

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.

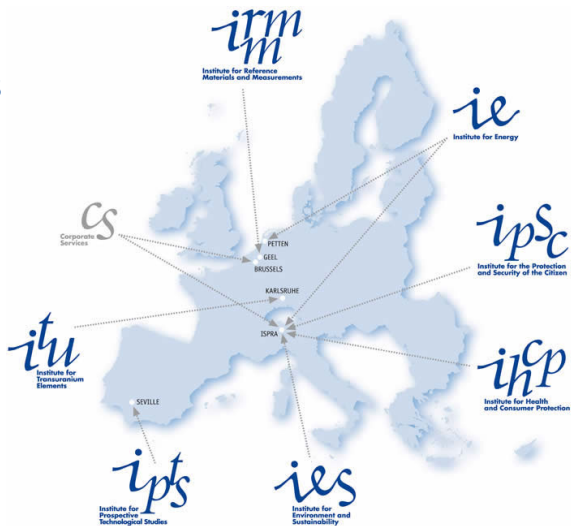
Close to the policy-making process, it serves the common interest of EU Member States, while being independent of special interests, whether private or national.

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)



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JRC sites and institutes



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



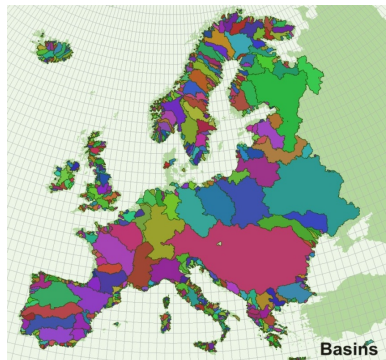
34 Spatial Data Themes
Entry into force: 15 May 2007

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

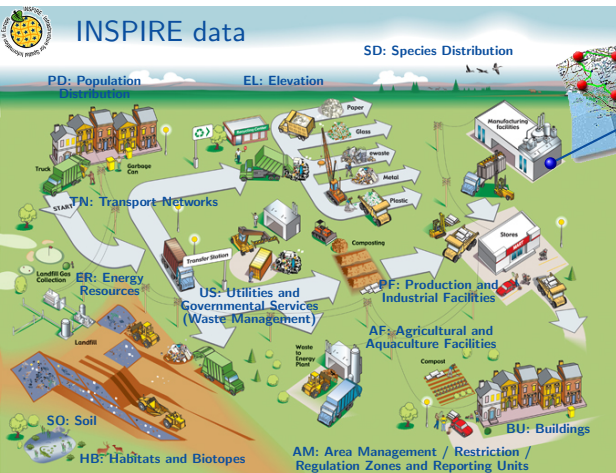


- Purpose: providing access to cross-border EU data to be used in support to
 - EU environmental policies
 - Policies or activities which impact on the environment
- Development & revision process involving experts & stakeholders from all EU Member States
- Comprehensive legal & technical framework for 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

Organisations developing formal
and de-facto standards



INSPIRE
"assets"



International
initiatives



Cross-sector
data portals

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)



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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

The screenshot shows a web browser window with the URL https://certificates.theodi.org. The page features a large, colorful, abstract graphic on the left side, composed of various colored shapes (yellow, green, blue, orange, pink, red, cyan) radiating from a central white area. The main heading is "Certify your open data" in a large, bold, sans-serif font. Below it is a subheading "Show that it's easy to find, use and share". There are two prominent buttons: an orange one labeled "Create a certificate" and a blue one labeled "Browse all certificates". At the bottom, there is a dark navigation bar with the text "open data certificate™" and a small "BETA" badge. To the right of this is a search bar with the placeholder text "Search certificates" and a "Go" button. Further right are links for "Register" and "Sign in".



