Data Service Directory (DSD) - OOTS

Contents

## Overview

The Data Service Directory is a Common Service defined in the OOTS HLA. It maintains a catalog of Evidence Providers with the Evidence Types, they are able to provide upon request using their Data Services. It is used in the Evidence Exchange process by the Evidence Requesters to discover the Evidence Providers that can provide the evidences they require.

The information data model is based on the SDG Application Profile for the DSD.

The Service API is implemented using the OASIS Regrep v4 Query Protocol with the REST API Binding.

In the following sections, a detailed analysis of the internal data model and the Service API specification are provided.
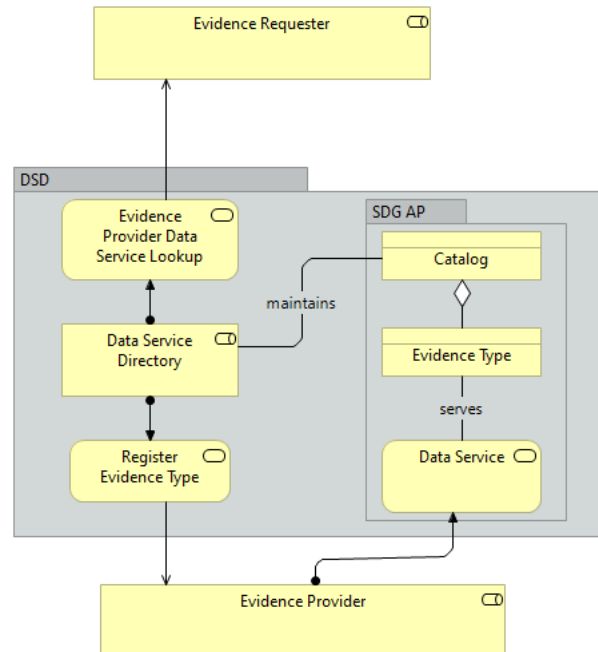
Functionality

The main functionality of the DSD is to publish Data Services of Evidence Providers that provide distributions of Evidence Types and make them discoverable through queries. The functionality requires three main classes of Information:

- The DataServiceEvidenceType, providing the semantic information and requirements for retrieving an evidence type from a Data Service.
- The Distribution of the EvidenceType, describing the format and conformance an evidence type can be provided with
- The DataService, describing the technical endpoint from which an Evidence Requester can request the evidence distributions
- the EvidenceProvider, describing the details of the Provider of the Evidence.

An Evidence Provider that wants to serve a Evidence of a specific evidence type MUST register this capability in the DSD. To do that,It needs to be registered as an Evidence Provider with its Data Service. A DataServiceEvidenceType, if it does not already exist, must also be registed in the DSD containing all the attributes required for informing the Evidence Requester of the requirements for requesting the Evidence, like any additional attributes, the level of assurance of the identification required, together with its available distributions. When all three information classes have been properly registered the Evidence Provider links its Data Service with the DataServiceEvidence type to publish its capability of providing the specific evidence type through its Data Service.

In the following section describes the Information Data Model used for the registration and the queries of the DSD Service.

