

Cross-domain metadata interoperability: Lessons learnt in INSPIRE

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CAMP-4-Data Workshop @ DC-2013, Lisbon, 6 September 2013



www.jrc.ec.europa.eu

*Serving society
Stimulating innovation
Supporting legislation*



The Joint Research Centre (JRC)

The mission of JRC is to provide customer-driven scientific and technical support for the conception, development, implementation and monitoring of EU policies.

As a service of the European Commission, the JRC functions as a reference centre of science and technology for the EU.

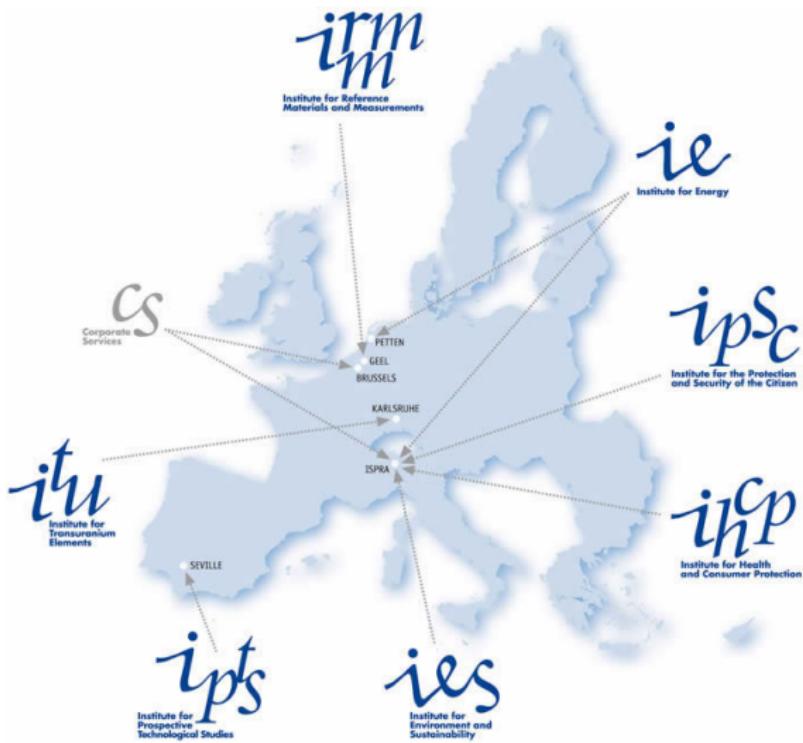
Close to the policy-making process, it serves the common interest of EU Member States, while being independent of special interests, whether private or national.

The *Digital Earth and Reference Data Unit* is part of the Institute for Environment and Sustainability, and it is the largest group in Europe devoted to research on Spatial Data Infrastructures and to the implementation in support of relevant EU policies (e.g., the INSPIRE Directive)



European
Commission

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Outline

- 1** What is INSPIRE
- 2** Cross-domain interoperability in the EU
- 3** Outstanding issues

What is INSPIRE?

“Infrastructure for Spatial Information in Europe”

Distributed infrastructure



28 Countries
24 Languages

Environment



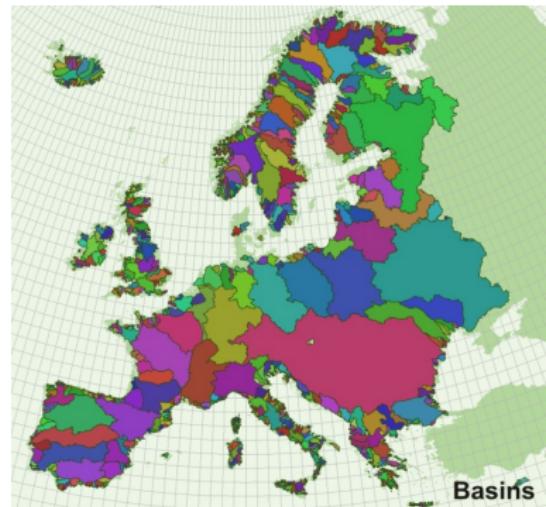
34 Spatial Data Themes
Entry into force: 15 May 2007

General rules for establishment

Set of European and national legal acts
and their coordinated implementation

Why a cross-border data infrastructure?

