



INSPIRE

Infrastructure for Spatial Information in Europe

Technical Guidance to implement INSPIRE Discovery Services

IOC Task Force “Network Services”

Title	Technical Guidance to implement INSPIRE Discovery Services
Creator	IOC Task Force “Network Services”
Date	2010-06-17
Subject	Technical Guidance for INSPIRE Discovery Services
Status	Second Version
Publisher	IOC Task Force “Network Services”
Type	Text
Description	This document identifies the recommendations and describes the implementation guidelines for Discovery Services to fulfil the requirements of the INSPIRE directive and the Regulation on INSPIRE Network Services , Annex II Discovery Services.
Contributor	Members of the INSPIRE Drafting Team “Network Services”, members of the INSPIRE IOC Task Force Network Services
Format	MS Word (doc)
Source	Network Services Drafting Team, Technical Guidance for INSPIRE Discovery Services v2.0
Rights	
Identifier	Technical Guidance for INSPIRE Discovery Services v2.12
Language	EN
Relation	Not applicable
Coverage	Project duration

TABLE OF CONTENTS

1	Preface	3
2	Revision History	3
3	Introduction	4
4	Normative references	5
5	INSPIRE Profile of CSW ISO AP	6
5.1	General background	6
5.2	INSPIRE specific constraints	6
5.3	Discovery service operations	6
5.3.1	Get Discovery Service Metadata	7
5.3.2	Discover Metadata	11
5.3.3	Publish (Push / Pull).....	12
5.3.4	Link Discovery Service.....	13
5.4	Discovery Service Queryables	15
5.4.1	Introduction.....	15
5.4.2	Mapping common queryables	15
5.4.3	Additional queryables advertised	17
5.5	Language Requirements.....	19
5.5.1	GetCapabilities-Operation	19
5.5.2	GetRecords-Operation.....	21
5.5.3	Common concept for other operations (optional).....	21
5.5.4	Further Perspectives.....	23

1 Preface

The scope of this document is to detail the INSPIRE technical requirements for **Discovery services** based on the [Regulation on INSPIRE Network Services](#), Annex II Discovery Services such that these services can be implemented consistently across Europe.

This version of the Technical Guidance is still **draft** and the implementation recommendations are subject to validation through testing that will take place in the context of the Initial Operating Capability in the next few months.

The final version is planned to be published towards the end of 2010.

2 Revision History

Date	Release	Editor	Description
28 July 2009	2.0	Network Services Drafting Team	Two approaches to include INSPIRE metadata as part of the <i>Get Discovery Service Metadata response</i> have been incorporated
17 June 2010	2.12	Initial Operating Capability Task Force	The INSPIRE extended Capabilities XML schema has been included in Annex B
17 June 2010	2.12	Initial Operating Capability Task Force	Links with other technical components in INSPIRE have been described based on the INSPIRE domain model
17 June 2010	2.12	Initial Operating Capability Task Force	A new interpretation and recommended implementation of the Link Discovery Service operation has been described
17 June 2010	2.12	Initial Operating Capability Task Force	An approach to implement the required Language parameter has been recommended
17 June 2010	2.12	Initial Operating Capability Task Force	General editorial changes

3 Introduction

INSPIRE is a Directive proposed by the European Commission in July 2004 which defines the legal framework for the establishment and operation of an Infrastructure for Spatial Information in Europe. The purpose of the infrastructure is to enable the formulation, implementation, monitoring activities and evaluation of Community environmental policies at all levels – European, national and local – and to provide public information.

INSPIRE builds on the infrastructures for spatial information that have already been created by the Member States. The components of those infrastructures include: metadata, spatial data themes (as described in Annexes I, II, III of the Directive), network services and technologies; agreements on data sharing, access and use; coordination and monitoring mechanisms, processes and procedures.

The guiding principles of INSPIRE are:

- that the infrastructures for spatial information in the Member States should be designed to ensure that spatial data are stored, made available and maintained at the most appropriate level;
- that it is possible to combine spatial data from different sources across the Community in a consistent way and share them between several users and applications;
- that it is possible for spatial data collected at one level of public authority to be shared between all the different levels of public authorities;
- that spatial data are made available under conditions that do not restrict their extensive use; and
- that it is easy to discover available spatial data, to evaluate their fitness for purpose and to know the conditions applicable to their use.

The text of the INSPIRE Directive is available from the INSPIRE¹ web site (http://inspire.jrc.it/directive/l_10820070425en00010014.pdf). The Directive identifies what needs to be achieved, and Member States have two years from the date of adoption to bring into force national legislation, regulations, and administrative procedures that define how the agreed objectives will be met taking into account the specific situation of each Member State. To ensure that the spatial data infrastructures of the Member States are compatible and usable in a Community and trans-boundary context, the Directive requires that common Implementing Rules (IR) are adopted in a number of specific areas. Implementing Rules are adopted as Commission Decisions, and are binding in their entirety. The Commission is assisted in the process of adopting such rules by a regulatory committee composed by representatives of the Member States and European Parliament. The committee is chaired by a representative of the Commission (this is known as the Comitology procedure).

The scope of this document is to detail the INSPIRE technical requirements for **Discovery services** based on the [Regulation on INSPIRE Network Services](#), such that these services can be implemented consistently across Europe.

The Technical Guidance is in conformance with European and international standards, current practices in stakeholder communities and relevant European initiatives such as e-Government, and the EU interoperability framework. In the context of network services, the [CSW ISO AP] has been identified as the relevant standard to implement INSPIRE Discovery Services.

This document will be publicly available as a 'non-paper', as it does not represent an official position of the Commission, and as such cannot be invoked in the context of legal procedures.

¹ <http://inspire.jrc.it/>

4 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

INSPIRE, INS NS Commission Regulation (EC) No 976/2009 of 19 October 2009 implementing Directive 2007/2/EC of the European Parliament and of the Council as regards the Network Services

INSPIRE, INS MD Commission Regulation (EC) No 1205/2008 of 3 December 2008 implementing Directive 2007/2/EC of the European Parliament and of the Council as regards metadata (Text with EEA relevance). See also Corrigendum to INSPIRE Metadata Regulation

INSPIRE, INS MD IMPL, INSPIRE Metadata Implementing Rules: Technical Guidelines based on EN ISO 19115 and EN ISO 19119, v1.1 (2009-02-18).

