

Concepts of Meta-SDI

Track: Linked Open Data

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Session: The concepts of meta-SDI

The decentralized nature of most SDI's raises a number of challenges relating to the design, the management and access of meta information about geographic information. Related items such as namespaces, code lists, coordinate reference systems, discovery services, etc. are an essential part of a Spatial Data Infrastructure and also have an impact on the technical infrastructure. These items require clear descriptions in registries and the possibility to be referenced through unique identifiers.

The development of a meta-information governance for the Flemish SDI - in short, Meta-SDI - includes a vision, a strategy for implementation and a test using a reference implementation. The Meta-SDI is being built based on INSPIRE guidelines and specifications. In this session the basic principles and functions of a Meta-SDI are outlined and discussed.

The presented content is based on a Meta-SDI project in Flanders, that is still in it's definition/scoping phase. Any feedback is welcome.

Overview

- What is a META-SDI?
- What are its components?
- Why do we need a Meta-SDI?
- How does it work? The Concepts.
- INSPIRE+



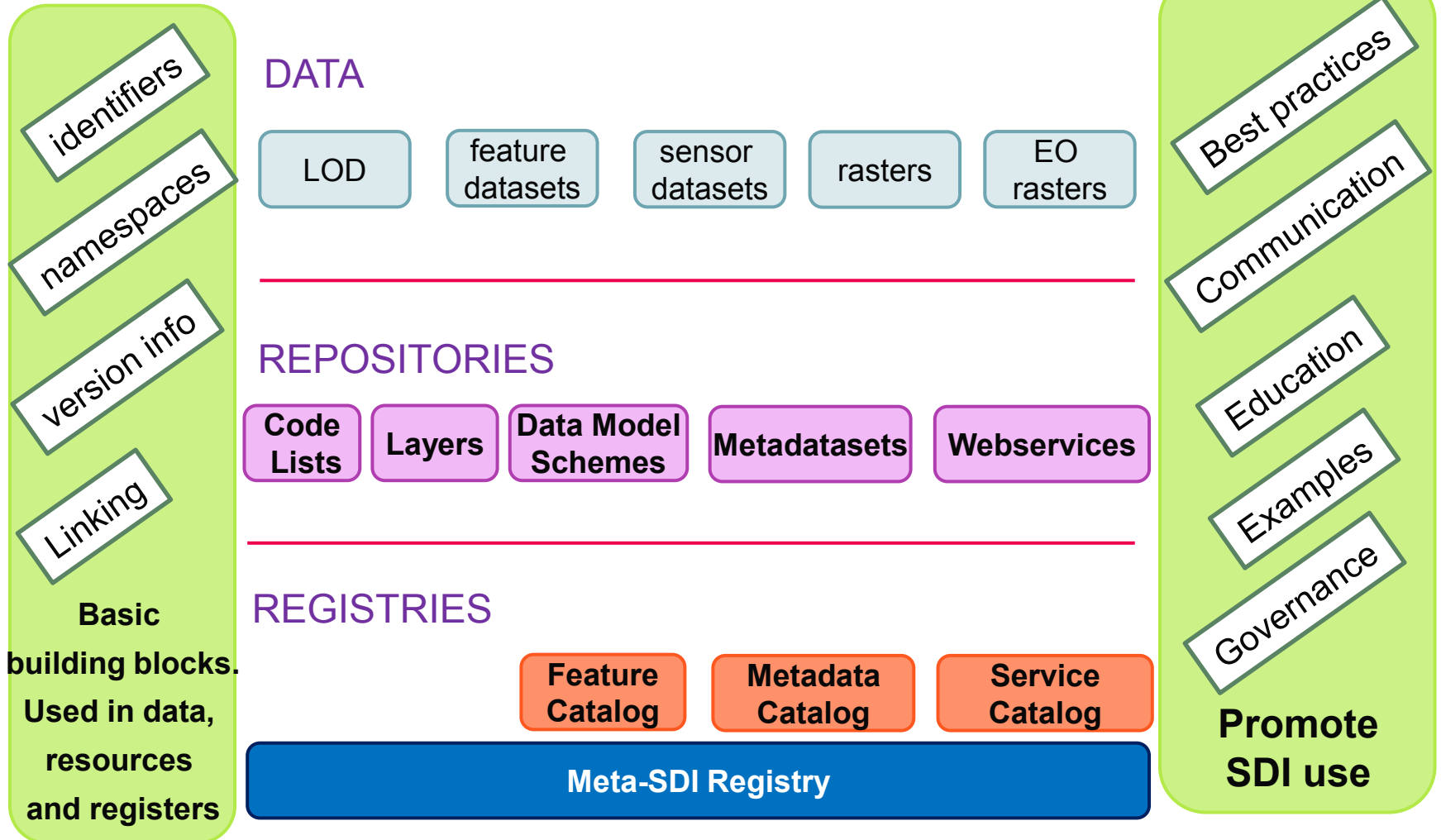
What is a Meta-SDI? One to rule them all!

