Specification

OpenPEPPOL AISBL

Peppol Transport Infrastructure
ICT - Models

Service Metadata Publishing (SMP)

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1.2.0	2021-02-24	Updated the references Improved layout Explicitly allowing Content-Type "application/xml" as it is equivalent to "text/xml" (chapter 5.1) Removing the requirement that the encoding attribute value is case sensitive (chapter 5.2) Change "is not" to "MUST NOT" in chapter 5.5 Replaced the references to the BusDox Common Definition document (BDEN-CEDF) Added clarifications on ServiceActivationDate and ServiceExpirationDate Linking peppol-smp-types-v1.xsd in the Appendix Fixed a typo in the name of the transformation Changed the Canonicalization Algorithm from "Exclusive" to "Inclusive"	Philip Helger, OpenPEPPOL OO

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Table of contents

1   1 Introduction

2 **1.1 Objective**

3 This document describes the REST (Representational State Transfer) interface for Service Metadata
4 Publication within the Business Document Exchange Network (BUSDOX). It describes the
5 request/response exchanges between a Service Metadata Publisher and a client wishing to discover
6 endpoint information. A client could be an end-user business application or an Access Point. It also
7 defines the request processing that must happen at the client.

8 **1.2 Scope**

9 This specification relates to the Technical Transport Layer i.e. BusDox specifications. The BusDox
10 specifications can be used in many interoperability settings. In the Peppol context, it provides
11 transport for procurement documents as specified in the Peppol Profiles.

12
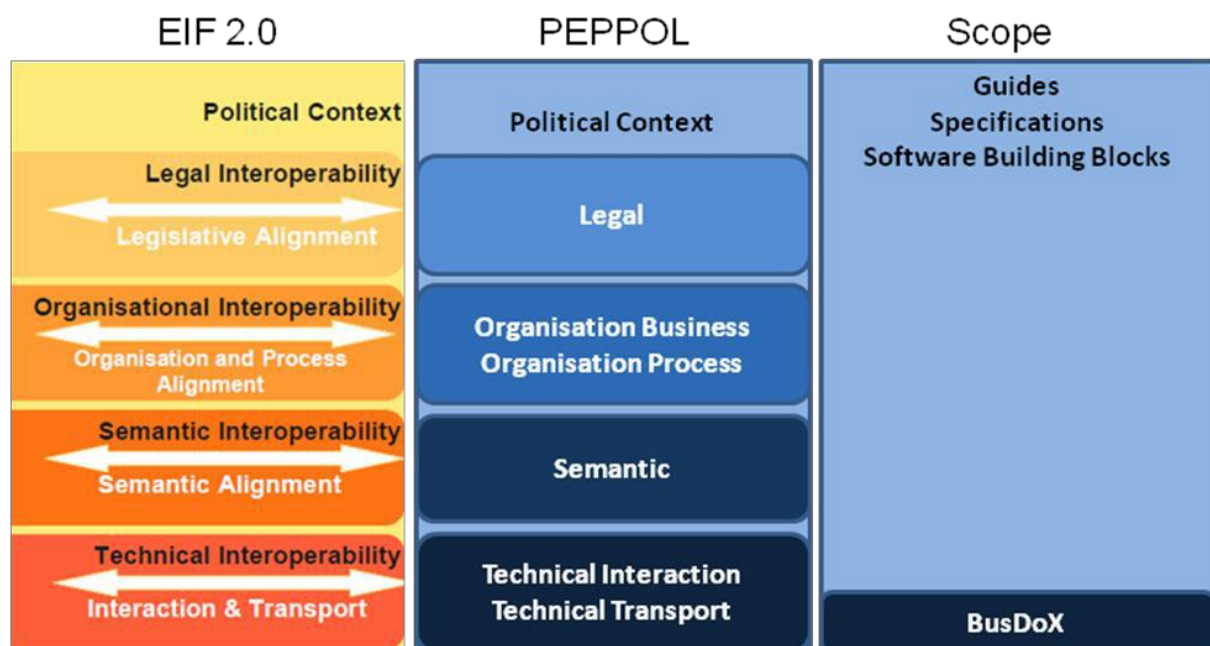
13   **Fig. 1: Peppol Interoperability**

14 **1.3 Goals and non-goals**

15 The goal of this document is to define the REST lookup interface that Service Metadata Publishers
16 ("SMP") and clients must support. Decisions regarding physical data format and management
17 interfaces are left to implementers of such a service.

18 Service Metadata Publishers may be subject to additional constraints of agreements and governance
19 frameworks within instances of the BUSDOX infrastructure not covered in this specification, which
20 only addresses the technical interface of such a service.

21 **1.4 Terminology**

22 The keywords "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD
23 NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as
24 described in RFC 2119 [RFC2119].

25 **1.4.1 Notational conventions**

26 Pseudo-schemas are provided for each component, before the description of the component. They
27 use BNF-style conventions for attributes and elements: "?" denotes optionality (i.e. zero or one
28 occurrences), "*" denotes zero or more occurrences, "+" one or more occurrences, "[" and "]" are
29 used to form groups, and "|" represents choice. Attributes are conventionally assigned a value which
30 corresponds to their type, as defined in the normative schema. Elements with simple content are
31 conventionally assigned a value which corresponds to the type of their content, as defined in the
32 normative schema. Pseudo schemas do not include extension points for brevity.

```
33  <!-- sample pseudo-schema -->
34  <defined_element
35      required_attribute_of_type_string="xs:string"
36      optional_attribute_of_type_int="xs:int"? >
37    <required_element />
38    <optional_element />?
39    <one_or_more_of_these_elements />+
40    [ <choice_1 /> | <choice_2 /> ]*
41  </defined_element>
```

42 **1.4.2 Normative references**

43 [XML-DSIG]   "XML Signature Syntax and Processing (Second Edition)",
44   http://www.w3.org/TR/xmldsig-core/

45 [RFC3986]   "Uniform Resource Identifier (URI): Generic Syntax",
46   http://tools.ietf.org/html/rfc3986

47 [WSA-1.0]   "Web Services Addressing 1.0 – Core",
48   http://www.w3.org/TR/2005/CR-ws-addrcore-20050817/
49   and "Web Services Addressing 1.0 - SOAP Binding",
50   http://www.w3.org/TR/wsaddr-soap/

