INSPIRE Good Practice – Data-Service Linking Simplification

MIG-T Sub-group 2.3.2
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INSPIRE Good Practice – Data-Service Linking Simplification Webinar
November 21st, 2022

Programme

- Welcome
- ➢ Introduction ‘Data-Service Linking Simplification good practice’
- Implementations and support evidences
- Q/A session & Discussion
- Conclusions and next steps

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Introduction ‘Data-Service Linking Simplification good practice’

- Context - MIWP Action 2.3.2
- Intended outcomes
- Summary of work
- Overview of the Data-service linking simplification specification
  - Part A: Data-Service Linking Simplification
  - Part B: Use of INSPIRE conformant standard capabilities documents
- Limitations

Context - workprogram

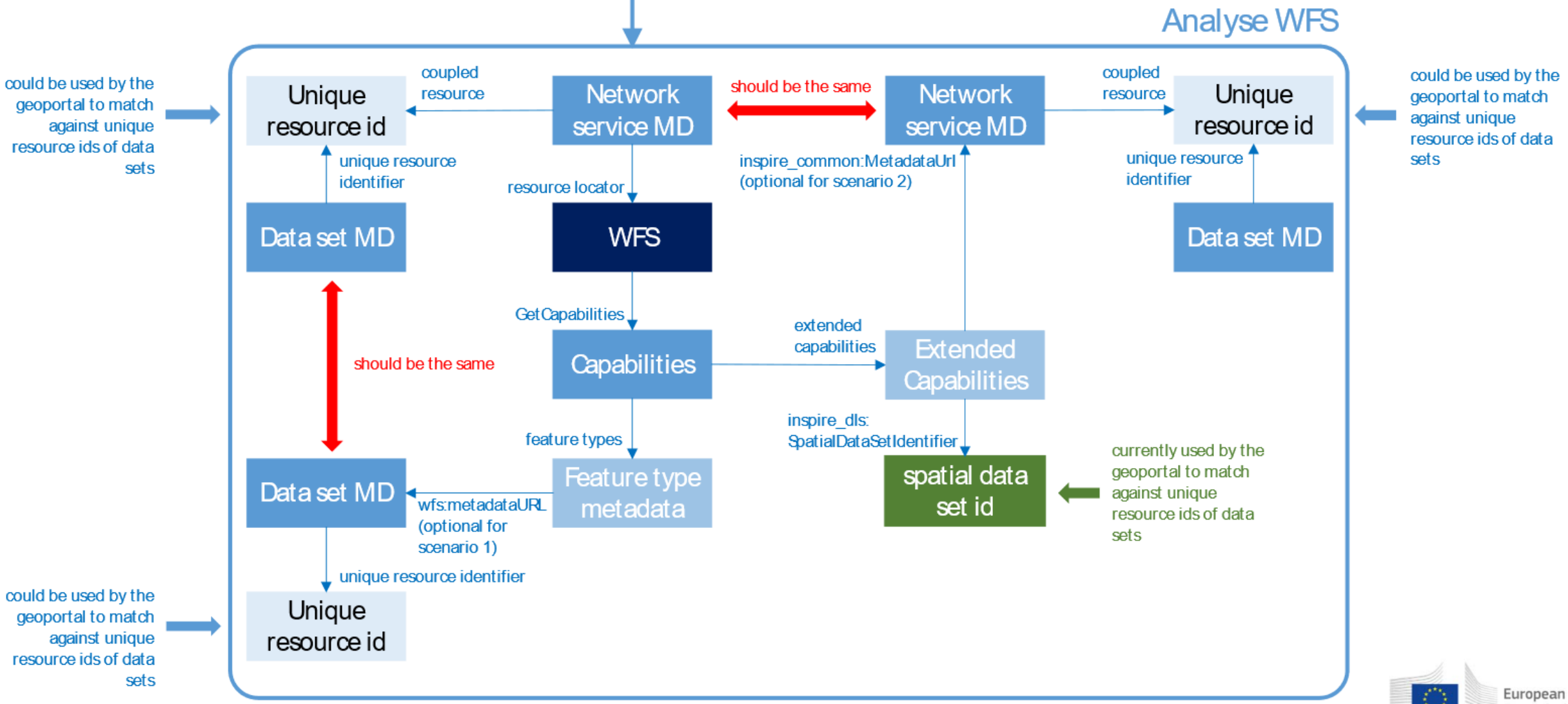
- INSPIRE MIWP 2021-2024
  - 3 areas of work & 6 actions
    1. A digital ecosystem for the environment and sustainability
    2. Towards a common implementation landing zone
       - 2.1 Need-driven data prioritisation
       - 2.2 Roadmap for priority-driven implementation
       - 2.3 Simplification of INSPIRE implementation
         - 2.3.1 Governance of INSPIRE artefacts
         - 2.3.2 Simplification of data-service linking
       - 2.4 Central infrastructure components
    3. GreenData4All

Context - MIWP Action 2.3.2

- Kick-off March 4th 2021
- Participants from AT, DE, DK, EL, ES, FR, IT, LT, NL, PL, SE, SK
- Starting from discussion paper created by action 2019.2

  The initial version of the paper was drafted by a small MIG-T ad-hoc group with members from DK, FR, NL, JRC and DG ENV, 2018
- The sub-group will work on the following activities:
  - Develop an approach for simplification of data and service linking
  - Validate the proposed technical approach with widely used web applications
  - Follow the procedure for submitting an INSPIRE Good practice

Current data – service linking approach



Context - the issues (52nd MIG-T meeting)

- the **level of data-service linking** in INSPIRE **is insufficient**, and many organisations seem to have difficulties to provide implementations in line with the current TGs (even though almost all MS provide at least some data sets with correct data-service linking);
- this already has **negative impacts** on the accessibility of INSPIRE data sets (through the INSPIRE geoportal) and hence the overall usability of the INSPIRE infrastructure;
- this will also lead to **poor indicators** in the future (metadata-based) approach for monitoring and reporting;
- the **current approach** for data-service linking described in the TGs for metadata and network services **is complicated**, and there are different interpretations of the related requirements, even by implementation/standards experts;
- the current approach for service metadata, which requires **extensions to base standards**, is posing **an obstacle to the implementation of** INSPIRE requirements for **network services** (because the required extensions are not widely implemented in off-the-shelf software); and
- there is a clear overlap / **duplication of data set and service metadata** (e.g. bounding box, INSPIRE theme), which in some cases leads to inconsistencies.