- Natural disasters as well as other environmental phenomena do not stop at national borders!
- 20% of the EU citizens (115 millions) live within 50Km from a border



- 70% of all fresh water bodies in Europe are part of a trans-boundary river basin!!

INSPIRE in a nutshell



- Purpose: providing access to cross-border EU data to be used in support to
 - EU environmental policies
 - Policies or activities which impact on the environment
- Development & revision process involving experts & stakeholders from all EU Member States
- Comprehensive legal & technical framework for data & service interoperability
- Cross-sector thematic scope
- Current status: *~200K data sets from EU Member States, discoverable through the INSPIRE Geoportal*

Cross-sector data interoperability



INSPIRE data



Data from other sectors



Urban Planning
 Waste Management Plans
 Environmental Impact Assessment
 Risk Management

A collaborative effort





The INSPIRE metadata schema

- Designed to describe data sets, data set series, and data services
- Consisting of a set of core metadata elements, recognised by the INSPIRE Committee as relevant to resource *discovery, evaluation, and use*
- *Not domain specific* – the majority of the INSPIRE metadata elements can describe any type of resources, not only geospatial ones
- Use of *multilingual controlled vocabularies* for semantic annotation

INSPIRE metadata elements at a glance

Data and service discovery

- Resource title
- Resource abstract
- Resource type
- Resource locator
- Keyword
- Geographic bounding box
- Spatial resolution
- Conformity
- Conditions for access and use
- Limitations on public access
- Responsible organisation
- Metadata point of contact
- Metadata date
- Metadata language

Data discovery

- Unique resource identifier
- Resource language
- Topic category
- Lineage

Service discovery

- Coupled resource
- Service type

Data evaluation & use

- Coordinate reference system
- Temporal reference system
- Encoding
- Character encoding
- Topological consistency
- Spatial representation type

INSPIRE metadata mapped to Dublin Core



INSPIRE
Infrastructure for Spatial Information in Europe

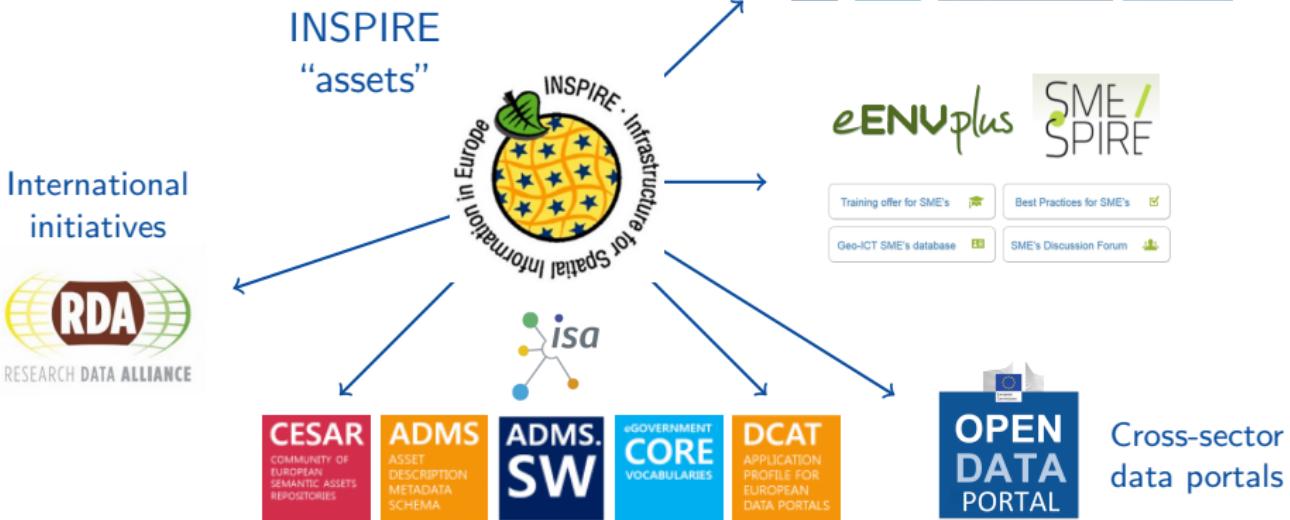
State of progress in the development of guidelines to express elements of the INSPIRE metadata implementing rules using ISO 15836