51 [RFC2119]   "Key words for use in RFCs to Indicate Requirement Levels",
52   http://www.ietf.org/rfc/rfc2119.txt

53 [PFUOI4]   "Policy for use of Identifiers 4.1.0",
54   https://docs.peppol.eu/edelivery/policies/PEPPOL-EDN-Policy-for-use-of-identifiers-
55   4.1.0-2020-03-
56   11.pdfhttps://github.com/OpenPEPPOL/documentation/raw/master/TransportInfrastr
57   ucture/PEPPOL-EDN-Policy-for-use-of-identifiers-4.0-2019-01-28.pdf

58 **1.4.3 Non-normative references**

59 [WSDL-2.0]   "Web Services Description Language (WSDL) Version 2.0 Part 1: Core Language",
60   http://www.w3.org/TR/wsdl20/

61 [REST]   "Architectural Styles and the Design of Network-based Software Architectures",
62   https://www.ics.uci.edu/~fielding/pubs/dissertation/top.htm

63 [BDEN-SML]   "Service Metadata Locator (SML) 1.2.0",
64   https://docs.peppol.eu/edelivery/sml/PEPPOL-EDN-Service-Metadata-Locator-1.2.0-
65   2020-06-25.pdf

66 ## 1.5 Namespaces

67 The following table lists XML namespaces that are used in this document. The choice of any
68 namespace prefix is arbitrary and not semantically significant.

Prefix	Namespace URI
ds	http://www.w3.org/2000/09/xmldsig#
ids	http://busdox.org/transport/identifiers/1.0/
smp	http://busdox.org/serviceMetadata/publishing/1.0/
wsa	http://www.w3.org/2005/08/addressing
xs	http://www.w3.org/2001/XMLSchema

2 The Service Discovery Process

The interfaces of the Service Metadata Locator (SML) service and the Service Metadata Publisher (SMP) service cover both sender-side lookup and metadata management performed by SMPs. Business Document Exchange Network (BUSDOX) mandates the following interfaces for these services:

- Service Metadata Locator:
    - o DNS-based resolve mechanism to locate individual SMPs
    - o Management interface towards SMPs
- Service Metadata Publishers:
    - o Discovery interface towards senders

This specification only covers the discovery interface for Service Metadata Publication services.

2.1 Discovery flow

For a sender, the first step in the Discovery process is to establish the location of the Service Metadata relating to the particular Participant Identifier to which the sender wants to transmit a message. Each participant identifier is registered with one and only one Service Metadata Publisher. The sender looks up the endpoint for the Service Metadata Publisher using the DNS-based Service Metadata Locator service (this is a regular DNS resolve). The sender can then retrieve the metadata associated with the Participant Identifier. This metadata includes the information necessary to transmit the message to the recipient endpoint.

The diagram below represents the lookup flow for a sender contacting both the Service Metadata Locator and the SMP.

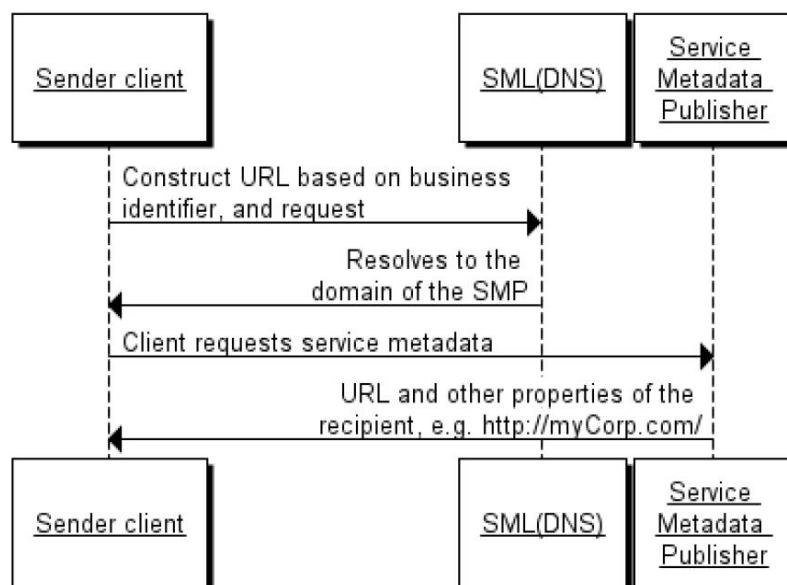Fig. 2: Endpoint lookup with Service Metadata

Note: For optimization reasons, the discovery doesn't have to be performed for every transfer if the necessary information for transfer is already cached from previous transmissions. Though necessary exception handling has to be in place i.e. new lookup has to be performed if the sending shows that information is outdated e.g. old endpoint address.

96 **2.1.1 Discovering services associated with a Participant Identifier**

97 In addition to the direct lookup of Service Metadata based on participant identifier and document
98 type, a sender may want to discover what document types can be handled by a specific participant
99 identifier. Such discovery is relevant for applications supporting several equivalent business
100 processes. Knowing the capabilities of the recipient is valuable information to a sender application
101 and ultimately to an end user. E.g. the end user may be presented with a choice between a "simple"
102 and a "rich" business process.

103 This is enabled by a pattern where the sender first retrieves the *ServiceGroup* entity, which holds a
104 list of references to the *ServiceMetadata* resources associated with it. The *SignedServiceMetadata* in
105 turn holds the metadata information that describes the capabilities associated with the recipient
106 participant identifier

107 ## 2.2 Service Metadata Publisher Redirection

108 For each participant identifier, the SML may only point to a single SMP. There are cases however
109 where the owner of a participant identifier may want to use different SMPs for different document
110 types or processes. This is supported by Service Metadata Publisher Redirection.