Context – recommendations (52nd MIG-T meeting)

- The MIG-T **supports the new data-centric approach** (already underlying the new geoportal and the proposed revision of the M&R IRs), which focuses on data and how they can be accessed through network services rather than considering data and network services as stand-alone components of the infrastructure. However, it might still be useful for application developers to be able to access a directory/register of the services available in the infrastructure.
- The MIG-T further recommends that there should be **one "source of truth" for service metadata**, ideally as provided by the service itself (e.g. in its Capabilities document).
- The **alternative approach for documenting data-service linking** in the data set metadata (as proposed in the discussion paper) **should be further elaborated** and become the **preferred option in the Metadata TGs** (and/or in a stand-alone guidance document on data-service linking); this guidance should include an explanation how the IR requirements for network service metadata are mapped to the new approach;
- The **current approach should still be supported for a transition period** (to be determined by the MIG) as an alternative option that will be used by the geoportal if no links to network services can be established based on the data set metadata; at the end of the transition period the necessity to further support the current approach should be reviewed;

Context - the issue

Current approach (as per TGs):

- complicated and partly ambiguous
- duplication of information

Low level of accessibility of INSPIRE data sets through view and download services

Negative impacts on the overall usability of the INSPIRE infrastructure - Monitoring indicators

Intended outcome (1)

- **The users** of the INSPIRE infrastructure **can access all available data** via the view and download services.
  When using this GP, data providers are not experiencing difficulties anymore to establish downloadable and viewable data sets, because:
- The requirements described in this good practice for documenting these links are **easy to be implemented and understood**, and therefore widely used and correctly implemented by MS.
- INSPIRE-specific extensions to existing standards that are not widely supported by existing software products. This GP makes them unnecessary from now onwards, since it allows implementer's organizations to access **off-the-shelf software** without worrying anymore about compliance to INSPIRE-specific extensions.

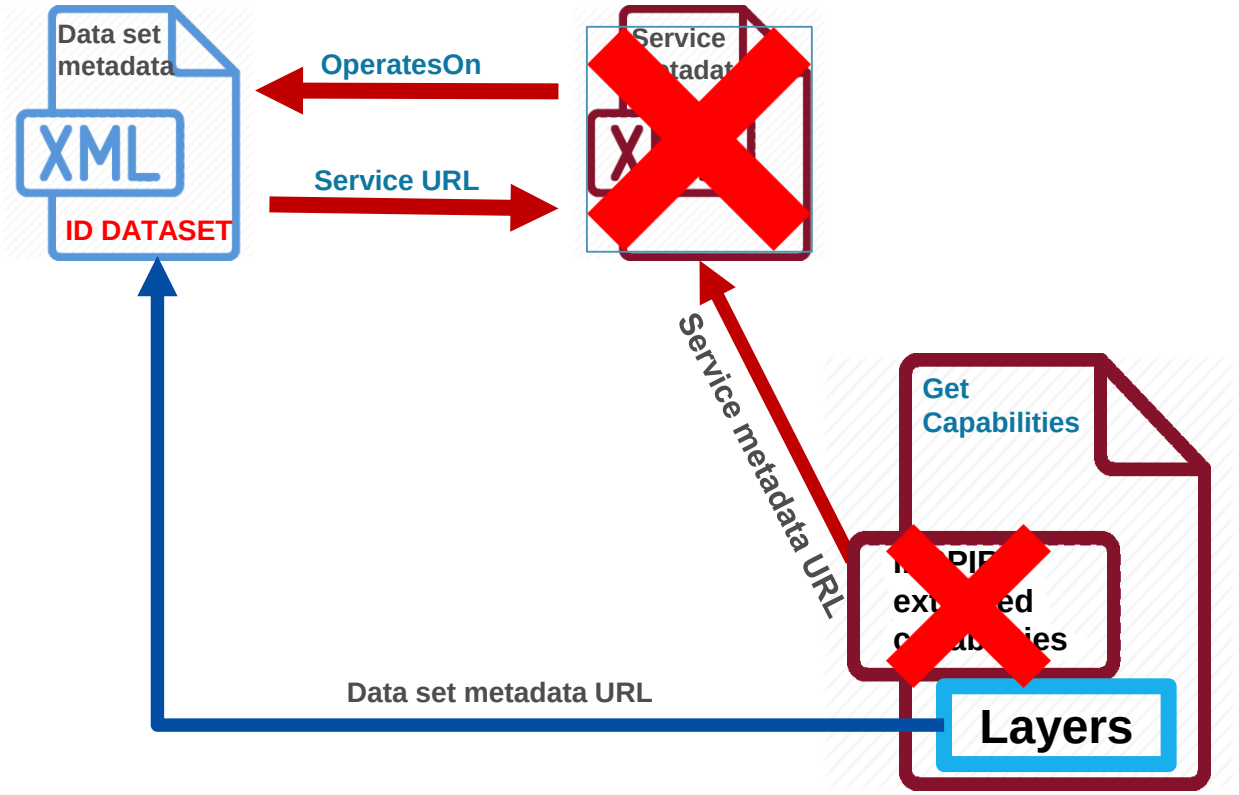
Intended outcome (2)

- The **duplication of metadata information is reduced**. Only one metadata record is required per data set, avoiding the need for documenting additional service metadata records (view, download and possibly direct access / WFS). Only the Capabilities document and service feed for ATOM's are used to document the service metadata, removing possible inconsistencies.
- The amount of metadata in the INSPIRE Geoportal and the national geoportals could be reduced, **making search easier** and reducing the size of information to be stored and indexed.
- For client applications, it becomes **easier to implement discovery of and access to data sets**. This helps implementers to focus on INSPIRE specificity following a data-centric approach, rather than devoting excessive time to documenting the resources, mainly services, and configuring them properly.

Summary of work

- This good practice constitutes an alternative way to provide the data-service linking in INSPIRE - Optional, not mandatory.
- The data set metadata record shall include additional elements, already present in many national metadata profiles, related to view and download services;
- There is no need for view and download services to be documented through their stand-alone service metadata records. The metadata returned by the service itself, as a response to a Get View/Download Service Metadata request, is enough to provide the required information;
- The metadata returned by the OGC web services (OWS) can follow a structure supported by all implementing servers, no longer including the Extended Capabilities section (an optional element not supported by all implementing servers).