Title	State of progress in the development of guidelines to express elements of the INSPIRE metadata implementing rules using ISO 15836
Creator	European Commission
Creation date	2008-05-06
Date of last revision	2008-05-07
Subject	INSPIRE Implementing Rules for Metadata and Dublin Core
Status	Final
Publisher	European Commission
Type	Text
Description	Relation between ISO 15836 Dublin Core Metadata Terms and the elements of the INSPIRE metadata implementing rules
Contributor	Drafting Team Metadata, Makx Dekkers

(Some of the) Interoperability initiatives in the EU

- ODP: The EU Open Data Portal – it publishes datasets from EU bodies and institutions
- EU ISA Programme: *Interoperability Solutions for European Public Administrations*
 - ADMS: Asset Description Metadata Schema – sharing & re-using semantic interoperability assets (i.e., code lists, vocabularies, thesauri, etc.)
 - eGovernment Core Vocabularies
 - DCAT-AP: DCAT application profile for data portals in Europe
- JRC is involved in these activities, as a provider of (research) data and technical coordinator of INSPIRE

Re-use of expertise, experience and networks





Outstanding issues for cross-domain interoperability

- Data quality
- Maintenance and interlinking of controlled vocabularies
- Licensing and Digital Rights Management (DRM)

Data quality

- Transparent and machine readable representation of data provenance, lineage, and use
- Versioning (data may be subject to changes and updates)
- Persistent IDs needed to make resources referenceable
- Support to users' feedback and quality rating (possibly including third-party quality certification)

ODI Open Data Certificate x

https://certificates.theodi.org



Certify your open data

Show that it's easy to find, use and share

Create a certificate

Browse all certificates

open data certificate™ BETA

Search certificates Go Register Sign in



W3C Recommendation

WS PROV-O: The PROV Ontology

www.w3.org/TR/prov-o/

W3C

PROV-O: The PROV Ontology

W3C Recommendation 30 April 2013

This version: <http://www.w3.org/TR/2013/REC-prov-o-20130430>

Latest published version: <http://www.w3.org/TR/prov-o/>

Implementation report: <http://www.w3.org/TR/2013/NOTE-prov-impl-20130430>

Previous version: <http://www.w3.org/TR/2013/PR-prov-o-20130430>

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W3C Working Group Note

WS Dublin Core to PROV Map

www.w3.org/TR/prov-dc/

W3C

Dublin Core to PROV Mapping

W3C Working Group Note 30 April 2013

This version: <http://www.w3.org/TR/2013/NOTE-prov-dc-20130430>

Latest published version: <http://www.w3.org/TR/prov-dc/>

Previous version: <http://www.w3.org/TR/2013/WD-prov-dc-20130312>

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Open Annotation Comm... X

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Open Annotation Community Group

The purpose of the Open Annotation Community Group is to work towards a common, RDF-based, specification for annotating digital resources. The effort will start by working towards a reconciliation of two proposals that have emerged over the past two years: the Annotation Ontology [1] and the Open Annotation Model [2]. Initially, editors of these proposals will closely collaborate to devise a common draft specification that addresses requirements and use cases that were identified in the course of their respective efforts. The goal is to make this draft available for public feedback and experimentation in the second quarter of 2012. The final deliverable of the Open Annotation Community Group will be a specification, published under an appropriate open license, that is informed by the existing proposals, the common draft specification, and the community feedback.

