Abstract:
Mappings from DSS messages into standard communication protocols are called DSS bindings. A transport binding specifies how DSS messages are encoded and carried using a transport protocol. The DSS Core standard [DSS Core] specifies two transport bindings. This document specifies an alternative transport binding that uses the OASIS ebXML Messaging Service. This profile supports is compatible with both the version 2.0 [ebMS 2.0] and version 3.0 [ebMS 3.0] ebXML Messaging OASIS standards.
Status:

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1 Introduction

Mappings from Digital Signature Services (DSS) messages into standard communication protocols are called DSS bindings. A transport binding specifies how DSS messages are encoded and carried using a transport protocol. The DSS 1.0 Core standard [DSS Core] specifies two transport bindings. This document specifies an alternative transport binding that uses the OASIS ebXML Messaging Service. This profile supports either version 2.0 [ebMS 2.0] or version 3.0 [ebMS 3.0].

1.1 Benefits and intended use

The benefits of a DSS transport binding for ebXML Messaging include the following:

- An application area for DSS is to sign electronic business documents, such as electronic invoices and order documents. The ebXML Messaging service is designed to support electronic business. This profile allows user communities that use ebXML messaging to exchange electronic business documents to use the same message transport protocol to interface with DSS service providers.
- ebXML Messaging supports asynchronous messaging, using elements in the ebXML business document header to correlate requests and asynchronous responses. It therefore naturally supports use cases of DSS that require, or benefit from, an asynchronous messaging capability, where a signature may not be returned until hours after it was requested.
- ebXML Messaging includes functionality for reliable messaging. It therefore provides a more robust message channel between DSS clients and servers, which facilitates the use of DSS in automated workflows.

1.2 Scope

There are currently two versions of the ebXML Message Service specification, which are very similar from a user functionality perspective but are not interoperable. For the purpose of this profile, the differences between these two versions are unimportant as the relevant ebXML message header elements affected by this profile have similar syntax and identical semantics. This profile therefore defines how to use either version 2.0 [ebMS 2.0] or version 3.0 [ebMS 3.0] of the ebXML Messaging Service as transport protocol for DSS messages.

Unlike other DSS profiles that constrain or extend the DSS XML messages to support particular uses of DSS, this profile is limited to being a transport binding. It does not constrain or extend the use of DSS itself. It is therefore compatible, and can be used in conjunction with, other profiles that are defined for particular business uses of DSS.

1.3 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].

1.4 Namespaces

This following table lists the namespaces referenced in this specification.

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Namespace</th>
<th>Specification(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>cpa2</td>
<td><a href="http://www.oasis-open.org/committees/ebxml-cppa/schema/cpp-cpa-2_0.xsd">http://www.oasis-open.org/committees/ebxml-cppa/schema/cpp-cpa-2_0.xsd</a></td>
<td>[ebCPA 2.0]</td>
</tr>
</tbody>
</table>
In the context of this profile, the differences between version 2.0 and version 3.0 of ebXML Messaging are limited. The generic prefix `eb` will be used to refer to either version in situations where elements are used that have the same syntax and semantics in both versions:

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Namespace</th>
<th>Specification(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>eb</td>
<td><a href="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</a> or <a href="http://docs.oasis-open.org/ebxml-msg/ebms/v3.0/ns/core/200704/">http://docs.oasis-open.org/ebxml-msg/ebms/v3.0/ns/core/200704/</a></td>
<td>[ebMS 2.0] or [ebMS 3.0]</td>
</tr>
</tbody>
</table>

### 1.5 Normative References


1.6 Non-Normative References


2 Exchanging DSS Messages using the ebXML Messaging Service

This profile specifies how the ebXML messaging service can be used to transport DSS messages. Section 2.1 defines DSS message exchanges and describes how these map to ebXML message exchanges. The profile constrains the use of various elements in the ebXML message header (section 2.2) and defines how DSS XML messages and documents that are transmitted along with these messages are packaged into ebXML messages (section 2.3).