MIWP Action 2.3.2
Data Service Linking Simplification - Overview



Section 8

Part A. Data - service linking simplification
Good practice guidelines

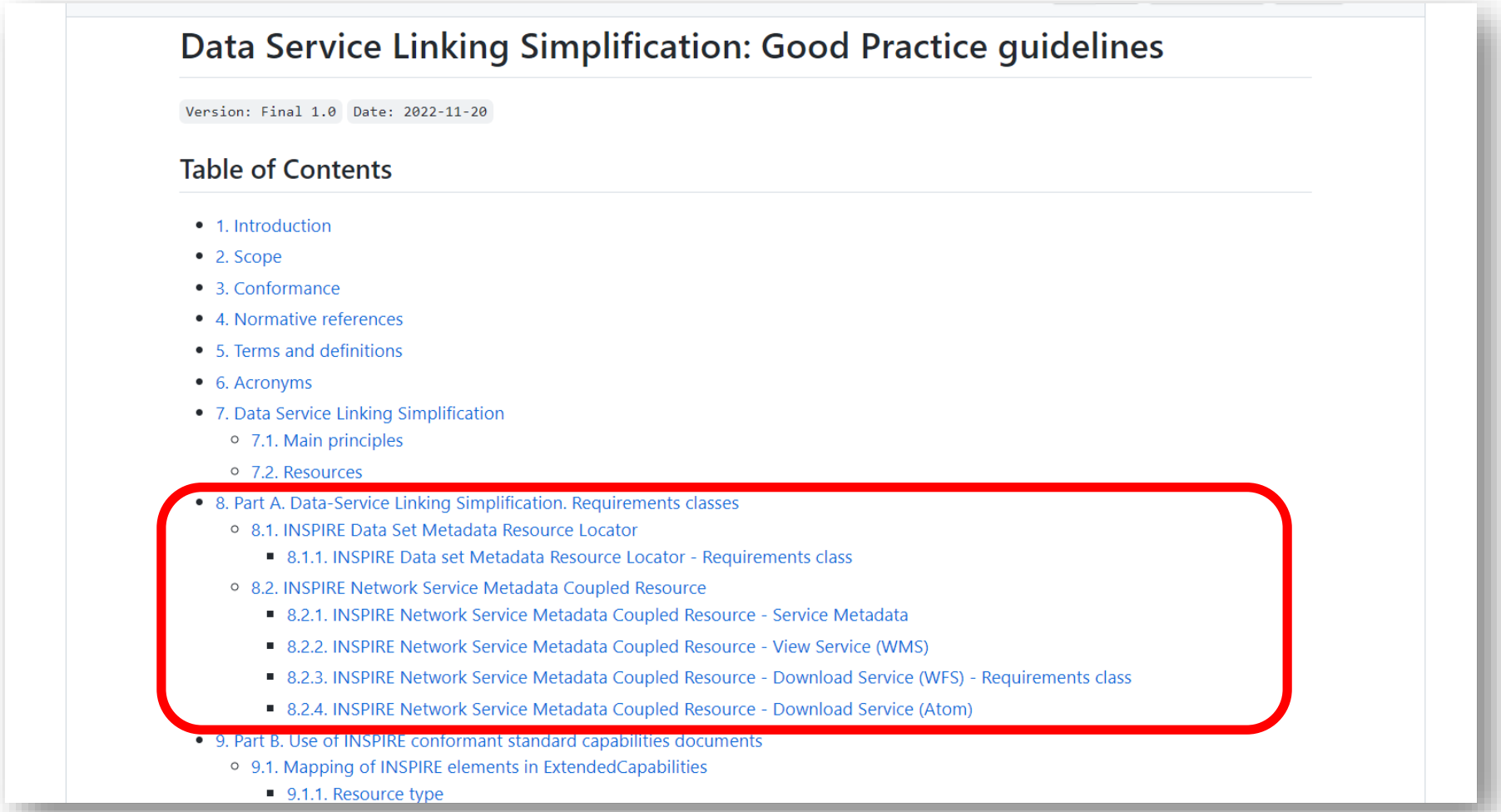
Section 9

Part B. Data - service linking simplification
Use of INSPIRE conformant standard capabilities documents

Final specification:

https://github.com/INSPIRE-MIF/gp-data-service-linking-simplification/blob/main/good-practice/data-service-linking-simplification-spec.md

Part A: Data-Service Linking Simplification



Data Service Linking Simplification: Good Practice guidelines

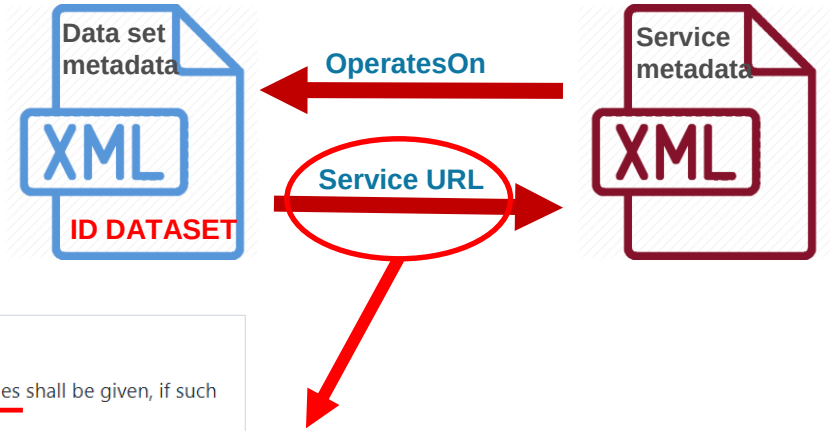
`Version: Final 1.0` `Date: 2022-11-20`

Table of Contents

https://github.com/INSPIRE-MIF/gp-data-service-linking-simplification/blob/main/good-practice/data-service-linking-simplification-spec.md#8-part-a-data-service-linking-simplification-requirements-classes-

Part A: Data-Service Linking Simplification

Current approach



TG Requirement 1.8: metadata/2.0/req/datasets-and-series/resource-locator

A Resource locator linking to the service(s) providing online access to the described data set or data set series shall be given, if such online access is available.

If no online access for the data set or data set series is available, but there is a publicly available online resource providing additional information about the described data set or data set series, the URL pointing to this resource shall be given instead.

These links shall be encoded using *gmd:transferOptions/gmd:MD_DigitalTransferOptions/gmd:onLine/gmd:CI_OnlineResource/gmd:linkage/gmd:URL* element.

The multiplicity of this element is 0..n.