[1] <http://code.google.com/p/annotation-ontology/>
[2] <http://www.openannotation.org/spec/beta/>

Get involved!

Anyone may join this Community Group. All participants in this group have signed the W3C Community Contributor License Agreement (CLA).

JOIN THIS GROUP

or learn how to join or request an account.

Participants



Controlled vocabularies

- An approach to the (collaborative) maintenance and publication of controlled vocabularies
- Key features include:
 - Multilingual support – cross-language search
 - Versioning support – backward / forward interoperability
 - Mapping support – cross-domain interoperability



W3C Working Group Note

Asset Description Metadata Schema (ADMS)

W3C Working Group Note 01 August 2013

This version: <http://www.w3.org/TR/2013/NOTE-ADMS>

Latest published version: <http://www.w3.org/TR/vocab-adms>

Previous version: <http://www.w3.org/TR/2013/NOTE-ADMS>

Editors: [Phil Archer](#), W3C / ERCIM
[Gofran Shukair](#), DERI, NUG

Author: [Maik Dekkers](#), AMI Consult (orig.)

The vocabulary defined in this document

Copyright © 2013 W3C® (MIT, ERCIM, Keio, Beira-Rio). W3C Working Group Note 01 August 2013. This version is available at <http://www.w3.org/TR/2013/NOTE-ADMS>. This note is part of the [W3C Semantic Web Activity](#).

Abstract

Semantic Assets | Joinup X https://joinup.ec.europa.eu/catalogue/all Contact | Search | Glossary | Help | Partners | Analytics Disclaimer English (en) Login or Sign up Search

Share and reuse interoperability solutions for public administrations

European Commission > ISIA > Joinup > Semantic assets > Catalogue

Home My Page Communities Semantic Assets Software News Events e-Library People

Semantic Assets Catalogue of assets Projects Federated Repositories Advanced Search

Semantic Assets Share and reuse semantic interoperability assets.

One central place to search for semantic assets

Here you can explore semantic assets such as domain models, ontologies, thesauri and code lists listed on more than 20 online repositories that have made their collections searchable through Joinup.

Language: Any language ▾ Current version

Keywords: Search Advanced search

Propose your repository Propose your... Share this on... Subscribe to Newsletter Subscribe to RSS

A screenshot of a web browser window displaying the Joinup Semantic Assets catalogue. The URL is https://joinup.ec.europa.eu/catalogue/all. The page title is "Semantic Assets | Joinup". The main content area shows a listing for the "Asset Description Metadata Schema (ADMS)". The listing includes a brief description, a "View details" button, and a "View on Joinup" link. The interface has a clean, modern design with a blue header and a white body. Navigation links for Home, My Page, Communities, Semantic Assets, Software, News, Events, e-Library, and People are visible at the top. On the left, there's a sidebar with links for Semantic Assets, Catalogue of assets, Projects, Federated Repositories, and Advanced Search. On the right, there are several call-to-action buttons for proposing repositories, sharing, subscribing to newsletters, and RSS feeds.

DCAT-AP: recommendations for controlled vocabularies

8.1. Requirements for controlled vocabularies

The following is a list of requirements that were identified for the controlled vocabularies to be recommended in this Application Profile.

Controlled vocabularies SHOULD:

- Be published under an open licence.
- Be operated and/or maintained by an institution of the European Union, by a recognised standards organisation or another trusted organisation.
- Be properly documented.
- Have labels in multiple languages, ideally in all official languages of the European Union.
- Contain a relatively small number of terms (e.g. 10-25) that are general enough to enable a wide range of resources to be classified.
- Have terms that are identified by URIs with each URI resolving to documentation about the term.
- Have associated persistence and versioning policies.

These criteria do not intend to define a set of requirements for controlled vocabularies in general; they are only intended to be used for the selection of the controlled vocabularies that are proposed for this Application Profile.