2.1 DSS message exchanges

The DSS protocol defines two two-way message exchanges involving four DSS XML messages.

- A signature generation message exchange. A DSS client can send a message to invoke a SignRequest action on a DSS server. The DSS server responds by returning a SignResponse DSS response message.
- A signature verification message exchange. A DSS client can send a message to invoke a VerifyRequest action on a DSS server. The DSS server responds by returning a VerifyResponse DSS response message.

Depending on bilaterally agreed bindings, this profile allows these message exchanges to be executed either as a single synchronous ebXML SOAP request-response interaction, or asynchronously as two separate ebXML SOAP one way messages.

2.1.1 Element <MessageId> and <RefToMessageId>

The elements <eb:MessageId> and <eb:RefToMessageId> in the ebXML header are used to correlate ebXML request and response message. In an ebXML message containing a DSS response document, the value of <eb:RefToMessageId> MUST be set to the value of the <eb:MessageId> element of the ebXML message that contained the corresponding DSS request document.

At the level of DSS XML messages, correlation of DSS requests and response can be expressed by using the optional attribute @RequestID on the <dss:SignRequest>, <dss:SignResponse>, <dss:VerifyRequest> and <dss:VerifyResponse> XML elements. If this attribute is set on a <dss:SignRequest> or a <dss:VerifyRequest> DSS message, the DSS server MUST return it in the response <dss:SignResponse> or <dss:VerifyResponse> DSS documents, respectively.

If a DSS server receives an ebXML message containing a DSS request and subsequently sends back an ebXML message containing a DSS response, and if both DSS messages have the @RequestID set, then the value of these attributes MUST be the same and the value of the ebXML element <eb:MessageId> in the ebXML response message MUST be identical to the value of the element <eb:MessageId> in the ebXML request message. The actual value of the @RequestID attribute in a DSS XML request document does not have to be the same as the value of the <eb:MessageId> element. The type of the @RequestID attribute is xs:string, whereas the value of the <eb:MessageId> element MUST match the msg-id production defined in [RFC 2822] and therefore MUST contain the "@" character.

2.1.2 Element <ConversationId>

The element <eb:ConversationId> in the ebXML business document header identifies the (possibly long-running) conversation that a particular message takes part in. Conversations may span multiple one way or two way ebXML message exchanges. The value of <eb:ConversationId> in a sign request message and in the corresponding sign response message MUST be the same. Similarly, the value of
2.2 Other Header Elements

The ebXML messaging service provides a general purpose business document header that contains ebXML extension elements. This profile constrains the values for some of these values.

2.2.1 Service

The value of the ebXML <eb:Service> element MUST have the fixed value urn:oasis:names:tc:dss:1.0.

2.2.2 Action

The value of the ebXML <eb:Action> element MUST have one of the following four fixed values:

- SignRequest
- SignResponse
- VerifyRequest
- VerifyResponse

Each of these values corresponds to the four DSS message types. An ebXML message conforming to this profile MUST have the value SignRequest (or SignResponse, VerifyRequest, VerifyResponse, respectively) for the <eb:Action> ebXML header element if, and only if, the business document transmitted using the message is a valid DSS XML document that has the root element <dss:SignRequest> (or <dss:SignResponse>, <dss:VerifyRequest>, <dss:VerifyResponse>, respectively).

2.2.3 Role

The value of the ebXML <eb:Role> element MUST have one of the following values:

- DSSClient for the DSS client partner
- DSSServer for the DSS server partner

2.3 Packaging

The ebXML message service is based on SOAP and MIME enveloping and provides a number of ebXML extension elements. The packaging differs due to the differences in message structure in versions 2.0 and 3.0 of ebXML Messaging.