- **A holistic approach towards all resources in the SDI, it consists of:**
 - **A set of rules to manage meta-information** and information objects – e.g. code lists, classifications, naming conventions, thesauri, ...
 - **A well-defined syntax for stable and long-living URI's** to support resolvability, linking and versioning
 - **Registries and repositories** for managing and discovering meta-information objects + links (associations) between different objects
- **.. to make all resources discoverable and accessible in a uniform (URI based service interface) way regardless their publication interface (WFS, CSW, REST service, SOAP service, ...) through a simple URL.**

The library/registry analogy ... make some concepts easier to grasp

Your Local Library	Meta-SDI Registry
Manages books and all types of published material	Manages all types of digital content
Has book shelves containing books and other published material	Has a "repository" containing all types of digital content
Has a card catalog that describes the published material that is available in the book shelves	Has a "registry" that describes the digital content that is available in the repository
Multiple libraries can voluntarily participate in a cooperative network and offer a unified service	Multiple repository's can voluntarily participate in a cooperative network and offer a unified service

Meta-SDI components



Why do we need a Meta-SDI?

1. To support and implement the information policy and governance

Availability of up-to-date, harmonised and qualitative public data inside and outside the public sector, to stimulate the use and reuse of geographical information.

Centralized publication of the offering.

Cost-saving: produce once, use many times.

Proces integration, efficiency and quality: A guaranteed offering of authentic data (addresses, parcels, buildings, roads, ...) as a reference framework for data usage and data processing.

Harmonized data models, metadata models, code lists, identifiers, service interfaces, exchange formats, ...

Why do we need a Meta-SDI?

2. To facilitate the use of the SDI for a large and diverse user base (geo and non-geo).

- Abstraction layer- Easy URI-based, transparent, centralized and uniform access to the metadata and content of all SDI resources
 - For end-use
 - URI-based information access. The user only needs a browser and a url to access the available information.
 - It's holistic, all information is available: geodata, list of organisations, list of standardization documents and the documents itself, implementing rules, rendering and presentation models (e.g. SLD's), data models, code lists (e.g. SRS, local ISO metadata keywords, ...)
 - For system integration
 - Machine interface for discovery of services, data, applications, code lists, documents, ...
 - Integration of the available information in applications and services (dropdown lists, input forms, process automation, ...)

Why do we need a Meta-SDI?

3. To meet INSPIRE requirements.

- Requirements coming from:
 - INSPIRE Guidelines for encoding of spatial data (D2.7), version 3.2
 - Discussion paper on INSPIRE registers, version 0.10
 - INSPIRE Generic Conceptual Model (D2.5), version 3.3
- Concerning ...
 - Naming conventions
 - Code lists & enumerations
 - Identifiers
 - National and Regional registries when extending INSPIRE code lists
- INSPIRE common registry (based on ISO 19135: Procedures for Item Registration) : <https://inspire-registry.jrc.ec.europa.eu>
 - Still much work to be done.

How does it work? The Concepts

The URI scheme



The URI scheme is an essential part of the Meta-SDI.

The scheme represents the “who-what-where”:

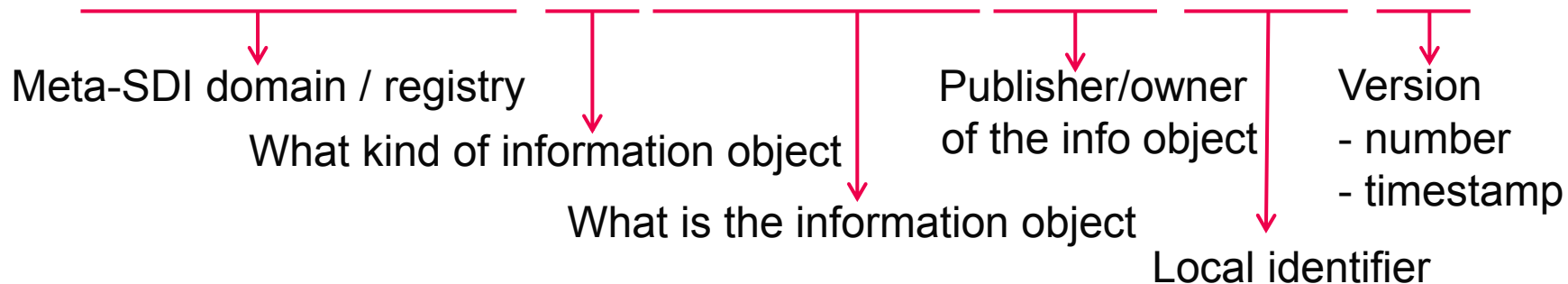
- **Who (provider):** All information providers are registered and have their own “orgns” (organisation namespace)
- **What (resource):** All kind of information is registered, categorised and associated
- **Where (online access):** All registered information is accessible through a standardised url