INSPIRE, INS ARC, Network Services Architecture Version 3.0 (30-09-2008)

ISO 15836: 2003, *Information and documentation- The Dublin Core metadata element set*

ISO 19115: 2003, *Geographic information – Metadata*

ISO 19115/Cor.1:2006, *Geographic information – Metadata, Technical Corrigendum 1*

ISO 19119:2005, *Geographic information – Services*

ISO 19119:2005 PDAM 1, *Geographic information – Services*

ISO/TS 19139:2006, *Geographic information - Metadata - Implementation specification*

OGC 07-006, **OGC CSW**, OGC™ Catalogue Services Specification, version 2.0.2 (Corrigendum Release 2).

OGC 07-045, **CSW ISO AP**, OGC™ Catalogue Services Specification 2.0.2 - ISO Metadata Application Profile for CSW 2.0, version 1.0.0 (2007).

OGC 05-008, **OGC OWS**, OGC Web Services Common Specification, version 1.0 (May 2005)

5 INSPIRE Profile of CSW ISO AP

5.1 General background

The base specification of an INSPIRE Discovery Service is [CSW ISO AP]. An INSPIRE Discovery Service will implement the minimal mandatory behaviour from a [CSW ISO AP] compliant service and the extensions as required by the INSPIRE Directive.

The extended behaviour for an INSPIRE Discovery Service with respect to the requirements of the INSPIRE Directive and the [Regulation on INSPIRE Network Services \[INS NS\]](#) consists of:

- Discovery Service Operations
- Discovery Service Queryables
- Discovery Service Multilingual aspects

The following sections specify required extensions to the given specifications.

5.2 INSPIRE specific constraints

Here is an initial list of INSPIRE constraints applicable to an [CSW ISO AP] base Discovery Service:

- SC1. An INSPIRE Discovery Service shall implement bindings for all discovery service operations as defined in [CSW ISO AP]. For SOAP, SOAP v2.1 will be used for the binding and WSDL1.1 for the interface definition. An example WSDL describing the INSPIRE Discovery Service interface can be found at "http://schemas.opengis.net/csw/2.0.2/examples/wSDL/2.0.2/".
- SC2. The list of federated catalogues, if any, shall be advertised as the result of a Service metadata response to a discover metadata request.
- SC3. The additional search attributes listed in section 5.4 are mandatory and shall be supported.
- SC4. The additional search attributes listed in section 5.4 shall be advertised as the result of a Service metadata response to a discover metadata request.
- SC5. The resource type 'http://www.isotc211.org/schemas/2005/gmd' shall be supported in case of a supported harvesting operation.

5.3 Discovery service operations

The base functionality of an INSPIRE Discovery Service is derived from [CSW ISO AP]. The following sections specify the extensions to this base specification that are derived from the INSPIRE requirements as defined by [INS NS].

[CSW ISO AP] distinguishes between two types of catalogue services: A 'read-only' catalogue service that has to provide operations labelled 'CSW' and a transactional catalogue service that has to provide operations labelled 'CSWT'. This distinction is derived from the OGC catalogue base specification [OGC CSW].

Table 1 **Error! Reference source not found.** shows the relation between operations of an INSPIRE Discovery Service and the corresponding catalogue service operation as defined by [OGC CSW].

Table 1: INSPIRE Discovery Services Operations

INSPIRE Discovery Services operations	INSPIRE Cardinality	OGC CSW ISO AP operations	OGC CSW ISO AP cardinality
Get Discovery Service Metadata	Mandatory	OGC_Service.GetCapabilities	Mandatory
Discover Metadata	Mandatory	CSW Discovery.GetRecords	Mandatory

Publish Metadata	Conditional	CSWT Manager.Transaction or CSWT Manager.Harvest	Conditional
Link Discovery service	Mandatory	Combination of OGC_Service.GetCapabilities and CSW_Discovery.GetRecords OR using Publish Metadata operation: CSWT Manager.Transaction or CSWT Manager.Harvest	Mandatory

5.3.1 Get Discovery Service Metadata

IR	Reference	2
	Operation name	Get Discovery Service Metadata
	Obligation / condition	Mandatory
CSW ISO AP	Operation name	OGC_Service.GetCapabilities
	Definition	The GetCapabilities operation allows clients to retrieve service metadata from a server.

5.3.1.1 **Request Parameters**

See [CSW ISO AP]. INSPIRE extends this operation with an additional parameter that indicates the client's preferred language. The recommended approach to implement this extension is described in 3.5.1.

5.3.1.2 **Response Parameters**

The response can be implemented in two ways: 1. by referencing a URL to where discovery service metadata elements required by INSPIRE are available or 2. by including all required metadata explicitly in the capabilities response.

In case of 1, the URL reference to discovery service metadata elements required by INSPIRE should be mapped in the extended capabilities by metadataURL element. Furthermore the required OGC CSW capabilities (see Table 2) should be available. The metadataURL is reported in the extended capabilities as shown below:

```
<complexType name="ExtendedCapabilitiesType">
  <annotation>
    <documentation>
      Extended metadata capabilities for the discovery INSPIRE Network
      Service
    </documentation>
  </annotation>
  <sequence>
    ...
    <element name="MetadataUrl" type="gmd:CI_OnlineResource_Type"
minOccurs="0"/>
    ...
  </sequence>
</complexType>
```

In case of 2, the response parameters are a combination of elements represented in a GetCapabilities response [CSW ISO AP] and the discovery service metadata elements required by INSPIRE. Table 2 shows the parameters that are part of a GetCapabilities Response according to [CSW ISO AP].

Table 2: GetCapabilities Response [CSW ISO AP].