111 In this pattern, the sender is redirected by the SMP to a secondary, remote SMP where the actual
112 *SignedServiceMetadata* can be found. A special element within the *SignedServiceMetadata* record of
113 the SMP points to the SMP that has the actual Service Metadata and certificate information for that
114 SMP. The diagram below shows this flow:

115
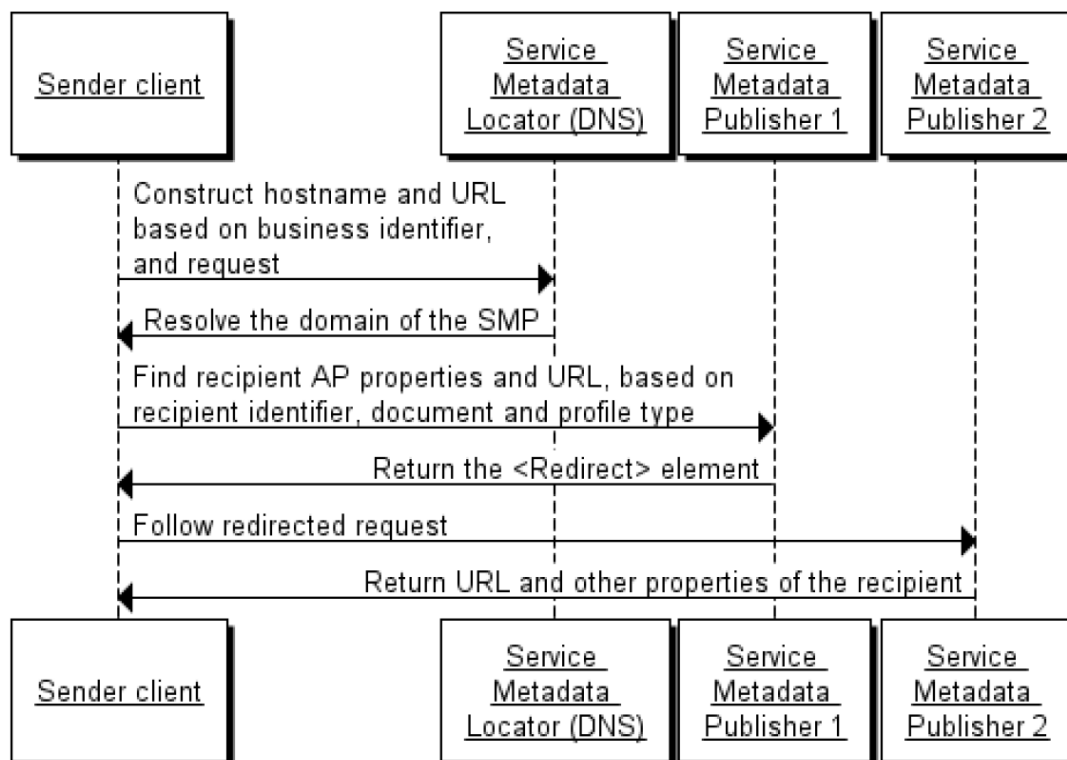
116 Fig. 3: Service Metadata Redirection

117 Note that only one degree of redirect is allowed; clients are not required to follow more than one
118 redirect, i.e. a redirect resource cannot point to another redirect resource. Allowing one level of
119 redirect permits the described use case to be realized, while avoiding the possibility of cyclic
120 references and long chains of redirects

3   Interface model

121

122 This specification defines a REST-based interface for retrieving Service Metadata, but does not
123 specify interfaces for creating, updating, deleting and managing Service Metadata, or any internal
124 data storage formats.

125 The goal is to allow the interface in this specification to expose data from many different Service
126 Metadata back-ends, which may be based on any suitable technology such as for example RDBMS,
127 LDAP, or UDDI.

128 Note that when adding or deleting Participant Identifiers in the SMP, an implementation of the SMP
129 will need to reflect its custody of a Participant Identifier in the SML. Please see the SML specification
130 [BDEN-SML] for a description of the processes and interfaces for doing this.

131   4 Data model

132 This section outlines the data model of the interface. The data model comprises the following main
133 data types:

134   •   ServiceGroup
135   •   ServiceMetadata / SignedServiceMetadata

136 Supporting data types for these main types are:

137   •   ServiceInformation
138   •   ServiceEndpointList
139   •   ParticipantIdentifier
140   •   DocumentIdentifier
141   •   Redirect
142   •   Process
143   •   ProcessList
144   •   Endpoint

145 Each of these data types is described in detail in the following sections.

146   4.1 On extension points

147 For each major entity, extension points have been added with the optional `<smp:Extension>`
148 element.

149   4.1.1 Semantics and use

150 Child elements of the `<smp:Extension>` element are known as "custom extension elements".
151 Extension points may be used for optional extensions of service metadata. This implies:

152   •   Extension elements added to a specific Service Metadata resource MUST be ignorable by any
153   client of the transport infrastructure. The ability to parse and adjust client behaviour based
154   on an extension element MUST NOT be a prerequisite for a client to locate a service, or to
155   make a successful request at the referenced service.
156   •   A client MAY ignore any extension element added to specific service metadata resource
157   instances.

158   4.2 ServiceGroup

159 The *ServiceGroup* structure represents a set of services associated with a specific participant
160 identifier that is handled by a specific SMP. The *ServiceGroup* structure holds a list of references to
161 *SignedServiceMetadata* resources in the *ServiceList* structure.

162 Pseudo-schema for *ServiceGroup*:

```
163  <smp:ServiceGroup>
164    <ids:ParticipantIdentifier scheme="xs:string">
165      xs:string
166    </ids:ParticipantIdentifier>
167    <smp:ServiceMetadataReferenceCollection>
168      <smp:ServiceMetadataReference href="xs:anyURI" />*
169    </smp:ServiceMetadataReferenceCollection>
170    <smp:Extension>xs:any</smp:Extension>?
171  </smp:ServiceGroup>
```

172 Description of the individual fields (elements and attributes).

Field	Description
ServiceGroup	Document element
ParticipantIdentifier	Represents the business level endpoint key and key type, e.g. a DUNS or GLN number that is associated with a group of services. See [PFUOI4] for information on this data type.
ServiceMetadataReferenceCollection	This structure holds a list of references to *SignedServiceMetadata* structures. From this list, a sender can follow the references to get each *SignedServiceMetadata* structure.
ServiceMetadataReference (0..*)	Contains the URL to a specific *SignedServiceMetadata* instance - see the REST binding section for details on the URL format. Note that references MUST refer to *SignedServiceMetadata* records that are signed by the certificate of the SMP. It MUST NOT point to *SignedServiceMetadata* resources published by external SMPs.
Extension	The extension element may contain any XML element. Clients MAY ignore this element. It can be used to add extended metadata to individual references to Service Metadata resources.