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W3C Recommendation

W3 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-o-20130430/>

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

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W3C Working Group Note

Dublin Core to PROV Mapping

W3C Working Group Note 30 April 2013

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

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

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The screenshot shows a web browser window with the address bar displaying www.w3.org/community/openannotation/. The page header includes the W3C logo and the text "W3C Community and Business Groups". Navigation links at the top right include "LOG IN", "GET AN ACCOUNT", "MY ACCOUNT", and "SKIP". A search bar is located on the right side of the header.

The main content area is titled "Open Annotation Community Group" and includes a paragraph describing the group's purpose: "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 2022. 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."

Footnotes at the bottom of the main content area provide links for [1] <http://code.google.com/p/annotation-ontology/> and [2] <http://www.openannotation.org/spec/beta/>.

A sidebar on the left contains links to "Mailing List", "Wiki", "Chat", "RSS", and "Contact Group". A right sidebar titled "Get involved!" contains the text "Anyone may join this Community Group. All participants in this group have signed the W3C Community Contributor License Agreement (CLA)." and a red button labeled "JOIN THIS GROUP". Below this, it says "or learn how to join or request an account." A section titled "Participants" is also visible at the bottom right.

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



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W3C Working Group Note

W3 Asset Description Metadata Schema (ADMS)

W3C Working Group Note 01 August 2013

This version:

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

Latest published version:

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

Previous version:

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

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Author:

[Mark Dekkers](#), AMI Consult (original)

The vocabulary defined in this document

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Abstract

Semantic Assets | Joinup

<https://joinup.eceuropa.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 > Joinup > Semantic assets > Catalogue

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:

☐ Current version

Keywords:

[Advanced search](#)

Joint
Research
Centre

DCAT-AP: recommendations for controlled vocabularies

8.1. Requirements for controlled vocabularies

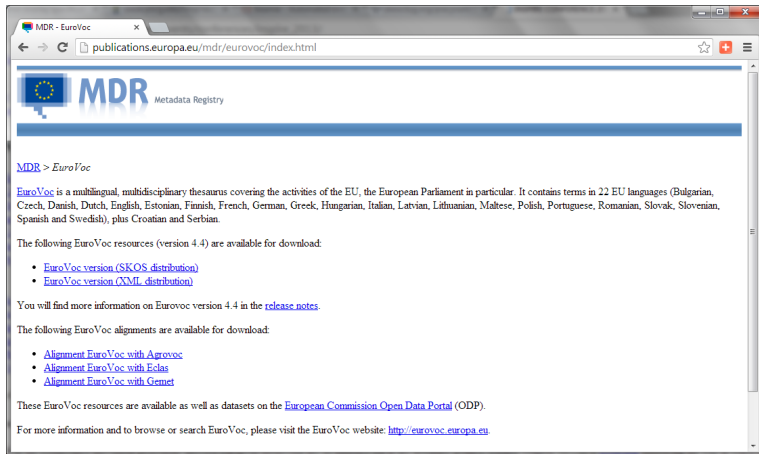
The following is a list of requirements that were identified for the controlled vocabularies to be recommended in this Application Profile.

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



The screenshot shows a web browser window with the address bar displaying "publications.europa.eu/mdr/eurovoc/index.html". The page header features the "MDR Metadata Registry" logo. The main content area is titled "MDR > EuroVoc" and contains the following text:

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 Eclis](#)
- [Alignment EuroVoc with Gernet](#)

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



The screenshot shows a web browser window displaying the INSPIRE Registry homepage. The browser's address bar shows the URL inspire.ec.europa.eu/registry/. The page features the European Commission logo and the title "INSPIRE REGISTRY" with the subtitle "Enhancing access to European spatial data". A navigation bar includes links for "About", "Contact", and "Legal notice", along with a language selector set to "English (en)". The main content area is titled "INSPIRE registry" and lists the following details:

- ID:** <http://inspire.ec.europa.eu/registry>
- Language:** en
- Label:** INSPIRE registry
- Registry manager:** European Commission, Joint Research Centre
- Content Summary:** 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.