CSW metadata
Service identification

ServiceType	The ServiceType for an CSW ISO AP is fixed to "CSW". The Spatial Data Service Type as defined by INSPIRE MD ('discovery') will be mapped to an INSPIRE keyword for the GetCapabilities response.
ServiceTypeVersion	Version of this service type implemented by this server. This value is fixed for the INSPIRE profile of CSW ISO AP to '2.0.2'.
Title	Title of this server, normally used for display to a human
Abstract	Brief narrative description of this server, normally available for display to a human
Keywords	Unordered list of one or more commonly used or formalized word(s) or phrase(s) used to describe this server. The Spatial Data Service Type as defined by INSPIRE MD, with a fixed value 'discovery' has to be provided as an INSPIRE keyword.
Fees	Fees and terms for retrieving data from or otherwise using this server, including the monetary units as specified in ISO 4217
AccessConstraints	Access constraints that should be observed to assure the protection of privacy or intellectual property, and any other restrictions on retrieving or using data from or otherwise using this server
Service provider	
ProviderName	Unique identifier for service provider organization
Providersite	Reference to the most relevant web site of the service provider
ServiceContact	Information for contacting service provider
Operations metadata	
Operation	Metadata for one operation that this server interface implements
Parameter	Parameter valid domain that applies to one or more operations which this server implements
Constraint	Constraint on valid domain of a non-parameter quantity that applies to this server
ExtendedCapabilities	Metadata about server and software additional abilities
Filter capabilities	
Filter_Capabilities	The following elements are examples of valid filter operators: And, Or, Not, PropertyIsEqualTo, PropertyIsNotEqualTo, PropertyIsLessThan, PropertyIsGreaterThan, PropertyIsLike, PropertyIsNull, PropertyIsLessThanOrEqualTo, PropertyIsGreaterThanOrEqualTo, BBOX, Intersects, Disjoint..

See Annex B for the full capabilities document XSD Schema.

The [CSW ISO AP] operations metadata section fulfils the requirements from clause 2.2.2 of the [INS MD].

Table 3 indicates which service metadata is required by INSPIRE [INS MD]. These fulfil the requirements of clause 2.2.1 of [INS MD]. The remaining requirements from INSPIRE [INS MD] are addressed in Section 5.5 of these technical guidelines.

Table 3: Service metadata required by [INS MD].

INSPIRE Metadata	
Identification	Obligation
Resource title (B1.1)	M
Resource abstract (B1.2)	M
Resource Type (B1.3)	M
Resource Locator (B1.4)	C
Coupled Resource (B1.6)	C (Not applicable to discovery service)
Classification of spatial data and services	
Spatial data service type (B2.2)	M
Keyword	
Keyword value (B3.1)	M
Originating controlled vocabulary (B3.2)	C
Geographic location	
Geographic bounding box (B4.1)	C (It is not recommended to implement this element for discovery service)
Temporal reference (only one of the elements below are required)	
Extent (B5.1)	C
Date of publication (B5.2)	C
Date of last revision (B5.3)	C
Date of creation (B5.4)	C
Quality and validity	
Spatial Resolution (B6.2)	C (Not applicable to discovery service)
Conformity	
Specification (B7.1)	M
Degree (B7.2)	M
Constraint related to access and use	
Conditions applying to access and use (B8.1)	M
Limitations on public access (B8.2)	M
Responsible organization	
Responsible party (B9.1)	M
Responsible party role (B9.2)	M

Metadata on metadata	
Metadata point of contac (B10.1)	M
Metadata Date (B10.2)	M
Metadata Language (B10.3)	M

5.3.1.3 ***Discovery Service Metadata***

[CSW ISO AP] specifies a GetCapabilities operation with several service metadata sections. The service metadata in the capabilities documents should be in conformance with the requirements of INSPIRE service metadata [INS NS].

Table 4 gives the mapping from the INSPIRE metadata IR elements to the capabilities as used for the implementation of the Discovery service by [CSW ISO AP].

The first two columns are from [INS MD IMPL]. In the column "Capabilities CSW ISO AP" of Table 4 the capabilities mapping is defined. In the last column the mappings as defined in the mapping ISO 19115/ISO 19119 of the DT Metadata are shown.

Table 4: INSPIRE metadata IR elements to CSW ISO AP capabilities metadata

INSPIRE Metadata element	M/C/O	Capabilities CSW ISO AP	Type Field	ISO 19139 / CSW ISO AP
Resource title (B1.1)	M	/csw:Capabilities/Serviceidentification/Title	String	identificationInfo[1]*/citation*/title [ISO 19139]
Resource abstract (B1.2)	M	/csw:Capabilities/Serviceidentification/Abstract	String	identificationInfo[1]*/abstract [ISO 19139]
Resource Type (B1.3)	M	/ExtendedCapabilities/ResourceType		identificationInfo[1]/hierarchyLevel [ISO 19139]
Resource Locator (B1.4)	C	/csw:Capabilities/OperationsMetadata/Operation/GetCapabilities/DCP/HTTP/@xlink:href	URL	distributionInfo*/transferOptions*/onLine*/linkage [ISO 19139]
Coupled Resource (B1.6)	C	Not applicable to discovery service	-	identificationInfo[1]*/operatesOn
Spatial data service type (B2.2)	M	/ExtendedCapabilities/SpatialDataServiceType	GenericName	identificationInfo[1]*/serviceType [CSW ISO Metadata AP]
Keyword value (B3.1)	M	/ExtendedCapabilities/INSPIREKeywords	String	identificationInfo[1]*/descriptiveKeywords*/keyword [ISO 19139]
Originating controlled vocabulary (B3.2)	C	/ExtendedCapabilities/INSPIREKeywords		identificationInfo[1]*/descriptiveKeywords*/thesaurusName [ISO 19139]
Temporal extent (B5.1)	C	/ExtendedCapabilities/TemporalReference	Date	identificationInfo[1]*/extent*/temporalElement*/extent [ISO 19139]
Date of publication (B5.2)	C	/ExtendedCapabilities/TemporalReference	Date	identificationInfo[1]*/citation*/date[./*/dateType*/text()='publication']*/date [ISO 19139]
Date of last revision (B5.3)	C	/ExtendedCapabilities/TemporalReference	Date	identificationInfo[1]*/citation*/date[./*/dateType*/text()='revision']*/date [ISO 19139]
Date of creation (B5.4)	C	/ExtendedCapabilities/TemporalReference	Date	identificationInfo[1]*/citation*/date[./*/dateType*/text()='creation']*/date [ISO 19139]