View and Download services are required to make data sets available; this implies that at least two locators need to be expressed in the data set metadata

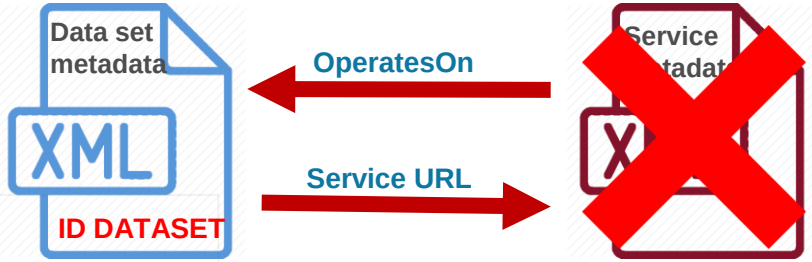
TG Recommendation 1.9: metadata/2.0/rec/datasets-and-series/resource-locator-additional-info

The *gmd:name*, *gmd:description*, and *gmd:function/gmd:CI_OnLineFunctionCode* child elements of *gmd:CI_OnlineResource* element containing the given *gmd:linkage* element should also be provided, if possible, to give additional information about the provided URL link. The *gmd:name* and the *gmd:description* elements should contain Non-empty Free Text Elements.

If provided, the *gmd:CI_OnLineFunctionCode* element should point to one of the values of the ISO 19139 code list *CI_OnLineFunctionCode*.

Part A: Data-Service Linking Simplification

Simplification approach (resource locator)



In case of **View and Download services**, for the resource locator:

- the element **gmd:URL** SHALL point to the response of the Get View/Download Service Metadata (GetCapabilities);
- the elements **gmd:protocol** and **gmd:applicationProfile** SHALL be present.

metadata element	Encoding
<gmd:protocol>	**gmx:Anchor** pointing to the URI coming from https://inspire.ec.europa.eu/metadata-codelist/ProtocolValue
	gco:CharacterString with the value of the label in the metadata language
<gmd:applicationProfile>	**gmx:Anchor** pointing to the URI https://inspire.ec.europa.eu/metadata-codelist/SpatialDataServiceType/view or https://inspire.ec.europa.eu/metadata-codelist/SpatialDataServiceType/download
	gco:CharacterString with the value of the label in the metadata language

Part A: Data-Service Linking Simplification

Example for a view service

```
<gmd:transferOptions>
   <gmd:MD_DigitalTransferOptions>
      <gmd:onLine>
         <gmd:CI_OnlineResource>
            <gmd:linkage>
         <gmd:URL>https://geoservizi.regione.liguria.it/geoserver/M1743/wms?version=1.3.0&request=get
capabilities</gmd:URL>
            </gmd:linkage>
            <gmd:protocol>
               <gmx:Anchor xlink:href="http://www.opengis.net/def/serviceType/ogc/wms">OGC Web Map
Service</gmx:Anchor>
            </gmd:protocol>
            <gmd:applicationProfile>
              <gmx:Anchor xlink:href="http://inspire.ec.europa.eu/metadata-
codelist/SpatialDataServiceType/view">consultazione</gmx:Anchor>
            </gmd:applicationProfile>
         </gmd:CI_OnlineResource>
      </gmd:onLine>
   </gmd:MD_DigitalTransferOptions>
</gmd:transferOptions>
```

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Part A: Data-Service Linking Simplification

Example for a download service

```
<gmd:transferOptions>
   <gmd:MD_DigitalTransferOptions>
      <gmd:onLine>
         <gmd:CI_OnlineResource>
            <gmd:linkage>
         <gmd:URL>https://geoservizi.regione.liguria.it/geoserver/M1241/wfs?version=2.0.0&request=get
capabilities</gmd:URL>
            </gmd:linkage>
            <gmd:protocol>
               <gmx:Anchor xlink:href="http://www.opengis.net/def/serviceType/ogc/wfs">OGC Web
Feature Service</gmx:Anchor>
            </gmd:protocol>
            <gmd:applicationProfile>
              <gmx:Anchor xlink:href="http://inspire.ec.europa.eu/metadata-
codelist/SpatialDataServiceType/download">scaricamento</gmx:Anchor>
            </gmd:applicationProfile>
         </gmd:CI_OnlineResource>
      </gmd:onLine>
   </gmd:MD_DigitalTransferOptions>
</gmd:transferOptions>
```

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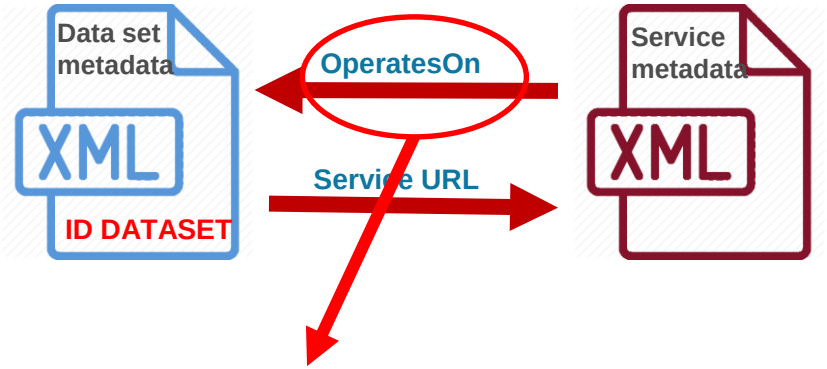
Part A: Data-Service Linking Simplification

Current approach



TG Requirement 3.6: metadata/2.0/req/sds/coupled-resource

Links pointing to the online metadata descriptions of data sets provided by the described service shall be given using *srv:operatesOn* element.

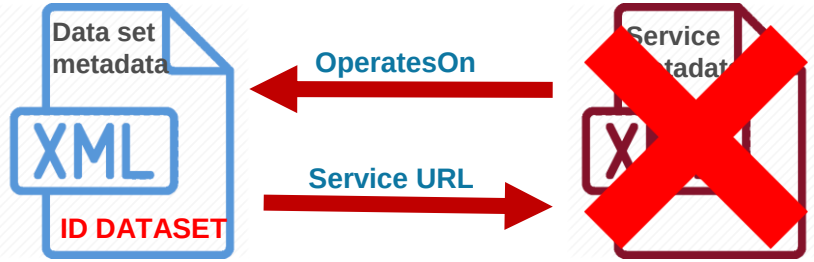
The multiplicity of this element is 0..n.

This property shall be implemented by reference. The *xlink:href* attribute of each of the *srv:operatesOn* elements shall contain a URI pointing to the *gmd:MD_DataIdentification* element of the metadata record of the provided the data set or data set series.