Below the summary, there is a section for "Other formats" with icons and links for XML, JSON, and Atom. At the bottom of the page, a "Registers" section is partially visible. On the right side of the browser window, there are three blue buttons: a question mark, a speech bubble, and a Wi-Fi symbol.

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?

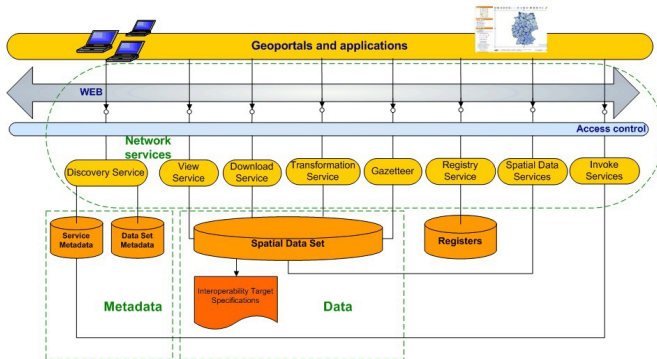
Licensing and DRM

- 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?*

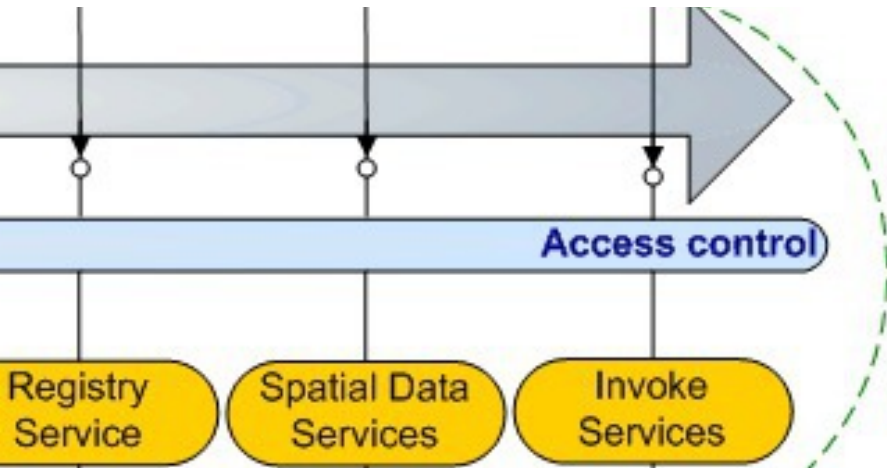
Licensing and DRM

- 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





European
Commission

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,

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

having regard to Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing 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 where Member States apply those exceptions, they



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](#)

- Attribution**
<http://purl.org/adms/licencetype/Attribution>
[skos:pref_label](#) "Attribution"@da
[skos:pref_label](#) "Zuschreibung"@de
[skos:pref_label](#) "Attribution"@en
[skos:pref_label](#) "Atribución"@es
[skos:pref_label](#) "Attribution"@fr
[skos:pref_label](#) "Attribuzione"@it
[skos:pref_label](#) "Naamsvermelding"@nl
[skos:pref_label](#) "Atribucja"@pl
[skos:definition](#) "In general, most licences request to respect author's credits. Example: Article 5 EURL: "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>
- GrantBack**
<http://purl.org/adms/licencetype/GrantBack>
[skos:pref_label](#) "Grant tilbage"@da
[skos:pref_label](#) "Gewähren zurück"@de
[skos:pref_label](#) "Grant back"@en



European
Commission

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 information, a statement of the rights that relate to potential re-use of the data.

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

- 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-using the data
- Pointers to further information, e.g. further guidance on re-use or details of the data

The Open Data Rights Statement vocabulary is intended to support the published work from the Dublin Core and Creative Commons communities and others.

W3C Community and Business Groups

Search blogs

CURRENT GROUPS

- [Home / ODRL Community Group](#)
- [Community & Business Groups](#)
- [ODRL Community 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

ABOUT

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.

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

Renato Iannella
Chair

More information

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

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

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