INSPIRE Metadata element	M/C/O	Capabilities CSW ISO AP	Type Field	ISO 19139 / CSW ISO AP
Specification (B7.1)	M	/ExtendedCapabilities/Conformity	string	dataQualityInfo/*/report*/result*/specification [ISO 19139]
Degree (B7.2)	M	/ExtendedCapabilities/Conformity	boolean	dataQualityInfo/*/report*/result*/pass [ISO 19139]
Conditions applying to access and use (B8.1)	M	/csw:Capabilities/Serviceidentification/Fees	string	identificationInfo[1]*/resourceConstraints*/useLimitation [ISO 19139]
Limitations on public access (B8.2)	M	/csw:Capabilities/Serviceidentification/AccessConstraints	string	identificationInfo[1]*/resourceConstraints*/accessConstraints [ISO 19139]
Responsible party (B9.1)	M	csw:Capabilities/Serviceprovider/ProviderName and csw:Capabilities/Serviceprovider/ServiceContact/ContactInfo/Address/ElectronicMailAddress	string	identificationInfo[1]*/pointOfContact*/organisationName and identificationInfo[1]*/pointOfContact/address/electronicMailAddress [ISO 19139]
Responsible party role (B9.2)	M	csw:Capabilities/Serviceprovider/role	string	identificationInfo[1]*/pointOfContact*/role [ISO 19139]
Metadata point of contact (B10.1)	M	/ExtendedCapabilities/MetadataPointOfContact	string	contact
Metadata Date (B10.2)	M	/ExtendedCapabilities/MetadataDate	Date	dateStamp
Metadata Language (B10.3)	M	/ExtendedCapabilities/metadataLanguage	string	language

5.3.2 Discover Metadata

IR	Reference	3
	Operation name	Discover Metadata
	Obligation / condition	Mandatory
CSW ISO AP	Operation name	CSW Discovery.GetRecords
	Definition	The primary means of a GetRecords operation is to search and to present metadata records.

5.3.2.1 Request Parameters

According to 3.1 [INS NS] two parameters have to be supported by the service :

- Language
- Query

The query parameter is realized by the filter statement of the GetRecords-Request itself. The query has to support all search attributes defined in chapter 5.4.

The language parameter is realized by using the Language queryable in a filter statement. With that a client can request metadata records in a specific metadata language.

Concerning the query language the INSPIRE requirements do not extend the basic requirements defined by [CSW ISO AP].

Example:

```
<csw:GetRecords xmlns:csw="http://www.opengis.net/cat/csw/2.0.2"
service="CSW" resultType="results"
outputFormat="application/xml"
outputSchema="http://www.isotc211.org/2005/gmd"
startPosition="1" maxRecords="10">
  <csw:Query typeNames="gmd:MD_Metadata">
    <csw:ElementSetName
typeNames="gmd:MD_Metadata">full</csw:ElementSetName>
    <csw:Constraint version="1.1.0">
      <ogc:Filter xmlns:ogc="http://www.opengis.net/ogc">
        <ogc:And>
          <ogc:PropertyIsEqualTo>
            <ogc:PropertyName>apiso:Language</ogc:PropertyName>
            <ogc:Literal>eng</ogc:Literal>
          </ogc:PropertyIsEqualTo>
          <ogc:PropertyIsEqualTo><ogc:PropertyName>apiso:ServiceType</ogc:PropertyNam
e>
            <ogc:Literal>wms</ogc:Literal>
          </ogc:PropertyIsEqualTo>
        </ogc:And>
      </ogc:Filter>
    </csw:Constraint>
  </csw:Query>
</csw:GetRecords>
```

5.3.2.2 **Response Parameters**

At least all mandatory INSPIRE metadata elements should be returned for one or more corresponding metadata records.

5.3.3 Publish (Push / Pull)

5.3.3.1 **Push**

IR	Reference	3
	Operation name	Publish Metadata (push)
	Obligation / condition	Conditional: one of Transaction or Harvest has to be supported
CSW ISO AP	Operation name	CSWT Manager.Transaction
	Definition	The Transaction operation defines an interface for creating, modifying and deleting catalogue records.

Request Parameters

No additional INSPIRE request parameters are required.

Response Parameters

No additional INSPIRE response parameters are required.

5.3.3.2 **Pull**

IR	Reference	3
	Operation name	Publish Metadata (pull)
	Obligation / condition	Conditional: one of Transaction or Harvest has to be supported
CSW	Operation name	CSWT Manager.Harvest

ISO AP	Definition	The Harvest operation "pulls" data into the catalogue.
--------	------------	--

Request Parameters

Within the context of INSPIRE an INSPIRE Discovery Service is at least able to harvest single metadata documents that are provided through some online location.

[**CSW ISO AP**] specifies a harvest operation that is based on the related operation of the underlying base specification [**OGC CSW**]. For an INSPIRE Discovery Service, the following settings have to be met if a resource is requested to be harvested by a catalogue service instance.

- **RESOURCE**TYPE: The resource type of the resource being harvested has to be `http://schemas.opengis.net/iso/19139/20060504/gmd`
- **RESOURCE**FORMAT: The resource format of the resource being harvested has to be "application/xml"

The following XML code fragment shows a valid Harvest request:

```
<?xml version="1.0" encoding="UTF-8"?>
<csw:Harvest service="CSW" version="2.0.2"
xmlns:csw="http://www.opengis.net/cat/csw/2.0.2">
  <csw:Source>http://www.myhost.com/metadata_dataset.xml</csw:Source>
  <csw:ResourceType>http://schemas.opengis.net/iso/19139/20060504/gmd</csw:ResourceType>
  <csw:ResourceFormat>application/xml</csw:ResourceFormat>
  <csw:HarvestInterval>P1Y2M3DT10H30M0S</csw:HarvestInterval>
</csw:Harvest>
```

Response Parameters

No additional response parameters are required.

5.3.4 Link Discovery Service

The Link Discovery Service function allows the declaration of the availability of a Discovery Service for the discovery of resources through the Member State Discovery Service while maintaining the resource metadata at the owner location.

The IOC TF recommends this operation to be implemented via the Discovery Service, Publish Metadata operation.

The Publish Metadata function enables the publication of the INSPIRE metadata elements of resources at the Discovery Service. The Regulation on INSPIRE Network Services imposes two alternatives for implementing the Publish Metadata operation: the push mechanism or the pull mechanism. For the implementation of the link discovery service operation, the both mechanisms can be used. For further description of the implementation of the push mechanism we refer to Section 8.2.3.1 on the Transaction operation of the [**CSW ISO AP**]. For further description of the implementation of the pull mechanism we refer to Section 8.2.3.2 on the Harvest operation of the [**CSW ISO AP**].

The Discovery Service that is used to implement the Link Discovery Service Operation must itself be part of the network.

If a member state chooses to implement the link discovery service operation by enabling federated search at the Discovery Service, the IOC TF recommends it being implemented by two operations of [**CSW ISO AP**]: GetRecords and GetCapabilities:

The above mentioned interpretation of the Link Service still needs to be confirmed by the European Commission (V2.1, march 2010).