Information Data Model

the DSD information Data Model is based on the SDG Application Profile For the DSD. It is based on the semantic classes of Evidence Type derived from the CCCEV v2.0, the DataService from DCAT and the Organization Class from the Core Public Organisation Vocabularies. It provides all the information aspects of the model, including the data types, use of Identifers and code lists for every element used in this profile. The serialization of the model is done using XML following the SDG Guidelines on XML Serialization. Below is an example of the XML representation of a Data Service serving an Evidence Type as it is contained in the DSD.

```xml
1   <?xml version="1.0" encoding="UTF-8"?>
2   <query:QueryResponse xmlns="urn:oasis:names:tc:ebxml-regrep:xsd:lcm:4.0"
3       xmlns:lcm="urn:oasis:names:tc:ebxml-regrep:xsd:lcm:4.0"
4       xmlns:query="urn:oasis:names:tc:ebxml-regrep:xsd:query:4.0"
5       xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:4.0"
6       xmlns:rs="urn:oasis:names:tc:ebxml-regrep:xsd:rs:4.0"
7       xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="urn:oasis:names:tc:e
    bxml-regrep:xsd:lcm:4.0" totalResultCount="1" startIndex="0" status="urn:oasis:names:tc:ebxml-
    regrep:ResponseStatusType:Success">
8       <!-- depending on the count of datasets returned, the totalResultCount attribute should
9      reflect the number of the Evidence Types returned -->
10      <rim:RegistryObjectList>
11          <!-- One registry object per Evidence Type -->
12          <rim:RegistryObject id="RE238912378">
13              <rim:Slot name="DataServiceEvidenceType">
14                  <rim:SlotValue xsi:type="rim:AnyValueType">
15                      <DataServiceEvidenceType xmlns="https://data.europa.eu/sdg/xml#">
16                          <Identifier>RE238918378</Identifier>
17                          <EvidenceTypeClassification>CertificateOfBirth</EvidenceTypeClassification>
18                          <Title>Certificate of Birth</Title>
19                          <!-- Distribution Information -->
20                          <DistributedAs>
21                              <!-- XML Distribution, conforming to the commom data model on Birth
    Certificate -->
22                              <Distribution>
23                                  <ConformsTo>https://semic.org/sa/common/birthcert-1.0.0</
    ConformsTo>
24                                  <Format>http://publications.europa.eu/resource/authority/file-
    type/XML</Format>
25                              </Distribution>
26                              <!-- PDF Distribution -->
27                              <Distribution>
28                                  <Format>http://publications.europa.eu/resource/authority/file-
    type/PDF</Format>
29                              </Distribution>
30                          </DistributedAs>
31                          <!-- Multiple Access Services, one per Evidence Provider -->
32                          <AccessService>
33                              <!-- The identifier of the Access Service, using ebcore Party ID Type.
    Used for pmode mapping -->
34                              <Identifier SchemeID="urn:oasis:names:tc:ebcore:partyid-
    type:iso6523:0060">8889909098</Identifier>
35                              <!-- The Evidence Provider Information of this access service -->
36                              <EvidenceProvider>
37                                  <Identifier SchemeID="1204">11231112313</Identifier>
38                                  <PrefLabel>Example Organization</PrefLabel>
39                                  <Location>
40                                      <Address>
41                                          <FullAddress>Prince Street 15</FullAddress>
42                                          <AdminUnitLevel1>SK</AdminUnitLevel1>
43                                          <AdminUnitLevel2>SK12</AdminUnitLevel2>
44                                      </Address>
45                                  </Location>
46                                  <Jurisdiction
```

```
47                            <AdminUnitLevel1>SK</AdminUnitLevel1>
48                            <AdminUnitLevel2>SK12</AdminUnitLevel2>
49                         </Jurisdiction>
50                      </EvidenceProvider>
51                   </AccessService>
52                   <!-- The identifier of the Access Service, using ebcore Party ID Type.
     Used for pmode mapping -->
53                   <AccessService>
54                      <Identifier SchemeID="urn:oasis:names:tc:ebcore:partyid-
     type:iso6523:0060">8889909099</Identifier>
55                      <EvidenceProvider>
56                         <!-- The Evidence Provider Information -->
57                         <Identifier SchemeID="1204">11231112313</Identifier>
58                         <PrefLabel>Example Organization</PrefLabel>
59                         <Location>
60                            <Address>
61                               <FullAddress>Prince Street 15</FullAddress>
62                               <AdminUnitLevel1>SK</AdminUnitLevel1>
63                               <AdminUnitLevel2>SK77</AdminUnitLevel2>
64                            </Address>
65                         </Location>
66                         <Jurisdiction>
67                            <AdminUnitLevel1>SK</AdminUnitLevel1>
68                            <AdminUnitLevel2>SK77</AdminUnitLevel2>
69                         </Jurisdiction>
70                      </EvidenceProvider>
71                   </AccessService>
72                   <!-- Code list of the identifier schemes. -->
73                   <EvidenceSubjectIdentifierScheme>urn:oasis:names:tc:ebcore:partyid-
     type:eas:3322</EvidenceSubjectIdentifierScheme>
74                   <!-- Level Of Assurance Required for the Evidence Type by the Evidence
     Provider -->
75                   <EvidenceSubjectLevelOfAssurance>http://eidas.europa.eu/LoA/High</
     EvidenceSubjectLevelOfAssurance>
76                   <!-- The type of eID required. It can be either NaturalPerson or
     LegalPerson -->
77                   <EvidenceSubjectNature>http://eidas.europa.eu/attributes/naturalperson</
     EvidenceSubjectNature>
78                </DataServiceEvidenceType>
79             </rim:SlotValue>
80          </rim:Slot>
81       </rim:RegistryObject>
82    </rim:RegistryObjectList>
83 </query:QueryResponse>
```