Thesaurus alignment at the Publications Office of the EU

A screenshot of a Microsoft Internet Explorer browser window. The title bar says "MDR - EuroVoc". The address bar shows the URL "publications.europa.eu/mdr/eurovoc/index.html". The page content is as follows:

MDR Metadata Registry

[MDR > EuroVoc](#)

EuroVoc is a multilingual, multidisciplinary thesaurus covering the activities of the EU, the European Parliament in particular. It contains terms in 22 EU languages (Bulgarian, Czech, Danish, Dutch, English, Estonian, Finnish, French, German, Greek, Hungarian, Italian, Latvian, Lithuanian, Maltese, Polish, Portuguese, Romanian, Slovak, Slovenian, Spanish and Swedish), plus Croatian and Serbian.

The following EuroVoc resources (version 4.4) are available for download:

- [EuroVoc version \(SKOS distribution\)](#)
- [EuroVoc version \(XML distribution\)](#)

You will find more information on EuroVoc version 4.4 in the [release notes](#).

The following EuroVoc alignments are available for download:

- [Alignment EuroVoc with Agrovoc](#)
- [Alignment EuroVoc with Eclas](#)
- [Alignment EuroVoc with Gemet](#)

These EuroVoc resources are available as well as datasets on the [European Commission Open Data Portal \(ODP\)](#).

For more information and to browse or search EuroVoc, please visit the EuroVoc website: <http://eurovoc.europa.eu>.



The INSPIRE Registry



A screenshot of a web browser displaying the INSPIRE Registry homepage. The URL in the address bar is inspire.ec.europa.eu/registry/. The page features the European Commission logo at the top left. The main title "INSPIRE REGISTRY" is centered above the subtitle "Enhancing access to European spatial data". A navigation bar at the top right includes links for "About", "Contact", "Legal notice", and a language selector set to "English (en)". Below the header, a breadcrumb trail shows the path: "European Commission > INSPIRE > INSPIRE registry". The main content area is titled "INSPIRE registry" and contains the following information:

ID:	http://inspire.ec.europa.eu/registry
Language:	en
Label:	INSPIRE registry
Registry manager:	European Commission, Joint Research Centre
Content Summary:	<p>The INSPIRE infrastructure involves a number of items, which require clear descriptions and the possibility to be referenced through unique identifiers. Examples for such items include INSPIRE themes, code lists, application schemas or discovery services. Registers provide a means to assign identifiers to items and their labels, definitions and descriptions (in different languages). The INSPIRE registry provides a central access point to a number of centrally managed INSPIRE registers. The content of these registers are based on the INSPIRE Directive, Implementing Rules and Technical Guidelines.</p>
Other formats:	 XML JSON Atom

On the right side of the content area, there are three blue square icons with white symbols: a question mark (?), a speech bubble (chat), and an RSS feed (RSS).

At the bottom of the page, a "Registers" section is visible, along with a footer containing the "Joint Research Centre" logo and various navigation icons.



The INSPIRE Registry

- Giving access to INSPIRE reference data – e.g., themes, application schemas, code lists (~400)
- Operated according to Linked Data principles
- Agile design and implementation process, based on users' feedback
- Public service, that can be used also outside the INSPIRE framework
- Prototype presented in June at the INSPIRE 2013 Conference in Florence (Italy)



Licensing and DRM

- What is missing?
 - *A common approach to digital rights management, for resource discovery, access, and use*



Licensing and DRM

- What is missing?
 - *A common approach to digital rights management, for resource discovery, access, and use*
- What is needed?