DSS Core [DSS Core] itself also provides mechanisms to either include business documents in the DSS XML structure or reference business documents in a MIME structure. The following example shows a <dss:Document> element containing a PDF business document included in the DSS XML in base64 encoded form. The structure then has a format like:

```
<dss:Document ID="doc1">
  <dss:Base64Data MimeType="application/pdf"> ... </dss:Base64Data>
</dss:Document>
```

Alternatively, DSS also allows documents to be transported in attachments and referenced from a <dss:AttachmentReference> element, which is similar to the ebXML extension elements <eb2:Manifest> and <eb3:PayloadInfo>.

2.3.1 Packaging in ebXML Messaging version 2.0

Version 2.0 of ebXML Messaging [ebMS 2.0] is based on SOAP 1.1 [SOAP 1.1] and provides extension elements from the eb2: namespace to both the SOAP header and SOAP body. Version 2.0 is also based
on the SOAP with attachments specification [SOAPATTACH]. The SOAP 1.1 envelope, including ebXML version 2.0 extension elements, is transported as the first part of a MIME envelope. Any business documents transported in a version 2.0 ebXML message are not contained in the SOAP envelope, but rather included in separate MIME parts. These documents are referenced from the SOAP envelope using an ebXML `<eb2:Manifest>` extension element. A version 2.0 ebXML message that carries n business documents therefore always consists of n+1 MIME parts. This is shown in Figure 1 ebXML Messaging version 2 message structure, from [ebMS 2.0].

![Figure 1 ebXML Messaging version 2 message structure](image)

When a DSS message is transported with version 2.0 of ebXML messaging, the message MIME envelope MUST contain at least two MIME parts: a first part containing a SOAP 1.1 envelope including ebXML version 2.0 extension elements and a second part containing a DSS XML document. If the document(s) referenced from the DSS message are not included in the DSS XML document, they are packaged in a third or subsequent MIME part. The following diagram illustrates this enveloping. It contains an attached PDF document which is referenced from a DSS XML document, which itself is referenced from the ebXML manifest.
2.3.2 Packaging in ebXML Messaging version 3.0

Version 3.0 of ebXML messaging can use either SOAP 1.1 [SOAP 1.1] or SOAP 1.2 [SOAP 1.2]. It provides a number of elements from the eb3: namespace included in an <eb3:Messaging> structure, included in the SOAP header. Any business documents transported in a version 3.0 ebXML message can be contained in the SOAP body, or contained in separate MIME parts, when using SOAP with attachments. These business documents are referenced from the SOAP envelope using an ebXML <eb3:PayloadInfo> extension element structure that has a similar function to the <eb2:Manifest> element. The use of SOAP with attachments is optional with version 3.0 of ebXML Messaging, and only needed in situations when the business document is not contained in the SOAP body. This is shown in Figure 3 ebXML Messaging version 3.0 message structure, from [ebMS 3.0].
When a DSS message is transported with version 3.0 of ebXML messaging, it can be included as the second MIME part as in version 2.0. An alternative packaging option is for the DSS XML document to be included in the SOAP body. If any documents referenced from the DSS document are base64 included in the DSS XML structure, there is no need to use a SOAP with attachments MIME envelope as all data can be included in the SOAP envelope.
3 Security Binding

This profile is based on the security bindings defined in section 6 of the DSS Core specification [DSS Core]. Specifically, the ebXML message exchange between the DSS client and DSS server SHOULD use TLS 1.0 [RFC 2246] to provide message confidentiality, integrity and authentication.

Note: Although at the time of writing this profile TLS 1.0 is an obsoleted standard, which is superseded by TLS 1.1 [RFC 4346], it is still used as normative reference to keep it aligned with the DSS Core specification [DSS Core].

The DSS Core protocol defines a mechanism to carry data authenticating the claimed identity of the entity on whose behalf the DSS services are invoked, such as the use of SAML tokens. The use of such additional security mechanisms is out of the scope for this transport binding profile, but may be required by profiles that use this transport binding for particular DSS applications.
4 Conformance

Any implementation of this profile is not conformant with this specification if it fails to satisfy one or more of the MUST or REQUIRED level requirements defined in this specification.