Query Interface Specification

The query interface specification for the Data Service Directory is based on the OASIS ebXML RegRep V4 standard. This standard has multiple protocol bindings that can be used to execute queries. Since the DSD queries have only simple, single-value parameters, the REST binding is used to implement the DSD query interface. This implies that the query transaction is executed as an HTTP GET request with the URL representing the query to execute and the HTTP response carrying the query response as an XML document. This section further profiles the REST binding as specified in the OASIS RegRep standard for use by the DSD.

The RegRep Query Request

The URL pattern for parameterised query invocation is defined as follows in the OASIS RegRep REST binding:

«server base url»/**rest/search?queryId=***{the query id}*(**&***{param-name}***=***{param-value}*)*****

The DSD query interface consists of a simple pre-defined parameterised query which is detailed below. The RegRep standard defines a set of canonical queries and query parameters that can be used. As the Data Service Directory is not a full implementation of a RegRep server it is NOT REQUIRED to support these canonical queries and query parameters. Clients therefore SHOULD only use the queries and query parameters specified by this specification. When the canonical queries or parameters are used the DSD MAY return an error.

The RegRep Successful Response

As specified by the RegRep REST binding, the DSD MUST always return a RegRep QueryResponse document which MUST either contain an `Exception` or `RegistryObjectList` element with zero or more `RegistryObjects`.

An example response with response-specific details omitted is provided in the following table:

```
1   <query:QueryResponse xmlns="urn:oasis:names:tc:ebxml-regrep:xsd:lcm:4.0"
2       xmlns:lcm="urn:oasis:names:tc:ebxml-regrep:xsd:lcm:4.0"
3       xmlns:query="urn:oasis:names:tc:ebxml-regrep:xsd:query:4.0"
4       xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:4.0"
5       xmlns:rs="urn:oasis:names:tc:ebxml-regrep:xsd:rs:4.0"
6       xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="urn:oasis:names:tc:e
    bxml-regrep:xsd:lcm:4.0" totalResultCount="1" startIndex="0" status="urn:oasis:names:tc:ebxml-
    regrep:ResponseStatusType:Success">
7       <!-- depending on the count of datasets returned, the totalResultCount attribute should
8     reflect the number of the datasets returned -->
9       <rim:RegistryObjectList>
10          <!-- One registry object per dataset -->
11          <rim:RegistryObject id="RE238912378">
12              <rim:Slot name="DataServiceEvidenceType">
13                  <rim:SlotValue xsi:type="rim:AnyValueType">
14                      <DataServiceEvidenceType xmlns="https://data.europa.eu/sdg/xml#">
15                          <!-- Omitted for clarity -->
16                      </DataServiceEvidenceType>
17                  </rim:SlotValue>
18              </rim:Slot>
19          </rim:RegistryObject>
20      </rim:RegistryObjectList>
21  </query:QueryResponse>
```

When an error occurs during the execution of the query, the DSD returns an exception as defined in the DSD Query Interface Specification. The exception has the following properties that are profiled for each expected error of the query.