Part A: Data-Service Linking Simplification

Simplification approach (coupled resources)

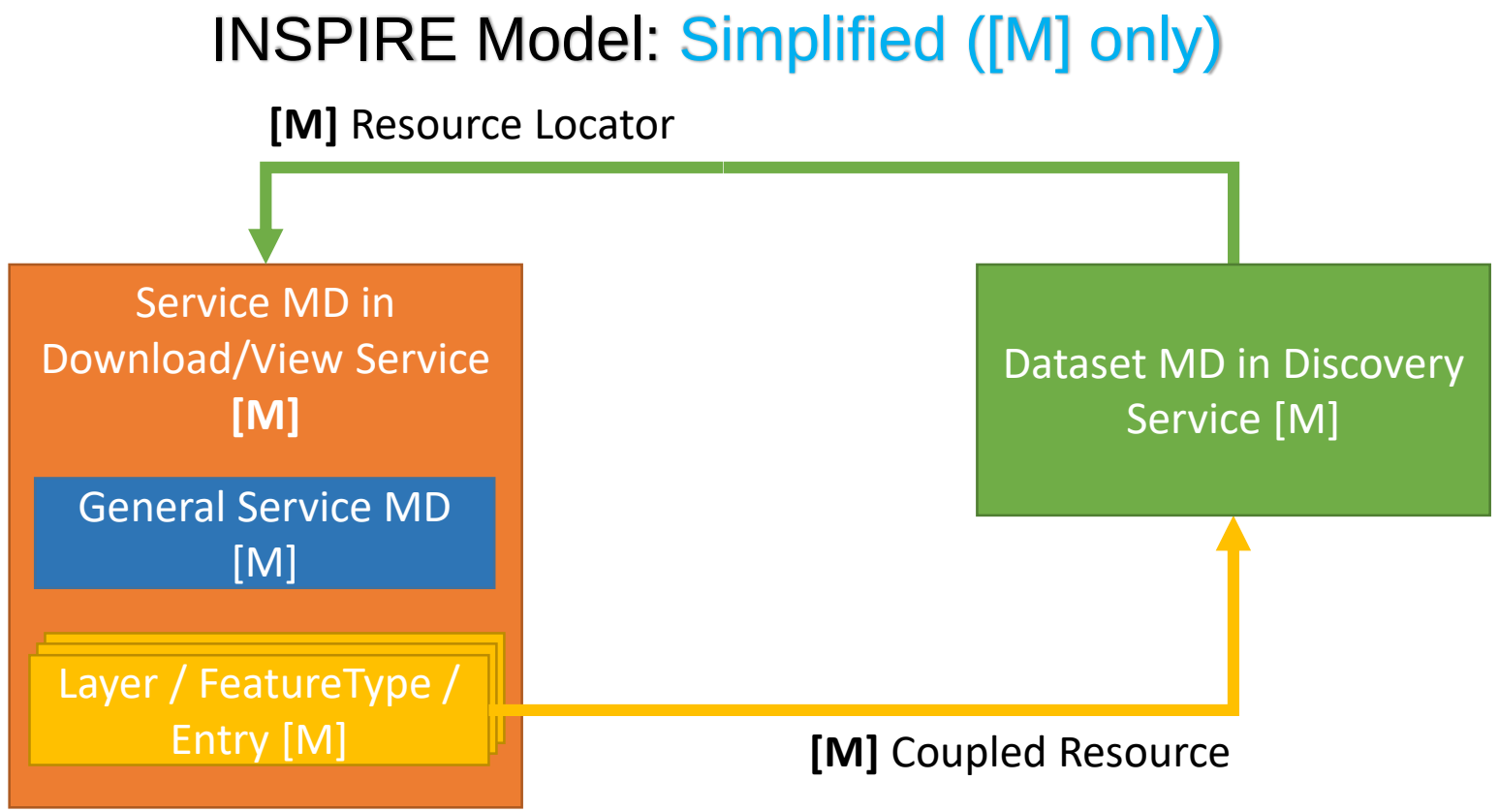
relax the implementation of the Coupled Resource by making the linkage to the <gmd:MD_DataIdentification> element of the data set metadata an optional feature, just **pointing to the URL of the metadata**



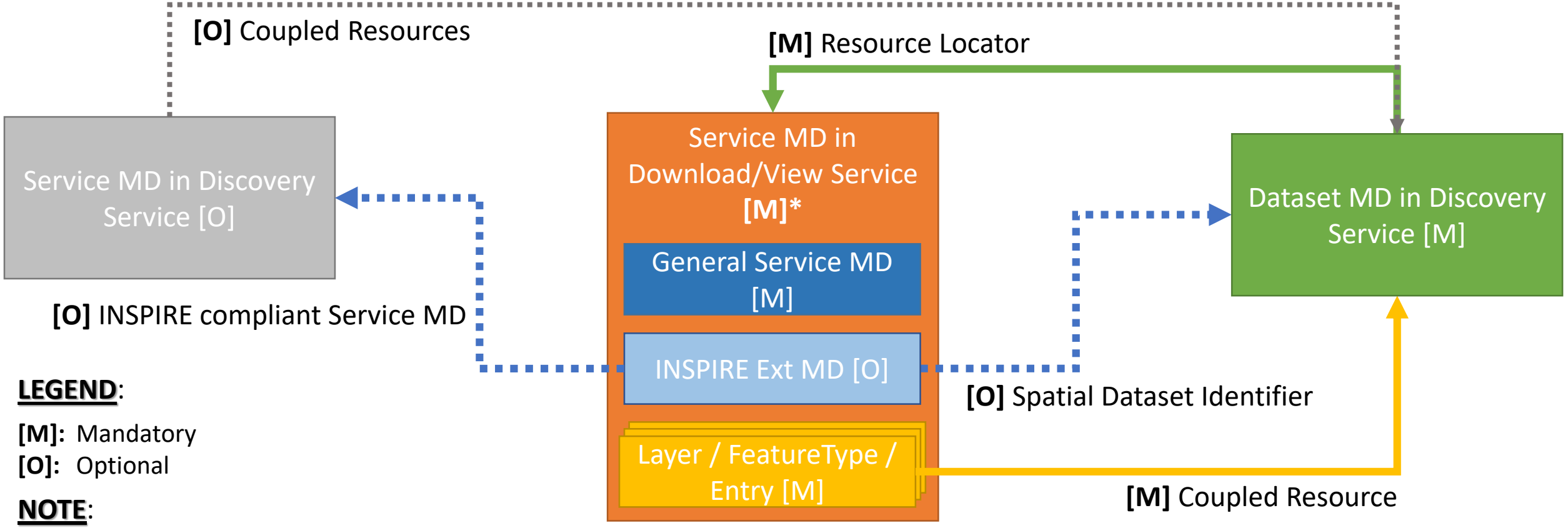
New wording of the TG Requirement

metadata element	Encoding
<wms:MetadataURL> (in Layer)	pointing to the metadata record of the provided data set or data set series, available in a Discovery Service catalog
<wfs:MetadataURL> (in Feature type)	pointing to the metadata record of the provided data set or data set series, available in a Discovery Service catalog
/feed/entry/link	containing a link to a data set metadata record with attributes **@rel="describedby"** and **@type=«application/xml»**

