

# The ISO TC211 General Feature Model and the semantic web: Compatible or Complementary?

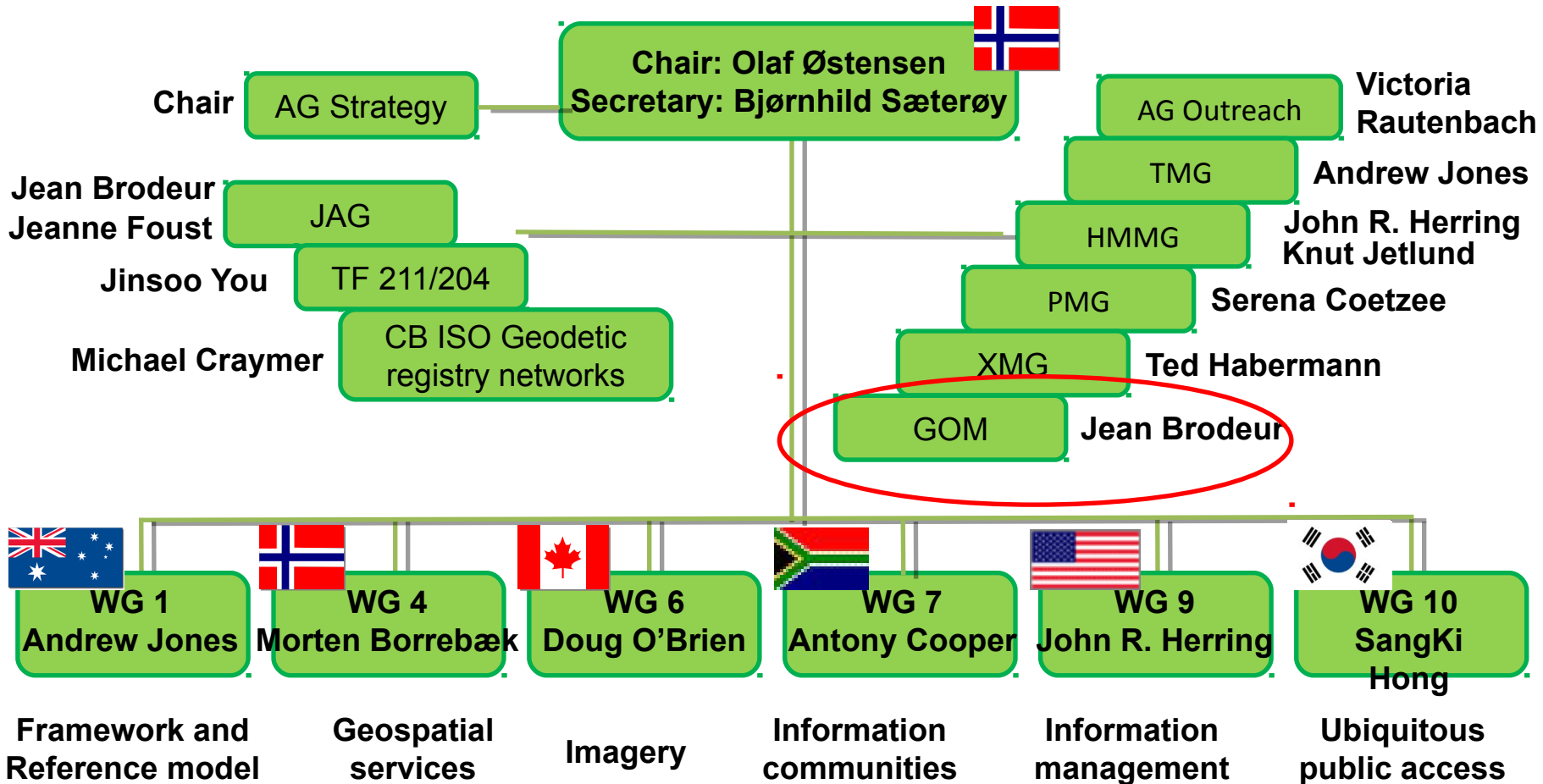
ISO TC211 suite of geostandards is based on object oriented information modelling. How does this fit in with the semantic web and ontology driven knowledge systems?