173   **4.2.1   Non-normative example**

174   Non-normative example of a *ServiceGroup* resource:

```
175   <?xml version="1.0" encoding="utf-8" ?>
176   <!--
177   This sample assumes that the service metadata publisher resides at
178   "http://serviceMetadata.eu/".
179   It assumes that the business identifier is "0010:5798000000001".
180   -->
181   <ServiceGroup xmlns="http://busdox.org/serviceMetadata/publishing/1.0/"
182   xmlns:ids="http://busdox.org/transport/identifiers/1.0/">
183     <ids:ParticipantIdentifier scheme="busdox-actorid-upis">
184       0010:5798000000001
185     </ids:ParticipantIdentifier>
186     <ServiceMetadataReferenceCollection>
187       <ServiceMetadataReference href="http://serviceMetadata.eu/busdox-actorid-
188   upis%3A%3A0010%3A5798000000001/services/busdox-docid-
189   qns%3A%3Aurn%3Aoasis%3Anames%3Aspecification%3Aubl%3Aschema%3Axsd%3AInvoice-
190   2%3A%3AInvoice%23%23UBL-2.0"/>
191     </ServiceMetadataReferenceCollection>
192     <Extension>
193       <ex:Test xmlns:ex="http://test.eu">Test</ex:Test>
194     </Extension>
195   </ServiceGroup>
```

196   ## 4.3   ServiceMetadata

197   This data structure represents Metadata about a specific electronic service. The role of the
198   *ServiceMetadata* structure is to associate a participant identifier with the ability to receive a specific

199 document type over a specific transport. It also describes which business processes a document can
200 participate in, and various operational data such as service activation and expiration times.

201 The *ServiceMetadata* resource contains all the metadata about a service that a sender Access Point
202 needs to know in order to send a message to that service.

4.3.1 Redirection

204 For recipients that want to associate more than one SMP with their participant identifier, they may
205 redirect senders to an alternative SMP for specific document types. To achieve this, the
206 *ServiceMetadata* element defines the optional element `Redirect`. This element holds the URL of
207 the alternative SMP, as well as the Subject Unique Identifier of the destination SMPs certificate used
208 to sign its resources.

209 In the case where a client encounters such a redirection element, the client MUST follow the first
210 redirect reference to the alternative SMP. If the *SignedServiceMetadata* resource at the alternative
211 SMP also contains a redirection element, the client SHOULD NOT follow that redirect. It is the
212 responsibility of the client to enforce this constraint.

213 Pseudo-schema for this data type:

```
<smp:ServiceMetadata>
   [<smp:ServiceInformation /> | <smp:Redirect />]
</smp:ServiceMetadata>
```

217 Pseudo-schema for the `ServiceInformation` data type:

```
<smp:ServiceInformation>
  <ids:ParticipantIdentifier scheme="xs:string">xs:string
  </ids:ParticipantIdentifier>
  <ids:DocumentIdentifier scheme="xs:string" />
  <smp:ProcessList>
    <smp:Process>+
      <ids:ProcessIdentifier scheme="xs:string" />
      <smp:ServiceEndpointList>
        <smp:Endpoint transportProfile="xs:string">+
          <wsa:EndpointReference />
          <smp:RequireBusinessLevelSignature>xs:boolean
          </smp:RequireBusinessLevelSignature>
          <smp:MinimumAuthenticationLevel>xs:string
          </smp:MinimumAuthenticationLevel >?
          <smp:ServiceActivationDate>xs:dateTime
          </smp:ServiceActivationDate>?
          <smp:ServiceExpirationDate>xs:dateTime
          </smp:ServiceExpirationDate>?
          <smp:Certificate>xs:string</smp:Certificate>
          <smp:ServiceDescription>xs:string
          </smp:ServiceDescription>
          <smp:TechnicalContactUrl>xs:anyURI
          </smp:TechnicalContactUrl>
          <smp:TechnicalInformationUrl>xs:anyURI
          </smp:TechnicalInformationUrl>?
          <smp:Extension>xs:any</smp:Extension>?
        </smp:Endpoint>
      </smp:ServiceEndpointList>
      <smp:Extension>xs:any</smp:Extension>?
    </smp:Process>
  </smp:ProcessList>
  <smp:Extension>xs:any</smp:Extension>?
```

250
```
</smp:ServiceInformation>
```

251 Pseudo-schema for the `Redirect` data type:

252
253
254
255
```
<smp:Redirect href="xs:anyURI">
   <smp:CertificateUID>xs:string</smp:CertificateUID>
   <smp:Extension>xs:any</smp:Extension>?
<smp:Redirect>
```

256 The Extension element may contain any XML element. Clients MAY ignore this element. It can be
257 used to add extension metadata to the service metadata.

258 The `href` attribute of the `Redirect` element contains the full address of the destination SMP
259 record that the client is redirected to.

260 For example, assume that an SMP called "SMP1" has the address `http://smp1.eu`, and another
261 SMP called "SMP2" has the address `http://smp2.eu`, and a client requests a resource with the
262 following URL (note that these examples have been percent encoded):

263
264
265
266
```
http://smp1.eu/busdox-actorid-
upis%3A%3A0010%3A5798000000001/services/busdox-docid-
qns%3A%3Aurn%3Aoasis%3Anames%3Aspecification%3Aubl%3Aschema%3Axsd%3AInvoice
- 2%3A%3AInvoice%23%23UBL-2.0
```

267 We now assume that the owner of these metadata has moved them to SMP2. SMP1 would then
268 return a *SignedServiceMetadata* resource with a `Redirect` child element that has the `href`
269 attribute set to

270
271
272
273
```
http://smp2.eu/busdox-actorid-
upis%3A%3A0010%3A5798000000001/services/busdox-docid-
qns%3A%3Aurn%3Aoasis%3Anames%3Aspecification%3Aubl%3Aschema%3Axsd%3AInvoice
- 2%3A%3AInvoice%23%23UBL-2.0
```

274 For the list of endpoints under each `Endpoint` element in the `ServiceEndpointList`, each
275 endpoint MUST have different values of the `transportProfile` attribute, i.e. represent bindings
276 to different transports.

277 Description of the individual fields (elements and attributes).

Field	Description
/ServiceMetadata	Document element
ServiceMetadata/Redirect	The direct child element of `ServiceMetadata` is either the `Redirect` element or the `ServiceInformation` element. The `Redirect` element indicates that a client must follow the URL of the `href` attribute of this element.
Redirect/CertificateUID	Holds the Subject Unique Identifier of the certificate of the destination SMP. A client SHOULD validate that the Subject Unique Identifier of the certificate used to sign the resource at the destination SMP matches the Subject Unique Identifier published in the redirecting SMP.