- **xsi:type:** The type of the error, selectable from a predefined set of error classes of the Query Interface of the DSD
- **severity:** The severity of the error, selectable from a predefined set of error classes of the Query Interface of the DSD
- **message:** A string describing the error in Human Readable form.
- **code:** A code for the error, specified by the DSD Technical Design documents

An Example for an empty result set is provided below:

```
 1   <?xml version="1.0" encoding="UTF-8"?>
 2   <query:QueryResponse xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
 3                        xmlns:rs="urn:oasis:names:tc:ebxml-regrep:xsd:rs:4.0"
 4                        xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:4.0"
 5                        xmlns:query="urn:oasis:names:tc:ebxml-regrep:xsd:query:4.0"
 6                        status="urn:oasis:nammes:tc:ebxml-regrep:ResponseStatusType:Failure">
 7
 8     <rs:Exception
 9         xsi:type="rs:ObjectNotFoundExceptionType"
10         severity="urn:oasis:names:tc:ebxml-regrep:ErrorSeverityType:Error"
11         message="No Evidence Providers were found based on the given parameters"
12         code="DSD:ERR:0001">
13     </rs:Exception>
14   </query:QueryResponse>
```

Query: Find Data Services of Evidence Providers for a specific Evidence Type Classification based on Evidence Provider Jurisdiction

This query allows the Evidence Requester to find all the Data Services of the Evidence Providers that can provide the required type of Evidence Type and are based in a specific geographic area.

Parameter Details

Parameter	Requirement	Description
queryId	MUST	This parameter MUST have value **urn:oots:dsd:ebxml-regrep:queries:dataservices-by-evidencetype-and-jurisdiction**.
evidenceType	MUST	The Evidence Type classification code.
countryCode	MUST	Two letter country code,
adminUnitL2	OPTIONAL	3 to 6 letter NUTS code
adminUnitL3	OPTIONAL	LAU Code

Result set specification

The result set of this query is specified as follows:

```
{d ∈ dsd.DataServiceEvidenceType: d.EvidenceTypeClassification == evidenceType ∧
 (countryCode = "" ∨ d.AccessService.EvidenceProvider.Jurisdiction.adminUnitLevel1 ==
countryCode) ∧ (regionCode = "" ∨
 d.AccessService.EvidenceProvider.Jurisdiction.adminUnit2 == adminUnitL2) ∧ (adminUnitL3
= "" ∨ d.AccessService.EvidenceProvider.Jurisdiction.adminUnitLevel3 == adminUnitL3) }
```

Query Response

The Query Response returns a RegRep QueryResponse document which MUST either contain an `Exception` or `RegistryObjectList` element with zero or more `RegistryObjects`. Each `RegistryObject` in the result MUST include one `Slot` element with a `SlotValue` of type *rim:AnyValueType* and a single `sdg:DataServiceEvidenceType` child element, following the DSD Profile of the SDG Application Profile. An examples of a successful response providing a collection of Data Services of Service Providers for a specific Evidence Type is shown below:

Example of a successful query

```xml
1   <?xml version="1.0" encoding="UTF-8"?>
2   <query:QueryResponse xmlns="urn:oasis:names:tc:ebxml-regrep:xsd:lcm:4.0"
3       xmlns:lcm="urn:oasis:names:tc:ebxml-regrep:xsd:lcm:4.0"
4       xmlns:query="urn:oasis:names:tc:ebxml-regrep:xsd:query:4.0"
5       xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:4.0"
6       xmlns:rs="urn:oasis:names:tc:ebxml-regrep:xsd:rs:4.0"
7       xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="urn:oasis:names:tc:e
    bxml-regrep:xsd:lcm:4.0" totalResultCount="1" startIndex="0" status="urn:oasis:names:tc:ebxml-
    regrep:ResponseStatusType:Success">
8       <!-- depending on the count of datasets returned, the totalResultCount attribute should
9     reflect the number of the datasets returned -->
10      <rim:RegistryObjectList>
11          <!-- One registry object per dataset -->
12          <rim:RegistryObject id="RE238912378">
13              <rim:Slot name="DataServiceEvidenceType">
14                  <rim:SlotValue xsi:type="rim:AnyValueType">
15                      <DataServiceEvidenceType xmlns="https://data.europa.eu/sdg/xml#">
16                          <Identifier>RE238918378</Identifier>
17                          <EvidenceTypeClassification>CertificateOfBirth</EvidenceTypeClassification>
18                          <Title>Certificate of Birth</Title>
19                          <!-- Distribution Information -->
20                          <DistributedAs>
21                              <!-- XML Distribution, conforming to the commom data model on Birth
    Certificate -->
22                              <Distribution>
23                                  <ConformsTo>https://semic.org/sa/common/birthcert-1.0.0</
    ConformsTo>
24                                  <Format>http://publications.europa.eu/resource/authority/file-
    type/XML</Format>
25                              </Distribution>
26                              <!-- PDF Distribution -->
27                              <Distribution>
28                                  <Format>http://publications.europa.eu/resource/authority/file-
    type/PDF</Format>
29                              </Distribution>
30                          </DistributedAs>
31                          <!-- Multiple Access Services, one per Evidence Provider -->
32                          <AccessService>
33                              <!-- The identifier of the Access Service, using ebcore Party ID Type.
    Used for pmode mapping -->
34                              <Identifier SchemeID="urn:oasis:names:tc:ebcore:partyid-
    type:iso6523:0060">8889909098</Identifier>
35                              <!-- The Evidence Provider Information of this access service -->
36                              <EvidenceProvider>
37                                  <Identifier SchemeID="1204">22299443</Identifier>
38                                  <PrefLabel>Example Organization</PrefLabel>
39                                  <Location>
40
41                                      <Address>
42                                          <AdminUnitLevel1>DE</AdminUnitLevel1>
43                                          <AdminUnitLevel2>DE300</AdminUnitLevel2>
44                                          <AdminUnitLevel3>11000000</AdminUnitLevel3>
45                                      </Address>
46                                  </Location>
```

```
47                              <Jurisdiction>
48                                  <!-- Country Code for Jurisdiction - Mandatory-->
49                                  <AdminUnitLevel1>DE</AdminUnitLevel1>
50
51                                  <!-- NUTS Code for Jurisdiction - Region -->
52                                   <AdminUnitLevel2>DE300</AdminUnitLevel2>
53
54                                  <!-- LAU Code for Jurisdiction - Municipality Level -->
55                                  <AdminUnitLevel3>11000000</AdminUnitLevel3>
56                              </Jurisdiction>
57                          </EvidenceProvider>
58                      </AccessService>
59                      <!-- The identifier of the Access Service, using ebcore Party ID Type.
     Used for pmode mapping -->
60                      <AccessService>
61                          <Identifier SchemeID="urn:oasis:names:tc:ebcore:partyid-
     type:iso6523:0060">8889909099</Identifier>
62                          <EvidenceProvider>
63                              <!-- The Evidence Provider Identifier -->
64                              <Identifier SchemeID="1204">0001002003</Identifier>
65                              <!-- The Evidence Provider Name -->
66                              <PrefLabel>Example Organization</PrefLabel>
67                              <Location>
68                                  <Address>
69                                      <FullAddress>Prince Street 15</FullAddress>
70                                      <AdminUnitLevel1>DE</AdminUnitLevel1>
71                                      <AdminUnitLevel2>DEF001</AdminUnitLevel2>
72                                      <AdminUnitLevel3>01001000</AdminUnitLevel3>
73                                  </Address>
74
75                              </Location>
76                              <Jurisdiction>
77                                  <!-- Country Code for Jurisdiction - Mandatory-->
78                                  <AdminUnitLevel1>DE</AdminUnitLevel1>
79
80                                  <!-- NUTS Code for Jurisdiction - Region -->
81                                  <AdminUnitLevel2>DEF001</AdminUnitLevel2>
82
83                                  <!-- LAU Code for Jurisdiction - Municipality Level -->
84                                  <AdminUnitLevel3>01001000</AdminUnitLevel3>
85                              </Jurisdiction>
86                          </EvidenceProvider>
87                      </AccessService>
88
89                      <!-- Code list of the identifier schemes -->
90                      <EvidenceSubjectIdentifierScheme>urn:oasis:names:tc:ebcore:partyid-
     type:eas:9933</EvidenceSubjectIdentifierScheme>
91                          <!-- Level Of Assurance Required for the Evidence Type by the Evidence
     Provider -->
92                      <EvidenceSubjectLevelOfAssurance>http://eidas.europa.eu/LoA/High</
     EvidenceSubjectLevelOfAssurance>
93                          <!-- The type of eID required. It can be either NaturalPerson or
     LegalPerson -->
94                      <EvidenceSubjectNature>http://eidas.europa.eu/attributes/naturalperson</
     EvidenceSubjectNature>
```

```
 95                         <!-- The Location Context of the Evidence Provider. Provides the way to
        determine the proper location of the Evidence Provider for this Evidence Type -->
 96                         <EvidenceProviderLocationContext lang="en">Location of Birth</
        EvidenceProviderLocationContext>
 97                         <EvidenceProviderLocationContext lang="de">Geburtsort</
        EvidenceProviderLocationContext>
 98                         <!-- The Minimum Jurisdiction Level Code required to find the Evidence
        Provider and its Data Service: 1 = Country, 2 = NUTS (Region), 3 = LAU (Municipality) -->
 99                         <EvidenceProviderMinimumJurisdictionLevelCode>3</
        EvidenceProviderMinimumJurisdictionLevelCode>
100                     </DataServiceEvidenceType>
101                 </rim:SlotValue>
102             </rim:Slot>
103         </rim:RegistryObject>
104     </rim:RegistryObjectList>
105 </query:QueryResponse>
```