International  
Organization for  
Standardization



ISO / TC211  
Geographic  
Information/Geomatics



## **X standards concerning information modelling and semantics**

19103: Conceptual schema language

19107: Spatial schema

19109: Rules for application schema

19110: Methodology for feature cataloguing

19126: Feature concept dictionaries and registers

19131: Data product specifications

19150: Ontology -- Part 2: Rules for developing  
ontologies in the Web Ontology Language

## Object Orientation: Revelation of the 90 ties

- Object oriented programming
- Object oriented modelling

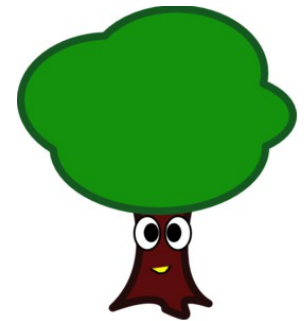
Classes (objecttypes)

Defined by attributes – attributes defined by classes

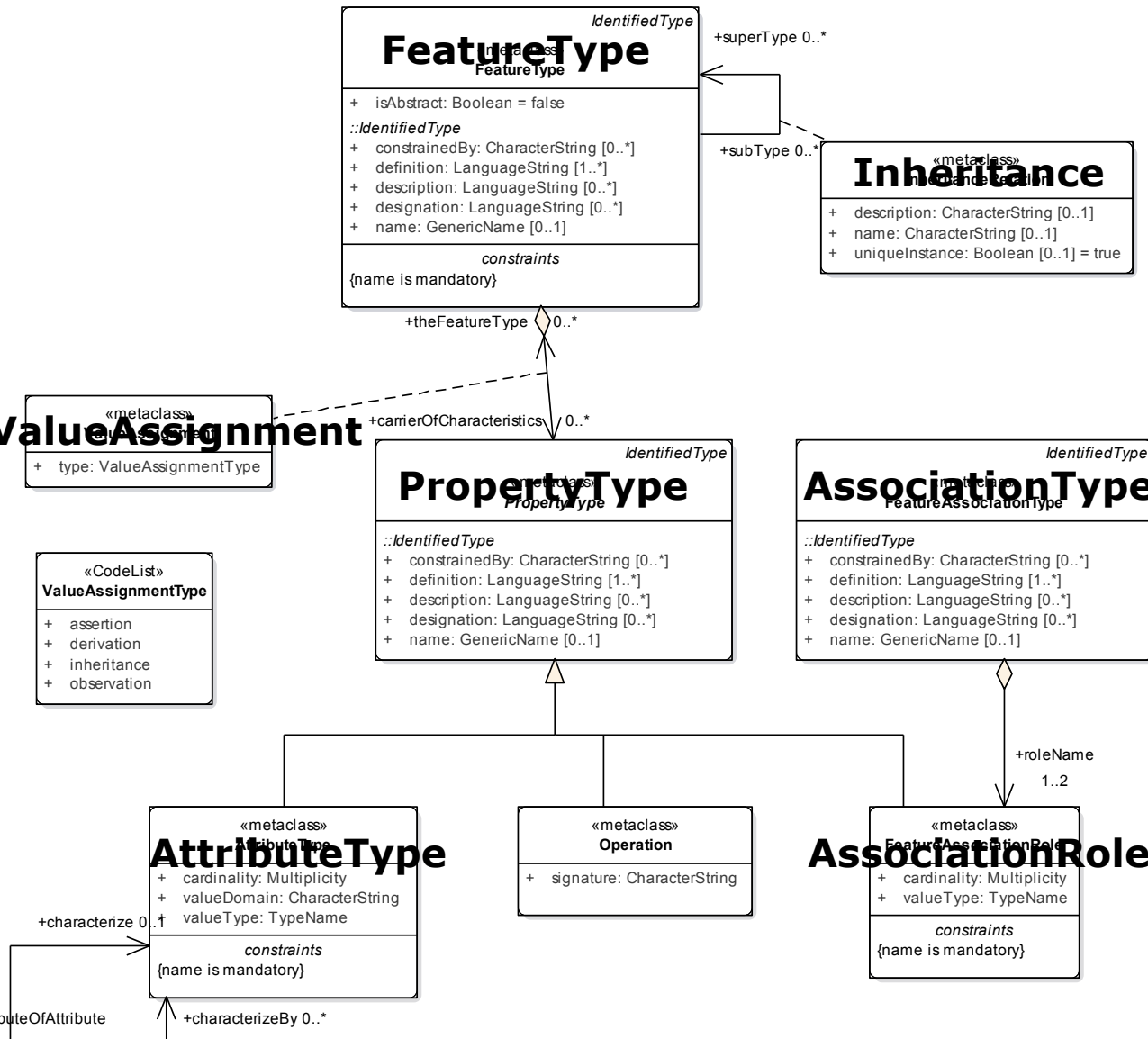
Class is unit of information

Class hierarchy – inheritance

Relation between objects



# ISO TC 211 General Feature Model



Back bone of  
geo-  
information  
modelling



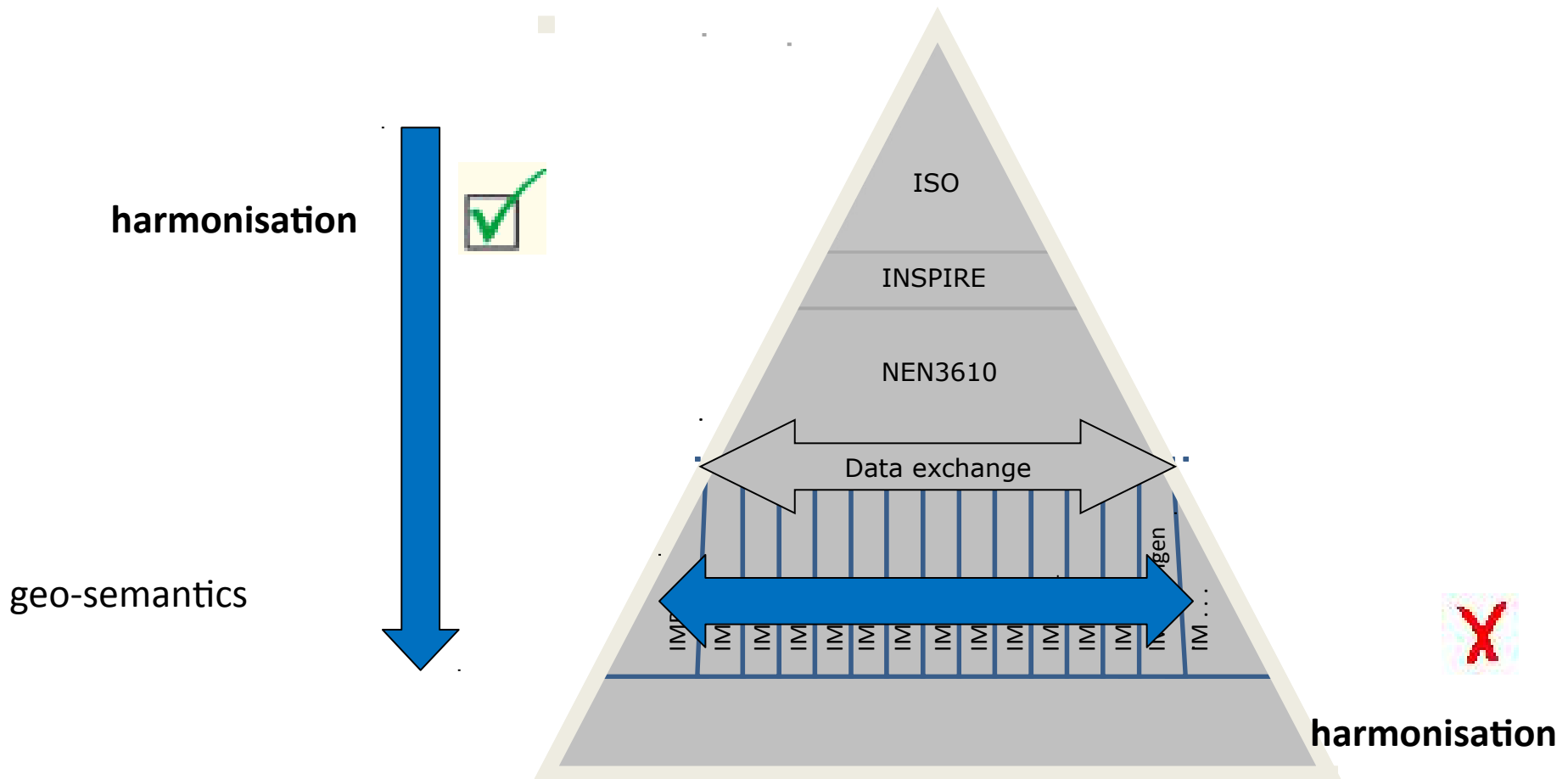
## **Positive:**

- Provides information structure within domains
- Controlled implementation (validation is facilitated)

## **Negative:**

- Information structure is rigid and hampers crossdomain harmonisation.
- Different views on same reality provides complication

# Geo semantic Framework in NL



## Describing what? Reality or Model of Reality?

Somehow Geo likes to describe the model

Then what's the model behind the register?