Field	Description
Redirect/Extension	The `Extension` element may contain any XML element. Clients MAY ignore this element. It can be used to add extension metadata to the `Redirect`.
ServiceMetadata/ServiceInformation	The direct child element of `ServiceMetadata` is either the `Redirect` element or the `ServiceInformation` element. The `ServiceInformation` element contains service information for an actual service registration, rather than a redirect to another SMP.
ServiceInformation/ParticipantIdentifier	The participant identifier. Comprises the identifier, and an identifier scheme. This identifier MUST have the same value of the {id} part of the URI of the enclosing *ServiceMetadata* resource. See the ParticipantIdentifier section of the 'Policy for use of identifiers' document [PFUOI4] for information on this data type.
ServiceInformation/DocumentIdentifier	Represents the type of document that the recipient is able to handle. The document type is represented by an identifier (identifying the document type) and an identifier scheme, which the format of the identifier itself. See the DocumentTypeIdentifier section of the 'Policy for use of identifiers' document [PFUOI4] for information on this data type.
ServiceInformation/ProcessList	Represents the processes that a specific document type can participate in, and endpoint address and binding information. Each process element describes a specific business process that accepts this type of document as input and holds a list of endpoint addresses (in the case that the service supports multiple transports) of services that implement the business process, plus information about the transport used for each endpoint. See the Process section of the 'Policy for use of identifiers' document [PFUOI4] for information on the identifier format.
Process/ProcessIdentifier	The identifier of the process. See the 'Policy for use of identifiers' document for a definition of process identifiers [PFUOI4]
Process/ServiceEndpointList	List of one or more endpoints that support this process.
ServiceEndpointList/Endpoint	`Endpoint` represents the technical endpoint and address type of the recipient, as an URL.

Field	Description
Endpoint/EndpointReference	The address of an endpoint, as a WS-Addressing Endpoint Reference (EPR).
Endpoint/@transportProfile	Indicates the type of transport protocol that is being used between access points, e.g. the Peppol AS4 profile (`peppol-transport-as4-v2_0`). A list of valid transport protocols is referenced from the 'Policy for use of identifiers' document [PFUOI4].
Endpoint/RequireBusinessLevelSignature	Set to `true` if the recipient requires business-level signatures for the message, meaning a signature applied to the business message before the message is put on the transport. This is independent of the transport-level signatures that a specific transport profile, such as the Peppol AS4 profile, might mandate. This flag does not indicate which type of business-level signature might be required. Setting or consuming business-level signatures would typically be the responsibility of the final senders and receivers of messages, rather than a set of APs.
Endpoint/MinimumAuthenticationLevel	Indicates the minimum authentication level that recipient requires. The specific semantics of this field is defined in a specific instance of the BUSDOX infrastructure.\n\nIt could for example reflect the value of the "urn:eu:busdox:attribute:assurance-level" SAML attribute defined in the START specification.
Endpoint/ServiceActivationDate	Activation date of the service. Senders MUST ignore services that are not yet activated.\n\nA missing activation date MUST be interpreted as "valid since forever".\n\nFormat of `ServiceActivationDate` is `xs:dateTime`.
Endpoint/ServiceExpirationDate	Expiration date of the service. Senders MUST ignore services that are expired.\n\nA missing expiration date MUST be interpreted as "valid until eternity".\n\nFormat of `ServiceExpirationDate` is `xs:dateTime`.
Endpoint/Certificate	Holds the complete signing certificate of the recipient AP, as a PEM (base 64) encoded X509 DER formatted value.
Endpoint/ServiceDescription	A human readable description of the service.

Field	Description
Endpoint/TechnicalContactUrl	Represents a link to human readable contact information. This might also be an email address.
Endpoint/TechnicalInformationUrl	A URL to human readable documentation of the service format. This could for example be a web site containing links to XML Schemas, WSDLs, Schematrons and other relevant resources.
Process/Extension	The `Extension` element may contain any XML element. Clients MAY ignore this element. It can be used to add extension metadata to the process metadata block as a whole.
ServiceInformation/Extension	The `Extension` element may contain any XML element. Clients MAY ignore this element. It can be used to add extension metadata to the service metadata.

278 **4.3.2   Non-normative example**

279 For a non-normative example of a *ServiceMetadata* resource, see the *SignedServiceMetadata* non-
280 normative example below.

281 ## 4.4   SignedServiceMetadata

282 The *SignedServiceMetadata* structure is a *ServiceMetadata* structure that has been signed by the
283 SMP, according to governance policies that are not covered by this document. Pseudo-schema for
284 this data type:

```
285 <smp:SignedServiceMetadata>
286   <smp:ServiceMetadata />
287   <ds:Signature />
288 </smp:SignedServiceMetadata>
```

289 • `ServiceMetadata` is the `ServiceMetadata` element covered by the signature.
290 • `Signature` represents an enveloped XML signature over the
291 `SignedServiceMetadata` element.

