation="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-secext-1.0.xsd"/>

<complexType name="HeaderBaseType">
  <sequence>
    <any maxOccurs="unbounded" minOccurs="0" namespace="##other"
        processContents="lax"/>
  </sequence>

  <attributeGroup ref="tns:headerExtension.grp"/>
</complexType>

<complexType name="MessageHeaderType">
  <complexContent>
    <extension base="tns:HeaderBaseType">
      <sequence>
        <element ref="tns:From"/>

        <element ref="tns:To"/>

        <element ref="tns:CollaborationInfo"/>

        <element ref="tns:MessageInfo"/>

        <element ref="tns:PayloadInfo"/>

        <element maxOccurs="unbounded" minOccurs="0" ref="tns:Description"/>
      </sequence>
    </extension>
  </complexContent>
</complexType>

<element name="To">
  <complexType>
    <sequence>
      <element maxOccurs="unbounded" ref="tns:PartyId"/>

      <element minOccurs="0" name="Role" type="tns:non-empty-string"/>
    </sequence>
  </complexType>
</element>

<element name="From">
  <complexType>
    <sequence>
      <element maxOccurs="unbounded" ref="tns:PartyId"/>

      <element minOccurs="0" name="Role" type="tns:non-empty-string"/>
    </sequence>
  </complexType>
</element>

<!-- PayloadInfo, for use in soap:Header element -->

<element name="PayloadInfo">
  <complexType>
    <complexContent>
      <extension base="tns:HeaderBaseType">
        <sequence>
          <element maxOccurs="unbounded" ref="tns:Payload"/>
        </sequence>
      </extension>
    </complexContent>
  </complexType>
</element>

<element name="Payload">
  <complexType>
    <complexContent>
      <extension base="tns:HeaderBaseType">
        <sequence>
          <element maxOccurs="unbounded" minOccurs="0" ref="tns:Schema"/>

          <element maxOccurs="unbounded" minOccurs="0" ref="tns:Description"/>

          <element maxOccurs="1" minOccurs="0" ref="tns:Processing"/>
        </sequence>

        <attribute ref="tns:payloadRef" use="required"/>
      </extension>
    </complexContent>
  </complexType>

```

```

    </complexType>
  </element>

  <element name="Schema">
    <complexType>
      <attribute ref="tns:location" use="required"/>

      <attribute ref="tns:version"/>
    </complexType>
  </element>

  <element name="Processing">
    <complexType>
      <complexContent>
        <extension base="tns:HeaderBaseType">
          <sequence>
            <element maxOccurs="unbounded" minOccurs="0" ref="tns:Step"/>
          </sequence>
        </extension>
      </complexContent>
    </complexType>
  </element>

  <element name="Step">
    <complexType>
      <complexContent>
        <extension base="tns:HeaderBaseType">
          <sequence>
            <element maxOccurs="unbounded" minOccurs="0" ref="tns:Parameter"/>

            <attribute ref="tns:sequence" use="required"/>

            <attribute ref="tns:service" use="required"/>
          </extension>
        </complexContent>
      </complexType>
    </element>

  <element name="Parameter">
    <complexType>
      <attribute ref="tns:name" use="required"/>

      <attribute ref="tns:value" use="required"/>
    </complexType>
  </element>

  <!-- MESSAGEHEADER, for use in soap:Header element -->

  <element name="MessageHeader" type="tns:MessageHeaderType"/>

  <element name="AgreementRef" type="tns:non-empty-string"/>

  <element name="ConversationId" type="tns:non-empty-string"/>

  <element name="Service">
    <complexType>
      <simpleContent>
        <extension base="tns:non-empty-string"/>
      </simpleContent>
    </complexType>
  </element>

  <element name="Action" type="tns:non-empty-string"/>

  <element name="MessageInfo">
    <complexType>
      <sequence>
        <element ref="tns:MessageId"/>

        <element minOccurs="0" ref="tns:RefToMessageId"/>

        <element ref="tns:ConversationId"/>

        <element ref="tns:Timestamp"/>
      </sequence>
    </complexType>
  </element>

  <element name="CollaborationInfo">
    <complexType>
      <sequence>
        <element ref="tns:AgreementRef"/>

```

```

    <element ref="tns:Service"/>
    <element ref="tns:Action"/>
  </sequence>
</complexType>
</element>