Geonovum maakt geo-informatie van de overheid toegankelijk en zorgt voor de standaarden die daarvoor



The screenshot shows a web interface for a semantic register. At the top, there is a green navigation bar with a home icon and several menu items: IMGEO, NEN3610, IMRO, IMBRT, and IMKL. Below the navigation bar, the text "Begrippen - NEN3610" is displayed. A horizontal list of letters from 'a' to 'z' is provided for navigation, with "alle begrippen" at the end. Below this is a table with three columns: "Nr", "Begrip", and "Uitleg". The table contains three entries:

Nr	Begrip	Uitleg
1	<a href="#">Functioneel gebied</a>	begrensd en benoemd gebied dat door een functionele eenheid wordt beschreven
2	<a href="#">Gebouw</a>	vrijstaande, overdekte en geheel of gedeeltelijke met wanden omsloten toegankelijke direct of indirect met de grond is verbonden.
3	<a href="#">Geo-object</a>	abstractie van een fenomeen in de werkelijkheid, dat direct of indirect is geassocieer locatie relatief ten opzichte van de aarde



# What's the source of semantics?



- Dataspecifications provide the UML models
- Models are implemented in XML and others
- Models get implemented in ontologies, vocabularies and semantic web
- Semantic web might become the source.....





# Compatible or complementary???

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- Evolutionary process – time will tell.
- ISO 19150: Ontology -- Part 2: Rules for developing ontologies in the Web Ontology Language



## ISO/TC 211 N 3976

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<b>ISO reference number:</b>	19150-2
<b>Title:</b>	ISO 19150-2 Geographic information — Ontology — Part 2: Rules for developing ontologies in the Web Ontology Language (OWL) as sent to ISO for publication
<b>Status:</b>	Note that this is not the final version, the draft will be checked and edited by the ISO CS before publication
<b>Source:</b>	ISO/TC 211/WG 7/EC 19150-2
<b>Expected action:</b>	Info
<b>Reference:</b>	DIS 19150-2, N 3975

# ISO 19150-2

Ontology - Part 2:  
Rules for developing  
ontologies in the Web  
Ontology Language

# Mapping rules from General Feature Model (UML) to OWL



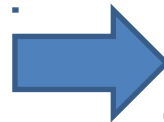


# General Feature Model



# RDFS SKOS constructs

- Package
- Class
- Abstract Class
- Generalization
- Association
- Attribute
- Datatype
- Codelist
- Union
- Multiplicity
- Constraint
- Aggregation
- Composition



- Ontology
- Class
- **Absent:documented**
- Generalization
- Association
- Data property
- Object property
- Class
- SKOS:collection
- unionOf
- Cardinality
- **absent:documented**
- **absent:documented**
- **absent:documented**

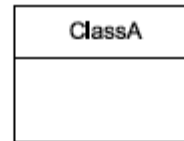


Figure 3 — UML CLASS notation

## 6.4.2 OWL notation

Class <OWL> is the resource corresponding to a set of individuals.