An implementation of this profile provides DSS client functionality, DSS server functionality, or both DSS client and DSS server functionality.

An implementation of this profile provides support for either version 2.0 or 3.0 of the OASIS ebXML Messaging Service specification, or supports both.

Any implementation of this profile SHOULD support the DSS security binding described in section 3.

4.1 Conformance as a DSS Client using ebMS 2.0

An implementation of this profile conforms to this profile as a DSS Client using ebMS 2.0 if it meets the following requirements:

• Supports sending of SignRequest signature generation request messages and VerifyRequest signature verification request messages with syntax and semantics defined in section 2 of this specification.

• Supports receiving of SignResponse signature generation response messages and VerifyResponse signature verification response message with syntax and semantics defined in section 2 of this specification.

• Supports version 2.0 of the ebXML Messaging Service version 2.0 OASIS Standard [ebMS 2.0].

4.2 Conformance as a DSS Server using ebMS 2.0

An implementation of this profile conforms to this profile as a DSS Server using ebMS 2.0 if it meets the following requirements:

• Supports receiving of SignRequest signature generation messages and VerifyRequest signature verification messages with syntax and semantics defined in section 2 of this specification.

• Supports sending of SignResponse signature generation messages and VerifyResponse signature verification messages with syntax and semantics defined in section 2 of this specification.

• Supports version 2.0 of the ebXML Messaging Service version 2.0 OASIS Standard [ebMS 2.0].

4.3 Conformance as a DSS Client using ebMS 3.0

The conformance requirements for a DSS Client using ebMS 3.0 are the same as for a DSS Client using ebMS 2.0, except that it support version 3.0 of the ebXML Messaging Service version 3.0 OASIS Standard [ebMS 3.0] instead of version 2.0 [ebMS 2.0].

4.4 Conformance as a DSS Server using ebMS 3.0

The conformance requirements for a DSS Server using ebMS 3.0 are the same as for a DSS Server using ebMS 2.0, except that it support version 3.0 of the ebXML Messaging Service version 3.0 OASIS Standard [ebMS 3.0] instead of version 2.0 [ebMS 2.0].
A. Sample ebXML Messaging 2.0 SOAP envelopes

This non-normative appendix contains sample SOAP envelopes with version 2.0 ebXML extension elements that reference a DSS <SignRequest> message (section A.1) and the response ebXML message containing the DSS <SignResponse> message (section A.2). The enveloping MIME structures and the DSS messages are omitted.