<element name="MessageId" type="tns:non-empty-string"/>

<!-- ERROR LIST, for use in soap:Header element -->

<element name="ErrorList">
  <complexType>
    <complexContent>
      <extension base="tns:HeaderBaseType">
        <sequence>
          <element maxOccurs="unbounded" ref="tns:Error"/>
        </sequence>

        <attribute name="highestSeverity" type="tns:severity.type"
          use="required"/>
      </extension>
    </complexContent>
  </complexType>
</element>

<element name="Error">
  <complexType>
    <complexContent>
      <extension base="tns:HeaderBaseType">
        <sequence>
          <element minOccurs="0" ref="tns:Description"/>
        </sequence>

        <attribute default="urn:oasis:names:tc:ebxml-msg:service:errors"
          name="codeContext" type="anyURI"/>

        <attribute name="errorCode" type="tns:non-empty-string"
          use="required"/>

        <attribute name="severity" type="tns:severity.type" use="required"/>

        <attribute name="location" type="tns:non-empty-string"/>
      </extension>
    </complexContent>
  </complexType>
</element>

<element name="PullRequest">
  <complexType>
    <complexContent>
      <extension base="tns:HeaderBaseType">
        <sequence>
          <choice>
            <element ref="tns:To"/>

            <element ref="tns:RefToMessageId"/>
          </choice>
        </sequence>
      </extension>
    </complexContent>
  </complexType>
</element>

<!-- STATUS RESPONSE, for use in soap:Header element -->

<element name="StatusResponse">
  <complexType>
    <complexContent>
      <extension base="tns:HeaderBaseType">
        <sequence>
          <element ref="tns:RefToMessageId"/>

          <element minOccurs="0" ref="tns:Timestamp"/>
        </sequence>

        <attribute name="messageStatus" type="tns:messageStatus.type"
          use="required"/>
      </extension>
    </complexContent>
  </complexType>
</element>

<!-- STATUS REQUEST, for use in soap:Header element -->

```



```

<element name="StatusRequest">
  <complexType>
    <complexContent>
      <extension base="tns:HeaderBaseType">
        <sequence>
          <element ref="tns:RefToMessageId"/>
        </sequence>
      </extension>
    </complexContent>
  </complexType>
</element>

<!-- COMMON TYPES -->

<simpleType name="status.type">
  <restriction base="NMTOKEN">
    <enumeration value="Reset"/>

    <enumeration value="Continue"/>
  </restriction>
</simpleType>

<simpleType name="messageStatus.type">
  <restriction base="NMTOKEN">
    <enumeration value="Unauthorized"/>

    <enumeration value="NotRecognized"/>

    <enumeration value="Received"/>

    <enumeration value="Processed"/>

    <enumeration value="Forwarded"/>

    <enumeration value="MessageNotAvailable"/>
  </restriction>
</simpleType>

<simpleType name="non-empty-string">
  <restriction base="string">
    <minLength value="1"/>
  </restriction>
</simpleType>

<simpleType name="non-negative-integer">
  <restriction base="nonNegativeInteger"/>
</simpleType>

<simpleType name="severity.type">
  <restriction base="NMTOKEN">
    <enumeration value="Warning"/>

    <enumeration value="Error"/>
  </restriction>
</simpleType>

<!-- ATTRIBUTES and ATTRIBUTE GROUPS -->

<attribute name="id" type="ID"/>

<attribute name="version" type="tns:non-empty-string"/>

<attributeGroup name="headerExtension.grp">
  <attribute ref="tns:id"/>

  <attribute ref="tns:version" use="required"/>

  <anyAttribute namespace="##other" processContents="lax"/>
</attributeGroup>

<attribute name="sequence" type="tns:non-negative-integer"/>

<attribute name="service" type="anyURI"/>

<attribute name="name" type="tns:non-empty-string" use="required"/>

<attribute name="value" type="tns:non-empty-string" use="required"/>

<attribute name="location" type="anyURI" use="required"/>

<attribute name="payloadRef" type="tns:non-empty-string" use="required"/>

<!-- COMMON ELEMENTS -->

```

```
<element name="PartyId">
  <complexType>
    <simpleContent>
      <extension base="tns:non-empty-string">
        <attribute name="type" type="tns:non-empty-string"/>
      </extension>
    </simpleContent>
  </complexType>
</element>