[CSW ISO AP] defines a mechanism to advertise remote or federated Discovery services for remote search through the GetRecords request of the Discovery Service instance (see chapter 10.8.4.13 and Annex B of [OGC CSW]). Discovery services may advertise, in the capabilities document, to which other Discovery Service a query is distributed using an operation constraint called "FederatedCatalogues". Operation constraints are described in Subclause 7.4.5 of **[OGC OWS]**. In **[CSW ISO AP]** a federated Discovery Service must be listed by the URL of the HTTP/KVP/GET GetCapabilities request.

IR	Reference	3
	Operation name	Link Discovery Service
	Obligation / condition	Mandatory
CSW ISO AP	Operation name	OGC_Service.GetCapabilities CSW Discovery.GetRecords
	Definition	The GetRecords operation is able to search and to present metadata records from federated Discovery Services. Federated Discovery Services are advertised in the Capabilities.

5.3.4.1 **Request Parameters**

No additional request parameters are required. However, it is demanded that the hopCount attribute of the Distributed search element of a GetRecords request should always have the value "2" to avoid circular searches.

GetRecords Request:

```
<csw:GetRecords xmlns:csw="http://www.opengis.net/cat/csw/2.0.2"
service="CSW" resultType="results"
outputFormat="application/xml"
outputSchema="http://www.isotc211.org/2005/gmd"
startPosition="1" maxRecords="10">
  <csw:DistributedSearch hopCount="2"/>
    <csw:Query typeNames="gmd:MD_Metadata">
      <csw:ElementSetName typeNames="gmd:MD_Metadata">full</csw:ElementSetName>
      <csw:Constraint version="1.1.0">
        <ogc:Filter xmlns:ogc="http://www.opengis.net/ogc">
          <ogc:And>
            <ogc:PropertyIsEqualTo>
              <ogc:PropertyName>apiso:Language</ogc:PropertyName>
              <ogc:Literal>eng</ogc:Literal>
            </ogc:PropertyIsEqualTo>
            <ogc:PropertyIsEqualTo>
              <ogc:PropertyName>apiso:ServiceType</ogc:PropertyName>
              <ogc:Literal>wms</ogc:Literal>
            </ogc:PropertyIsEqualTo>
          </ogc:And>
        </ogc:Filter>
      </csw:Constraint>
    </csw:Query>
  </csw:GetRecords>
```

5.3.4.2 **Response Parameters**

GetRecords Response:

No additional parameters are required.

GetCapabilities Response:

The supported federated catalogues shall be advertised to be supported by an INSPIRE Discover or Collect Metadata operation. An appropriate <OperationsMetadata>-section of a capabilities document is shown next (excerpt from full capabilities):

```
<ows:OperationsMetadata>
  <ows:Constraint name="FederatedCatalogues">
    <ows:Value>http://www.mycatalogue.com</ows:Value>
    <ows:Value>http://www.yourcatalogue.com</ows:Value>
  <ows:Value>http://www.theotherguyscatalogue.com</ows:Value>
  </ows:Constraint>
</ows:OperationsMetadata>
```

5.4 Discovery Service Queryables

5.4.1 Introduction

[CSW ISO AP] as the base specification for the INSPIRE Discovery Service is based on the ISO 19115/19119 information model. As such it is required that the abstract INSPIRE metadata elements (see [INS MD]) could be requested though the INSPIRE Discovery Service interface within a query.

The relation between ISO 19115 and ISO 19119 and the elements of the INSPIRE Metadata IR is described in [INS MD IMPL].

Clause 5.4.2 defines the required mappings to common queryables specified by [CSW ISO AP] and [OGC CSW]. Clause 5.4.3 defines additional queryables required by [INS MD] and [INS MD IMPL].

5.4.2 Mapping common queryables

Table 4 identifies these INSPIRE elements from [INS NS] and connects them to appropriate queryables defined by OGC [CSW ISO AP]. Annotations are given wherever necessary.

The third column in Table 4 indicates if the queryable must be supported by an INSPIRE Discovery Service or not.

Table 4: INSPIRE queryables

INSPIRE queryable metadata elements	INSPIRE Discovery Service (CSW ISO AP) queryable properties	Is mandatory for INSPIRE Discovery Service? ²
Resource title	Title	Yes
Resource Abstract	Abstract	Yes
Resource Type	Type	Yes
Unique resource identifier	ResourceIdentifier	Yes
Topic category	TopicCategory	Yes, if resources of type 'dataset' or 'series' are supported by the catalogue service instance
Spatial data service type	ServiceType	Yes, if resources of type 'service' are supported by the catalogue service instance.
Keyword	Subject	Yes
Geographic bounding box	BoundingBox	Yes, if resources of type 'dataset' or 'series' are supported by the catalogue service instance

² See Article 11 (2) of the INSPIRE directive and Annex II Part A of the Network services IR.

Temporal Reference	TemporalExtent PublicationDate RevisionDate CreationDate	Yes
Spatial resolution	SpatialResolution	Yes, if resources of type 'dataset' or 'series' are supported by the discovery service instance
Responsible party	OrganisationName	Yes
Degree	-(not supported)	Yes
Specification	-(not supported)	Yes
Limitations on public access	-(not supported)	Yes
Conditions applying to access and use	-(not supported)	Yes
Lineage	-(not supported)	Yes

The only queryable that is not defined by [INS MD IMPL] is "Metadata language". This is a mandatory queryable for INSPIRE Discovery Service to support the "Language" query parameter as defined by clause 3.1 in [INS NS].

Table 5 identifies the additional queryables that are not supported by [CSW ISO AP], but required by [INS MD]. X-Path expression and data types are taken from [INS MD IMPL].