## 6.4.3 Rules

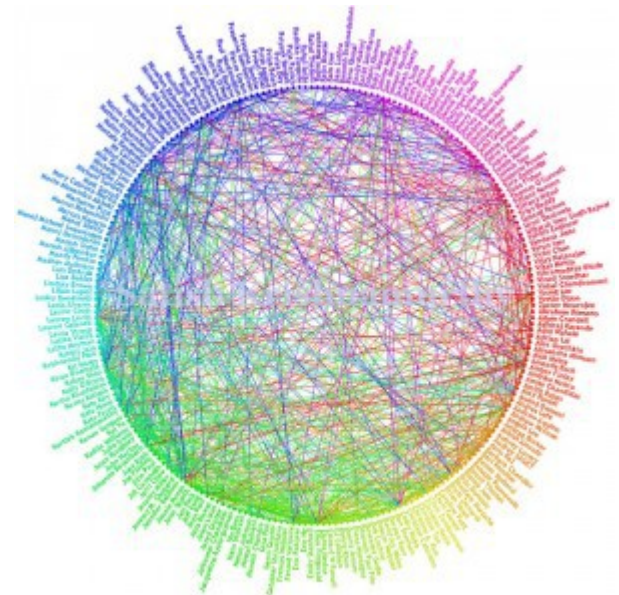
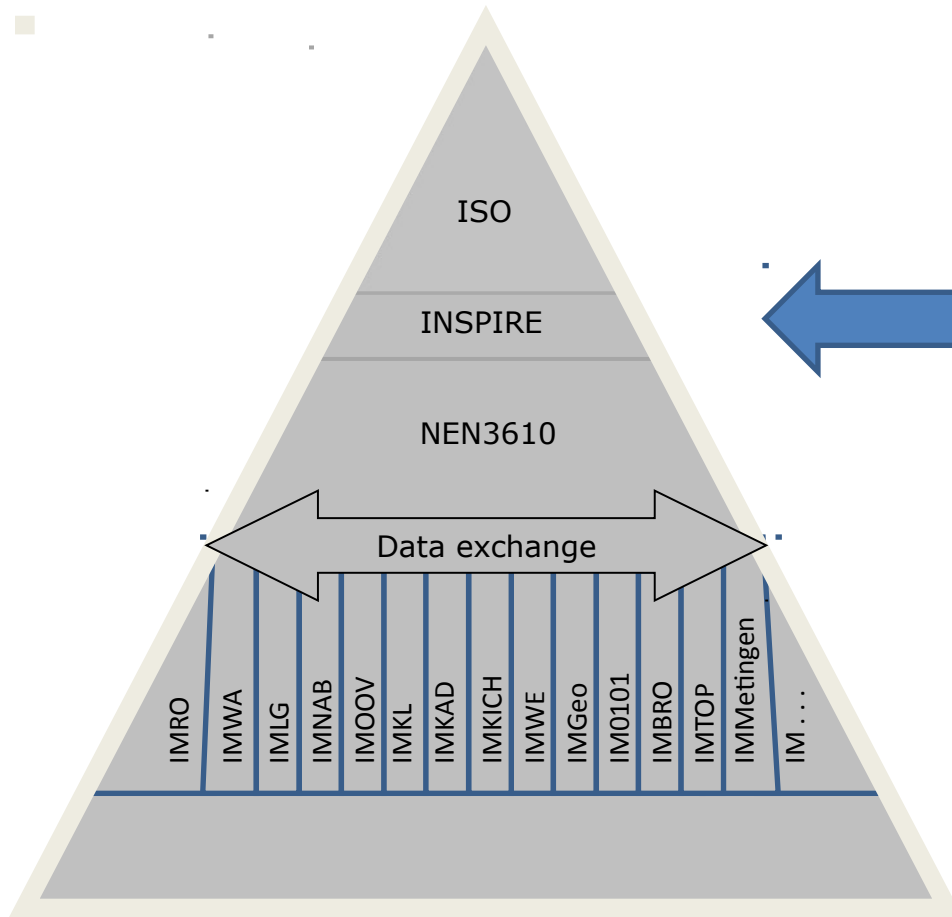
A UML CLASS corresponds to a Class <OWL> using an *owl:Class* declaration.

A Class <OWL> is annotated with a label, its definition, and the source of its definition. The label provides the name of the Class <OWL> as used in the UML CLASS and uses a *rdfs:label* declaration. The definition provides the semantic of the Class <OWL> and uses a *skos:definition* declaration. The source of the definition identifies the resource defining this Class <OWL>. It uses a *rdfs:isDefinedBy* declaration to specify the IRI of the source document.

Table 10 sets the requirement for the description of CLASSES in Ontology <OWL>.

Table 10 — Class

Requirement
19150-2package:class
A UML CLASS shall correspond to a Class <OWL> using an <i>owl:Class</i> declaration. A Class <OWL> shall be annotated with: <ul style="list-style-type: none"><li>— a label, using <i>rdfs:label</i>,</li><li>— the source of the definition, using <i>rdfs:isDefinedBy</i> for the IRI of the source document.</li></ul>



## ISO-TC211 / GOM

<> Code ! Issues 0 🔗 Pull requests 0 📖 Wiki ↶ Pulse 📊 Graphs

Branch: master ▾ GOM / isotc211\_GOM\_harmonizedOntology /

BrodeurJS ISO 19144-1:2009 ontologies ...

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00639/VersionUndefined	Ontology for ISO639
03166/VersionUndefined	Ontology for ISO3166
19101-2/2008	ISO 19101-2:2008 ontologies
19103	ISO 19103:2015 ontologies
19107/2003	ISO 19107:2003 ontologies
19108/2006	ISO 19108:2006 ontologies
19109/2005	ISO 19109:2005 ontologies
19110/2005	ISO 19110:2005 ontologies
19111-2/2009	ISO 19111-2:2009 ontologies
19111/2007	ISO 19111:2007 ontologies
19112/2003	ISO 19112:2003
19115-1/2014	ISO 19115-1:2014 ontologies



**Further reading and exploring:**

**ISO TC211 on Github**

[https://github.com/ISO-TC211/GOM/tree/master/isotc211\\_GOM\\_harmonizedOntology](https://github.com/ISO-TC211/GOM/tree/master/isotc211_GOM_harmonizedOntology)





# Thank You.

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