<element name="Description">
  <complexType>
    <simpleContent>
      <extension base="tns:non-empty-string">
        <attribute ref="xml:lang" use="required"/>
      </extension>
    </simpleContent>
  </complexType>
</element>

<element name="RefToMessageId" type="tns:non-empty-string"/>

<element name="Timestamp" type="dateTime"/>
</schema>
```

# Communications Protocol Bindings

## 1. Introduction

One of the goals of this specification is to design a message handling service usable over a variety of network and application level transport protocols. These protocols serve as the "carrier" of ebXML Messages and provide the underlying services necessary to carry out a complete ebXML Message exchange between two parties.

HTTP, FTP, Java Message Service (JMS) and SMTP are examples of application level transport protocols. TCP and SNA/LU6.2 are examples of network transport protocols. Transport protocols vary in their support for data content, processing behavior and error handling and reporting. For example, it is customary to send binary data in raw form over HTTP. However, in the case of SMTP it is customary to "encode" binary data into a 7-bit representation. HTTP is equally capable of carrying out synchronous or asynchronous message exchanges whereas it is likely that message exchanges occurring over SMTP will be asynchronous.

This section describes the technical details needed to implement this abstract ebXML Message Handling Service over particular transport protocols.

This section specifies communications protocol bindings and technical details for carrying ebXML Message Service messages for the following communications protocols:

- Hypertext Transfer Protocol [RFC 2616], in both asynchronous and synchronous forms of transfer.
- Simple Mail Transfer Protocol [RFC 2821], in asynchronous form of transfer only.
- File Transfer Protocol [RFC 949], in asynchronous form of transfer only.

## 2. HTTP

### 2.1. Minimum Level of HTTP Protocol

Hypertext Transfer Protocol Version 1.1 [RFC2616] is the minimum level of protocol that **MUST** be used.

### 2.2. Sending ebXML Service Messages over HTTP

Even though several HTTP request methods are available, this specification only defines the use of HTTP POST requests for sending ebXML Message Service messages over HTTP. The identity of the ebXML MSH (e.g. ebxmlhandler) may be part of the HTTP POST request:

POST /ebxmlhandler HTTP/1.1

Prior to sending over HTTP, an ebXML Message MUST be formatted according to ebXML Message Service Specification. Additionally, the messages MUST conform to the HTTP specific MIME canonical form constraints specified in section 19.4 of the [RFC 2616] specification.

HTTP protocol natively supports 8-bit and Binary data. Hence, transfer encoding is OPTIONAL for such parts in an ebXML Service Message prior to sending over HTTP. However, content-transfer-encoding of such parts (e.g. using base64 encoding scheme) is not precluded by this specification.

The rules for forming an HTTP message containing an ebXML Service Message are as follows:

- The Content-Type MIME header with the associated parameters, from the ebXML Service Message Envelope MUST appear as an HTTP header.
- All other MIME headers that constitute the ebXML Message Envelope MUST also become part of the HTTP header.
- The mandatory SOAPAction HTTP header field must also be included in the HTTP header and MAY have a value of "ebXML"

Further, it is recommended that sending MSHs act liberally in allowing the presence and/or absence of the SOAPAction header in synchronous responses, and that implementers refer to the SOAP 1.1 specifications for guidance.

- Other headers with semantics defined by MIME specifications, such as Content-Transfer-Encoding, SHALL NOT appear as HTTP headers. Specifically, the "MIME-Version: 1.0" header MUST NOT appear as an HTTP header. However, HTTP-specific MIME-like headers defined by HTTP 1.1 MAY be used with the semantic defined in the HTTP specification.
- All ebXML Service Message parts that follow the ebXML Message Envelope, including the MIME boundary string, constitute the HTTP entity body. This encompasses the SOAP Envelope and the constituent ebXML parts and attachments including the trailing MIME boundary strings.

The example below shows an example instance of an HTTP POST ebXML Service Message:

### Example B.1. HTTP POST Example

```
POST /servlet/ebXMLhandler HTTP/1.1
Host: www.example2.com
SOAPAction: "ebXML"
Content-type: multipart/related; boundary="Boundary"; type="text/xml";
  start="<ebxmhheader111@example.com>"