Table 5: INSPIRE additional queryables

Name	Definition	Data type	Property Mapping to Information Model
Degree	This is the degree of conformity of the resource to the related specification.	Boolean	dataQualityInfo/*/report/*/result/*/pass
Specification	This is a citation of the specification to which the resource is expected to conform.	Specification, see Table 6	
LimitationsOnPublicAccess	This metadata element shall provide information on the limitations (if they exist) and the reasons for such limitations (Article 5-2(e))	LimitationsOnPublicAccess, see Table	
ConditionApplyingToAccessAndUse	This metadata element defines the conditions for access and use of spatial datasets and services, and where applicable, corresponding fees as required by Articles 5-2 (b) and 11-2 (f).	CharacterString	identificationInfo[1]*/resourceConstraints/*/useLimitation
Lineage	This is a statement on process history and/or overall quality of the spatial dataset.	CharacterString	dataQualityInfo/*/lineage/*/statement
ResponsiblePartyRole	The function performed by the responsible party.	Codelist (CI_RoleCode codelist), one of : resourceProvider, custodian, owner,	identificationInfo[1]*/pointOfContact/*/role

		user, distributor, originator, pointOfContact, principallInvestigator, processor, publisher, author	
--	--	---	--

Table 6: Composition of union Specification

Name	Definition	Data type	Property Mapping to Information Model
SpecificationTitle	Title of the specification	CharacterString	dataQualityInfo/*/report/*/result/*/specification/*/title
SpecificationDate	Reference date of specification	Date-8601	dataQualityInfo/*/report/*/result/*/specification/*/date/*/date
SpecificationDateType	Type reference date of specification	Codelist (CI_DateTypeCode), one of: creation, revision or publication	dataQualityInfo/*/report/*/result/*/specification/*/date/*/dateType

Table 7: Composition of union LimitationsOnPublicAccess

Name	Definition	Data type	Property Mapping to Information Model
AccessConstraints	Access constraints applied to assure the protection of privacy or intellectual property, and any special restrictions or limitations on obtaining the resource.	Codelist (MD_RestrictionCode), one of: copyright, patent, patentPending, trademark, license, intellectualPropertyRights, restricted, otherRestrictions	identificationInfo[1]/*/resourceConstraints/*/accessConstraints
OtherConstraints	other restrictions and legal prerequisites for accessing and using the resource.	CharacterString	identificationInfo[1]/*/resourceConstraints/*/otherConstraints
Classification	name of the handling restrictions on the resource.	CodeList (MD_ClassificationCode), one of: unclassified, restricted, confidential, secret, topSecret	identificationInfo[1]/*/resourceConstraints/*/classification

5.4.3 Additional queryables advertised

[CSW ISO AP] defines a mechanism to advertise additional queryables through the capabilities document of the Discovery service instance (see chapter 7.5, table 23 in [CSW ISO AP]).

All supported ISO queryables shall be advertised to be supported by an INSPIRE Discover Metadataoperation; in addition, all INSPIRE queryables shall be listed in the section "AdditionalQueryables". A sample <OperationsMetadata>-section of a capabilities document is shown next (excerpt from full capabilities):

```
<ows:OperationsMetadata>
  <ows:Operation name="GetRecords">
    [...] (List of DCPs, parameters here)
  <ows:Constraint name="SupportedISOQueryables">
    <ows:Value>Language</ows:Value>
    <ows:Value>CreationDate</ows:Value>
    <ows:Value>PublicationDate</ows:Value>
    <ows:Value>OrganisationName</ows:Value>
    <ows:Value>ResourceIdentifier</ows:Value>
```

```
<ows:Value>TopicCategory</ows:Value>
<ows:Value>DistanceValue</ows:Value>
<ows:Value>DistanceUOM</ows:Value>
<ows:Value>TempExtent_begin</ows:Value>
<ows:Value>TempExtent_end</ows:Value>
<ows:Value>ServiceType</ows:Value>
<ows:Value>Denominator</ows:Value>
</ows:Constraint>
<ows:Constraint name="AdditionalQueryables">
  <ows:Value>Degree</ows:Value>
    <ows:Value>AccessConstraints</ows:Value>
    <ows:Value>OtherConstraints</ows:Value>
    <ows:Value>Classification</ows:Value>
    <ows:Value>ConditionApplyingToAccessAndUse</ows:Value>
    <ows:Value>Lineage</ows:Value>
    <ows:Value>ResponsiblePartyRole</ows:Value>
    <ows:Value>SpecificationTitle</ows:Value>
  <ows:Value>SpecificationDate</ows:Value>
  <ows:Value>SpecificationDateType</ows:Value>
</ows:Constraint>
  </ows:Operation>
</ows:OperationsMetadata>
```

5.5 Language Requirements

The IR Network Services requires supporting multilingual aspects for network services.

General concept:

The basic principle of the realisation to support multilingualism is as follows:

A network service metadata response shall contain a list of the natural languages supported by the service. This list shall contain one or more languages that are supported.

A client may indicate in a request a specific language. If the requested language is contained in the list of supported languages, the natural language fields of the service response shall be in that specific language. If the requested language is not supported this parameter is to be ignored by the service.

General considerations:

There is not yet a standard way to deal with multilingualism when using the current ISO or OGC public Standard specifications to implement INSPIRE Network Services.

For this reason INSPIRE Network Services extend the OGC-standards for multilingualism in the following way:

5.5.1 GetCapabilities-Operation

GetCapabilities-Request:

The http/get binding of the GetCapabilities-Operation is extended by an additional parameter that indicates the client's preferred language.

The Name of this parameter is "LANGUAGE". The parameter values are based on ISO 639-2/T alpha 3 codes as used in the INSPIRE Metadata Implementing Rule.

Parameter Name	Parameter Value	Is mandatory for a Client Request?	Is mandatory to support for the Service?
LANGUAGE	ISO 639-2/T alpha 3 code (corresponds to the code used in the INSPIRE Metadata Implementing Rules)	No, it is optional.	Yes, it is mandatory to be supported and shall be processed if the parameter is present in a client's request with a supported language code. If the parameter is absent in clients request or it requested an unsupported language the service shall response in the service default language.

Schema:

[OCG-GetCapabilities-Request]&LANGUAGE=<ISO 639-2/T alpha 3 code>

Example:

http://inspire.network.service.example/service?SERVICE=CSW&VERSION=2.0.2&LANGUAGE=eng

GetCapabilities-Response:

If a Client requested a specific supported language the following fields of the GetCapabilities-Response are affected:

- Titles
- Abstracts
- Descriptions

If a Client requested an unsupported language or the parameter is absent in the request, these fields shall be in the service default language. This behaviour equals as if the parameter is ignored and assures that any clients may still interact with the service as supplied by the OGC standard.

Extended Capabilities

To advertise the supported languages the service shall respond with Extended Capabilities.

The Extended Capabilities shall

1. indicate the **current used language** for the current GetCapabilities-Response,
2. contain a **list of supported languages** and
3. indicate the **service default language**.