How does it work? The Concepts

The Meta-SDI identifier

- Follows the **URI schema, syntax and semantics**
- Is **resolvable**: The identifier is a URL that locates an information resource.
- Examples:

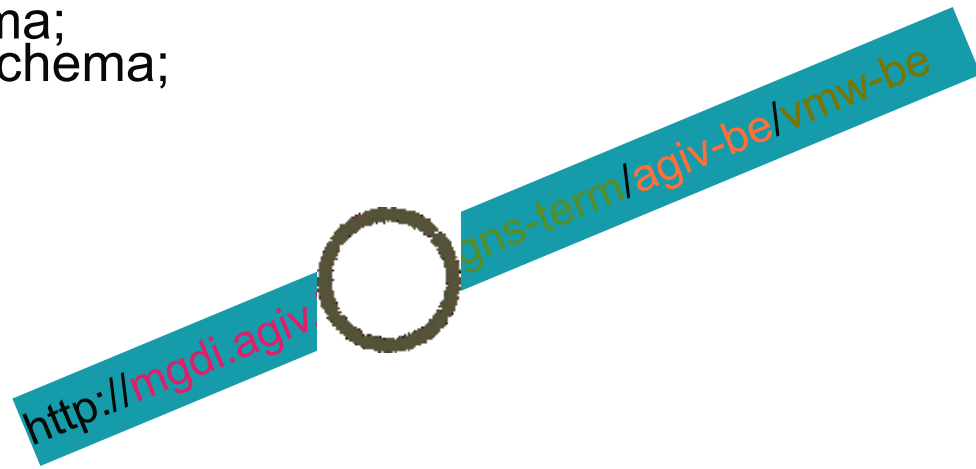
- <http://mgdi.geopunt.be/cl/orgns-term/agiv-be/vmw-be>
- <http://mgdi.geopunt.be/data/klip-WaterPipe/vmw-be/wp000001/V2.0>
- <http://mgdi.geopunt.be/dms/klip-xsd/agiv-be/main/V1.0>
- <http://mgdi.geopunt.be/pms/klip-sld/agiv-be/kleur/V1.0>
- <http://mgdi.geopunt.be/cl/xsns-term/agiv-be/POI/V0.9>
- <http://mgdi.geopunt.be/data/poi/agiv-be/1209873>
- <http://mgdi.geopunt.be/meta/address/agiv-be/5464738>
- <http://mgdi.geopunt.be/meta/address-inspire/agiv-be/5464738/V1.1>



How does it work? The Concepts

The resource classification

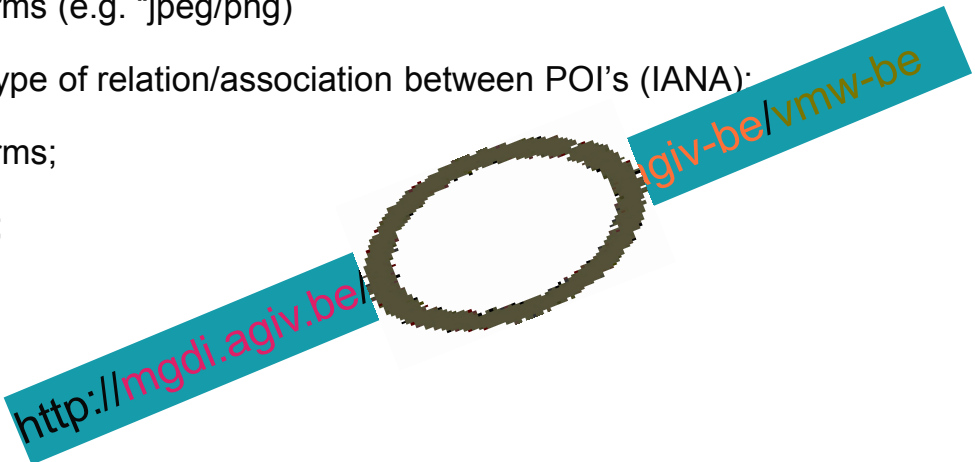
- Classification of information objects (terms, features, names, codes, organizations, etc.)
- Associating classified information objects
- The hart of the Meta-SDI is the “resource classification” (type of information object):
 - **cl**: code list;
 - **dms**: data model schema;
 - **pms**: portrayal model schema;
 - **meta**: metadata;
 - **data**: data instances;
 - **ws**: web services;
 - **reg**: registry;
 - **doc**: documents.