--Boundary
Content-ID: <ebxmhheader111@example.com>
Content-Type: text/xml

<?xml version="1.0" encoding="UTF-8"?>

<SOAP:Envelope xmlns:xlink="http://www.w3.org/1999/xlink"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:SOAP="http://schemas.xmlsoap.org/soap/envelope/"
  xmlns:eb="http://www.oasis-open.org/committees/ebxml-msg/schema/msg-header-2_0.xsd"
  xsi:schemaLocation="http://schemas.xmlsoap.org/soap/envelope/
http://www.oasis-open.org/committees/ebxml-msg/schema/envelope.xsd
http://www.oasis-open.org/committees/ebxml-msg/schema/msg-header-2_0.xsd
http://www.oasis-open.org/committees/ebxml-msg/schema/msg-header-2_0.xsd">
  <SOAP:Header>
    <eb:MessageHeader eb:id="..." eb:version="3.0" SOAP:mustUnderstand="1">
      <eb:From>
        <eb:PartyId>uri:example.com</eb:PartyId>
```

```

    <eb:Role>http://rosettanet.org/roles/Buyer</eb:Role>
  </eb:From>
  <eb:To>
    <eb:PartyId eb:type="someType">QRS543</eb:PartyId>
    <eb:Role>http://rosettanet.org/roles/Seller</eb:Role>
  </eb:To>
  <eb:CollaborationInfo>
    <eb:AgreementRef>http://www.oasis-open.org/cpa/123456</eb:AgreementRef>
    <eb:Service eb:type="myservicetypes">QuoteToCollect</eb:Service>
    <eb:Action>NewPurchaseOrder</eb:Action>
  </eb:CollaborationInfo>
  <eb:MessageInfo>
    <eb:MessageId>UUID-2@example.com</eb:MessageId>
    <eb:RefToMessageId>UUID-1@example.com</eb:RefToMessageId>
    <eb:ConversationId>987654321</eb:ConversationId>
    <eb:Timestamp>2000-07-25T12:19:05</eb:Timestamp>
  </eb:MessageInfo>
  <eb:PayloadInfo>
    <eb:Payload eb:id="..." eb:payloadRef="cid:ebxmlpayload111@example.com">
      <eb:Schema eb:location="http://foo/bar.xsd" eb:version="1.0"/>
      <eb:Description xml:lang="en-US">Purchase Order 1</eb:Description>
      <eb:Processing>
        <eb:Step eb:sequence="0" eb:id="urn:foo:ps:CompressionSvc">
          <eb:Parameter eb:name="command" eb:value="uncompress" />
          <eb:Parameter eb:name="algorithm" eb:value="gzip" />
        </eb:Step>
      </eb:PostProcessing>
    </eb:Payload>
  </eb:PayloadInfo>
</eb:MessageHeader>
</SOAP:Header>
<SOAP:Body/>
</SOAP:Envelope>

--Boundary
Content-ID: <ebxmlpayload111@example.com>
Content-Type: text/xml

<?xml version="1.0" encoding="UTF-8"?>
<purchase_order>
  <po_number>1</po_number>
  <part_number>123</part_number>
  <price currency="USD">500.00</price>
</purchase_order>