Licensing and DRM

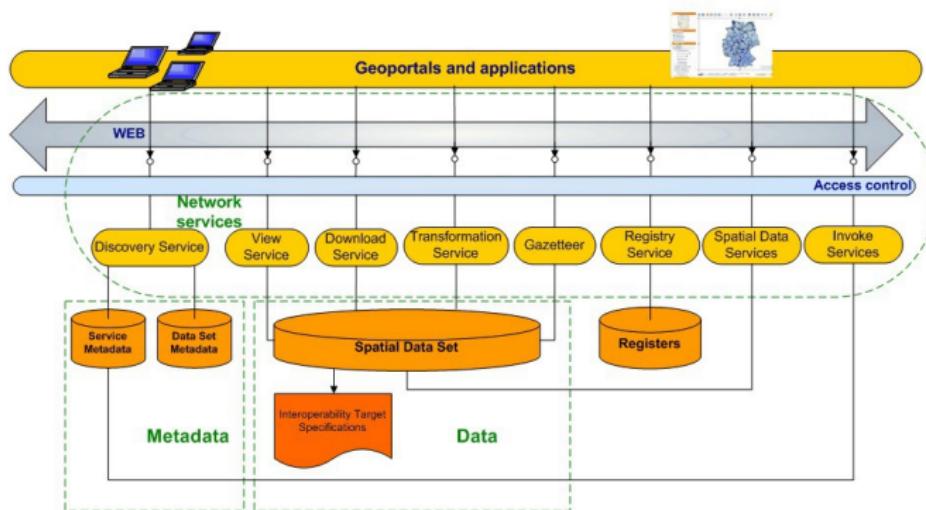
- What is missing?
 - *A common approach to digital rights management, for resource discovery, access, and use*
- What is needed?
 - *What about transparent and machine readable representations of licences for data and services?*