292 **4.4.1   Non-normative example**

293 Non-normative example of a *SignedServiceMetadata* resource.

```
294 <?xml version="1.0" encoding="utf-8" ?>
295 <!--
296 This sample assumes that the service metadata publisher resides at
297 "http://serviceMetadata.eu/".
298 It assumes that the business identifier is "0010:5798000000001".
299 -->
300 <SignedServiceMetadata xmlns="http://busdox.org/serviceMetadata/publishing/1.0/"
301 xmlns:ids="http://busdox.org/transport/identifiers/1.0/">
302   <ServiceMetadata xmlns="http://busdox.org/serviceMetadata/publishing/1.0/"
303 xmlns:wsu="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wsswssecurity-
304 utility-1.0.xsd">
305     <ServiceInformation>
306       <ids:ParticipantIdentifier scheme="busdox-actorid-
307 upis">0010:5798000000001</ids:ParticipantIdentifier>
```

```
308        <ids:DocumentIdentifier scheme="busdox-docid-
309  qns">urn:oasis:names:specification:ubl:schema:xsd:Invoice-2::Invoice##UBL-
310  2.02</ids:DocumentIdentifier>
311        <ProcessList>
312          <Process>
313            <ids:ProcessIdentifier scheme="cenbii-procid-
314  ubl">BII04</ids:ProcessIdentifier>
315            <ServiceEndpointList>
316              <Endpoint transportProfile="busdox-transport-start">
317                <EndpointReference xmlns="http://www.w3.org/2005/08/addressing">
318                  <Address>http://busdox.org/sampleService/</Address>
319                </EndpointReference>
320                <RequireBusinessLevelSignature>false</RequireBusinessLevelSignature>
321                <MinimumAuthenticationLevel>2</MinimumAuthenticationLevel>
322                <ServiceActivationDate>2009-05-01T09:00:00</ServiceActivationDate>
323                <ServiceExpirationDate>2016-05-01T09:00:00</ServiceExpirationDate>
324                <Certificate>TlRMTVNTUAABAAAAt7IY4gk....</Certificate>
325                <ServiceDescription>invoice service</ServiceDescription>
326                <TechnicalContactUrl>https://example.com</TechnicalContactUrl>
327        <TechnicalInformationUrl>http://example.com/info</TechnicalInformationUrl>
328              </Endpoint>
329            </ServiceEndpointList>
330          </Process>
331          <Process>
332            <ids:ProcessIdentifier scheme="cenbii-procid-
333  ubl">BII07</ids:ProcessIdentifier>
334            <ServiceEndpointList>
335              <Endpoint transportProfile="busdox-transport-start">
336                <EndpointReference xmlns="http://www.w3.org/2005/08/addressing">
337                  <Address>http://busdox.org/sampleService/</Address>
338                </EndpointReference>
339                <RequireBusinessLevelSignature>true</RequireBusinessLevelSignature>
340                <MinimumAuthenticationLevel>1</MinimumAuthenticationLevel>
341                <ServiceActivationDate>2009-05-01T09:00:00</ServiceActivationDate>
342                <ServiceExpirationDate>2016-05-01T09:00:00</ServiceExpirationDate>
343                <Certificate>TlRMTVNTUAABAAAAt7IY4gk....</Certificate>
344                <ServiceDescription>invoice service</ServiceDescription>
345                <TechnicalContactUrl>https://example.com</TechnicalContactUrl>
346        <TechnicalInformationUrl>http://example.com/info</TechnicalInformationUrl>
347                <Extension>
348                  <ex:Test xmlns:ex="http://test.eu">Test</ex:Test>
349                </Extension>
350              </Endpoint>
351            </ServiceEndpointList>
352            <Extension>
353              <ex:Test xmlns:ex="http://test.eu">Test</ex:Test>
354            </Extension>
355          </Process>
356        </ProcessList>
357        <Extension>
358          <ex:Test xmlns:ex="http://test.eu">Test</ex:Test>
359        </Extension>
360      </ServiceInformation>
361    </ServiceMetadata>
362    <!-- Message signature, details omitted for brevity -->
363    <Signature xmlns="http://www.w3.org/2000/09/xmldsig#"/>
364  </SignedServiceMetadata>
```

4.4.2   Redirect, non-normative example

```xml
<?xml version="1.0" encoding="utf-8" ?>
<!--
This sample assumes that the user contacts a service metadata publisher that
resides at "http://serviceMetadata.eu/",
but is redirected to a service metadata publisher that resides at
"http://serviceMetadata2.eu/".
-->
<SignedServiceMetadata xmlns="http://busdox.org/serviceMetadata/publishing/1.0/">
  <ServiceMetadata xmlns="http://busdox.org/serviceMetadata/publishing/1.0/">
    <Redirect xmlns="http://busdox.org/serviceMetadata/publishing/1.0/"
href="http://serviceMetadata2.eu/busdox-
actoridupis%3A%3A0010%3A5798000000001/services/busdox-
docidqns%3A%3Aurn%3Aoasis%3Anames%3Aspecification%3Aubl%3Aschema%3Axsd%3AInvoice-
2%3A%3AInvoice%23%23UBL-2.0">
      <CertificateUID>PID:9208-2001-3-279815395</CertificateUID>
      <Extension>
        <ex:Test xmlns:ex="http://test.eu">Test</ex:Test>
      </Extension>
    </Redirect>
  </ServiceMetadata>
  <!-- Message signature, details omitted for brevity -->
  <Signature xmlns="http://www.w3.org/2000/09/xmldsig#"/>
</SignedServiceMetadata>
```

5 Service Metadata Publishing REST binding

389

390 This section describes the REST binding of the SMP interface.

5.1 The use of HTTP

391

392 A service implementing the REST binding MUST set the HTTP `Content-Type` header, and give it a
393 value of `text/xml` or `application/xml`. A service implementing the REST profile MUST NOT
394 use TLS (Transport Layer Security) or SSL (Secure Sockets Layer). An instance of the BUSDOX
395 infrastructure MAY set restrictions on what ports are allowed.

396 An implementation of the SMP might choose to manage resources through the HTTP POST, PUT and
397 DELETE verbs. It is however up to each implementation to choose how to manage records, and use of
398 HTTP POST, PUT and DELETE is not mandated or regulated by this specification.

399 HTTP GET operations MUST return the following HTTP status codes:

HTTP Status Code	Meaning
200	Must be returned if the resource is retrieved correctly.
404	Code 404 must be returned if a specific resource could not be found. This could for example be the result of a request containing a participant identifier that does not exist.
500	Code 500 must be returned if the service experiences an internal processing error.

400 The service MAY support other HTTP status codes as well.

401 The service SHOULD NOT use HTTP redirection in the manner indicated by the HTTP 3xx codes.
402 Clients are not required to support active redirection.

5.2 The use of XML and encoding

404 XML document returned by HTTP GET MUST be UTF-8 encoded. They MUST contain a document type
405 declaration starting with `<?xml` which includes the `encoding` attribute set to `UTF-8`. Please
406 observe that the content of the encoding attribute is not case sensitive. Version 1.0 of XML is used.

5.3 Resources and identifiers

408 The REST interface comprises 2 types of resources.

Resource	URI	Method	XML resource root element	HTTP Status	Description of returned content
ServiceGroup	/{identifier scheme}::{id}	GET	<ServiceGroup>	200; 500; 404	Holds the participant identifier of the recipient, and a list of references to individual ServiceMetadata resources that are associated with that participant identifier.