A.1 Sample SOAP envelope for DSS SignRequest message

```xml
<?xml version="1.0" encoding="UTF-8"?>
<envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xlink="http://www.w3.org/1999/xlink"
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/envelope.xsd">
  <Header xmlns:eb="http://www.oasis-open.org/committees/ebxml-msg/schema/msg-header-2_0.xsd"
xsi:schemaLocation="http://www.oasis-open.org/committees/ebxml-msg/schema/msg-header-2_0.xsd">
    <MessageHeader eb:id="ID18890041183727249323localhost"
        eb:version="2.0"
        xsi:mustUnderstand="1">
      <From>
        <PartyId eb:type="urn:oasis:names:tc:ebxml-cppa:partyid-type:0088">1234567890123</PartyId>
        <Role>DSSClient</Role>
      </From>
      <To>
        <PartyId eb:type="urn:oasis:names:tc:ebxml-cppa:partyid-type:0088">3210987654321</PartyId>
        <Role>DSSServer</Role>
      </To>
      <CPAId>CPAID_3210987654321_1234567890123_0001</CPAId>
      <ConversationId>89612fb6-08ba-49c6-aff2-8ddf81988495</ConversationId>
      <Service>urn:oasis:names:tc:dss:1.0</Service>
      <Action>SignRequest</Action>
      <MessageData>
        <MessageId>d8afbc35-2bc1-11dc-8605-000c29eb4f66@localhost.localdomain</MessageId>
        <Timestamp>2007-07-06T13:07:29.314Z</Timestamp>
      </MessageData>
      <DuplicateElimination/>
    </MessageHeader>
  </Header>
  <Body xmlns:eb="http://www.oasis-open.org/committees/ebxml-msg/schema/msg-header-2_0.xsd">
    <MessageHeader eb:id="ID137206991183727249317localhost"
        eb:version="2.0"
        xsi:actor="urn:oasis:names:tc:ebxml-msg:actor:toPartyMSH"
        xsi:mustUnderstand="1">
      <From>
        <PartyId eb:type="urn:oasis:names:tc:ebxml-cppa:partyid-type:0088">1234567890123</PartyId>
        <Role>DSSClient</Role>
      </From>
      <To>
        <PartyId eb:type="urn:oasis:names:tc:ebxml-cppa:partyid-type:0088">3210987654321</PartyId>
        <Role>DSSServer</Role>
      </To>
      < CPAId>CPAID_3210987654321_1234567890123_0001</ CPAId>
      <ConversationId>89612fb6-08ba-49c6-aff2-8ddf81988495</ ConversationId>
      <Service>urn:oasis:names:tc:dss:1.0</Service>
      <Action>SignRequest</Action>
      <MessageData>
        <MessageId>d8afbc35-2bc1-11dc-8605-000c29eb4f66@localhost.localdomain</MessageId>
        <Timestamp>2007-07-06T13:07:29.314Z</Timestamp>
      </MessageData>
      <DuplicateElimination/>
    </MessageHeader>
  </Body>
</envelope>
```
A.2 Sample SOAP envelope for DSS SignResponse message

```xml
<?xml version="1.0" encoding="UTF-8"?>
<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/"
    xmlns:xlink="http://www.w3.org/1999/xlink"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    <soap:Header xmlns:eb="http://www.oasis-open.org/committees/ebxml-msg/schema/msg-header-2_0.xsd"
        <eb:MessageHeader eb:id="ID283962961183731565500Vega" eb:version="2.0"
            s11:mustUnderstand="1">
            <eb:From>
                <eb:PartyId eb:type="urn:oasis:names:tc:ebxml-cppa:partyid-type:0088">3210987654321</eb:PartyId>
                <eb:Role>DSSServer</eb:Role>
            </eb:From>
            <eb:To>
                <eb:PartyId eb:type="urn:oasis:names:tc:ebxml-cppa:partyid-type:0088">1234567890123</eb:PartyId>
                <eb:Role>DSSClient</eb:Role>
            </eb:To>
            <eb:CPAId>CPAID_3210987654321_1234567890123_0001</eb:CPAId>
            <eb:ConversationId>89612fb6-08ba-49c6-aff2-8ddf81988495</eb:ConversationId>
            <eb:Service>urn:oasis:names:tc:dss:1.0</eb:Service>
            <eb:Action>SignResponse</eb:Action>
            <eb:MessageData>
                <eb:MessageId>M1183731565500.20294@vega_cn6692455690889293175</eb:MessageId>
                <eb:Timestamp>2007-07-06T14:19:25.500Z</eb:Timestamp>
                <eb:RefToMessageId>d8afbc35-2bc1-11dc-8605-000c29eb4f68@localhost.localdomain</eb:RefToMessageId>
            </eb:MessageData>
            <eb:DuplicateElimination/>
            <eb:AckRequested eb:id="ID187545611183731565500Vega" eb:signed="false"
                eb:version="2.0" s11:actor="urn:oasis:names:tc:ebxml-msg:actor:toPartyMSH" s11:mustUnderstand="1"/>
        </eb:MessageHeader>
    </soap:Header>
    <soap:Body xmlns:eb="http://www.oasis-open.org/committees/ebxml-msg/schema/msg-header-2_0.xsd"
        <eb:Manifest eb:id="ID118631211183731565500Vega" eb:version="2.0">
            <eb:Reference eb:id="ID6765681183731565500Vega" xlink:href="cid:A1183731565500.20296@vega_cn" xlink:type="simple"/>
        </eb:Manifest>
    </soap:Body>
</soap:Envelope>
```
B. Sample Collaboration Protocol Agreement