Proposed data – service linking approach



INSPIRE Model: Simplified



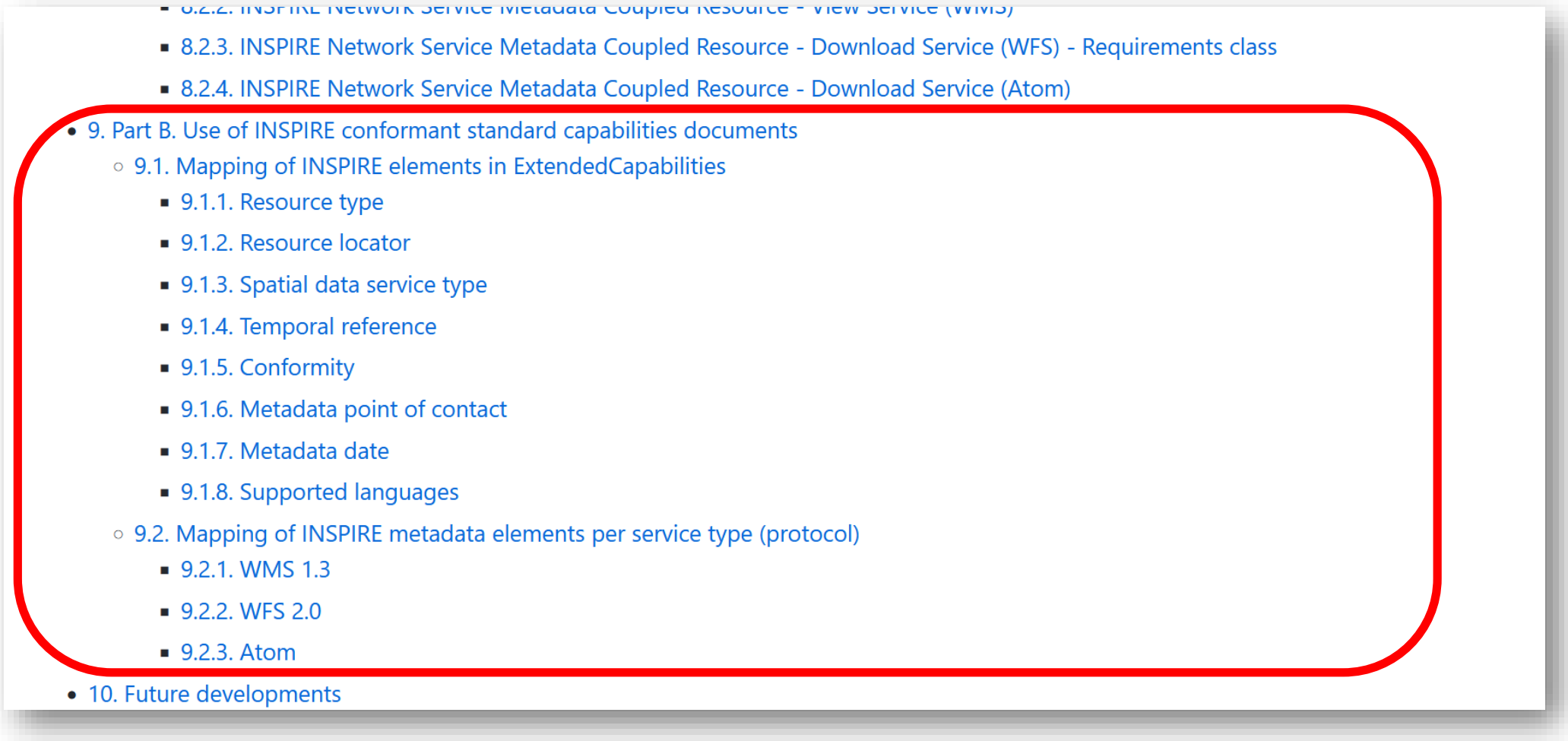
LEGEND:

[M]: Mandatory
[O]: Optional

NOTE:

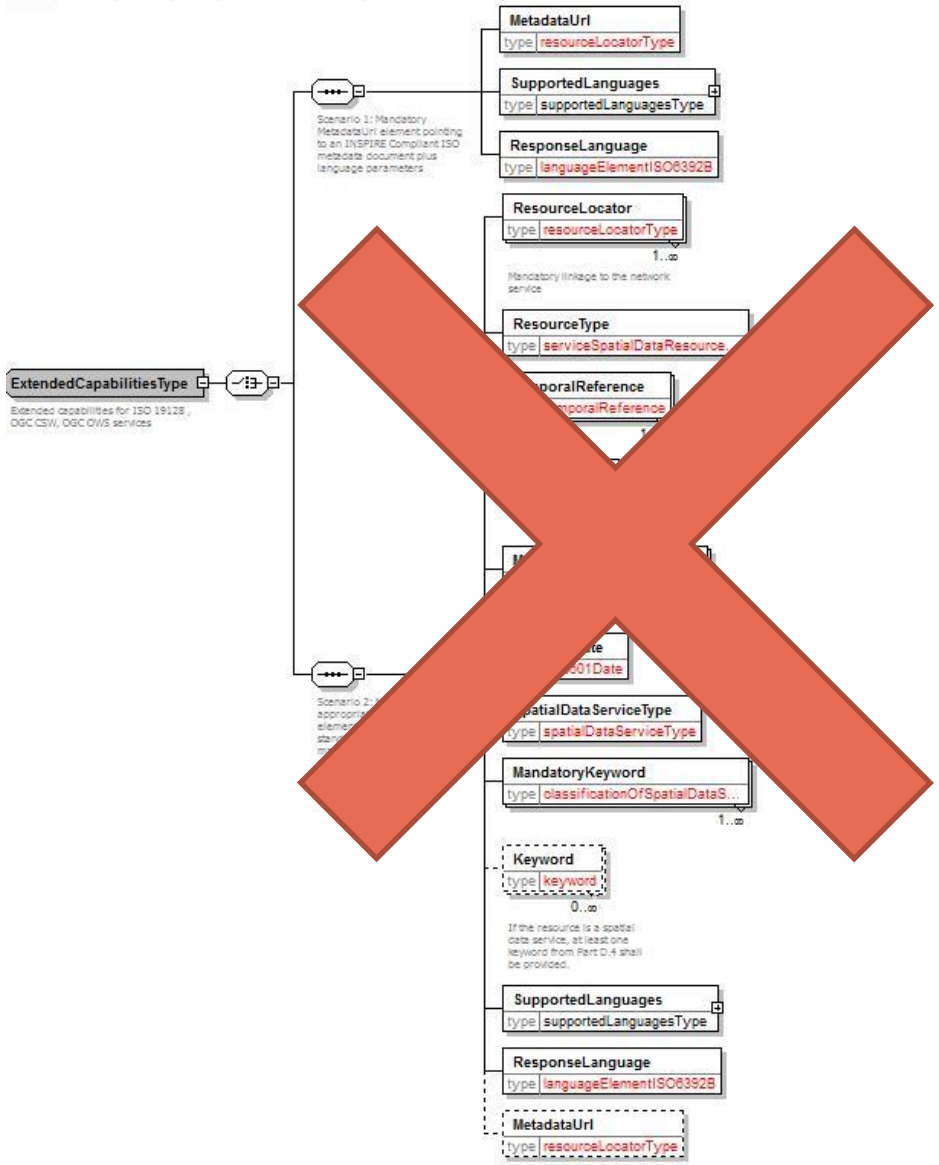
- Regarding the INSPIRE compliant Service MD - In an INSPIRE Network Service Scenario 1 implementation, the Service MD will not contain all INSPIRE metadata elements but contain a link to the Service MD in the Discovery Service; An Scenario 2 implementation have no separate Service MD in the Discovery Service. Instead, all metadata elements are provided in the extended capabilities section of the capabilities document of the service; An Scenario 3 implementation (new scenario considered if the good practice candidate on Data-Service Linking Simplification is endorsed) also have no separate Service MD in the Discovery. Instead, the metadata elements are remapped to existing elements in the capabilities document of the service and in the dataset metadata.
- Regarding the Spatial Data Set Identifier - The IR on Metadata is not including the Unique resource identifier as a required metadata element to be applied to services. The TG for Download and View services specify a WxS/Atom metadata element that contains the Unique Resource Identifier of the Spatial Data Set. In the current INSPIRE Geoportal this is used, in some cases, to establish a link between data and service for quality control purposes. The Coupled resource would be enough for data-service linking purposes, as is used e.g. in case of a WMS in the current INSPIRE Geoportal.