Query Error Responses

The following table provides the list of the error responses defined for the query:

#	Error Title	Type	code	Message
1	Data Services Not Found	rs:ObjectNotFoundExceptionType	DSD:ERR:0001	No Data services were found based on the given parameters
2	Evidence Type Not Found	rs:ObjectNotFoundExceptionType	DSD:ERR:0002	The requirement requested, represented by the requirement id, does not exist
3	Bad Query Parameters	rs:InvalidRequestExceptionType	DSD:ERR:0003	The query parameters do not follow the query specification
4	Unknown Query	rs:InvalidRequestExceptionType	DSD:ERR:0004	The requested Query does not exist

Example for an empty result set:

```xml
<?xml version="1.0" encoding="UTF-8"?>
<query:QueryResponse xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
                     xmlns:rs="urn:oasis:names:tc:ebxml-regrep:xsd:rs:4.0"
                     xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:4.0"
                     xmlns:query="urn:oasis:names:tc:ebxml-regrep:xsd:query:4.0"
                     xmlns:xlink="http://www.w3.org/1999/xlink
                     status="urn:oasis:nammes:tc:ebxml-regrep:ResponseStatusType:Failure">

   <rs:Exception
       xsi:type="rs:ObjectNotFoundExceptionType"
       severity="urn:oasis:names:tc:ebxml-regrep:ErrorSeverityType:Error"
       message="No Data services were found based on the given parameters"
       code="DSD:ERR:0001">
   </rs:Exception>
</query:QueryResponse>
```