--Boundary--

```

## 2.3. HTTP Response Codes

In general, semantics of communicating over HTTP as specified in [RFC 2616] MUST be followed, for returning the HTTP level response codes. A 2xx code MUST be returned when the HTTP Posted message is successfully received by the receiving HTTP entity. However, see exception for SOAP error conditions below. Similarly, other HTTP codes in the 3xx, 4xx, 5xx range MAY be returned for conditions corresponding to them. However, error conditions encountered while processing an ebXML Service Message MUST be reported using the error mechanism defined by the ebXML Message Service Specification.

## 2.4. SOAP Error Conditions and Synchronous Exchanges

The SOAP 1.1 specification states:

"In case of a SOAP error while processing the request, the SOAP HTTP server MUST issue an HTTP 500 "Internal Server Error" response and include a SOAP message in the response containing a SOAP Fault element indicating the SOAP processing error. "

However, the scope of the SOAP 1.1 specification is limited to synchronous mode of message exchange over HTTP, whereas the ebXML Message Service Specification specifies both synchronous and asynchronous modes of message exchange over HTTP. Hence, the SOAP 1.1 specification MUST be followed for synchronous mode of message exchange, where the SOAP Message containing a SOAP Fault element indicating the SOAP processing error MUST be returned in the HTTP response with a response code of "HTTP 500 Internal Server Error". When asynchronous mode of message exchange is being used, a HTTP response code in the range 2xx MUST be returned when the message is received successfully and any error conditions (including SOAP errors)

must be returned via separate HTTP Post.

## 2.5. Synchronous vs. Asynchronous

When a synchronous transport is in use, the MSH response message(s) SHOULD be returned on the same HTTP connection as the inbound request, with an appropriate HTTP response code, as described above. When the syncReplyMode parameter is set to values other than none, the application response messages, if any, are also returned on the same HTTP connection as the inbound request, rather than using an independent HTTP Post request. If the syncReplyMode has a value of none, an HTTP response with a response code as defined in Section 2.3, "HTTP Response Codes" above and with an empty HTTP body MUST be returned in response to the HTTP POST.

## 2.6. Access Control

### 2.6.1. Basic & Digest Authentication

Implementers MAY protect their ebXML Message Service Handlers from unauthorized access through the use of an access control mechanism. The HTTP access authentication process described in "HTTP Authentication: Basic and Digest Access Authentication" [RFC 2617] defines the access control mechanisms allowed to protect an ebXML Message Service Handler from unauthorized access.

Implementers MAY support all of the access control schemes defined in [RFC 2617] including support of the Basic Authentication mechanism, as described in [RFC 2617] section 2, when Access Control is used.

Implementers that use basic authentication for access control SHOULD also use communications protocol level security, as specified in the section titled "Confidentiality and Transport Protocol Level Security" in this document.

### 2.6.2. SSL Client (Digital Certificate) Authentication

## 2.7. Confidentiality and Transport Protocol Level Security

An ebXML Message Service Handler MAY use transport layer encryption to protect the confidentiality of ebXML Messages and HTTP transport headers. The IETF Transport Layer Security specification TLS [RFC 2246] provides the specific technical details and list of allowable options, which may be used by ebXML Message Service Handlers. ebXML Message Service Handlers MUST be capable of operating in backwards compatibility mode with SSL [SSL3], as defined in Appendix E of TLS [RFC 2246].

ebXML Message Service Handlers MAY use any of the allowable encryption algorithms and key sizes specified within TLS [RFC 2246]. At a minimum ebXML Message Service Handlers MUST support the key sizes and algorithms necessary for backward compatibility with [SSL3].

The use of 40-bit encryption keys/algorithms is permitted, however it is RECOMMENDED that stronger encryption keys/algorithms SHOULD be used.

Both TLS [RFC 2246] and SSL [SSL3] require the use of server side digital certificates. Client side certificate based authentication is also permitted. All ebXML Message Service handlers MUST support hierarchical and peer-to-peer or direct-trust trust models.

## 3. SMTP

The Simple Mail Transfer Protocol (SMTP) [RFC 2821] specification is commonly referred to as Internet Electronic Mail. This specifications has been augmented over the years by other specifications, which define additional functionality "layered on top" of this baseline specifications. These include:

- Multipurpose Internet Mail Extensions (MIME) [RFC 2045], [RFC 2046], [RFC 2387].
- SMTP Service Extension for Authentication [RFC 2554].
- SMTP Service Extension for Secure SMTP over TLS [RFC 2487].

Typically, Internet Electronic Mail Implementations consist of two "agent" types:

*Message Transfer Agent (MTA)*: Programs that send and receive mail messages with other MTA's on behalf of MUA's. Microsoft Exchange Server, Postfix and Sendmail are all MTAs.

*Mail User Agent (MUA)*: Electronic Mail programs are used to construct electronic mail messages and communicate with an MTA to send/retrieve mail messages. Microsoft Outlook, Eudora and Evolution are all MUAs.

MTA's often serve as "mail hubs" and can typically service hundreds or more MUA's.

MUA's are responsible for constructing electronic mail messages in accordance with the Internet Electronic Mail Specifications identified above. This section describes the "binding" of an ebXML compliant message for transport via eMail from the perspective of a MUA. No attempt is made to define the binding of an ebXML Message exchange over SMTP from the standpoint of a MTA.

### 3.1. Minimum Level of Supported Protocols

- Simple Mail Transfer Protocol [RFC 2821]
- MIME [RFC2045] and [RFC 2046]
- Multipart/Related MIME [RFC 2387]

### 3.2. Sending ebXML Service Messages over SMTP

Prior to sending messages over SMTP an ebXML Message MUST be formatted according to the ebXML Message Service Specification. Additionally the messages must also conform to the syntax, format and encoding rules specified by MIME [RFC2045], [RFC2046] and [RFC2387].

Many types of data that a party might desire to transport via email are represented as 8bit characters or binary data. Such data cannot be transmitted over SMTP [RFC2821], which restricts mail messages to 7bit US-ASCII data with lines no longer than 1000 characters including any trailing CRLF line separator. If a sending Message Service Handler knows that a receiving MTA, or ANY intermediary MTA's, are restricted to handling 7-bit data then any document part that uses 8 bit (or binary) representation must be "transformed" according to the encoding rules specified in section 6 of MIME [RFC2045]. In cases where a Message Service Handler knows that a receiving MTA and ALL intermediary MTA's are capable of handling 8-bit data then no transformation is needed on any part of the ebXML Message.

The rules for forming an ebXML Message for transport via SMTP are as follows:

- If using SMTP [RFC2821] restricted transport paths, apply transfer encoding to all 8-bit data that will be transported in an ebXML message, according to the encoding rules defined in section 6 of MIME [RFC2045]. The Content-Transfer-Encoding MIME header MUST be included in the MIME envelope portion of any body part that has been transformed (encoded).
- The Content-Type MIME header with the associated parameters, from the ebXML Message Envelope MUST appear as an eMail MIME header.
- All other MIME headers that constitute the ebXML Message Envelope MUST also become part of the eMail MIME header.
- The SOAPAction MIME header field must also be included in the eMail MIME header and MAY have the value of ebXML:

SOAPAction: "ebXML"

- The "MIME-Version: 1.0" header must appear as an eMail MIME header.
- The eMail header "To:" MUST contain the SMTP [RFC2821] compliant eMail address of the ebXML Message Service Handler.

- The eMail header "From:" MUST contain the SMTP [RFC2821] compliant eMail address of the senders ebXML Message Service Handler.
- Construct a "Date:" eMail header in accordance with SMTP [RFC2821]
- Other headers MAY occur within the eMail message header in accordance with SMTP [RFC2821] and MIME [RFC2045], however ebXML Message Service Handlers MAY choose to ignore them.

The example below shows a minimal example of an eMail message containing an ebXML Message:

```

From: ebXMLhandler@example.com
To: ebXMLhandler@example2.com
Date: Thu, 08 Feb 2001 19:32:11 CST
MIME-Version: 1.0
SOAPAction: "ebXML"
Content-type: multipart/related; boundary="BoundaryY"; type="text/xml";
      start="<ebxhmheader111@example.com>"

      This is an ebXML SMTP Example

--BoundaryY
Content-ID: <ebxhmheader111@example.com>
Content-Type: text/xml

<?xml version="1.0" encoding="UTF-8"?>

<SOAP:Envelope xmlns:xlink="http://www.w3.org/1999/xlink"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:SOAP="http://schemas.xmlsoap.org/soap/envelope/"
  xmlns:eb="http://www.oasis-open.org/committees/ebxml-msg/schema/msg-header-2_0.xsd"
  xsi:schemaLocation="http://schemas.xmlsoap.org/soap/envelope/
    http://www.oasis-open.org/committees/ebxml-msg/schema/envelope.xsd
    http://www.oasis-open.org/committees/ebxml-msg/schema/msg-header-2_0.xsd
    http://www.oasis-open.org/committees/ebxml-msg/schema/msg-header-2_0.xsd">
  <SOAP:Header>
    <eb:MessageHeader eb:id="..." eb:version="3.0" SOAP:mustUnderstand="1">
      <eb:From>
        <eb:PartyId>uri:example.com</eb:PartyId>
        <eb:Role>http://rosettanet.org/roles/Buyer</eb:Role>
      </eb:From>
      <eb:To>
        <eb:PartyId eb:type="someType">QRS543</eb:PartyId>
        <eb:Role>http://rosettanet.org/roles/Seller</eb:Role>
      </eb:To>
      <eb:CollaborationInfo>
        <eb:AgreementRef>http://www.oasis-open.org/cpa/123456</eb:AgreementRef>
        <eb:Service eb:type="myservicetypes">QuoteToCollect</eb:Service>
        <eb:Action>NewPurchaseOrder</eb:Action>
      </eb:CollaborationInfo>
      <eb:MessageInfo>
        <eb:MessageId>UUID-2@example.com</eb:MessageId>
        <eb:RefToMessageId>UUID-1@example.com</eb:RefToMessageId>
        <eb:ConversationId>987654321</eb:ConversationId>
        <eb:Timestamp>2000-07-25T12:19:05</eb:Timestamp>
      </eb:MessageInfo>
      <eb:PayloadInfo>
        <eb:Payload eb:id="..." eb:payloadRef="cid:ebxmlpayload111@example.com">
          <eb:Schema eb:location="http://foo/bar.xsd" eb:version="1.0"/>
          <eb:Description xml:lang="en-US">Purchase Order 1</eb:Description>
          <eb:Processing>
            <eb:Step eb:sequence="0" eb:id="urn:foo:ps:CompressionSvc">
              <eb:Parameter eb:name="command" eb:value="uncompress" />
              <eb:Parameter eb:name="algorithm" eb:value="gzip" />
            </eb:Step>
          </eb:PostProcessing>
          <eb:Payload>
            <purchase_order>
              <po_number>1</po_number>

```

```
<part_number>123</part_number>
<price currency="USD">500.00</price>
</purchase_order>
--Boundary--
```

### 3.3. Response Messages

All ebXML response messages, including errors and acknowledgments, are delivered asynchronously between ebXML Message Service Handlers.