Part B: Use of INSPIRE conformant standard capabilities documents



https://github.com/INSPIRE-MIF/gp-data-service-linking-simplification/blob/main/good-practice/data-service-linking-simplification-spec.md#9-part-b-use-of-inspire-conformant-standard-capabilities-documents-

Part B: Use of INSPIRE conformant standard capabilities documents



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Part B. Remapping of Extended Capabilities Aim of the work

- Define an alternative mapping of INSPIRE service metadata elements to elements available in the Capabilities document of OGC OWS standard services (WMS, WFS) and Atom feeds.
- Avoid (as an option) the need for the INSPIRE Extended Capabilities section.
- Remove remaining obstacles in the implementation of INSPIRE requirements for network services due to the extensions required to software tools available in the market.

Part B. Remapping of Extended Capabilities

Resource Type and Resource Locator

- Current mapping (in **INSPIRE NS - View/Download Service TGs**)

INSPIRE metadata elements	Elements of INSPIRE Extended Capabilities/Atom feed	Applicable on Service type
Resource Type	inspire_common:ResourceType	WMS - WFS
Resource Type	not mapped	Atom
Resource Locator	inspire_common:ResourceLocator	WMS - WFS
Resource Locator	Feed level link in the top Atom feed /feed/link[@rel="self"]	Atom

- **Agreed new mapping**

INSPIRE metadata elements	New allocation	Applicable on Service type
Resource Type	No element mapped	WMS - WFS - Atom
Resource Locator	No element mapped	WMS - WFS - Atom

In case of view and download services, when the service metadata is provided as response to a Get Download/View Service Metadata request, then the resource type is implicit and shall not be documented.

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Part B. Remapping of Extended Capabilities

Spatial data service type

- Current mapping (in **INSPIRE NS - View/Download Service TGs**)

INSPIRE metadata elements	Elements of INSPIRE Extended Capabilities/Atom feed	Applicable on Service type
Spatial Data Service Type	inspire_common:SpatialDataServiceType	WMS - WFS
Spatial Data Service Type	not mapped	Atom

- **Agreed new mapping**

INSPIRE metadata elements	New allocation	Applicable on Service type
Spatial Data Service Type	**gmd:applicationProfile** element (in data set metadata record)	WMS - WFS - Atom

D

Part B. Remapping of Extended Capabilities

Temporal reference

- Current mapping (in **INSPIRE NS - View/Download Service TGs**)

INSPIRE metadata elements	Elements of INSPIRE Extended Capabilities/Atom feed	Applicable on Service type
Temporal Reference	inspire_common:TemporalReference	WMS - WFS
Temporal Reference	not mapped	Atom

- **Agreed new mapping**

INSPIRE metadata elements	New allocation	Applicable on Service type
Temporal Reference	**updateSequence attribute** in the WMS_Capabilities/WFS_Capabilities root element.	WMS - WFS
Temporal Reference	**feed/updated** element in the Atom feed	Atom
Temporal Reference	Otherwise, **gmd:citation/gmd:CI_Citation/gmd:date/gmd:CI_Date/ gmd:date** element in the data set metadata record, with one of the following prioritised date types:- *publication*, - *revision* or - *creation*	WMS – WFS - Atom

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Part B. Remapping of Extended Capabilities

Conformity

- Current mapping (in **INSPIRE NS - View/Download Service TGs**)

INSPIRE metadata elements	Elements of INSPIRE Extended Capabilities/Atom feed	Applicable on Service type
Conformity	inspire_common:Conformity	WMS - WFS
Conformity	not mapped	Atom

- **Agreed new mapping**

INSPIRE metadata elements	New allocation	Applicable on Service type
Conformity	**wms:Keyword** element for each specification against the service is conformant, included within an specific **wms:KeywordList** group.	WMS S
Conformity	**ows:Keyword** element for each specification against the service is conformant, included within an specific **ows:Keywords** group including an ows:Type element of type URI.	WFS S
Conformity	**atom:category** element for each specification against which the service is conformant.	Atom S

In order to reference a specific INSPIRE regulation as specification to which a spatial data service may declare its conformity, its URL of publication in EUR-Lex shall be used as a common interoperable URI value

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Part B. Remapping of Extended Capabilities

Metadata point of contact

- Current mapping (in **INSPIRE NS - View/Download Service TGs**)

INSPIRE metadata elements	Elements of INSPIRE Extended Capabilities/Atom feed	Applicable on Service type
Metadata Point of Contact	inspire_common:MetadataPointOfContact	WMS - WFS
Metadata Point of Contact	not mapped	Atom