SignedServiceMet adata	/{identifier scheme}::{id}/ser vices/{docType} See section below for {docType} format	GET	<SignedSe rviceMeta data>	200; 500; 404	Holds all of the metadata about a Service, or a redirection URL to another Service Metadata Publisher holding this information.

409
<p align="center">**Fig. 4: Table of resources and identifiers**</p>

410 A service implementing the REST binding MUST support these resource types. It MUST provide
411 access to these using the URI scheme of table in Fig. 3.

5.3.1 On the use of percent encoding
412

413 When any types of BUSDOX identifiers are used in URLs, each section between slashes MUST be
414 percent encoded according to [RFC3986] individually, i.e. section by section.

415 For example, this implies that for an URL in the form of `/{identifier`
416 `scheme}::{id}/services/{docType}` the slash literals MUST NOT be URL encoded.

5.3.2 Using identifiers in the REST Resource URLs
417

418 This section describes specifically how participant and document identifiers are used to reference
419 *ServiceGroup* and *SignedServiceMetadata* REST resources. For a general definition on how to
420 represent participant and document identifiers in URLs, see [PFUOI4].

421 For the URL referencing a *ServiceGroup* resource, the `{identifier scheme}::{id}` part
422 follows the participant identifier format described in the "ParticipantIdentifier" section of the 'Policy
423 for use of identifiers' document [PFUOI4].

424 The following URL format is used:

425 `/{identifier scheme}::{id}`

426 In the reference to the *SignedServiceMetadata* or *Redirect* resources
427 (`/{id}/services/{docType}`), the `{docType}` part consists of `{document type`
428 `identifier scheme}::{document type identifier}`. For information on the format
429 of `{document type identifier}`, see the DocumentIdentifier section of the 'Policy for use of
430 identifiers' document [PFUOI4].

5.3.3 Non-normative identifier example
431

432 We assume an SMP can be accessed at the URL `http://serviceMetadata.eu`.

433 A business with the participant identifier `0010:5798000000001` would have the following
434 identifier for the *ServiceGroup* resource:

435 `http://serviceMetadata.eu/busdox-actorid-upis::0010:5798000000001`

436 After percent encoding:

437 `http://serviceMetadata.eu/busdox-actorid-upis%3a%3a0010%3a5798000000001`

438 In the case of a NES-UBL order, a *SignedServiceMetadata* or *Redirect* resource can then be identified
439 by

440 • Identifier format type: `busdox-docid-qns`
441 • Root namespace:
442   `urn:oasis:names:specification:ubl:schema:xsd:Order-2`

443 • Document element local name: `Order`
444 • Subtype identifier: `UBL-2.0` (since several versions of the Order schema may use the same
445 namespace + document element name)

446 The document type identifier will then be:

```
busdox-docid-qns::urn:oasis:names:specification:ubl:schema:xsd:Order-
2::Order##UBL-2.0
```

449 The document type identifier MUST be percent encoded as described in [RFC3986]. The above, non-
450 normative example is thus encoded to

```
busdox-docid-
qns%3A%3Aurn%3Aoasis%3Anames%3Aspecification%3Aubl%3Aschema%3Axsd%3AOrder-
2%3A%3AOrder%23%23UBL-2.0
```

454 The entire URL reference to a *SignedServiceMetadata* or *Redirect* resource thus has the form

```
{URL to server}/{identifier scheme}::{id}/services/{document identifier
type}::{rootNamespace}::{documentElementLocalName}[##{Subtype identifier}]
```

457 The percent-encoded form of the identifier using the above example will then be

```
http://serviceMetadata.eu/busdox-actorid-
upis%3a%3a0010%3a5798000000001/services/busdox-docid-
qns%3A%3Aurn%3Aoasis%3Anames%3Aspecification%3Aubl%3Aschema%3Axsd%3AOrder-
2%3A%3AOrder%23%23UBL-2.0
```

462 Note that the forward slashes delimiting the individual parts of the REST resource identifier URL are
463 not percent encoded, since they are part of the URL.

5.3.4 Implementation considerations

465 When a client is redirected to an SMP using the DNS-based SML scheme described in [BDEN-SML],
466 the HTTP `Host` header will be set to a value originating from the CNAME alias set in the SML
467 (http://www.w3.org/Protocols/rfc2616/rfc2616-sec14.html#sec14.23). Implementations should be
468 prepared to accept requests with this "host" header value.

5.4 Referencing the SMP REST binding

470 For referencing the SMP REST binding, for example from SML records, the following identifier should
471 be used for the version 1.0 of the SMP REST binding:

```
http://busdox.org/serviceMetadata/publishing/1.0/
```

473 This is identical to the target namespace of the SMP schema.

5.5 Security

475 At the transport level, the service MUST NOT be secured.

5.5.1 Message signature

477 The message returned by the service is signed by the Service Metadata Publisher with XML-Signature
478 according to the standard `http://www.w3.org/TR/2002/REC-xmldsig-core-`
479 `20020212/`.

480 The signature MUST be an enveloped XML signature represented via a `ds:Signature` element
481 embedded in the `SignedServiceMetadata` element. The `ds:Signature` element MUST be
482 constructed according to the following rules:

483 • The <Reference> MUST use exactly one <Transform> being:
484 `http://www.w3.org/2000/09/xmldsig#enveloped-signature`
485 • The <ds:KeyInfo> element MUST contain an <ds:X509Data> element with an
486 <ds:X509Certificate> sub-element containing the signer's X.509 certificate as PEM (base 64)
487 encoded X509 DER value.
488 • The canonicalization algorithm MUST be
489 `http://www.w3.org/TR/2001/REC-xml-c14n-20010315`
490 • The SignatureMethod MUST be
491 `http://www.w3.org/2000/09/xmldsig#rsa-sha1`
492 • The DigestMethod MUST be
493 `http://www.w3.org/2000/09/xmldsig#sha1`

494 **5.5.2 Verifying the signature**

495 When verifying the signature, the consumer has access to the full certificate as a PEM (base 64)
496 encoded X509 DER value within the `dsSignature` element. The consumer may verify the signature
497 by

498 a) extracting the certificate from the `ds:X509Data` element,
499 b) verify that it has been issued by the trusted root,
500 c) perform a validation of the signature, and
501 d) perform the required certificate validation steps (which might include checking
502 expiration/activation dates and revocation lists).