All ebXML Message Service Handlers **MUST** be capable of receiving a delivery failure notification message sent by an MTA. A MSH that receives a delivery failure notification message **SHOULD** examine the message to determine which ebXML message, sent by the MSH, resulted in a message delivery failure. The MSH **SHOULD** attempt to identify the application responsible for sending the offending message causing the failure. The MSH **SHOULD** attempt to notify the application that a message delivery failure has occurred. If the MSH is unable to determine the source of the offending message the MSH administrator should be notified.

MSH's which cannot identify a received message as a valid ebXML message or a message delivery failure **SHOULD** retain the unidentified message in a "dead letter" folder.

A MSH **SHOULD** place an entry in an audit log indicating the disposition of each received message.

### 3.4. Access Control

Implementers **MAY** protect their ebXML Message Service Handlers from unauthorized access through the use of an access control mechanism. The SMTP access authentication process described in "SMTP Service Extension for Authentication" [RFC2554] defines the ebXML recommended access control mechanism to protect a SMTP based ebXML Message Service Handler from unauthorized access.

### 3.5. Confidentiality and Transport Protocol Level Security

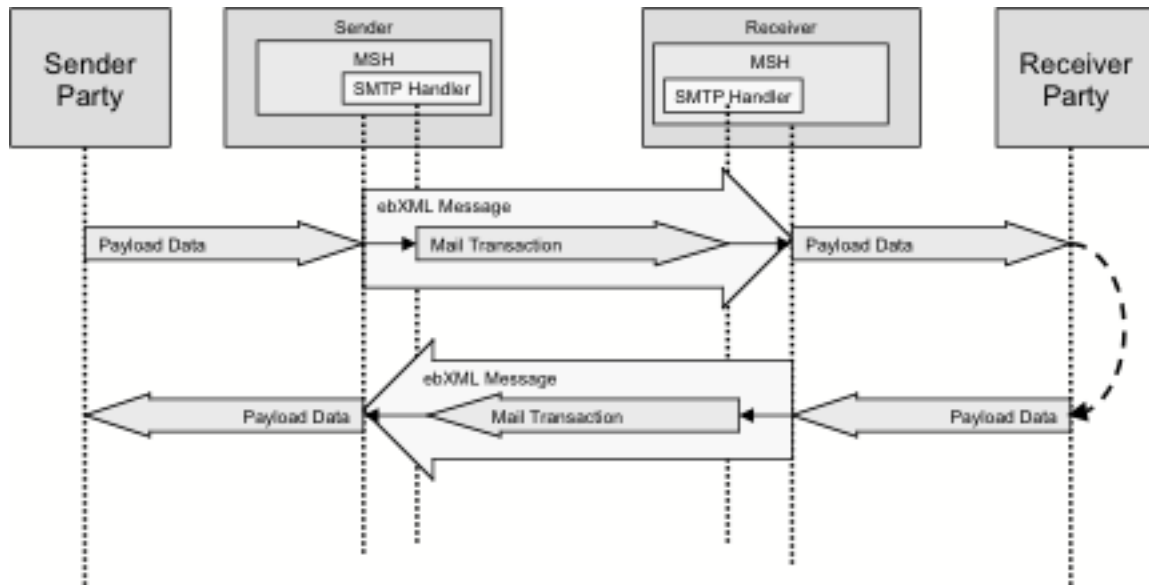
An ebXML Message Service Handler **MAY** use transport layer encryption to protect the confidentiality of ebXML messages. The IETF "SMTP Service Extension for Secure SMTP over TLS" specification [RFC2487] provides the specific technical details and list of allowable options, which may be used.

### 3.6. SMTP Model

All ebXML Message Service messages carried as mail in an SMTP [RFC2821] Mail Transaction:

#### Figure B.1. SMTP Model





### 3.7. Communication Errors during Reliable Messaging

When the Sender or the Receiver detects a communications protocol level error (such as an HTTP, SMTP or FTP error) and Reliable Messaging is being used then the appropriate transport recovery handler will execute a recovery sequence. Only if the error is unrecoverable, does Reliable Messaging recovery take place.

*Jeff: Please make sure this jives with new RM.*

## 4. FTP

This section defines the File Transfer Protocol binding for ebXML Messaging.

### 4.1. Minimum Level of Supported Protocols

Implementations of the ebXML Messaging FTP transport binding MUST conform with [RFC 949].

### 4.2. Sending ebXML Service Messages over FTP

Message transmission via FTP is accomplished by having the sender connect to the recipient's FTP server, and uploading the message contents into a file located in the FTP server's root directory, named thusly: <message id>.ebms.

Messages MAY be placed in a directory other than the root directory of the FTP filesystem depending on values defined in the CPA.

*TODO: Dale, how's this work?*

The example below illustrates a probably command sequence for transferring an ebXML Message using FTP.

#### Example B.2. Sample FTP Session