Current used language:

Depending on the requested language the value of the current language corresponds to the current used language. If a supported language was requested, the current language field shall correspond to that requested language. If an unsupported language was requested or if no specific language was requested the current language field shall correspond to the default language.

List of supported languages:

The list of supported languages shall consist of at least one supported language. Regardless of the requested language, the list of supported languages is invariant for each GetCapabilities-Response.

Current used language:

Exact one language of the listed languages shall be indicated as the service default language (default="true"). Regardless of the requested language, the service default language is invariant for each GetCapabilities-Response.

The Extended Capabilities use the XML Schema as defined in Annex B.

Example 1, service supports French and English, Service default language is French

Response to [OCG-GetCapabilities-Request]&LANGUAGE=eng

```
<INSPIRE:ViewCapabilities>
  <INSPIRE:Languages> <!--list of supported languages -->
    <INSPIRE:Language>eng</Language>
    <INSPIRE:Language default="true">fra</Language>
  </INSPIRE:Languages>
  <INSPIRE:CurrentLanguage>
    <INSPIRE:Language>eng</Language>
  </INSPIRE:CurrentLanguage>
</INSPIRE:ViewCapabilities>
```

Response to [OCG-GetCapabilities-Request] or [OCG-GetCapabilities-Request]&LANGUAGE=fra

```
<INSPIRE:ViewCapabilities>
  <INSPIRE:Languages> <!--list of supported languages -->
    <INSPIRE:Language>eng</Language>
    <INSPIRE:Language default="true">fra</Language>
  </INSPIRE:Languages>
  <INSPIRE:CurrentLanguage>
    <INSPIRE:Language>fra</Language>
  </INSPIRE:CurrentLanguage>
</INSPIRE:ViewCapabilities>
```

Example 2, service supports only German

Response to any GetCapabilities-Request:

```
<INSPIRE:ViewCapabilities>
```

```

<INSPIRE:Languages> <!--list of supported languages -->
  <INSPIRE:Language default="true">deu</Language>
</INSPIRE:Languages>
<INSPIRE:CurrentLanguage>
  <INSPIRE:Language>deu</Language>
</INSPIRE:CurrentLanguage>
</INSPIRE:ViewCapabilities>

```

5.5.2 GetRecords-Operation

[CSW ISO AP] requires a Language queryable to be supported in a filter statement (see chapter Discover Metadata) of a catalogue service. As a consequence INSPIRE Discovery Services are required to support this accordingly and to ensure the following behaviour:

- a client CSW Discovery.GetRecords request containing no language specific filter is to be responded including all meta data elements that comply to the request independent from any language. Dependent on the discovery service contents, the response will involve metadata records of several natural languages.
- a client CSW Discovery.GetRecords request containing a language specific filter requiring a response of meta data records of that specific language:
If the service does not contain any meta data records of that specific language or it is an unknown language to the service, the service responses normally with an empty result set (without raising an exception).
- an invalid client CSW Discovery.GetRecords request (not compliant to CSW ISO AP) containing a language specific filter is to be responded with an exception in the default or in a requested and supported language. The use of a language specific filter itself shall not raise an exception.

It is worth noting that the language of the metadata records contained by a service may not correspond to the list of supported languages in the GetCapabilities-Response.

5.5.3 Common concept for other operations (optional)

Although further multilingual support is not required for INSPIRE Network Services, it may be desired by a service provider to implement further multilingual support such as

- multilingual error messages
- multilingual GetFeatureInfo-Operation for WMS
- multilingual GetMap-Operation for WMS

For that reason a further implementation concept for multilingual aspects is recommended as follows:

The required INSPIRE Extension described before already provides language specific capabilities for a service. For further language support for other operation it is recommended to replace the operation-online-resources in each language specific GetCapabilities-Response by a specific operation-online-resource for that language.

To support the additional operation-online-resources the service shall listen at the language specific operation end points to distinguish for the requested languages.

To show the behaviour hereafter an example of the behaviour is given. The example shows how to extend the WMS.getMap()-Operation to support multilingual error messages. It is adaptable for other operations and the discovery services in the same way.

1. The client sends the initial Request for Capabilities:
[OCG-GetCapabilities-Request]
2. The service responses with extended Capabilities including the supported Languages:

```

<inspire_lang:ExtendedCapabilities>
  <inspire_lang:Languages>

```

```

    <inspire_lang:Language>deu</inspire_lang:Language>
    <inspire_lang:Language
      default="true">eng</inspire_lang:Language>
  </inspire_lang:Languages>
  <inspire_lang:CurrentLanguage>eng</inspire_lang:CurrentLanguage>
</inspire_lang:ExtendedCapabilities>

```

3. The Client sends a language specific request for capabilities
[OCG-GetCapabilities-Request]&LANGUAGE=eng
4. The service response with language specific capabilities containing:
 - a. translated natural language fields (titles, abstracts)
 - b. language specific entry points for all other language specific operations:

TODO

Response to [OCG-GetCapabilities-Request]&LANGUAGE=eng or [OCG-GetCapabilities-Request]

```

...
<ows:Operation name="GetRecords">
  <ows:DCP>
    <ows:HTTP>
      <ows:Post
        xlink:href="http://someHOST.net/eng/SOAPservices/services/CSWDiscovery">
          <ows:Constraint name="PostEncoding">
            <ows:Value>XML</ows:Value>
            <ows:Value>SOAP</ows:Value>
          </ows:Constraint>
        </ows:Post>
      </ows:HTTP>
    </ows:DCP>
  </ows:Operation>
...

```

Response to [OCG-GetCapabilities-Request]&LANGUAGE=deu

```

...
<ows:Operation name="GetRecords">
  <ows:DCP>
    <ows:HTTP>
      <ows:Post
        xlink:href="http://someHOST.net/deu/SOAPservices/services/CSWDiscovery">
          <ows:Constraint name="PostEncoding">
            <ows:Value>XML</ows:Value>
            <ows:Value>SOAP</ows:Value>
          </ows:Constraint>
        </ows:Post>
      </ows:HTTP>
    </ows:DCP>
  </ows:Operation>
...

```

5. The Client sends a GetRecords-Request to either the English or the German operation endpoint.
 - a. English operation end point:
http://someHOST.net/eng/SOAPservices/services/CSWDiscovery
 - b. German operation end point:
http://someHOST.net/deu/SOAPservices/services/CSWDiscovery

5.5.4 Further Perspectives

With the onward completion of OWS Common it is expected that further versions of OGC Standards do include language support. For some technical reasons the concept of OWS common were not suitable to extend the current standards. However, with the availability of further versions of the OGC base standards the concept to support multilingualism needs to be revisited.