How does it work? The Concepts

The resource type classification

- A Point of Interest (POI) resource type classification example
 - ...
 - (cl) **poi**: POI information elements (e.g. “label”, “link”, “time”, “author”, “license”, “category”, “(spatial) relationship”, “point”, “line”; “polygon”, etc.);
 - (cl) **poi-term**: POI terms (e.g. ;
 - (cl) **mime**: MIME type code list (IANA) (e.g. “image”;
 - (cl) **mime-term**: MIME type code list terms (e.g. “jpeg/png)
 - (cl) **relation**: Code list to describe the type of relation/association between POI’s (IANA);
 - (cl) **relation-term**: Relation code list terms;
 - (dms) **poi-xsd**: W3C POI XMLSchema;
 - (data) **poi**: POI data;



How does it work? The Concepts

The registry

- Storing information objects in a standardized way, accessible via the web.
- Allocating unique and standardized, meaningful Meta-SDI identifiers for information objects.
- Providing a searchable meta description for the information objects
- Governance of the SDI principles, processes and available information.
- Can be federated and heterogeneous
 - e.g. A central OASIS ebXML Registry for common information objects and a OGC CSW for INSPIRE metadata on datasets, dataset series, services and spatial data services

Example: Linking with Meta-SDI identifiers

The POI Use Case

```
<Perceel>
  <code>987620</code>
  <locatie href="http://mgdi.agiv.be/data/poi/agiv-be/8911110"/>
</Perceel>

<poi id="http://www.geopunt.be/poi/8911110" xml:lang="nl-BE" xml:base="http://mgdi.agiv.be/data/poi/agiv-be/8911110">
  <category term="kadastraalPerceel" scheme="http://mgdi.agiv.be/cl/poi-term/agiv-be/category"/>
  <link term="Perceel" scheme="http://mgdi.agiv.be/cl/poi-term/agiv-be/link" href="http://mgdi.agiv.be/data/grbgis-perceel/agiv-be/987620"/>
  <link term="POI-huisAdres" scheme="http://mgdi.agiv.be/cl/poi-term/agiv-be/link" href="http://mgdi.agiv.be/data/poi/agiv-be/1209873"/>
  <link term="Kunstpatrionium" scheme="http://mgdi.agiv.be/cl/poi-term/agiv-be/link" href="http://mgdi.agiv.be/data/kunstpatrionium/erfgoedplus-be/987620"/>
  <location>
    <polygon term="area" scheme="http://mgdi.agiv.be/cl/poi-term/agiv-be/polygon">
      <SimplePolygon srsName="http://www.opengis.net/def/crs/EPSSG/0/4326">
        <posList>42.360890561289295 -71.09139204025269 42.361176 -71.09018 42.36272976137689 -71.09049081802368 42.36318955298668 -71.0967779159
2.363617631805496 -71.10156297683716 42.360890561289295 -71.09139204025269</posList>
      </SimplePolygon>
    </polygon>
    <relationship targetPOI="http://mgdi.agiv.be/data/poi/agiv-be/8911456" term="touches" scheme="http://mgdi.agiv.be/cl/poi-term/agiv-be/spatialRelationship"/>
  </location>
</poi>
```

INSPIRE+

■ INSPIRE is GEO

- Inspire is geo-oriented with a common interface for the geo-domain (WMS, WFS, CWS, GML, ISO Metadata). For most non-geo users these interfaces aren't that common, so we build a shell that provides a uniform access to all available information. Users/integrators can **retrieve** information without having to be bothered with a variety of more or less complex interfaces. Stable, meaningful identifiers allow the user to link to (a version of) the data rather than having to store the data themselves.
- Make INSPIRE services more addressable also for non-geo users based on common web interfaces (browser), protocols (http) en interfaces (REST URL)

■ Specialization or generalization? (Geo as predicate vs geo as attribute)

- Hoeilaart, Brusselsesteenweg, 87
 - → INSPIRE <http://location.testproject.eu/so/ad/Address/AGIV/2000008168>
 - → Meta-SDI <http://mgdi.geopunt.be/data/Address/agiv-be/2000008168>

INSPIRE+

- Register of all resources
 - INSPIRE Discovery service only covers data & services
 - Codelists? Governance? Repositories
 - Discussion Paper on Registries in INSPIRE v0.10 was taken into account