The OASIS ebXML Collaboration Protocol Profiles and Agreements version 2.0 technical specification [ebCPA 2.0] is an OASIS standard that defines an XML language to encode and exchange the technical configuration parameters used to exchange ebXML version 2.0 messages. Implementations of ebXML messaging may use CPAs to configure ebXML message handlers.

The following non-normative sample CPA defines the agreement between the sample DSS client and server used to create the sample messages displayed in section A. The certificate details have been omitted to simplify the example.

```xml
<?xml version="1.0" encoding="UTF-8"?>
xmlns:cpa2="http://www.oasis-open.org/committees/ebxml-cppa/schema/cpp-cpa-2_0.xsd"
xsl:schemaLocation="http://www.oasis-open.org/committees/ebxml-cppa/schema/cpp-cpa-2_0.xsd"
http://www.oasis-open.org/committees/ebxml-cppa/schema/cpp-cpa-2_0.xsd"
cpa2:cpaid="CPAID_3210987654321_1234567890123_0001" cpa2:version="1.0">
<cpa2:Status cpa2:value="agreed"/>
<cpa2:Start>2007-06-12T00:00:00Z</cpa2:Start>
<cpa2:End>2008-06-12T00:00:00Z</cpa2:End>
<cpa2:PartyInfo cpa2:partyName="Company X"
cpa2:defaultMshChannelId="Client_defaultDeliveryChannel_ProfileReliableMessaging"
cpa2:defaultMshPackageId="defaultPackage_Profile">
</cpa2:PartyInfo>
<cpa2:CollaborationRole>
<cpa2:ProcessSpecification cpa2:name="Digital Signature Services" cpa2:version="0.1"
xlink:href="http://docs.oasis-open.org/dss/v1.0/"
cpa2:uuid="http://docs.oasis-open.org/dss/v1.0/"/>
<cpa2:Role cpa2:name="DSSClient" xlink:href="http://docs.oasis-open.org/dss/v1.0/"/>
<cpa2:ServiceBinding>
<cpa2:Service>urn:oasis:names:tc:dss:1.0</cpa2:Service>
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### C. Revision History

[optional; should not be included in OASIS Standards]

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<th>Revision</th>
<th>Date</th>
<th>Editor</th>
<th>Changes Made</th>
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<td>0.1</td>
<td>2007-11-16</td>
<td>Pim van der Eijk, Ernst Jan van Nigtevecht</td>
<td>Initial Draft.</td>
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<tr>
<td>0.2</td>
<td>2008-02-18</td>
<td>Pim van der Eijk</td>
<td>Updated and restructured based on review by Juan Carlos Cruellas</td>
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<tr>
<td>0.3</td>
<td>2008-04-14</td>
<td>Pim van der Eijk, TC Chairs</td>
<td>Edits to reflect Committee Draft status</td>
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<tr>
<td>0.4</td>
<td>2008-04-27</td>
<td>Stefan Drees</td>
<td>Minor edits in normative references (obsoleted RFC, SOAP and applying bibliographic style)</td>
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<tr>
<td>0.5</td>
<td>2008-04-28</td>
<td>Stefan Drees</td>
<td>Added a note on referencing obsoleted or historical standards as alignment to dss core.</td>
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<td>0.6</td>
<td>2008-05-09</td>
<td>Pim van der Eijk</td>
<td>Feedback from OASIS TC admin; conformance section added.</td>
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<tr>
<td>0.7</td>
<td>2008-05-26</td>
<td>Stefan Drees</td>
<td>Minor edits, normative version set to PDF and added normative indicator to latest version section.</td>
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