503 **5.5.3 Verifying the signature of the destination SMP**

504 For the redirect scheme, the unique identifier of the destination SMP signing certificate is stored at
505 the redirecting SMP. In addition to the regular signature validation performed by the client of the
506 destination SMP resources, the client SHOULD also validate that the identifier of the destination SMP
507 signing certificate corresponds to the unique identifier which the redirecting SMP claims belongs to
508 the destination SMP.

6 Appendix A: Schema for the REST interface

6.1 peppol-smp-types-v1.xsd (non-normative)

This section defines the XML Schema for all the resources of the REST interface. The normative version of the XML Schema is packaged together with this specification.

```xml
<?xml version="1.0" encoding="utf-8"?>
<xs:schema id="ServiceMetadataPublishing"
targetNamespace="http://busdox.org/serviceMetadata/publishing/1.0/"
elementFormDefault="qualified"
xmlns="http://busdox.org/serviceMetadata/publishing/1.0/"
xmlns:ids="http://busdox.org/transport/identifiers/1.0/"
xmlns:ds="http://www.w3.org/2000/09/xmldsig#"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
xmlns:wsa="http://www.w3.org/2005/08/addressing">
  <xs:import schemaLocation="xmldsig-core-schema.xsd"
namespace="http://www.w3.org/2000/09/xmldsig#"/>
  <xs:import schemaLocation="oasis-200401-wss-wssecurity-utility-1.0.xsd"
namespace="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-
utility-1.0.xsd"/>
  <xs:import schemaLocation="ws-addr.xsd"
namespace="http://www.w3.org/2005/08/addressing"/>
  <xs:import schemaLocation="peppol-identifiers-v1.xsd"
namespace="http://busdox.org/transport/identifiers/1.0/"/>

  <xs:element name="ServiceGroup" type="ServiceGroupType"/>
  <xs:element name="ServiceMetadata" type="ServiceMetadataType"/>
  <xs:element name="SignedServiceMetadata" type="SignedServiceMetadataType"/>

  <xs:complexType name="SignedServiceMetadataType">
    <xs:sequence>
      <xs:element ref="ServiceMetadata"/>
      <xs:element ref="ds:Signature"/>
    </xs:sequence>
  </xs:complexType>

  <xs:complexType name="ServiceMetadataType">
    <xs:sequence>
      <xs:choice>
        <xs:element name="ServiceInformation" type="ServiceInformationType"/>
        <xs:element name="Redirect" type="RedirectType"/>
      </xs:choice>
    </xs:sequence>
  </xs:complexType>

  <xs:complexType name="ServiceInformationType">
    <xs:sequence>
      <xs:element ref="ids:ParticipantIdentifier"/>
      <xs:element ref="ids:DocumentIdentifier"/>
      <xs:element name="ProcessList" type="ProcessListType"/>
      <xs:element name="Extension" type="ExtensionType" minOccurs="0"/>
    </xs:sequence>
  </xs:complexType>

  <xs:complexType name="ProcessListType">
    <xs:sequence>
      <xs:element name="Process" type="ProcessType" maxOccurs="unbounded"/>
```

```
564        </xs:sequence>
565      </xs:complexType>
566
567      <xs:complexType name="ProcessType">
568        <xs:sequence>
569          <xs:element ref="ids:ProcessIdentifier"/>
570          <xs:element name="ServiceEndpointList" type="ServiceEndpointList"/>
571          <xs:element name="Extension" type="ExtensionType" minOccurs="0"/>
572        </xs:sequence>
573      </xs:complexType>
574
575      <xs:complexType name="ServiceEndpointList">
576        <xs:sequence>
577          <xs:element name="Endpoint" type="EndpointType" maxOccurs="unbounded"/>
578        </xs:sequence>
579      </xs:complexType>
580
581      <xs:complexType name="EndpointType">
582        <xs:sequence>
583          <xs:element ref="wsa:EndpointReference"/>
584          <xs:element name="RequireBusinessLevelSignature" type="xs:boolean"/>
585          <xs:element name="MinimumAuthenticationLevel" type="xs:string"
586   minOccurs="0"/>
587          <xs:element name="ServiceActivationDate" type="xs:dateTime" minOccurs="0"/>
588          <xs:element name="ServiceExpirationDate" type="xs:dateTime" minOccurs="0"/>
589          <xs:element name="Certificate" type="xs:string"/>
590          <xs:element name="ServiceDescription" type="xs:string"/>
591          <xs:element name="TechnicalContactUrl" type="xs:anyURI"/>
592          <xs:element name="TechnicalInformationUrl" type="xs:anyURI" minOccurs="0"/>
593          <xs:element name="Extension" type="ExtensionType" minOccurs="0"/>
594        </xs:sequence>
595        <xs:attribute name="transportProfile" type="xs:string"/>
596      </xs:complexType>
597
598      <xs:complexType name="ServiceGroupType">
599        <xs:sequence>
600          <xs:element ref="ids:ParticipantIdentifier"/>
601          <xs:element name="ServiceMetadataReferenceCollection"
602   type="ServiceMetadataReferenceCollectionType"/>
603          <xs:element name="Extension" type="ExtensionType" minOccurs="0"/>
604        </xs:sequence>
605      </xs:complexType>
606
607      <xs:complexType name="ServiceMetadataReferenceCollectionType">
608        <xs:sequence>
609          <xs:element name="ServiceMetadataReference"
610   type="ServiceMetadataReferenceType" minOccurs="0" maxOccurs="unbounded"/>
611        </xs:sequence>
612      </xs:complexType>
613
614      <xs:complexType name="ServiceMetadataReferenceType">
615        <xs:attribute name="href" type="xs:anyURI"/>
616      </xs:complexType>
617
618      <xs:complexType name="RedirectType">
619        <xs:sequence>
620          <xs:element name="CertificateUID" type="xs:string"/>
```

```
621            <xs:element name="Extension" type="ExtensionType" minOccurs="0"/>
622         </xs:sequence>
623         <xs:attribute name="href" type="xs:anyURI"/>
624      </xs:complexType>
625
626      <xs:complexType name="ExtensionType">
627         <xs:sequence>
628            <xs:any/>
629         </xs:sequence>
630      </xs:complexType>
631   </xs:schema>
632
```