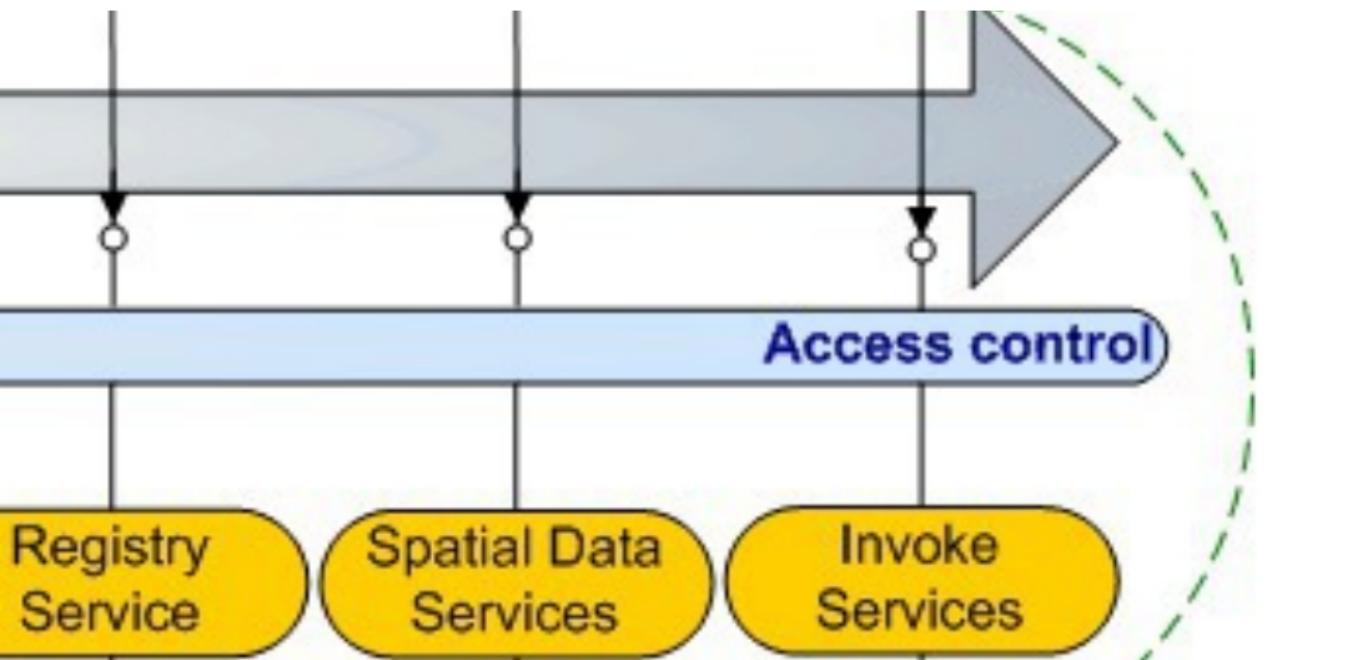
Licensing and DRM

- What is missing?
 - *A common approach to digital rights management, for resource discovery, access, and use*
- What is needed?
 - *What about transparent and machine readable representations of licences for data and services?*
 - *Maybe, but we could start with something simpler*

DRM in the INSPIRE architecture



DRM in the INSPIRE architecture



COMMISSION REGULATION (EU) No 268/2010
of 29 March 2010

implementing Directive 2007/2/EC of the European Parliament and of the Council as regards the access to spatial data sets and services of the Member States by Community institutions and bodies under harmonised conditions

THE EUROPEAN COMMISSION,

Acting regard to the Treaty on the Functioning of the European Union,

Acting regard to Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing the Infrastructure for Spatial Information in the European Community (INSPIRE)⁽¹⁾, and in particular Article 17(8) thereof,

Whereas:

Directive 2007/2/EC requires Member States to provide the institutions and bodies of the Community with access to spatial data sets and services in accordance with harmonised conditions.

In order to ensure a coherent approach to the provision of access to spatial data sets and services this Regulation should define a minimum set of conditions to be respected.

Directive 2007/2/EC allows for exceptions from data sharing according to Article 17(7). However, even



INSPIRE

Infrastructure for Spatial Information in Europe

Guidance on the 'Regulation on access to spatial data sets and services of the Member States by Community institutions and bodies under harmonised conditions'

Title	Guidance on the 'Regulation on access to spatial data sets and services of the Member States by Community institutions and bodies under harmonised conditions'
Creator	DT Data and Service Sharing
Date	09/01/2013 (revision)
Subject	Access to spatial data sets and services of the Member States by Community institutions and bodies
Status	Final



Feedback from the INSPIRE 2013 Conference

- A solution to licensing and DRM is not at hand
- The final strategy:



Feedback from the INSPIRE 2013 Conference

- A solution to licensing and DRM is not at hand
- The final strategy:
 - *Keep on working on it ;)*



Feedback from the INSPIRE 2013 Conference

- A solution to licensing and DRM is not at hand
- The final strategy:
 - *Keep on working on it ;)*
 - *In the meantime, identify the core set of your data that can be accessed and re-used with no restriction*



ADMS licence types

ADMS.SW Visualiser https://joinup.ec.europa.eu/svn/adms_foss/amds_sw_taxonomies/ADMS_SW_v1.00_Taxonomies.html

Licence Type

URI <http://purl.org/adms/licencetype/1.1>
rdf:type <http://www.w3.org/2004/02/skos/core#ConceptScheme>

A vocabulary to classify the conditions and restrictions that are related to the specified licence.

[dcterms:rights](#) European Union
[dcterms:license](#) <https://joinup.ec.europa.eu/category/licence/isa-open-metadata-licence-v11>

+ skos:hasTopConcept

1. **Attribution**
<http://purl.org/adms/licencetype/Attribution>
skos:prefLabel "Attribution"@da
skos:prefLabel "Zuschreibung"@de
skos:prefLabel "Attribution"@en
skos:prefLabel "Atribucion"@es
skos:prefLabel "Attribution"@fr
skos:prefLabel "Attribuzione"@it
skos:prefLabel "Naamsvermelding"@nl
skos:prefLabel "Atrybucja"@pl
skos:definition "In general, most licences request to respect author's credits. Example: Article 5 EUPL: 'the licensee shall keep intact all copyright notices... in every distributed copy...' For the most permissive licences, this 'Attribution obligation' (combined with a warranty disclaimer) is the main or sole condition for using, copying, performing and (re)distributing the work. Examples: CC by, MIT, BSD, ISA Open Metadata v1.1."@en
<http://www.w3.org/2004/02/skos/core#inScheme> <http://purl.org/adms/licencetype/1.1>
2. **GrantBack**
<http://purl.org/adms/licencetype/GrantBack>
skos:prefLabel "Grant tilbage"@da
skos:prefLabel "Gewahren zurück"@de
skos:prefLabel "Grant back"@en