Annex A The relation of discovery services to other technical components in INSPIRE

The aim technical guidance document is to describe how INSPIRE discovery services should be implemented. The focus of this limited to the characteristics of this service type, in the broader context of the technical infrastructure for INSPIRE it is only one single building block. Many use cases and workflows in a spatial data infrastructure are comprehensive and span across various technical components.

These workflows and use cases are not directly handled in the INSPIRE technical guidance document, so each of them addresses single aspects only; e.g. for each of the network service types, metadata, spatial data. To provide guidance and to help understanding the nature of technical components (entities), their relationships, their context and how they could interact to realize use cases and workflows is the purpose of the INSPIRE domain model.

Beside others, two major “cross technical component” aspects are of importance for INSPIRE discovery services:

1) Linkages

Discovery services and metadata serve the purpose to discover, evaluate and use geospatial resources in INSPIRE. Such resources are at a minimum spatial datasets and services that provide access to them. Workflow examples are: I found a metadata document for a spatial dataset, how can i use it? I am visualizing a layer of a view service and am interested in the spatial dataset for further analysis; how do i find an appropriate download facility?

Automated discover-evaluation-use workflows require that metadata is accessible through a discovery services via linkages, that metadata is linked to the resources they describe and that –in case that resources are linked together, e.g. a spatial dataset is accessible through a service which is described via a separated metadata document- metadata of related resources are linked together.

2) Metadata

Discovery services provide access to metadata. The selection of OGC CSW ISO APP as base specification for the discovery service involve that service interface and metadata have dependencies, both in terms of content and encoding. These are mainly metadata elements needed for discovery (and not necessarily required by the directive itself) such as: identifiers for resources, identifiers for metadata records. An obvious occasion is the element “metadataUrl” as part of the capabilities of view and download services. This element is to be populated with a single URL that allows access to an unambiguous metadata record. The discovery service provides the “GetRecordById” operation. This operation allows expressing access in a single HTTP/GET URL but requires a metadata element “fileIdentifier” which is the identifier of a metadata record.

The INSPIRE domain model describes these aspects in details. It is therefore recommended to get familiar with it parallel with this technical guidance document.

Annex B Extended capabilities

The following XSD Schema defines the XSD Types that are needed to provide additional information on multilingual aspects. This information has to be provided in a capabilities documents that is returned by an INSPIRE Discovery Service (see [OGC WS]).

The XML Elements that comply with the following shall be applied in the <ExtendedCapabilities> section of the capabilities document.

```
<schema xmlns:inspire_ds="http://inspire.europa.eu/networkservice/discovery"
xmlns:ows="http://www.opengis.net/ows" xmlns:gco="http://www.isotc211.org/2005/gco"
xmlns:gmd="http://www.isotc211.org/2005/gmd"
xmlns:srv="http://www.isotc211.org/2005/srv"
xmlns="http://www.w3.org/2001/XMLSchema" xmlns:xlink="http://www.w3.org/1999/xlink"
targetNamespace="http://inspire.europa.eu/networkservice/discovery"
elementFormDefault="qualified" attributeFormDefault="unqualified" version="1.0.0">
  <import namespace="http://www.opengis.net/ows"
schemaLocation="http://schemas.opengis.net/ows/1.0.0/owsAll.xsd"/>
  <import namespace="http://www.isotc211.org/2005/gmd"
schemaLocation="http://schemas.opengis.net/iso/19139/20060504/gmd/gmd.xsd"/>
  <import namespace="http://www.isotc211.org/2005/gco"
schemaLocation="http://schemas.opengis.net/iso/19139/20060504/gco/gco.xsd"/>
  <import namespace="http://www.isotc211.org/2005/srv"
schemaLocation="http://schemas.opengis.net/iso/19139/20060504/srv/srv.xsd"/>
  <element name="ExtendedCapabilities" type="inspire_ds:ExtendedCapabilitiesType"
substitutionGroup="ows:ExtendedCapabilities"/>
  <!-- =====>
  <!-- == The Top-Level ExtendedCapabilitiesType. ==-->
  <!-- =====>
  <complexType name="ExtendedCapabilitiesType">
    <annotation>
      <documentation>
        Extended metadata capabilities for the discovery INSPIRE Network
        Service
      </documentation>
    </annotation>
    <sequence>
      <element name="ResourceLocator" type="gmd:CI_OnlineResource_Type"
minOccurs="0"/>
      <element name="MetadataUrl" type="gmd:CI_OnlineResource_Type" minOccurs="0"/>
      <element name="ResourceType" type="gmd:MD_ScopeCode_PropertyType"
minOccurs="0"/>
      <element name="TemporalReference" type="gmd:EX_Extent_Type" minOccurs="0"/>
      <element name="Conformity" type="gmd:DQ_ConformanceResult_Type" minOccurs="0"
maxOccurs="unbounded"/>
      <element name="MetadataPointOfContact" type="gmd:CI_ResponsibleParty_Type"
minOccurs="0"/>
      <element name="MetadataDate" type="gco:Date_Type" minOccurs="0"/>
      <element name="SpatialDataServiceType" type="srv:SV_ServiceType_Type"
minOccurs="0"/>
      <element name="InspireKeywords" type="gmd:MD_Keywords_Type" minOccurs="0"/>
      <element name="Languages" type="inspire_ds:LanguagesType" minOccurs="0"/>
      <element name="CurrentLanguage" type="inspire_ds:LanguageType"/>
    </sequence>
  </complexType>
  <!-- =====>
  <!-- == The LanguagesType type declaration ==-->
  <!-- =====>
  <complexType name="LanguagesType">
    <annotation>
      <documentation>List of languages defined by a 3-letter code as
        described in ISO 639-2/T that are supported by this service
        instance.</documentation>
    </annotation>
  </complexType>

```

```
<sequence>
  <element name="Language" type="inspire_ds:LanguageType" maxOccurs="unbounded"/>
</sequence>
</complexType>
<complexType name="LanguageType">
  <simpleContent>
    <extension base="string">
      <attribute name="default" type="boolean" use="optional" default="false"/>
    </extension>
  </simpleContent>
</complexType>
</schema>
```