```
Connected to ftp.partner.com.
220 ebMS-FTP Server (ftp.partner.com FTP) [ftp]
Name (ftp.partner.com:anonymous): anonymous
331 Password required for anonymous.
Password:
230 User anonymous logged in.
Remote system type is UNIX.
Using binary mode to transfer files.
ftp> cdup
250 CDUP command successful.
ftp> put message@id.ebms
```

```
local: message@id.ebms remote: message@id.ebms
502 Command not implemented.
227 Entering Passive Mode (10,36,3,5,67,144)
150 File status okay; about to open data connection.
100% |*****
226 Transfer complete, closing data connection.
10 bytes sent in 00:00 (0.13 KB/s)
ftp> bye
221 Service closing control connection.
```

### 4.3. Response Messages

Since FTP is designed for one way file transfer sessions, all response and error messages will be returned asynchronously via the transport that is configured in the CPA. Transmission and FTP protocol level errors will, however, be handled as specified in [RFC 959].

### 4.4. Access Control Considerations

If the CPA defines access control settings (username and password), that information **MUST** be used to perform the login operation at the start of the FTP session. Otherwise, username anonymous should be used with the password set as the same value as the From header field of the ebXML Service Message.

### 4.5. Confidentiality and Transport Protocol Level Security.

Security extensions to FTP such as those defined by RFC 2228 (Security Extensions for FTP) have not been widely adopted by vendors of FTP software. To achieve confidentiality during message transmission, it is recommended that security be enforced at a higher level, possibly via a VPN connection or SSL tunnel. These approaches to confidentiality can be setup so as to be completely transparent to the message service handler.

## Supported Security Services

## Relationship to WSDL

## WS-I Compliance

## Notices

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## Revision History

### Revision History

Revision 01	5 May 2004	mm
Create outline, document structure, added payload services.		
Revision 01-1	14 May 2004	mm
Moved content over from 2.0/2.1 document source.		
Revision 02	1 Oct 2004	mm
Integrated Reliable messaging, many editorial changes also.		

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### Normative

*NOTE: Most of these references are not correct, and are just placeholders.*

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