Open Data Rights Statement Vocabulary

Latest Version
<http://schema.theodi.org/odrs>

Created
2013-05-31

Last Modified
2013-07-29

Authors
Leigh Dodds

Alternate Versions
[Turtle](#)

A vocabulary that supports the publication of Open Data by providing the machine-readable information, copyright notices and attribution requirements that are associated with the data.

Introduction

Data published to the web should always be accompanied by machine-readable, a statement of rights that relate to potential re-use of the data.

While legal requirements vary across jurisdictions, a statement of rights will:

- A reference to a licence or waiver that relates to re-use of the dataset
- A reference to a licence or waiver that relates to re-use of the contents of the dataset
- Notices, e.g. copyright notices, that should be preserved by re-users
- Guidance on a means of attributing the source of the data, e.g. when re-used
- Pointers to further information, e.g. further guidance on re-use or details of the dataset

The Open Data Rights Statement vocabulary is intended to support the publication of data and related work from the Dublin Core and Creative Commons communities and

ODRL Community Group

www.w3.org/community/odrl/

W3C Community and Business Groups

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Community & Business Groups

ODRL Community Group

The Open Digital Rights Language (ODRL) Initiative is an international effort aimed at developing and promoting an open standard for policy expressions. ODRL provides flexible and interoperable mechanisms to support transparent and innovative use of digital content in publishing, distribution and consumption of digital media across all sectors and communities. The ODRL Policy model is broad enough to support traditional rights expressions for commercial transaction, open access expressions for publicly distributed content, and privacy expressions for social media.

Mailing List Wiki Version Control Issue Tracking Twitter RSS Contact Group Reports

Completed Work (licensing info)

2012-04-24	ODRL Version 2.0 Core Model	Licensing commitments
2012-04-24	ODRL Version 2.0 Common Vocabulary	Licensing commitments
2012-04-24	ODRL Version 2.0 XML Encoding	Licensing commitments

Get involved!

Anyone may join this Community Group. All participants in the group have signed the W3C Community Contributor License Agreement (CLA).

JOIN THIS GROUP

or learn how to join or request an account.

Participants

Renato Iannella Chair

Thanks for your attention!

More information

■ INSPIRE

<http://inspire.ec.europa.eu>

■ The ISA Programme

<http://ec.europa.eu/isa>

■ EU OP's Metadata Registry

<http://publications.europa.eu/mdr>



LINKED OPEN GOVERNMENT DATA

Harmonization and Interoperability of EU Environmental Information and Services

Andrea Pergo, Cecilia Paganini, Lorraine Yeraci, Michael Gatz, Paul Saito,

Much of what occurs in the environmental and geographical community involves multiple databases and Web services along with open standards to share information across the Internet efficiently. These efforts are making data and services available to citizens and governments, and thus reducing data distribution methods and costs for individual users and providers. In addition, harmonization moves toward the reuse of data and services for which it was originally created. The objective of this report is to provide recommendations to the European environment community, such as the European Environment Agency, and to other policy communities, such as the European Commission, to facilitate reuse of environmental information in Europe. The aim of this article is to provide a better understanding of the challenges and opportunities for interoperability in the context of environmental information systems. It also highlights the role of the European Environment Agency in addressing these problems. We provide recommendations for the reuse of environmental information in Europe, particularly in the field of biodiversity, climate change, and environmental monitoring. The report also discusses the importance of linked open data for making environmental information, as well as other types of data, more accessible and useful.

European Water Policy Context

Harmonization and interoperability of environmental data and services are key to the