- **Agreed new mapping**

INSPIRE metadata elements	New allocation	Applicable on Service type
Metadata Point of Contact	**WMS_Capabilities/Service/ContactInformation/ContactPersonPrimary/ContactOrganization** and **WMS_Capabilities/Service/ContactInformation/ContactElectronicMailAddress**	WMS S
Metadata Point of Contact	**WFS_Capabilities/ows:ServiceProvider/ows:ProviderName** and **WFS_Capabilities/ows:ServiceProvider/ows:ServiceContact/ows:ContactInfo/ows:Address/ows:ElectronicMailAddress**	WFS S
Metadata Point of Contact	**<feed><author><name>** and **<feed><author><email>**	Atom S

Part B. Remapping of Extended Capabilities

Metadata date

- Current mapping (in **INSPIRE NS - View/Download Service TGs**)

INSPIRE metadata elements	Elements of INSPIRE Extended Capabilities/Atom feed	Applicable on Service type
Metadata Date	inspire_common:MetadataDate	WMS - WFS
Metadata Date	Feed level link in the top Atom feed /feed/updated	Atom

- **Agreed new mapping**

INSPIRE metadata elements	New allocation	Applicable on Service type
Metadata Date	**updateSequence** parameter in the WMS_Capabilities/WFS_Capabilitiesroot element.	WMS - WFS S
Metadata Date	**<updated>** element in the Atom feed.	Atom S
Metadata Date	Otherwise, **gmd:citation/gmd:CI_Citation/gmd:date/gmd:CI_Date/ gmd:date** element in the data set metadata record, with one of the following prioritised date types: - *publication*, - *revision* or - *creation*	WMS – WFS - Atom D

Part B. Remapping of Extended Capabilities

Supported languages

- Current mapping (in **INSPIRE NS - View/Download Service TGs**)

INSPIRE metadata elements	Elements of INSPIRE Extended Capabilities/Atom feed	Applicable on Service type
Metadata Language	inspire_common:SupportedLanguages	WMS - WFS
Metadata Language	Feed level link in the top Atom feed /feed/link[@rel="self"]/@hreflang	Atom

- **Agreed new mapping**

INSPIRE metadata elements	New allocation	Applicable on Service type
Metadata Language	**gmd:MD_Metadata/gmd:language/gmd:LanguageCode** element in the data set metadata record for default language. **xml:lang attribute** for supported languages	WFS - Atom

```
<ows:ServiceIdentification>
        <ows:Title xml:lang="en">My WFS</ows:Title>
        <ows:Title xml:lang="da">Min WFS</ows:Title>
        <ows:Abstract xml:lang="en">My abstract</ows:Abstract>
        <ows:Abstract xml:lang="da">Min abstrakt</ows:Abstract>
…
```

S

This doesn't work for WMS, it is not based on the (newer) OWS specification.
In this case keep the possibility to include the (optional) ExtendedCapabilities section, including the SupportedLanguages elements

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Part B. Remapping of Extended Capabilities

Unique Resource Identifier (referring to data set)

- Current mapping (in **INSPIRE NS - View/Download Service TGs**)

INSPIRE metadata elements	Elements of INSPIRE Extended Capabilities/Atom feed	Applicable on Service type
Unique Resource Identifier	`inspire_dls:SpatialDataSetIdentifier/inspire_common:Code` `inspire_dls:SpatialDataSetIdentifier/inspire_common:Namespace`	WFS
Unique Resource Identifier	*spatial_dataset_identifier_code* and *spatial_dataset_identifier_namespace*	Atom

- **Mapping proposed**

INSPIRE metadata elements	New allocation	Applicable on Service type
Unique Resource Identifier	**not mapped** as Unique resource identifier is not relevant for services	WMS - WFS - Atom

The IR on metadata is not including the Unique resource identifier as a required metadata element to be applied to services.

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Limitations

- This GP is not yet applicable for services based on the OGC API family of standards.
  This is because a mapping between the INSPIRE metadata elements and the OpenAPI Specification has not yet been agreed. See also the Technical guidelines for setting up an INSPIRE Download service based on the OGC API-Features standard.
- Complying with this GP and providing metadata for services in the discovery service will result in the duplication of certain INSPIRE metadata elements, which can lead to inconsistencies if the metadata elements are not kept in sync by means of automated processes.

Programme

- Welcome
- Introduction ‘Data-Service Linking Simplification good practice’
- ➢ Implementations and support evidences
- Q/A session & Discussion
- Conclusions and next steps

Implementations and support evidences

- The Netherlands
- Italy
- France
- Revamped INSPIRE Geoportal (GeoNetwork)

Programme

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- Introduction ‘Data-Service Linking Simplification good practice’
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- Conclusions and next steps

Q/A session & Discussion

https://app.sli.do/event/eNPZqBKmorFjmCuMhCU7Hr

Programme

- Welcome
- Introduction ‘Data-Service Linking Simplification good practice’
- Implementations and support evidences
- Q/A session & Discussion
- Conclusions and next steps

Conclusions and next steps

Data-Service Linking Simplification good practice candidate

- Outreach webinar (today)
  - Presentation of the final good practice specification.
  - Implementation evidences.
- Ready for MIG-T / MIG endorsement.
  - November 25th 2022

Procedure for proposing & endorsing good practices and progress overview
https://inspire.ec.europa.eu/portfolio/good-practice-library

The procedure includes the following six steps	Progress until 21.11.2022
Step 1. Initiation	**GitHub:** https://github.com/INSPIRE-MIF/gp-data-service-linking-simplification **Collection of issues:** https://github.com/INSPIRE-MIF/gp-data-service-linking-simplification/issues **Support organisations and proposals:** https://github.com/INSPIRE-MIF/gp-data-service-linking-simplification/tree/main/proposals **Initiation fiche:** https://github.com/INSPIRE-MIF/gp-data-service-linking-simplification/blob/main/good-practice/good-practice-fiche.md **Final good practice specification:** https://github.com/INSPIRE-MIF/gp-data-service-linking-simplification/blob/main/good-practice/data-service-linking-simplification-spec.md
Step 2. Submission as good practice candidate	**Data Service Linking Simplification** https://inspire.ec.europa.eu/good-practice/data-service-linking-simplification
Step 3. Outreach	**Webinar 21.11.2022 16:00 – 17:30 (CET)** https://inspire.ec.europa.eu/events/inspire-good-practice-data-service-linking-simplification-webinar
Step 4. Submission	**Scheduled:** – 16th INSPIRE MIG - November 24. – 72nd INSPIRE MIG-T - November 25.
Step 5. Legal scrutiny	
Step 6. Feedback	

Thank you!

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European Commission